

FISH COMMISSION OF OREGON

AUG 17 1973

BIENNIAL REPORT

1970-1972





Homeward Bound On The Atsea

*To the Governor and Honorable Members
of the 57th Legislative Assembly
Salem, Oregon*

Governor McCall:
Ladies and Gentlemen of the
Oregon State Legislature:

The Fish Commission of Oregon presents its Biennial Report in accordance with the provisions of Oregon law. Our operational narrative covers the period from July 1, 1970 through June 30, 1972. These past two years have been marked with exceptional growth in our responsibilities as stewards for a living resource. The complexities of the environmental age coupled with the mandate of an enlightened citizenry placed a challenging task before the commission. We feel you will be gratified with the results of our efforts during this recent two-year period and look forward, as we approach our one-hundredth year, to serving Oregon and Oregonians with renewed vigor.

Respectfully Submitted,

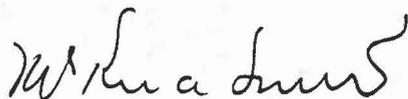
FISH COMMISSION OF OREGON



Joseph I. Eoff
Chairman



Edward G. Huffs Schmidt
Commissioner



McKee A. Smith
Commissioner

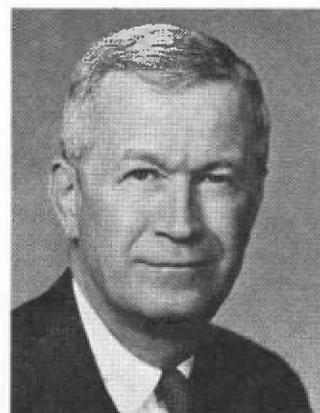
THE COMMISSION



JOSEPH I. EOFF
Chairman

Born and raised in Oregon. . . graduate of the University of Oregon. Heads Eoff Electric Company, Salem. Served in the Air Force during the Korean Conflict. Continues to fly his own plane. Is a twenty-year veteran pilot. Active pursuits include hunting, fishing and falconry. Has headed the Commission during a period of exceptional administrative change and operational streamlining.

A native Oregonian. . . owner of Western Foundry Company, Portland. A past president of Associated Oregon Industries and trustee of the Oregon Museum of Science and Industry. Board member of National Association of Manufacturers. Avid hunter, fisherman, collects period firearms. Chairman of the Commission for two biennial periods. Responsibly steered the Commission through its major period of growth and the complexities of the new environmental age.



EDWARD G. HUFFSCHMIDT
Commissioner



McKEE A. SMITH
Commissioner

Settled in Oregon in his early youth, educated in Portland, heads Smith Brothers Office Outfitters, Inc. in Portland. Member of the board of directors of a number of business organizations in Oregon and California. Spare time interests include fishing, collecting and rebuilding antique cars, boating and the gathering of historical memorabilia relating to the sea. Known for the pungent humor that keeps Commission hearings to the point under discussion.

The Fish Commission of Oregon traces its founding to the first Fish Protector for Oregon in 1878. Though the form of the Commission has changed over the years its prime responsibility remains the same. . . the protection and enhancement of the fishery resources of Oregon. The Commissioners, appointed by the Governor, serve without pay in overlapping four-year terms thereby giving the Commission a continuity of leadership. This report will be published as the Commission begins its 95th year of service to Oregon.

TABLE OF CONTENTS

Transmittal Statement	1
The Commission	2
From the Director's Desk	5
Organizational Chart	10
Regulatory Action	11
Administration	13
Engineering	19
Fish Culture	21
Management & Research	25
Biennial Highlights	30-31

TABLES

Financial Statement Summary	32
Cash Balance of Fish Commission Funds	33
Statement of Receipts	33
Statement of Expenditures	34
Oregon Commercial Fish Landings	35
Licenses Issued	35
Adult Salmon and Steelhead Returns	36
Egg Take 1970-1972	36
Salmon and Steelhead Liberations	37-38



Mt. Hood looks down on the Willamette Valley and the river of the same name. The Willamette is the only river in the United States to rise and fall solely within the borders of one state — Oregon. Through its ten year liberation program, the Fish Commission hopes to establish spawning populations of Chinook and Coho salmon equaling 410,000 and 55,000 fish respectively in this upper Willamette river system.

FROM THE DIRECTOR'S DESK



DR. THOMAS E. KRUSE
State Fisheries Director

During the biennium from July 1970 through June 1972, major personnel changes occurred within the Commission. Robert W. Schoning, State Fisheries Director for 11 years, left the Fish Commission to become Deputy Director of the National Marine Fisheries Service in Washington, D.C. While Bob Schoning was director, a growing public awareness of our natural resources and their environment provided increased public support for Commission programs. The problems of a burgeoning population in Oregon put additional stress on those same resources and significantly increased the complexities of our management. During Bob Schoning's term as director, the Fish Commission grew from 185 employees to a staff of 231 in order to handle its increasing responsibilities. Those 11 years of Bob's leadership proved to be a period of enlightened growth and innovative management requiring acute adjustment to jet-age problems. His counsel will be missed but we feel fortunate indeed to have him arguing the case for our fishery resources in the National Marine Fisheries Service, Washington D.C.

I now turn to those matters that best summarize the Commission's activity during the recent biennium. In-depth research programs were developed to provide better management of stocks of marine fish, shellfish and salmon. The valuable Columbia River salmon runs were the subject of particularly intensive research studies to investigate dam-related problems which were having a serious effect on these species. While salmon and steelhead runs entering the upper Columbia River system tended to decline during this period, increased hatchery production of lower-river stocks helped maintain this important resource. Hatchery production increased from 574,000 pounds of salmonids in 1961 to over 1½ million pounds in 1971.

After my appointment as State Fisheries Director in February 1972, I selected Robert N. Thompson, formerly Assistant Director of Research, as the new Assistant State Fisheries Director. Mr.

Thompson has been an employee of the Commission since 1953 and has acquired a wealth of experience in the fishery resources of Oregon. From 1961 to 1964, he was program leader of the very sensitive Columbia River Investigations. Following a two-year tour of duty as assistant leader of the University of Idaho Cooperative Fishery Unit, he returned to the Fish Commission to represent us on the Technical Committee of the Pacific Salmon Interagency Council. This group was responsible for evaluating problems of salmon and steelhead along the entire Pacific Coast. Bob is a welcome addition to the administrative staff.

During the past biennium the impact of the Soviet fishing fleet off the Oregon coast continued to be felt by our fishermen. Stocks of Pacific Ocean perch which once contributed almost 15 million pounds of food fish annually to Oregon fishermen remained at a low level. Less than two million pounds of Pacific Ocean perch were landed in each of the two years of the biennium. Fishery agreements between the U.S. and U.S.S.R. have been effective in reducing foreign trawl effort on perch stocks but they still do not provide adequate protection.

The problems created by large foreign fishing fleets concentrated off the U.S. coasts as well as off other countries have caused concern in many parts of the world. This has resulted in organizing a "Law of the Sea" conference now scheduled for 1974 in Geneva. Among other things this conference will explore the matter of fishery jurisdiction in offshore waters. If the conference is successful on this issue, coastal nations will receive increased authority and can exert control over the manner in which some stocks of fish are harvested off their coasts. Although the conference appears as the best way to assist our fishermen, this route does not offer either a quick or a positive solution.

Oregon's food fish resources other than perch continued in good condition as reflected by catches. Shrimp landings of 13.7 million pounds in 1970 were a record high. The trend of the shrimp harvest has been steadily upward since this fishery first began in the late 1950's. Albacore tuna landings were slightly above average (25-year average is 10.1 million pounds) with 21.8 million pounds



landed in 1970 and 8.4 million pounds in 1971. Nearly 14.9 million pounds of Dungeness crab were landed in each calendar year 1970 and 1971. These were the two highest years on record for Oregon. Total Oregon food fish landings were 98.0 million pounds in 1970 and 77.7 million pounds in 1971.

One serious problem facing many Oregon commercial fishermen is the rapidly increasing competition they face from new individuals and gear in their fisheries. Crab fishermen in particular have seen a tremendous competitive increase in their respective fishery. For example, the number of crab pots fished has gone from 8,000 in 1947-48 to 33,500 in 1969-70. Crab pots are now being fished in deeper water and later in the season than in former years. As a result, the catches of individual crab pots are decreasing. Further, both the groundfish and troll salmon fishermen are running into crab gear as they attempt to fish in their historical fishing areas. Tow boats, barges, and ocean freighters are now picking up crab gear in navigation lanes.

This increase in crabbing has led many fishermen to ask for programs to restrict or reduce effort. The Fish Commission has held major meetings with fishermen to discuss how this might be done. One opportunity to reduce fishing effort may be available through the new state-federal fishery management programs now being considered. The National Marine Fisheries Service is presently seeking federal legislation to provide them with authority over U.S. fishermen beyond the territorial seas. Subsequent legislation will also be considered to authorize state-federal cooperative fishery management programs off the U.S. coasts. One of the highest priorities in this program will be the consideration of restricted effort in commercial fisheries for the purpose of increasing the well-being of America's

commercial fishermen. The Dungeness crab program is the first species on the Pacific Coast to be considered. Although this state-federal program holds promise for assisting Oregon's crab fishermen, this is not to infer there will be immediate changes. A great amount of data must be collected and evaluated before we are in any position to discuss with fishermen ways of improving the crab fishery. We are determined, however, to follow this program through to some conclusion.

Oregon's salmon hatcheries continued to demonstrate that our salmon resource can be enhanced with artificial propagation methods. Studies completed in 1969 using fin-marked fish indicate that one out of every two coho caught off Oregon that year was produced in a Columbia River or coastal hatchery. Total commercial landings of coho in 1970 were 13.1 million pounds which is just slightly less than the best year (1935: 13.2 million pounds) since inception of a modern record keeping system in 1928. Chinook salmon landings continue at a low level compared to years prior to 1950, but they have steadily improved in the past decade.

The success of our hatchery program has created problems for the Commission in addition to its contribution to the sport and commercial fisheries. Salmon after passing through these intensive fisheries return in large numbers to our hatcheries. These surplus hatchery fish are now graded into three categories ranging from those suitable for the market to those unfit for human consumption. Fish in these categories are sold to the highest bidder. This grading procedure, established after many hours of consultation with the fishing industry, has lessened the impact of hatchery fish on the markets.

The important natural runs of Columbia River salmon and steelhead con-

tinued to receive attention during the biennium. A serious problem affecting downstream migrating juveniles as well as adults moving upstream is that of nitrogen supersaturation. Water passing over the spillways of dams carries air to considerable depth as it plunges into the pool below. This air, under pressure due to the depth, enters solution and water below the dam becomes supersaturated with nitrogen. When the supersaturation reaches 110 percent or greater, as it does in the Columbia River, it can become lethal to fish. The Fish Commission sponsored two tri-state Governors Conferences convening experts from all federal and state agencies to focus attention on this important problem. The U.S. Army Corps of Engineers is presently designing and testing methods of reducing nitrogen supersaturation in the Columbia River. Although the problem has not yet been resolved, much of the needed research and trial is under way. The eventual storage capability provided by upriver dams will substantially decrease spilling in the future.

The Willamette Falls fish ladder at Oregon City was completed in October of 1971 and for the first time we have adequate passage facilities for salmon and steelhead into the upper Willamette River. The \$3.7 million ladder was constructed with funds from the National Marine Fisheries Service and Portland General Electric Company. As a result of new fish facilities, cleanup of pollution in Willamette Harbor, and increased planting of salmon in the watershed, we are already observing results from our Willamette River salmon rehabilitation program. Adult fall chinook salmon stocks have increased steadily at Willamette Falls from 77 in 1965 to 4,800 in 1971. Adult coho salmon returns have also increased from 2,000 in 1959 to 17,300 in 1971.

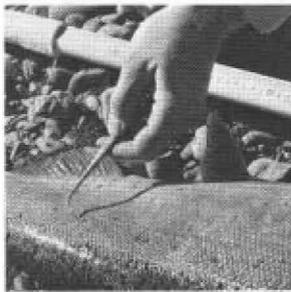
Some problems still remain to be solved with operation of the new lad-

der, however. The spring chinook run in 1972 apparently delayed below the new ladder and suffered an extensive mortality. The specific reasons for this delay are unknown but changes are being made at the dam to see if fish movement is related to water flow patterns below the Falls.

A serious problem has existed in the past with downstream salmonid migrants passing through private industry turbines at Willamette Falls. In November 1971 an agreement was signed by the State Fish and Game Commissions and the companies operating turbines at the Falls which resolves most of the problem. A major part of the Crown Zellerbach and all of Publishers Paper Company turbines will be shut down during the period of intensive downstream migration. Studies of a limited duration to resolve the remaining fish loss will soon be completed.

The 1971 Legislature passed House Bill 1328 which authorized the Fish Commission to issue permits to individuals to build and operate private chum hatcheries. In the 1971-72 period we received nine applications. Permit applications are reviewed by the biological staff to make sure that the hatchery location and operational procedures will not be detrimental to natural populations of anadromous or freshwater fish. The first application was approved in September 1971 for the Sandlake area on the Oregon coast. The permittees have started operations on a small, experimental scale until chum eggs are available from the Oregon State University facility on Netarts Bay. Only two permits were authorized during the biennium. These closely controlled hatchery operations could result in a new Oregon industry but they have not yet been proven successful. The Fish Commission will work closely with all private hatchery operators to make sure Oregon's native salmon resources are protected.





Oregon's limited estuaries continued to be a strong focal point for public attention. The Oregon Coastal Conservation and Development Committee and other coastal groups are working diligently to develop rational land-use plans for Oregon's bays and estuaries. A basic consideration in all plans is the needs of fish and shellfish which depend on these vital areas during part of their life cycle. Special efforts were made by our staff in these two years to collect information basic to protective plans for these fragile environments. A great deal of work still remains, however, and if funded we will accelerate the collection of much needed data. Of great help in supporting our efforts is the public awareness of the need for environmental protection. Without such support progress would be extremely slow.

Our "town hall" meetings with commercial fishermen and the public along the Oregon coast have continued as an annual event. With equal participation by Oregon State University and the National Marine Fisheries Service, these meetings have provided a forum both to let fishermen know what fishery agencies are doing and to listen to their problems. Critical subjects such as foreign fishing off Oregon, salmon and crab seasons, resource status and sale of surplus hatchery fish have been discussed in depth. These meetings have been extremely valuable in evaluating problems and shaping departmental direction.

Although the Fish Commission has no authority to regulate sport fishing for game fish, we recognize that many fish produced by our hatcheries are caught by sportsmen. We encourage this catch whenever possible. During 1971 we initiated monthly seminars with representatives of the major Oregon sportsmen organizations. These meetings have provided an important forum for explaining our statutory responsibilities and programs, and

have given us a much better understanding of the sportsmen's viewpoint. Typical controversial points discussed included the Columbia River commercial fishery and our management program, salmon losses at Willamette Falls, and gravel removal and filling of estuaries. A field tour to River Mill, Faraday and North Fork Dams on the Clackamas was also made and the fish passage problems at these installations were summarized. Many useful suggestions have come from these discussions and we will continue them as long as they prove beneficial to all concerned.

Commissioners Eoff, Smith and Huffschtmidt continued to provide the department with wise counsel and advice throughout the biennium. Their willingness to devote their personal time and effort to guiding Commission activities is a tribute to the Oregon system of government. Although all three individuals were very active in businesses of their own, they were always available to attend Commission meetings and functions as the "policy-makers" of our organization.

My remarks have been directed to only some of the more important activities in which we have been involved during the 1970-72 biennium. In the pages that follow, we will comment in more detail on specific projects and operational activities during this period. While we can be proud of these recent accomplishments in a growing Oregon, we can also clearly see the future presenting us with greater populations and increased competition for our fishing resources. The future forewarns us to plan carefully for these important needs so that we might perpetuate for all Oregonians, in the years to come, these vital and unique living natural resources.

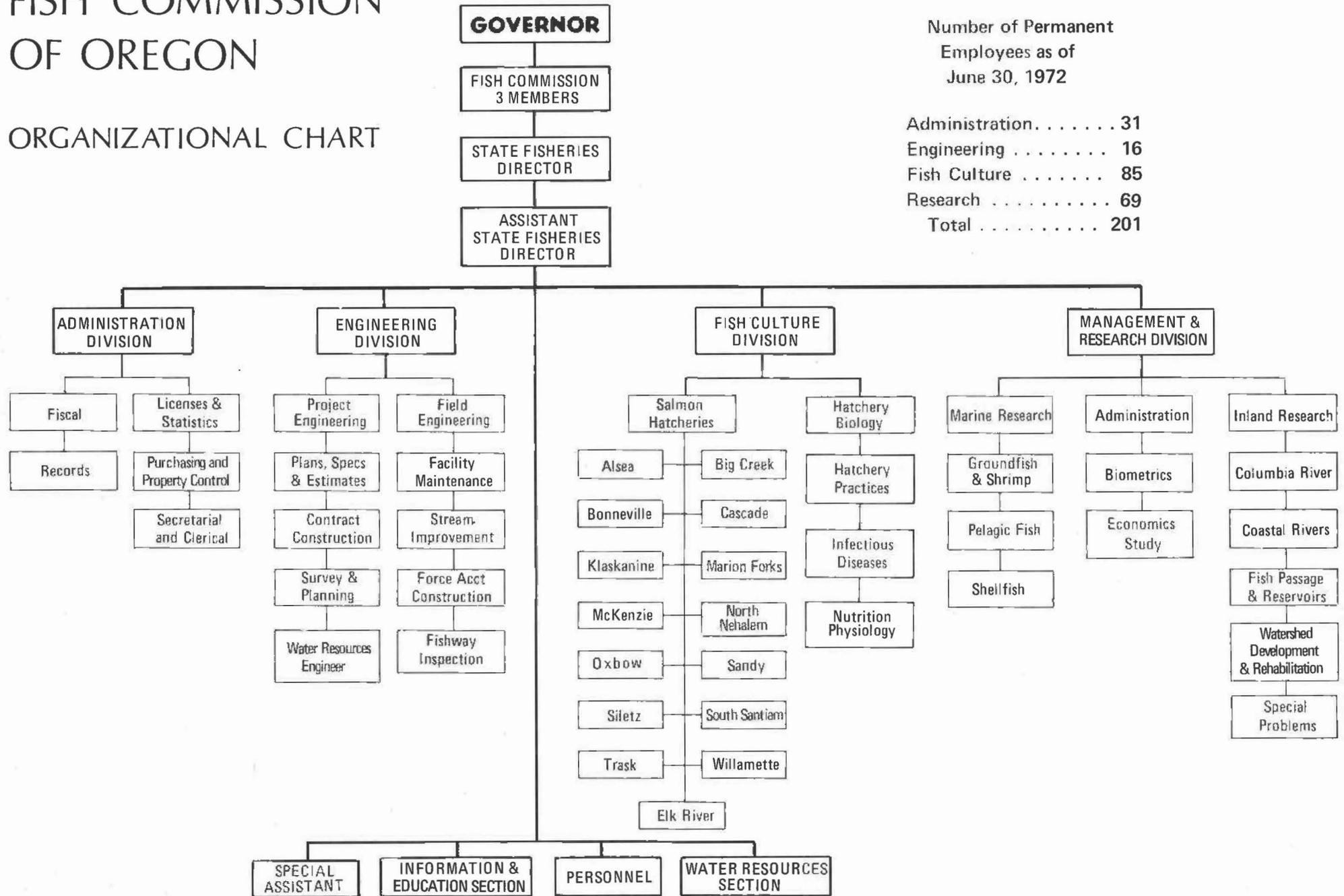
Thomas E. Kruse

DR. THOMAS E. KRUSE
State Fisheries Director



FISH COMMISSION OF OREGON

ORGANIZATIONAL CHART



COMMISSION REGULATORY ACTION



ROBERT N. THOMPSON
Asst. State Fisheries Director

In carrying out its responsibility to manage the fishery resources under its jurisdiction, the Fish Commission adopts regulations to control the harvest of these resources. Regulations are adopted after deliberation at public hearings, except under situations of extreme emergency where action must be taken immediately and there is no time to con-

vene a hearing. The authority to take emergency action without holding a public hearing was given to the Fish Commission by the 1971 Legislature.

The first major use of this authority was in April 1972 when the Fish Commission and the Washington Department of Fisheries jointly opened the Columbia River spring commercial fishing season on April 26 when the count of salmon at Bonneville Dam indicated that the spring chinook escapement goal would be reached. This opening date equaled the earliest on record for the spring season and resulted in a strong sustained protest from sports fishermen even though the run of spring chinook over Bonneville Dam was the largest ever recorded.

In the management of Columbia River commercial fisheries, the Fish Commission completed its first biennium under a law passed by the 1969 Oregon Legislature which made steelhead trout a game fish. This law authorized the Fish Commission to regulate the incidental catch of this species. The Commission interpreted this law as a charge to

reduce the catch of steelhead and sought means of curtailing the catch while still maintaining a viable salmon fishery. The Commission's management staff considered various alternatives and recommended that the regulation of gillnet mesh size would be the most effective method of reducing the steelhead catch without seriously affecting the harvest of salmon during fishing seasons when the two groups were both present in the river. During times when few salmon were in the fishing area, curtailment of fishing time was also used to limit the steelhead catch. A reduced catch of steelhead in the winter season (February-March) was brought about by a mesh restriction. In the August, or early fall season, a mesh restriction and a shorter fishing season were used to reduce the steelhead catch. In the winter season, the average catch for the two years of the biennium was 6,600 fish, whereas the 10-year average catch prior to the implementation of a mesh restriction was 8,200 steelhead. The average annual catch for the 10-year period prior to the use of a mesh restriction in the early fall season below Bonneville Dam was 32,300 whereas the average catch during the biennium was 7,900 per year.

In other Commission action, the use of a hunter to harass seals in the Columbia was discontinued during the biennium. State statutes direct the Commission to collect a special fee with the sale of Columbia River gill-net and fish canner licenses and to pay a bounty for scalps of seals taken in the waters of the Columbia River. The Commission is also directed to use these funds in any manner it considers best for controlling seals in the Columbia River. In the past, seal control funds had been used to hire a hunter to harass the seal herds and keep them out of the river during times when fishing



Commission met 26 times, setting the dates of 17 fishing seasons, streamlining the rules of its recreational fisheries and approving a host of Engineering, Fish Culture and Management projects completed largely within the Biennium.

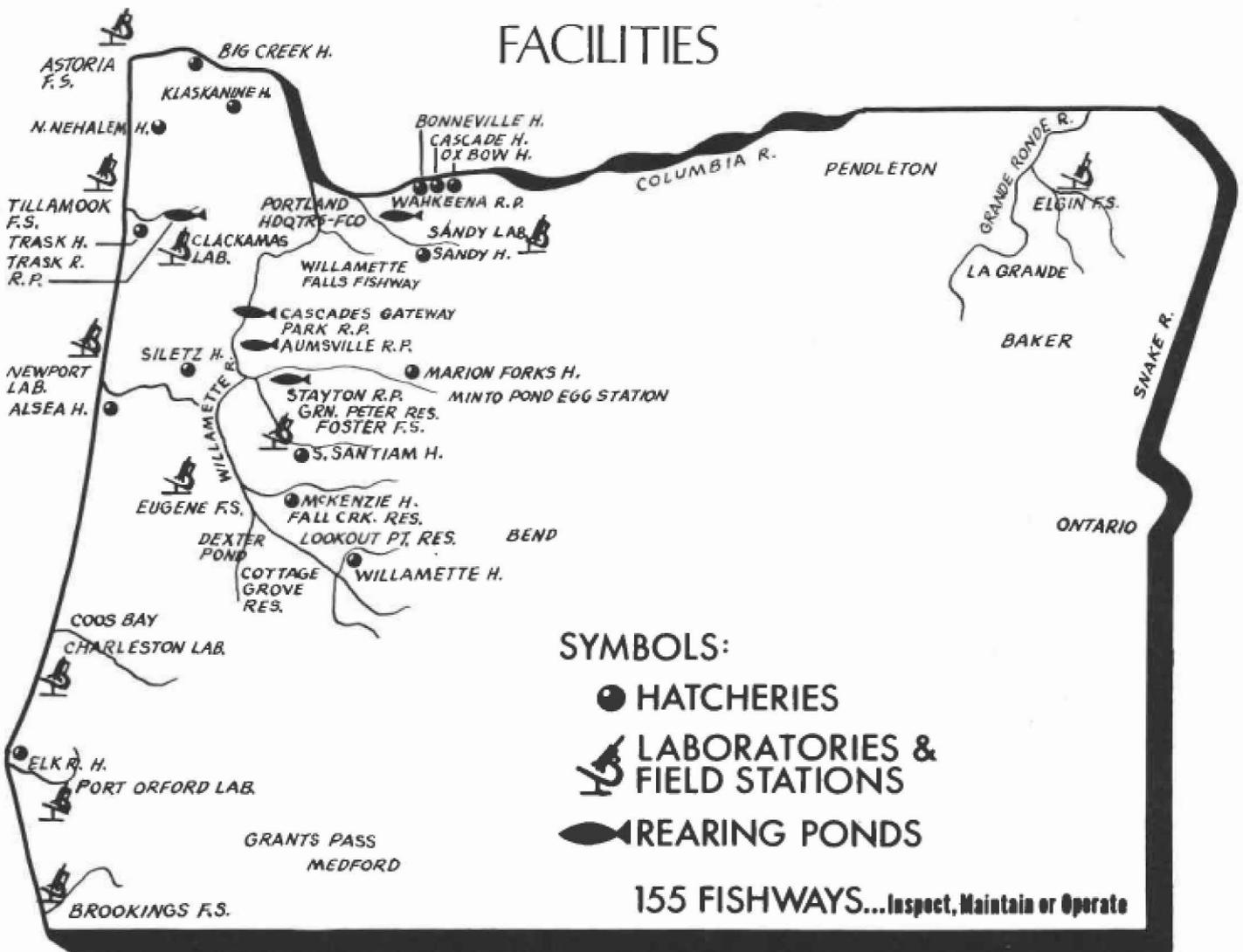
was in progress. The activities of the seal hunter were discontinued to see if seal predation on salmon in fishermen's nets would increase. Results have been thus far inconclusive. In addition to its purely regulatory role the Commission heard testimony on a variety of matters of concern to Oregon. Typical subjects presented included an Oyster Lease Review, California-Oregon Shrimp Management, Indian Ceremonial Fishing and an In-depth Appraisal of the Status of Oregon Abalone.

A thorough review of the Commission's Administrative Rules was also completed during the biennium. These are rules or regulations which are adopted by the Commission, and deal with all aspects of the Commission's responsibility for the food fish resource of the state. Appropriate staff members throughout the Commission devoted considerable effort to this task. Many rules were

reworded for clarity or brevity, others were changed to permit better enforcement, and some unnecessary regulations were eliminated.

During the biennium, the Fish Commission in conjunction with the Washington Department of Fisheries continued to regulate the Indian fishery on the Columbia between Bonneville and McNary Dams. Although some problems with illegal fishing continued, it appeared that regulation by the state had reached a more acceptable level while meeting the needs of conservation and adhering to the intent of the 1969 federal court decision regarding the state's authority to regulate Indian fishing. During the biennial period we estimated that the Indian fishery caught 254,000 salmon and 41,000 steelhead. These landings are approaching the same level of landings obtained when Indians last fished at Celilo Falls.

FISH COMMISSION FACILITIES



ADMINISTRATION DIVISION



GERALD L. FISHER
Director of Administration

The administration division provides general supervision and coordination of the activities of the Fish Commission's operative division. It also conducts the business management services of the Commission including general accounting, budget preparation and control, personnel administration, records management, purchasing, issuance of licenses, pound-

age tax collection, statistical compilation, property inventories, and preparation of general reports and records.

Further, the overall preparation of the Commission's upcoming biennial budget for submission to the legislature is a formidable task. Division and section requests for services and equipment range from sophisticated pharmaceuticals to capital construction in the millions of dollars. Amalgamation of these complex budgets into one understandable



Property Control, Budget Preparation and Steno Pool Support form one facet of complex services provided by Administration Division. It takes a blizzard of paper work to insure that far flung facilities and programs mesh into unified whole. . . The Commission.



Fish Commission document, aimed at resource enhancement, represents considerable decision making and legislative fiscal liaison.

Approximately 21,100 fishing, boat, and dealer licenses were issued during the biennium. Poundage fees were collected and statistics were compiled on 176 million pounds of fish and shellfish landed in Oregon during 1970 and 1971. Income for the two-year period July 1, 1970 to June 30, 1972 to the state general fund from poundage fees was \$752,087.13 and from license sales \$560,449.50.

Fish Commission property is currently valued at \$10.3 million. The overall expenditures of the Commission for the biennial period amounted to \$8,186,781.79.

This division prepares the commercial fishing regulations and administers all legislative fiscal and regulatory responsibilities.

The information-education section, water resources section, special assistant, and personnel section are included in the administration division for organizational purposes. However each of these functions operates independently under the direct supervision of the Assistant State Fisheries Director.

Records extending back into 1800's, Poundage fees, License sales and all Business Services a modern agency requires are provided by the Division. Millions of dollars are aimed at rehabilitation or enhancement of state's fishery resources.

SPECIAL ASSISTANT



KELLY R. CONOVER
Special Assistant

The duties of the director's Special Assistant include coordination of two Federal Aid Programs which collectively provided over \$2.8 million during the biennium for management, research and artificial propagation of anadromous fish in Oregon and for completion of the new Willamette Falls Fishway at West Linn, Oregon. The Anadromous Fish Act

provided valuable support for the Commission's salmon programs on the Oregon coast while funds from the Federal Columbia River Fishery Development Program were used in the operation of six Columbia River hatcheries, construction and maintenance of fishways and current efforts to develop

major new runs of salmon and steelhead in the Willamette River system.

A special assignment of this office was the coordination of Commission efforts with those of other state and federal agencies, in seeking resolution of the juvenile downstream fish passage problem at the industrial complex surrounding Willamette Falls. Negotiations with the industries involved resulted in one agreement approved October 15, 1970 and another which became effective November 9, 1971. Implementation of these agreements have reduced juvenile fish mortalities by an estimated 80-90 percent and set in motion efforts expected to result in correction of the remaining problems. Increasing the survival of juvenile downstream migrants passing Willamette Falls and completion of the \$3.7 million Willamette Falls fish ladder in October 1971 were vital steps in the Commission's long-range goal to substantially increase the production of salmon and steelhead in the Willamette River system.

PERSONNEL



JAMES S. WHITE
Personnel Officer

The personnel officer maintains a continuing program of position classification review, salary recommendation, employee relations and applicant evaluation. Registers are maintained for those classifications, such as fish hatcheryman, not examined by the State Personnel Division.

Completed and projected activities for the biennium include the reclas-

sification of 24 positions, promotion of 32 employees, establishment of 91 positions and abolishment of 72 others. Although 330 temporary and seasonal employees will be employed and terminated during the biennium the average payroll total is 228 with the seasonal peak at 269.

Employee turnover in permanent positions will approximate 35 resignations and 7 retirements.

Balancing this will be 30 new hires to state employment and 12 reemployments and transfers from other agencies. An indication of the length of tenure in the agency is the fact that 66 employees received service pins representing a total of 755 years of service to the Fish Commission and the state of Oregon.

Other important accomplishments during the biennium include an intensive 3-day staff training conference at Gearhart and the development and coordination of Emergency Employment Act projects within the agency. Of those EEA proposals submitted, the Fish Commission was granted a trainee in the information and education section and four samplers for estuary studies along the Oregon coast. In addition these major projects also went forward successfully: the development of a new employee orientation program, a new educational leave policy and training of all agency supervising personnel in the use of a management-by-objective approach to performance evaluation. These programs evidence the Commission's continuing concern for quality in its personnel and in the resources they actively manage.

INFORMATION AND EDUCATION SECTION



JACK DUGAN
Chief, Information-Education

This section of the Commission is charged with the responsibility of communicating information to a sophisticated public on the management programs, research responsibilities and recreational fisheries under Commission stewardship. It utilizes all media for its projects: newspapers, magazines, public forums, exhibits, radio, television and in-school programs.

In addition it publishes informative pamphlets and brochures that create a better understanding of Oregon's fishery resources.

During the biennium, I&E personnel spoke at three national conservation conferences, gave 163 principal talks to civic and education groups, provided eight in-depth articles for major sports publications, assisted the *National Geographic* magazine in the preparation of an article on the redemption of the Willamette River, aired 28 television news stories and put out 76 press releases informing Oregonians of important Commission operations and management.



News Stories on a variety of activities brought Oregonians a closer look at Commission. Salemites watch spawning fall Chinook, signboards explain what's happening. Crowd disperses after ribbons fell dedicating multi-million dollar Willamette Fishway.



New Signs for recreational fisheries and protected areas now dot the Oregon Coast. Educational Programs brought youngsters environmental awareness and OMSI exhibit showed young and old Intertidal life zones.

In addition I&E personnel with the assistance of the Research and Engineering Divisions erected protected area signs along the Oregon coast. These areas were set aside to protect, for future citizens, fragile intertidal life, as well as abalone rearing areas and require a permit before any type of collection is authorized. In preparation there are an additional 152 signs offering helpful information to sportsmen after clams, crabs and food fish. The signs will be prominently placed the length of the Oregon coast, in parks, beach areas and public docks. Upcoming are 250,000 copies of sport regulations for the Commission's recreational fisheries; these will be found in licensing stations and sporting goods stores in reach of all Oregonians.

During this period the I&E section was privileged to assist in the arrangements for the Western Association of State Game and Fish Commissioners Conference and the Pacific Marine Fisheries Commission Conference, both held in Portland, the dedication of the multi-million dollar Willamette Falls Fishway at Oregon City, two Tri-State Governors Conferences on Nitrogen and the Columbia River and the Governors National Forum on Marine Fishery Resources.

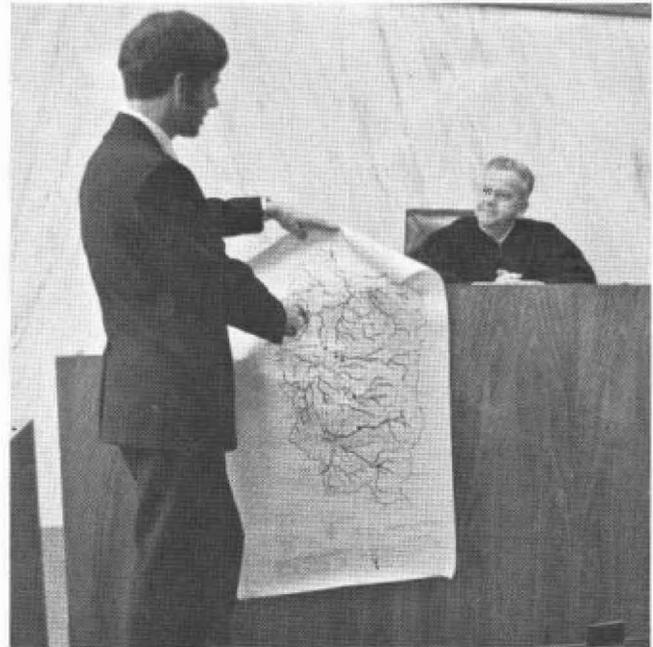
WATER RESOURCES SECTION



JAMES B. HAAS
Water Resource Analyst

Since demands on the water resources of the state continue to intensify proper consideration of fish life in planning for land and water use is vital. The water resources section is charged with solving fishery conflicts resulting from water and land uses affecting the state's rivers, bays and offshore waters. The section has responsibility for

(1) passage of anadromous fish at dams in state and interstate waters; (2) compensation of fishery losses and enhancement of fishery values at water projects; (3) monitoring of projects involving water pollution, river and harbor improvements, gravel removal, flood control, logging and lumbering operations, highway and bridge construction, submarine blasting, chemical pesticides, mining, water diversion, and water



Carrying out legal action on behalf of Oregon's citizens, Water Resource Section investigates mining activity gravel removal, blasting and stream alteration in its role as protector of Oregon waterways and estuarine resources.



Permit is required before construction begins so that spawning beds are not destroyed. 2500 matters per biennium are processed thru this section. Ultimate opportunity for Salmon and Steelhead to reach quality spawning ground is of prime concern to Aquatic Biologists.

appropriations; (4) investigation of flow needs for anadromous fish migration, spawning and rearing; (5) fulfillment of the Commission's role in state and federal water resources planning programs; (6) representation on several interstate technical committees; (7) promotion of legislation to conserve fish and fish habitat; and (8) resolution of fishery problems resulting from nuclear power development.

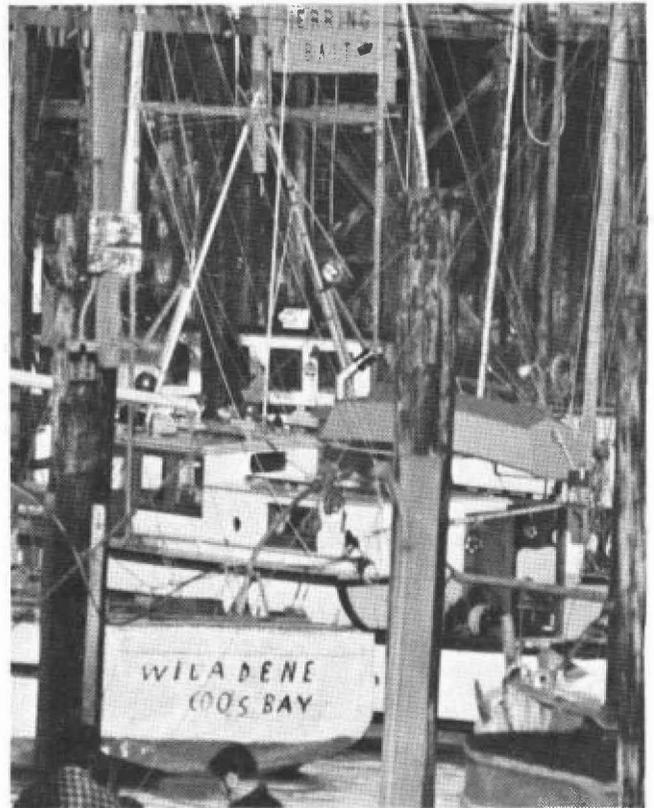
The section acted repeatedly during the biennium to control encroachment on waterways. In reviewing approximately 60 applications to the Division of State Lands to fill estuaries and rivers, the Commission formally opposed all applications not clearly in the public interest pending development of approved land-use plans in affected areas. Attention was focused on curtailment of filling in the lower Willamette and lower Columbia Rivers where this practice, through reduction of water area, seriously threatens the fish resource and public rights of fishing and recreation. Senate Bill 224, the fill law, was drafted under direction of the section, introduced into the 1971 Legislature at the Commission's request by the Senate Fish and Game Committee, and subsequently passed into law.

Estuarine and marine fish resources were assured future protection by provision of data on resource needs to coastal land and water-use planning groups. Oregon estuaries provide reproductive and nursery environment for the bulk of our anadromous, marine and shellfish species at some time during their life cycle. Estuary preservation therefore is a priority objective of the Fish Commission.

Again, serious fishery problems due to hydroelectric dam operation on the Columbia River required much attention. An estimated 50 percent of juvenile spring chinook salmon migrating out of the Snake River were killed from nitrogen supersaturation and other dam related causes. Upstream migrant adults were equally affected. The section initiated action among Columbia basin fishery agencies to endorse a nitrogen standard for the Columbia and Snake Rivers of 110 percent of saturation. Close liaison was maintained with the Corps, fishery agencies, and pollution control agencies in developing a Columbia system nitrogen control program, including a timetable for modeling, testing, and installing nitrogen reduction devices at all appropriate dams. A new position of fish passage specialist was created to coordinate activities of the six fishery agencies which share responsibility for monitoring and inspecting fish passage operations at 14 main stem Columbia dams. Serious interdam losses of adult salmonids make it essential to maintain the fish passage operation at maximum efficiency.

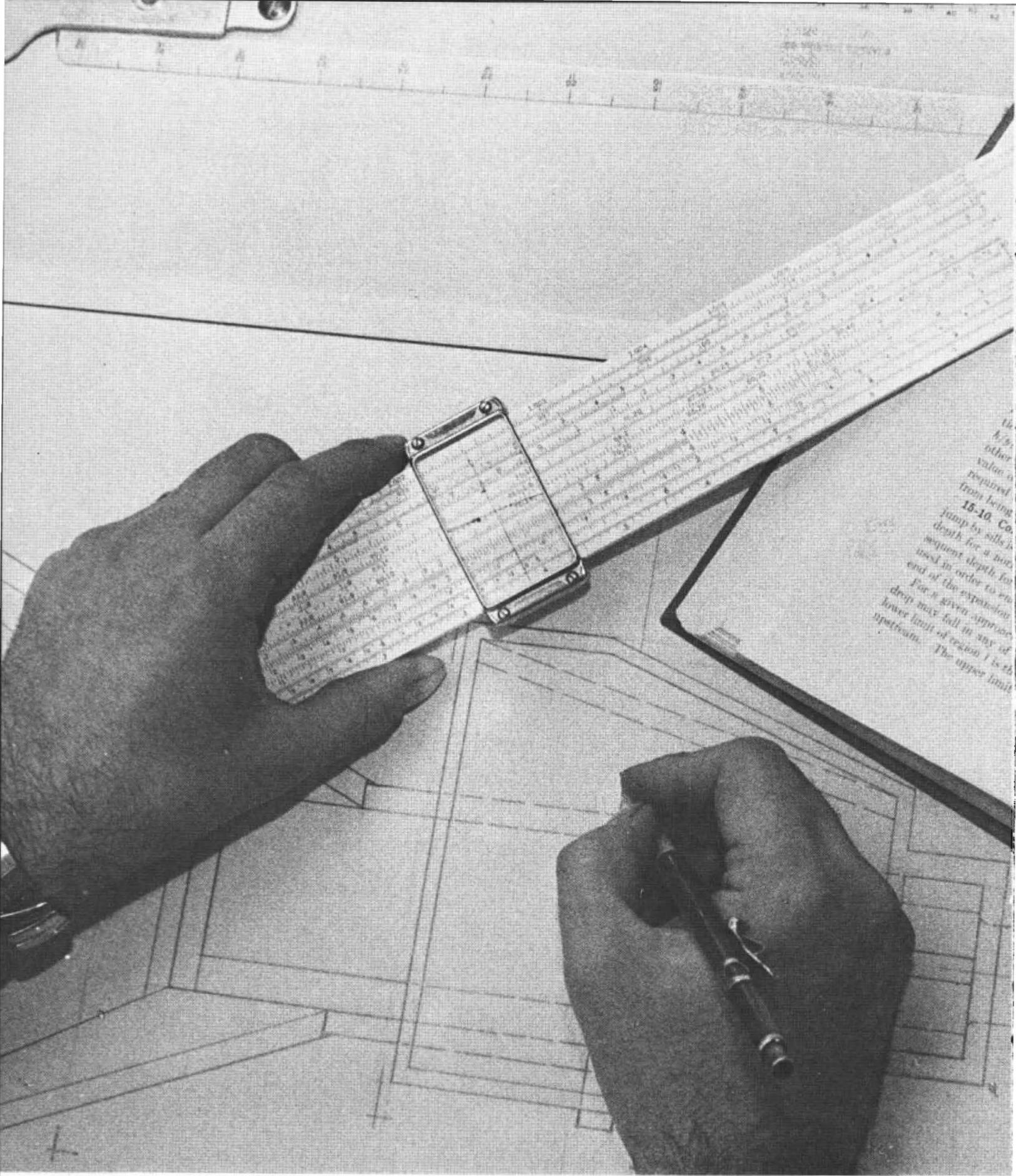


Dams, ranging from small irrigation thru multi-million dollar hydroelectric are a source of constant work for Biologists and Aquatic Engineers interested in water conditions and passage favorable to upstream adults and downstream juveniles.



Forest of masts, boats, gear and people single out growing responsibility of the Commission in Oregon's estuaries. Protection of vital breeding grounds for fragile ocean stocks is prime concern. Encroachment of commercial developments, marinas and highways pose constant threat to limited estuarine areas.

Continued expansion of nuclear power necessitated several actions including evaluation of effects on fish of proposed plant development in the Boardman reach of the Columbia River, coordination of fishery studies with PGE at Trojan, coordination with the Nuclear Thermal Energy Council on development of statewide guidelines on plant siting, and evaluation of fishery requirements relative to proposed development of nuclear plants by EWEB on the mid coast and PGE on the mid Columbia. Strong stands were taken to obtain compensation and enhancement for anadromous fish runs affected by more than 20 federal dam projects being planned. A program to eliminate serious losses of juvenile salmonids at power and irrigation diversions was launched with agreement on solutions reached with EWEB on Leaburg project and PP&L on Stayton project. Implementation of the Forest Practices Act by the Department of Forestry required extensive coordination with that agency. Passage problems for adult salmonids at various dams were further resolved as six more obstructions preventing passage were eliminated. The total number of major problems thus resolved in the past eight years involves nearly fifty dams.



One of a kind solutions to unique problems are commonplace in engineering division. Far flung installations are served by field force which provides maintenance and supervises new construction.

ENGINEERING DIVISION



EDWARD K. NEUBAUER
Director of Engineering

Design, construction, major maintenance and repair, fishway operation, and stream improvement work are primary responsibilities of the engineering division. A permanent staff of six engineers and ten related specialists are actively employed on a host of projects throughout the calendar year.

Division engineers, occasionally aided by private consultants, prepare extensive designs and specifications for the construction of hatcheries, fishways and research and management facilities. All construction except very small projects is contracted for on a bid basis, and contracts are administered by the division.

Small projects, most maintenance and repair work, fishway inspection and operation, and the removal of logjams and other stream work are done by engineering specialists with the aid of temporary labor. The division has a variety of heavy equipment and construction tools which are used for numerous in-house operations.

Major Projects

Typical of the diverse projects carried out by the engineering division during the biennium are the following:

FLOOD DAMAGE

Severe flooding in western Oregon in January 1972, caused extensive damage to hatcheries and fishways, and created numerous logjams. Emergency work was undertaken immediately. Plans for more permanent corrections were made and the removal of stream obstructions was coordinated with other concerned agencies. It is expected that \$260,000 will be spent during the calendar year to repair damages and restore stream habitat. Funds are being provided by the federal Office of Emergency Preparedness.

ELK RIVER HATCHERY

Elk River Hatchery was enlarged to accommodate an additional 700,000 salmon smolts at a cost of \$221,342. The expansion included ten rearing ponds, incubators, a 9,500 gallon per minute water supply system and related appurtenances. This modern, newly expanded hatchery is already providing sportsmen with some exceptional catches of salmon in the Elk and Chetco River systems.

TRASK RIVER HATCHERY

A new salmon smolt acclimation pond was constructed at the Trask River Hatchery. This work cost \$12,800. A new portable refrigeration unit for fish food was erected for \$7,500. East Fork Trask River rearing facilities were also completed and put into operation.

LIBERATION TRUCK

A large 4,000 gallon refrigerated tanker truck was constructed to transport salmon adults and smolts. The tractor-trailer unit cost \$37,400. It joins a sister tanker already in service. Each unit nominally handles the work load of four regular liberation vehicles.

BONNEVILLE HATCHERY

Approximately \$7 million will be spent by the Corps of Engineers at Bonneville Hatchery to mitigate fish losses related to John Day Reservoir. The engineering division assisted in functional planning and reviewed details for this 28-pond expansion. Bonneville Hatchery traditionally acts as the pivotal facility in the Commission's Columbia Gorge operations. New expansion will contribute significantly to maintenance of Columbia River salmon runs.

McKENZIE RIVER HATCHERY

Functional plans were developed for a new McKenzie River Hatchery. Half of the cost is being furnished by the Corps of Engineers as mitigation for Cougar and Blue River projects. Construction is proposed for the next biennium. Hatchery design and estimate construction will put a modern fish culture facility into the promising upper Willamette River system. Its contribution toward establishment of strong upriver salmonid runs is expected to be significant.

CHARLESTON LABORATORY

A new wood-frame, single-story building containing 1,800 square feet of floor space and facilities for ten management and research personnel was constructed at Charleston. Construction, fixed equipment and major furnishings cost \$36,000. It will serve as anchor facility for south coast research projects extending to the California border.

CLACKAMAS LABORATORY

Approximately \$38,000 was spent for improvements at the Clackamas Management and Research Headquarters. A new entrance road was constructed to eliminate a dangerous railroad crossing, building exteriors were repainted, one building was reroofed, the property was fenced and a variety of repair work was performed. The area houses a large number of the Commission's most important research teams.

WILLAMETTE FALLS FISHWAY

Willamette Falls Fishway construction began in April 1966 and was completed in October 1971. The project was built in three major phases at a cost of nearly \$3.7 million. Official dedication ceremonies were held October 8, 1972 putting the fishery into full-time operation.

STREAM IMPROVEMENT

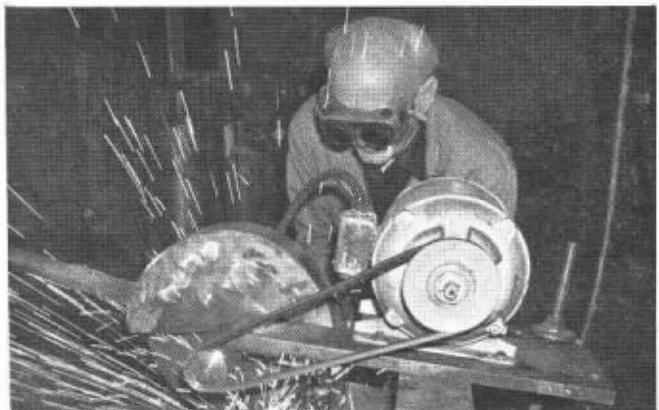
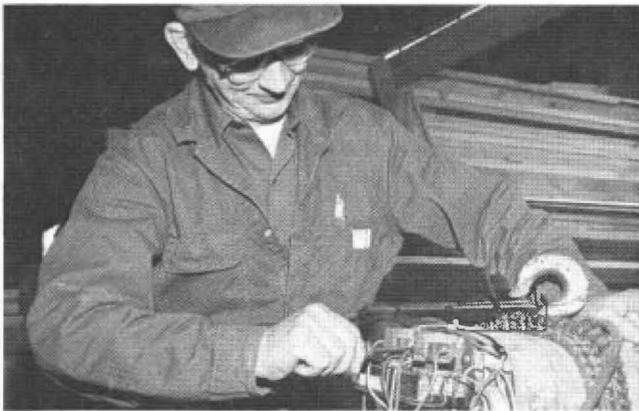
Over 40 miles of streams were reopened to salmon spawning and rearing by the removal of ten principal log and debris jams. The average cost to remove each obstruction was \$1,200. The Commission conducts an aggressive debris removal program annually.

FISHWAY OPERATION

Regular inspections were made of 118 fishways. Fifty-five of these (36 formal and 19 rock cuts) are operated, maintained and repaired by the engineering division; the remainder though privately owned are inspected and corrections of deficiencies are recommended to the responsible owner. The division spent about \$10,000 to repair 14 state-owned fish facilities.

MISCELLANEOUS

Closure markers and intertidal information signs designating protected areas cost \$1,500 to erect and maintain. Miscellaneous maintenance at hatcheries, labs and offices by staff personnel and contractors accounted for expenditures of about \$68,000.



Metal work, cabinetmaking, drafting, fishway inspection, flood control and structural design are typical of ongoing projects carried out routinely by Engineering Division in a given day.

FISH CULTURE DIVISION



ERNEST R. JEFFRIES
Director of Fish Culture

The major purpose of the Fish Culture Division is to produce and release salmon and steelhead fingerlings which survive to adults and are caught by sport and commercial fishermen. Fisheries must be maintained at a high level. This cannot be accomplished with only naturally reared fish. We are working to maintain and increase hatchery production potentials,

improve facilities and to develop new skills to more efficiently utilize the facilities available.

During the last several years marking studies show that over one half the coho landed in Oregon originated from Oregon or Washington hatcheries. In 1971 more coho were landed in Oregon than in any previous year on record. Fall chinook from the hatcheries are making major contributions to ocean and river fisheries. Hatchery reared spring chinook contributed heavily to the gill net and sport fisheries in the lower Columbia and they contributed up to 40 percent of the Willamette River run. Streams stocked with steelhead provided excellent sport catches.

During this two year period we released 114,835,766 million juvenile salmon and steelhead. These weighed 3,074,035 pounds and this was 371,099 pounds more than in the previous two years. We collected over 165 million eggs and handled almost 350,000 adult salmon and steelhead.

The Fish Commission operates 15 hatcheries with 71 fish culturists, three supervisors and one secretary. There are five hatcheries located on coastal tributaries from Elk River to the Nehalem, six on Columbia River tributaries from the Klaskanine to Herman Creek, and four on Willamette streams. Species reared are spring and fall chinook, winter and summer steelhead, and coho. Hatchery Biology staff members (11 biologists, 3 technicians) provide technical service in all aspects of fish culture (nutrition, hatchery practices, and Infectious Diseases).

NEW FACILITIES

Several new facilities were constructed and put into use during the biennium. A one-third acre rearing lake was completed on the East Fork of the Trask River with 100 percent federal funds from the Anadromous Fish Act (P.L. 89-304). The pond will be operated as part of the Trask Hatchery and has the capacity to rear over one million coho smolts or the equivalent in other species. The pond is unique in that it is shaped to provide good flows throughout its length and is lined with 1/16 inch butyl rubber. Production has been excellent during the first year of operation.

In addition a smaller rearing pond was constructed at the Trask Hatchery proper and will aid in allowing full use of the water during winter and spring months. We are using the pond for short-term rearing of 1.25 million coho. This facility was constructed with P.L. 89-304 funds matched by general fund dollars.

Ten additional rearing ponds with needed pumps, etc. were provided at the Elk River Hatchery. Funds from Curry County were used to match P.L. 89-304 dollars to build the ponds. Curry County has actively assisted our fish culture program at Elk River. In addition they have provided funds and personnel to construct and operate an electrical barrier for collecting adults on Jack Creek, Chetco River tributary.

A 3,500 gallon liberation tanker has been purchased for use in our expanding rearing program for the transfer and release of fish. This is the second tanker purchased in the last three years.

Extensive planning has been accomplished by the Walla Walla District Corps of Engineers on the new facilities proposed for the Bonneville Hatchery. Twenty-eight rearing ponds with a complete reuse system for water control will be constructed starting in fiscal year 1973 as one-half mitigation for losses of Columbia River fall chinook by John Day Dam. Spring Creek National Fish Hatchery in Washington is being enlarged as the other half of the mitigation.

TRAINING

A need has been apparent for several years for trained personnel to provide the manpower for fish culture facilities. Contact was made with Mt. Hood



A. Sea bright Spring Chinook Salmon returning from three years at sea, delights Elk River Hatcheryman who reared him from an egg. B. New electric fish rack on Jack Creek, Curry County. C. Spring heralds the liberation of some 60 million juvenile salmon and steelhead, scene is at Willamette Hatchery near Oakridge, Oregon. D. Egg take at Bonneville, 85 million eggs are taken annually at 15 hatcheries. E. Fertilized Fall Chinook eggs are poured into modern incubation trays at North Nehalem Hatchery. Eggs will hatch in approximately 90 days. F. Experiments in automated fish feeding showed promise. Oregon pellet is blown through pipes which drop, allowing impellers to blow them over wide areas of pond. G. New North Coast Rearing Pond extends hatchery output. This one pond will make possible the rearing of one million more Coho or Chinook salmon.

Community College personnel, a training program established, and we are now employing two-year graduates with an Associate degree in fish culture.

NUTRITION-PHYSIOLOGY

Steady progress has been made in providing more efficient, economic feeds for hatchery-reared salmonids. Refinements of the Oregon Pellet Diet have resulted in formulations which are 10-15% more efficient than the ration used in 1969. Studies underway to evaluate the potential of dry feeds have indicated that the Abernathy Diet, a dry pellet developed by the U.S. Bureau of Sport Fisheries and Wildlife, holds promise as an alternate feed for coho fingerlings. Tests are currently underway to evaluate survival of fingerlings raised on the Abernathy Diet compared with the Oregon Pellet Diet.

Technical assistance has been provided in areas of food programming, quality control, and the preparation of diet specifications. Each year schedules are prepared detailing the amounts of food to feed to coho salmon by month and hatchery. Frequent, unscheduled inspection trips are made to the manufacturer's plant helping to ensure that fish in our hatcheries are fed a diet that is meeting our specifications. Each year detailed specifications are prepared regarding the diet to be fed the following contract year. Based upon these specifications various diet manufacturers bid annually in an attempt to receive the contract for furnishing the three million pounds of fish food to the Fish Commission.

HATCHERY PRACTICES

A stock improvement program based on selective breeding was undertaken with coho salmon at the Big Creek Hatchery. From the data collected to date, there is evidence that the survival of coho salmon can be dramatically increased. We now have underway a study comparing a high survival line with a control group of normal hatchery fish. Increased success of the 1971-brood high survival line will provide a measure of the degree to which genetic make-up influences survival. This work is being done in cooperation with scientists at Oregon State University.

Four groups each of 1967- and 1968-brood Willamette Hatchery spring chinook were reared to various sizes and released at different times with identifying marks. From preliminary data (4 year-olds of the 1967 brood) it appears that juveniles released in March are nearly twice as successful as

those released in January and that the survival of juveniles liberated at a large size is four times greater than the survival of smaller sized juveniles.

INFECTIOUS DISEASES

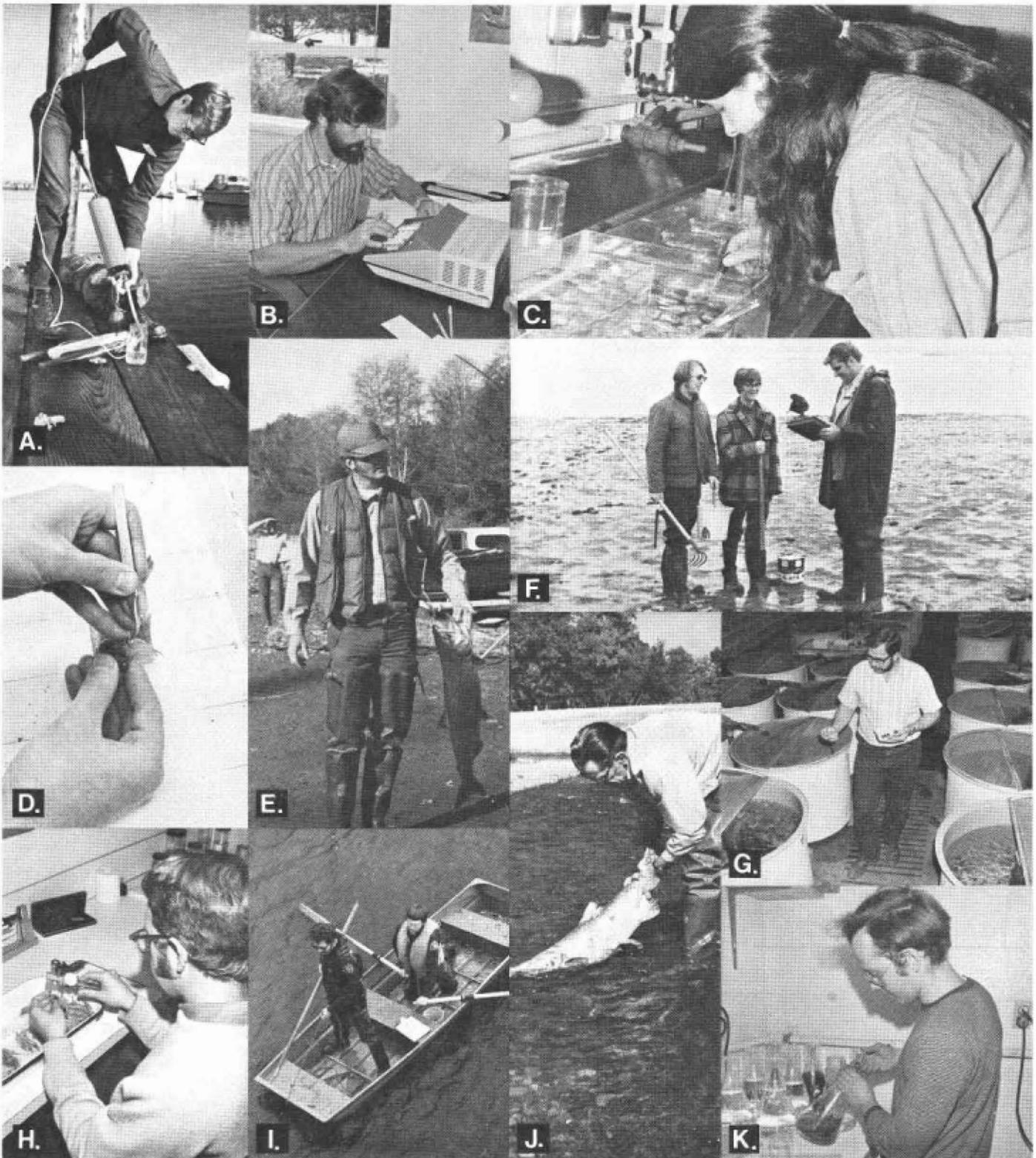
Monitoring the condition of salmon in our hatcheries results in the assurance that effective measures to control communicable diseases are initiated rapidly when required. Cooperative research conducted with the Department of Microbiology, Oregon State University, has advanced the level of knowledge regarding immunization of fish against several common fish pathogens.

NEW CONCERNS

Hatchery operations and facilities have been improved and capacities increased. Both sport and commercial fishing in the ocean and rivers on hatchery stocks have been excellent in recent years. Management cannot be precise enough to harvest hatchery stocks at a high rate while allowing a reduced catch of natural stocks. As a result large numbers have returned to hatcheries and those not needed for hatchery or other biological uses have been sold on bid. Commercial fishermen object to this practice. As a result, a large number of meetings were held with commercial fishermen and others to develop the best use of the fish which return, consistent with state law.

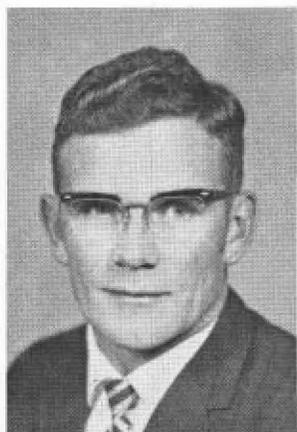
In 1971 the bidding procedure was changed and restrictions were placed on the use of fish by three separate categories. All spawned females and fish in poor condition were placed in category 3, were covered with a yellow dye and could not be used for human consumption. Fish in an ocean-bright condition were put in category 1 for use on the fresh market and the remainder were assigned to category 2 and processed.

A second problem occurred in 1970 when stream-flows in Cedar Creek, water supply for the Sandy River Hatchery, became dangerously low. One of the reasons for the low flow was the use of water by many residents along the stream without water rights. This use has been of some concern for many years. The State Engineer was contacted as were all water users. Flows to the illegal water users were cut off by the State Engineer. As a result many people were unhappy even though they were not within the law. Personnel from the Governor's office and the State Engineer assisted in working out a temporary solution for 1970. The real problem has not been resolved, however in 1971 flows were not as critical as the previous year.



A. Marine Biologist checks water quality in Yaquina Bay. Thousands of marine life forms call this home. B. Biometrician checks computer printout giving results of a tagging study. Commission operates Mark Processing Center for western states. C. Femininity invades the Research laboratory . . . and capably, too, as Biologist checks clams under study. D. Flatfish is examined as part of continuing effort to maximize populations of rock and bottom fish. Some stocks are seriously jeopardized by foreign fishing fleets off Oregon. E. Aquatic Biologist holds prime Spring Chinook salmon now returning in record numbers to Oregon's south coast area. This one was landed in the Chetco River, near Port Orford. F. Conducting survey, Biologist checks couple bent on Bay clamming. In depth study of all sixteen Oregon estuaries will yield firsthand information about sports clamming, crabbing and Bay fishing. G. Nutrition studies seek to produce better food for fish at less cost. Spiraling costs put pressure on researchers to seek cheap, accessible ingredients for "Oregon Pellet" fed in hatcheries. H. Shrimp study aims at assessing next year's class, its mortality problems and density of population. Rich beds lie off Oregon coast. I. Inland Creek is checked as part of carcass study of spawned adult Chinook salmon. J. Mid-Willamette Valley rearing ponds have helped re-establish chinook populations in upper reaches of State's largest river. K. Algae cultured in laboratory is fed specimens under study as well as scrutinized for its food potential in ocean environment.

MANAGEMENT AND RESEARCH DIVISION



WALLACE F. HUBLOU
Dir. Management & Research

The management and research division utilizes the specialized talents of 69 permanent employees. Included in this number are 50 biologists, 11 technicians, and 8 supporting positions.

Headquarters for the division is at Clackamas, Oregon. Additional laboratories and field stations are located at Astoria, Tillamook, Newport, Charleston, Port Orford,

Brookings, Foster-Green Peter Reservoir, Eugene and Elgin in the heart of Oregon's rugged Willowa Mountains. The field office at Tillamook was opened in March 1971 to increase coverage of important north coast rivers and estuaries. A much needed new facility at Charleston was completed in May 1972. This building has office and laboratory space adequate for 8-10 persons.

Management

Fisheries resource areas were established throughout the state where anadromous fish runs exist. Six experienced biologists were designated as "Resource Managers" and assigned to protect and develop the food fish resource and to maintain alliance with public and private agencies on watershed management problems.

SALMON AND STEELHEAD

Commercial landings of ocean troll-caught salmon were exceptionally good during the period. In 1970 over 10.6 million pounds of salmon were landed and in 1971 over 11.2 million pounds including a record catch of 10.1 million pounds of coho.

In the Columbia River, commercial landings of salmon and steelhead totaled 12.6 million pounds in 1970 and 8.9 million in 1971 compared to an average of 7.5 million pounds since 1960. The commercial take of steelhead was reduced during both years by imposing minimum mesh restrictions in the winter and early fall Columbia River gill-net seasons.

The 1972 upriver spring chinook run in the Columbia River was 271,700 fish (preliminary estimate).

This is the second largest run since counting started at Bonneville Dam in 1938. The 1971 Columbia River fall chinook run of 479,000 fish was the second largest since 1950 while the coho run of 616,000 was near the 1964-70 average. The 1971 summer steelhead run (233,800) was the second largest run since 1955 while the sockeye run of 142,000 fish was the largest since 1967. The small run of summer chinook and the remnant chum run continued in 1970 and 1971.

In the Willamette River, counts at Willamette Falls in 1970 showed record adult escapements of 7,560 fall chinook and 17,900 coho. The spring chinook escapement was 34,200. In 1971 the fall chinook escapement was 5,090; 17,400 adult coho, and a record run of 26,300 winter steelhead. The 1971 spring chinook escapement was 44,600 fish. In addition, 2,310 summer steelhead were counted over the falls. The 1972 winter steelhead escapement over Willamette Falls was 23,157 fish.

On the coast, spawning salmon were counted in index streams as a measure of abundance of adult fish. In 1970, the adjusted count of fall chinook was 52 fish per mile and among the best ever recorded; in 1971 the count was only 29 fish per mile. Counts of coho were slightly below average in 1970 and average in 1971. Chum salmon remained low in abundance following a decline in the early 1950's. Spring chinook spawning surveys were not conducted but the Oregon Game Commission made index counts for this species from SCUBA surveys of pools where the adult fish hold over the summer months.

SHAD

The Columbia River shad harvest remained low at 251,000 and 175,000 pounds in 1970 and 1971 because of restrictive regulations designed to protect other species of fish. New shad fisheries were established in the John Day River (Clatsop County), Youngs Bay, and Taylors Slough. A test fishery was conducted in the Willamette Slough but because of very limited success no commercial season was recommended.

Landings of shad from coastal rivers (Siuslaw, Smith, Umpqua, Coos, and Coquille) were approximately 471,000 pounds in 1970 and decreased to 321,000 in 1971, which was 40% lower than the 10-year average.

STRIPED BASS

Striped bass are commercially harvested in five coastal rivers (same as previously listed for shad). In 1970, 50,000 pounds of stripers were landed. The 1971 catch of 67,000 pounds was 52% higher than the 10-year average and was principally due to a strong year class entering the fishery rather than more intensive fishing effort.

STURGEON

Sturgeon are taken incidentally on the Columbia River during all commercial fishing seasons. The 1971 white sturgeon landings of 311,000 pounds were the largest since 1957. Green sturgeon landings of 52,000 pounds were above those of 1970 but less than the 10-year average.

ALBACORE

The northwest albacore fishery is on a downward trend from a record catch in 1968. The 1970 Oregon landings were over 21.8 million pounds and about 8.4 million pounds in 1971. Cooler ocean temperature was probably the main contributing factor to the reduced catch in 1971.

SHRIMP

A record catch of 13.7 million pounds was recorded in 1970. The 1971 landings declined to 8.8 million pounds, lowest since 1966. The decline in 1971 was due largely to poor market conditions caused by an enormous increase in landings of shrimp in Alaska which competed for the same market at a lesser price.

GROUND FISH

Above-average landings were recorded for petrale sole and Dover sole (highest since 1952) during the biennium. Landings of Pacific ocean perch continued low but stable while other Rockfish landings were down considerably (lowest since 1957). Rockfish landings declined due to the pressure exerted on this species by foreign fleets, largely of the Soviet Union. Landings intended for use as animal food continued to skid as a result of the continued decline of the Oregon mink farming industry. Other groundfish landings were about average and changed little from the 1968-69 levels.

CRABS

A new high in production was attained with a record 15 million pounds of commercial landings in the 1970-71 season. Production for the 1971-72 season will fall far short of these figures and will be closer to the long-term means of 7-8 million pounds.

CLAMS

The 1971 commercial landings of 30,000 pounds

of razor clams were double the 1970 production. The sport catch increased from a calculated 715,000 clams in 1970 to 968,000 clams in 1971.

The commercial bay clam production continued at a low level with about 25,000 pounds landed annually. The low price paid to diggers, rather than scarcity of clams, is believed to be the reason for this low production.

INTERTIDAL ANIMALS

In 1970 we issued 238 collecting permits and 284 in 1971. Efforts were continued to educate the public in the conservation of this fragile fisheries resource.

SMELT

Landings of smelt from the Columbia River and tributaries totaled about 1.2 million pounds in 1970 and 1.5 million pounds in 1971.

Research

SALMON AND STEELHEAD

Commercial ocean troll and Columbia River gill-net landings were sampled to determine the age and size composition of fish in the catch and to estimate contribution of hatchery fish.

Troll fishery logbook programs were conducted in 1970 and 1971 to estimate the number of salmon released voluntarily and because of size and seasonal restrictions. An estimated 73,000 chinook and 73,000 coho were released in 1970; respective figures for 1971 were 73,000 and 92,000. Many of the coho were released because of the preference of fishermen and buyers for larger fish. Methods are being explored to minimize catch of fish that must be released.

We increased our efforts to develop the natural runs in the Willamette River and tributaries. Over 2.5 million coho smolts were planted in selected Willamette streams. Over 4,300 adult winter steelhead were transplanted to the system from the Big Creek and Klaskanine hatcheries. Fall chinook introductions were made by way of a pond rearing program at sites near Salem, Aumsville, and Stayton. In 1971, 10.5 million juvenile fall chinook were released from these ponds into the Willamette River and its major tributaries; in 1972 slightly over 11 million fish were released.

The first adult returns from the pond rearing program were realized during the period. In 1970 some 2,000 adult fall chinook were counted in Mill Creek near Salem; another 1,200 adults were counted in 1971. These returns were from fish reared in Cascades Gateway Park Pond.

The spring chinook run in the Willamette system is currently being supported in near equal amounts by natural and hatchery maintained runs. In most of the suitable accessible areas the natural runs seem to be maintaining themselves at levels we believe close to maximum capacities. Our efforts at supplementing existing natural and hatchery runs is by releasing small hatchery fish into large storage reservoirs. By releasing small fish surplus to hatchery needs into these highly productive artificial lakes, we can produce many more smolts than is possible with hatchery facilities alone. Reservoirs currently being studied are Foster-Green Peter, Fall Creek, and Cottage Grove. Adult spring chinook returns to Foster-Green Peter totaled 1,500 fish in 1970 and 4,800 in 1971. The 1971 returns greatly exceeded preproject numbers indicating enhancement of these runs is possible as a result of reservoir rearing of juvenile fish and successful downstream passage at the dams. At Fall Creek Dam, some 1,800 adult spring chinook returned in 1970 and 2,700 in 1971 compared to 50-600 fish prior to construction of the dam. At Cottage Grove, the reservoir was chemically treated in 1971 to eliminate predatory fish that had previously competed with the planted chinook and resulted in very low survival of the hatchery fish.

Studies to evaluate efficiency of fish passage were completed under U.S. Army Corps of Engineers funding at Foster and Green Peter dams. Passage conditions were found to be satisfactory. We also completed evaluating fish passage at River Mill and Faraday dams, two old projects on the Clackamas River. This study demonstrated a need for improved adult passage at River Mill and protection of juvenile fish at both dams. Portland General Electric, owner of the dams, constructed new adult fish facilities at River Mill. State and company representatives are considering methods of protecting juveniles.

Each year many surplus coho adults returning to coastal hatcheries are trucked to barren streams above natural barriers in a joint program with the Game Commission. In 1970 and 1971 over 22,500 coho adults were transplanted. The potential egg deposition from this effort was nearly 34 million.

The 1971 legislature enacted a law (Chapter 203) authorizing private chum hatcheries in close proximity to the ocean. Several applications have been received and the Commission has issued two permits to date; one on Jewell Creek, tributary of Sand Lake, and the other on Sweet Creek, tributary of the Siuslaw River.

In eastern Oregon, a long-term ecology study of spring chinook salmon was continued. This study which began in 1964 has uncovered many facts concerning early life history of native spring chinook in Lookingglass Creek, tributary of the Grande Ronde River.

The Tenmile Lake system was rotenoned in 1968 to remove competing species and improve salmon and trout production. The total return of adults (1969 and 1970) of salvaged 1967-brood coho was 31,800 from 930,000 smolts released in the drainage. Production of coho was high following the reclamation project and 90,500 (1968 brood) jack and adult coho returned in 1970 and 1971 to spawn. This was the highest return of coho since 1950 when records begin. The future of Tenmile Lake in producing large numbers of coho is again threatened following the resurgence of bluegill sunfish in the lake system.

Research on fall chinook salmon in south coastal streams is conducted at Port Orford and Brookings. The projects will provide guidelines on time and size of release of chinook reared at Elk River Hatchery for optimum contribution to sport and commercial fisheries. We are also exploring ways of making the hatchery operation compatible with the life cycle of wild fall chinook. Data collected on wild and hatchery populations will be valuable in formulating management plans for wild and hatchery-reared chinook in other coastal drainages and transplants into selected rivers lacking hatcheries.

SHAD

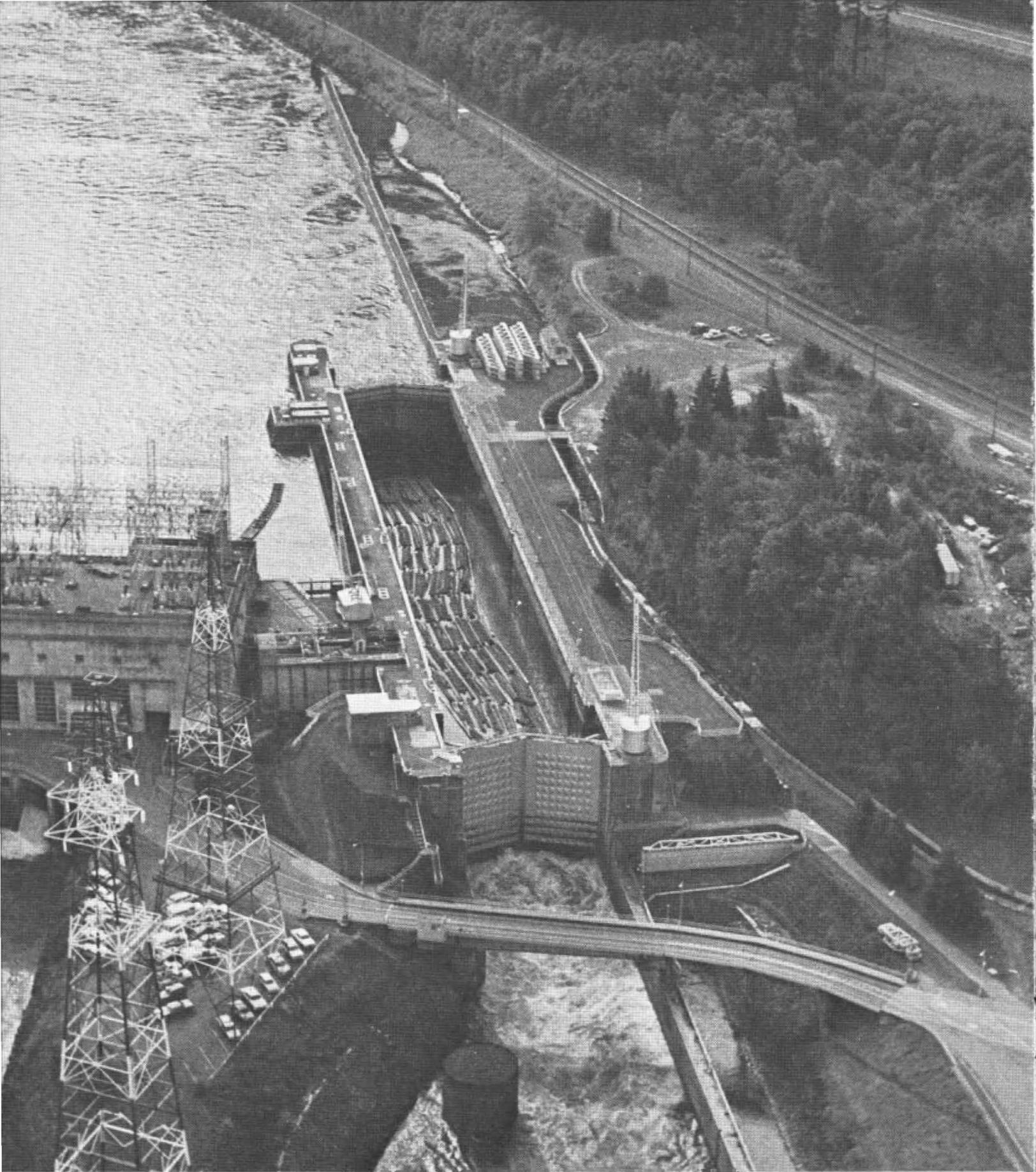
We continued to study methods of harvesting shad without catching other species of fish. Results to date are not promising. Biological information was collected on adult and juvenile shad in the Columbia River and on adult shad landings from the Siuslaw, Smith, Umpqua, Coos, and Coquille rivers.

STRIPED BASS

Stripers were tagged in the Umpqua and Smith rivers in the spring of 1972 to estimate the population recruited to the nets and harvest rate by the commercial fishery.

ALBACORE

Preseason surveys were conducted to locate albacore and to study environmental conditions at the time albacore moved onshore. Although albacore were not caught during the 1970 survey we were able to successfully predict when the first Oregon catches would occur. During the 1971 survey 305 albacore were caught which prompted immediate commercial fishing.



FLYING THE MAJESTIC COLUMBIA

Aerial Survey of Columbia River commercial fishing activity aims at improving management of this prime commercial-recreational fishery. Note Bonneville Dam with locks (center) and log raft being raised to upper river. Indian and White Man vie with nature as gillnets dot the length of river during various seasons for shad and salmon.

SHRIMP

A study on ocean pink shrimp was completed that determined the temperature and salinity requirements for adult shrimp. In addition, temperature and salinity requirements and feeding rate was determined for larval shrimp.

A survey was made of Oregon shrimp beds in September 1971 to provide estimates of shrimp abundance and to provide estimates of potential yield to the industry.

GROUND FISH

In September 1971 we launched our most significant study to date in the marine environment when the first phase of a groundfish survey of the Continental Shelf off Oregon was conducted. Objectives of the planned 4-year project are to determine the abundance of flatfishes occupying the Continental Shelf and to establish techniques for forecasting the potential yield from the trawl fishery. The data collected will provide information necessary for management of those species presently harvested by the commercial fishery and for species not yet utilized by Americans.

CLAMS

Experimental plantings of laboratory reared Manila littleneck clams were made in Alsea, Yaquina, Salmon River, Tillamook, and Netarts bays. More than a million of these clams will be planted during the early summer of 1972 in selected estuaries. Indications are that a major contribution to bay clam populations could be made by employing clam hatchery techniques. Commercial adoption of our techniques appears feasible.

SPORT FISHERY FOR OCEAN FOOD FISH

The Yaquina Bay nonsalmonid sport fishery was sampled for catch, effort, and species composition. Shore fishermen, small boat fishermen, and divers spent an estimated 115,000 man hours fishing for ocean food fish during a 1-year period. Charter boat fishermen spent an estimated 9,000 man hours during the year fishing for ocean food fish outside Yaquina Bay.

HERRING

Herring spawn in Oregon's estuaries and deposit eggs on rocks, piling, eel grass and other forms of algae. Fifteen Oregon estuaries were surveyed from their entrance to tidewater to establish spawning sites and spawning schedules of this estuarine dependent species.

OYSTERS

Oyster mortality was monitored in Tillamook, Yaquina, and Coos bays under a federally funded

contract. Oregon oyster mortality continued at a level much lower than that found in the other coastal states.

ESTUARIES

In the summer of 1970, we completed a joint estuarine survey of Coos Bay with Game Commission personnel. The primary purpose was to determine the distribution of juvenile shad and striped bass. Extensive data were also compiled on many other important commercial and sport fish inhabiting the estuary. The survey data provide baseline information on current populations and are used in making recommendations on dredge and fill projects and other estuarine modifications affecting fishery resources in these important nursery areas.

In 1971 an intensive survey was made of the personal-use fisheries in 15 major Oregon estuaries. Clam diggers, shore fishermen, and boat fishermen fishing for crabs and ocean food fish were interviewed to obtain information on the number of people using the estuarine resources and the number and kinds of fish being harvested. When analysis of this data is completed, we will have a good picture of fishing intensity and the importance of the estuarine fish resources to the people of Oregon.

ECONOMICS STUDY

In February 1972, an economist was hired to study the economic feasibility of limiting entry into Oregon commercial fisheries. The Dungeness crab fishery was the first examined. Results are not available as yet.

BIOMETRICS

This section, comprised of three biologists and one research analyst, operates a regional fish "Mark Processing Center." Sampling information of marked and unmarked salmon and steelhead trout from Washington, Oregon, and California is forwarded by the various fisheries agencies to the center for processing. In March of 1972 the center completed publication of the first of three projected annual data reports, this one covering the 1970 sampling season. The report summarized the contribution of identifiable hatchery programs to Pacific coast salmon fisheries.

COLUMBIA RIVER DAMS

The effect of operational procedures at several Columbia and Snake river dams was studied. Recommendations were made for correction of spilling patterns that caused problems with upstream passage of adult salmonids.

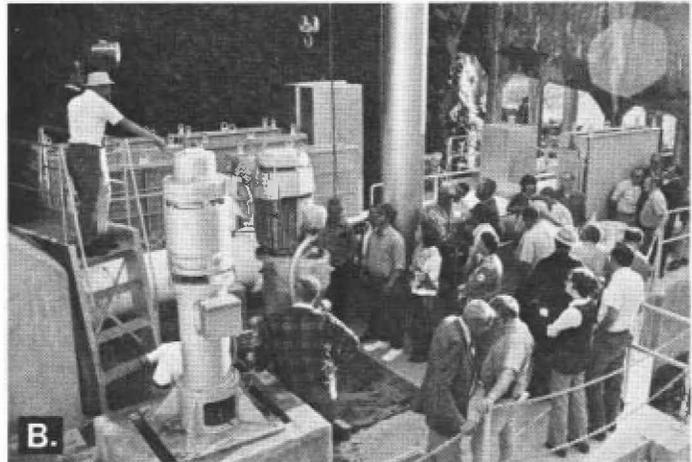
BIENNIAL HIGHLIGHTS

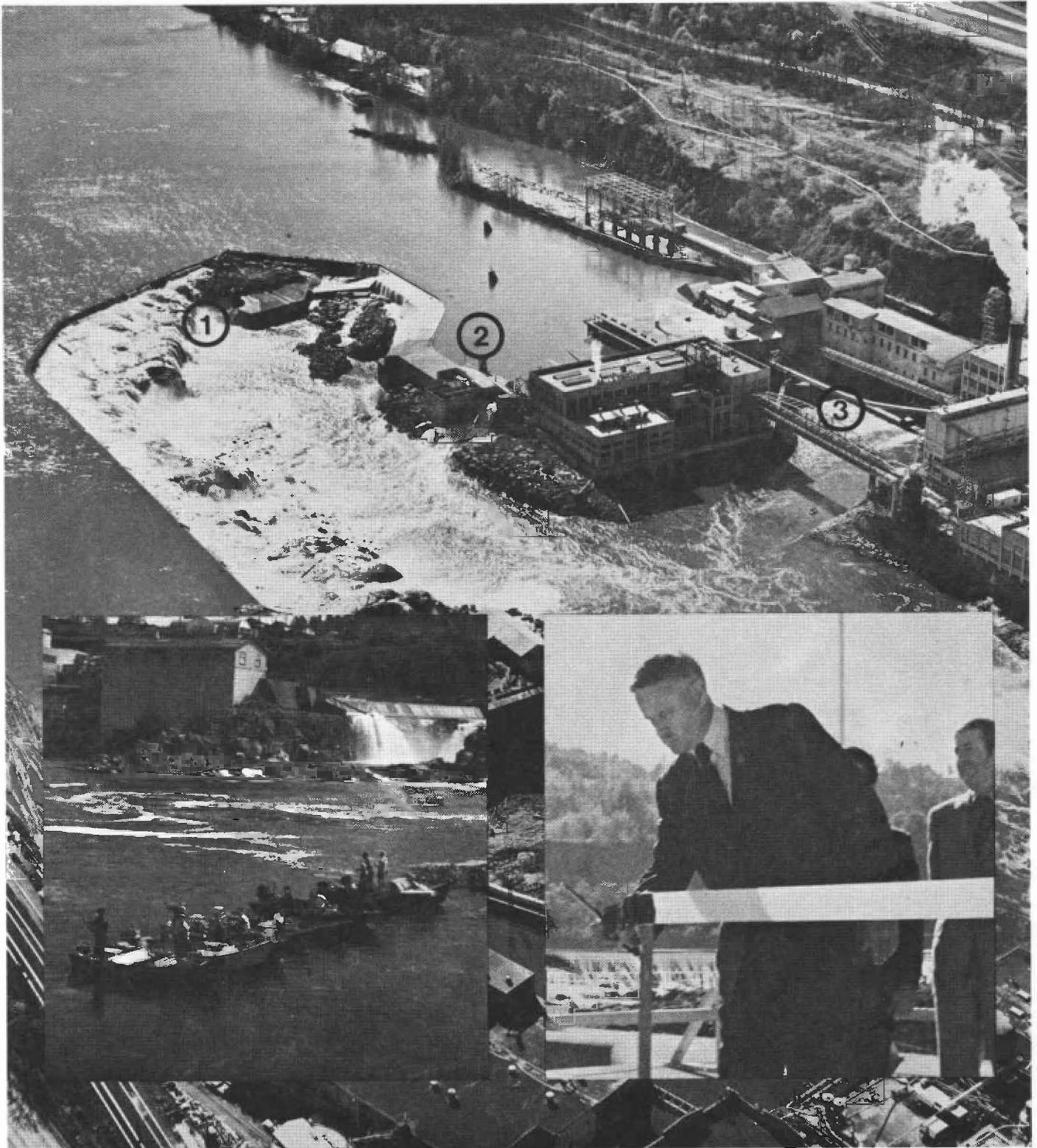
The two year period composing the Biennium presented its own unique set of challenges – some of them bordered on heartbreak, others concluded on a note of exhilaration. Herewith are highlights of those twenty four unusual months and the people and events that shaped them.

- A. Ice engulfed North Nehalem Hatchery during a winter storm. Here a hatcheryman uses a sledge hammer to break block ice from water outflow. Drains and inlets equally froze, threatening loss of the hatchery's entire population of young fish. At night, scene looked macabre as hundreds of burners were utilized to thaw clogged pumps and pipes.
- B. A new series of Sports Seminars was inaugurated on a monthly basis. Sportsmen picked wide variety of subjects for discussion, Fish Commission staff then buckled down to put togeth-

er a presentation on each requested subject. Meetings proved rewarding, both to Sportsmen and Commission. They are being continued into coming year.

- C. Flood waters swept the Trask River filling Commission's hatchery with a sea of mud and debris. Ponds literally filled up with soft ooze requiring hours of backbreaking work before restoration was completed. Thousands of young salmonids were lifted up and carried into brush and woods there to be left high and dry as water retreated. The Commission expresses its appreciation to The Oregon Wildlife Federation whose volunteers did so much to return the hatchery to normal operation.
- D. Newest Research and Management Laboratory was completed at Charleston, Oregon west of Coos Bay. It houses offices, laboratories and much needed storage areas. It was built at a cost of \$36,000 and will anchor southcoast research projects to the California border.





Multi-million dollar Willamette Falls Fishway was officially put into operation as Governor McCall (Inset) cut dedicatory ribbon before packed throng of distinguished civic, business and government leaders. New Fishway has three entrances (Note locations in picture above) each placed in areas known to attract upstream adult spawners bound for Cascade tributaries. Passage at Falls has historically been difficult for salmon and steelhead. It is hoped the new innovative design will enhance upstream movement of salmonids. In conjunction with the development of the fishway is an active stocking program designed to increase upriver stocks to the point

where they will be self-perpetuating by 1980's. Construction was carried out under supervision of Division of Engineering of the Fish Commission. Funds came from National Marine Fisheries Service under public law and from Portland General Electric Company. Thus far record numbers of fish have passed the Fishway even though the project was not fully operational until this last fall. Fishermen still crowd the hogline (Inset) for their Spring Chinook Salmon, often unaware that the upper Willamette River is now wide open for intelligent fish management on a promising scale.

FINANCIAL STATEMENT
Summary Statement of Financial Transactions
July 1, 1970 – June 30, 1972

Unexpended balance of funds at beginning of biennium		\$ 121,552.77
Appropriations and Receipts:		
General Fund Appropriations:		
Operation and Maintenance:		
1967-1969 Appropriation	\$2,464,155.00	
Less:		
1967-1969 disbursements	\$2,460,255.64	
Reverted to State Treasury	1,939.36	
	2,462,195.00	\$ 1,960.00
1969-1971 Appropriation	\$3,359,505.00	
Less:		
1969-1970 disbursements	\$1,581,827.65	
Reverted to State Treasury	19,397.52	
	1,601,225.17	1,758,279.83
1971-1973 Appropriation	\$3,577,825.00	
Less:		
Reservation for 1972-73 expenditures	1,786,100.56	1,791,724.44
Capital Construction:		
1969-1971 Appropriation	\$ 273,000.00	
Less:		
1969-1970 disbursements	\$ 228,917.96	
Reverted to State Treasury	3,937.85	
Reservation for 1972-1973 expenditures	3,000.00	
	235,855.81	37,144.19
Total Net General Fund Appropriations for 1970-1972		\$3,589,108.46
Receipts from Other Sources:		
Schedule "A" Fiscal Year 1970-1971	\$2,557,604.81	
Fiscal Year 1971-1972	2,050,331.36	
Total Receipts – Other Sources		4,607,936.17
Total Net Appropriations and Receipts		\$8,197,044.63
Expenditures for period per Schedule "B":		
Fiscal Year 1970-1971	\$4,170,267.51	
Fiscal Year 1971-1972	4,016,514.28	
Total expenditures for biennium		8,186,781.79
Unexpended balance June 30, 1972		\$ 131,815.61

ANALYSIS OF CASH BALANCE

As of June 30, 1972

Seal Control	\$ 6,434.37
Miscellaneous Receipts	13,827.94
Donation	8,610.68
Daily Ocean Salmon Angler Licenses (Transferred from Game Commission)	<u>102,942.62</u>
Total All Funds	\$131,815.61

SCHEDULE "A" Statement of Receipts July 1, 1970 – June 30, 1972

	<u>Fiscal Year 1970-1971</u>	<u>Fiscal Year 1971-1972</u>	<u>Total for Biennium</u>
GENERAL FUND RECEIPTS			
Licenses:			
Bait Dealer	\$ 45.00	\$ 555.00	\$ 600.00
Bait Fishing	30.00	555.00	585.00
Boat	101,970.00	105,630.00	207,600.00
Buyer	1,590.00	1,935.00	3,525.00
Canner, Fish	2,700.00	2,700.00	5,400.00
Canner, Shellfish	300.00	75.00	375.00
Commercial Fishing	144,187.00	147,338.00	291,525.00
Gillnet, Nonresident	3,196.00	1,224.00	4,420.00
Gillnet, Resident	5,176.00	4,552.00	9,728.00
Lost License, Other	67.00	60.00	127.00
Setline	64.00	16.00	80.00
Setnet	1,040.00	728.00	1,768.00
Single Delivery	6,279.00	4,577.00	10,856.00
Special Permit (Carp)	6.00	79.50	85.50
Wholesale	<u>11,550.00</u>	<u>12,225.00</u>	<u>23,775.00</u>
Total License Receipts	\$ 278,200.00	\$ 282,249.50	\$ 560,449.50
Other Receipts:			
Poundage fees and interest	\$ 362,695.93	\$ 389,391.20	\$ 752,087.13
Seized and confiscated property sales	2,473.29	1,802.13	4,275.42
Miscellaneous – all other	<u>19,158.93</u>	<u>12,685.37</u>	<u>31,844.30</u>
Total Other Receipts	\$ 384,328.15	\$ 403,878.70	\$ 788,206.85
Total General Fund Receipts	\$ 662,528.15	\$686,128.20	\$1,348,656.35
Less Transfer to State General Fund	\$ 662,528.15	\$686,128.20	\$1,348,656.35
DEDICATED FUND RECEIPTS			
Donation	\$ 86,824.75	\$ 8,054.45	\$ 94,879.20
Salmon Management (Salmon-Steelhead Angling Tags)	149,084.55	112,670.00	261,754.55
Daily Ocean Salmon Angler Licenses (Transferred from Game Commission)		185,055.00	185,055.00
Federal Funds	2,182,608.18	1,880,118.24	4,062,726.42
*Seal Fund	<u>1,768.50</u>	<u>1,752.50</u>	<u>3,521.00</u>
Total Dedicated Fund Receipts	\$2,420,285.98	\$2,187,650.19	\$4,607,936.17
*SEAL FUND DETAIL			
Gillnet	\$ 1,615.00	\$ 1,352.50	\$ 2,967.50
Canner	<u>350.00</u>	<u>400.00</u>	<u>750.00</u>
Total	\$ 1,965.00	\$ 1,752.50	\$ 3,717.50
Less tithe transfer to State General Fund	<u>196.50</u>		<u>196.50</u>
Net Seal Fund Receipts	\$ 1,768.50	\$ 1,752.50	\$ 3,521.00

SCHEDULE "B"
Statement of Expenditures
July 1, 1970 – June 30, 1972

	Totals for 1970-1972 Biennium			Total
	General Fund	Federal Funds	*Other Funds	
Anadromous Fish				
Propagation	\$1,030,674.02	\$1,729,030.09	\$ 46,664.58	\$2,806,368.69
Habitat Improvement	100,878.14	55,185.70		156,063.84
Management and Research	761,881.10	869,535.20	352,492.49	1,983,908.79
Capital Construction		855,943.36	223,759.60	1,079,702.96
Storm Damage		22,931.60		22,931.60
Total Anadromous Fish	\$1,893,433.26	\$3,532,625.95	\$ 622,916.67	\$6,048,975.88
Marine Fish and Shellfish				
Operating	\$ 417,859.59	\$ 296,508.03		\$ 714,367.62
Capital Construction	37,144.19			37,144.19
Total Marine Fish & Shellfish	\$ 455,003.78	\$ 296,508.03		\$751,511.81
Administration	\$1,240,671.42	\$ 120,877.96	\$ 24,744.72	\$1,386,294.10
Total Expenditures	<u>\$3,589,108.46</u>	<u>\$3,950,011.94</u>	<u>\$647,661.39</u> *	<u>\$8,186,781.79</u>

***Other Fund Detail**

Miscellaneous Receipts	\$ 13,407.92
Salmon Management (Salmon-Steelhead Angling Tags)	280,899.39
Daily Ocean Salmon Angler Licenses (Transferred from Game Commission)	82,112.38
Seal Control	1,141.34
Private Chum Hatchery Processing Costs	900.00
Eugene Water and Electric Board	5,487.47
Portland General Electric	137,561.94
Curry County	113,268.63
Washington Department of Fisheries	1,840.34
Washington Department of Game	4,552.63
Oregon State Game Commission	4,552.63
California Dept. of Fish & Game	1,936.72
Total Other Funds	<u>\$647,661.39</u>

OREGON COMMERCIAL LANDINGS OF FINFISH AND SHELLFISH

(All Figures in Pounds)

	1966	1967	1968	1969	1970	1971
FINFISH						
Cod (true)	634,365	432,277	382,852	49,839	76,397	483,147
Flounders	598,302	376,683	522,473	418,003	585,038	613,714
Hake	65,170	17,812	4,140	-----	-----	5,935
Halibut	86,654	89,880	116,479	89,700	103,411	71,601
Lingcod	1,039,921	1,170,261	1,609,326	1,267,825	1,121,325	1,534,302
Mink Food	3,408,575	4,087,974	2,942,326	2,687,696	2,053,163	1,814,030
Pacific Ocean Perch	4,533,263	1,705,831	1,663,935	937,966	1,612,600	1,738,991
Rockfish	5,543,263	4,673,215	4,932,877	5,977,126	4,223,955	4,193,510
Sablefish	248,344	435,403	426,899	531,657	161,845	274,570
Salmon and Steelhead						
Chinook	3,669,294	4,641,561	3,772,271	5,235,332	6,311,491	5,013,543
Chum	7,335	9,214	2,261	2,766	4,883	3,050
Coho	8,693,895	11,353,764	5,781,384	4,941,033	13,084,479	11,774,660
Humpback	4,406	1,234,640	4,708	298,555	1,004	10,412
Sockeye	6,893	117,550	61,961	71,397	40,675	163,440
Steelhead	349,729	424,143	393,293	382,936	186,370	313,130
Shad	1,000,441	1,060,974	816,392	553,229	698,248	473,822
Smelt	241,883	231,594	119,903	62,808	148,105	134,246
Sole						
Dover	3,511,004	3,645,843	4,357,712	5,625,388	5,606,116	5,718,550
English	3,538,312	2,368,477	2,358,945	1,809,242	1,887,586	1,804,012
Petrale	1,806,431	1,779,739	1,674,874	1,858,201	2,151,452	2,290,871
Other	1,716,813	1,496,944	1,345,624	1,779,924	1,662,580	1,360,665
Striped Bass	48,282	31,649	27,011	38,614	50,051	67,084
Sturgeon						
Green	55,142	36,400	45,844	55,385	40,017	39,920
White	136,645	119,503	106,733	227,857	172,631	201,708
Tuna	17,682,222	29,242,696	37,751,816	29,827,579	26,936,875	13,092,167
Other Fish	124,844	101,762	109,519	235,269	196,052	186,522
TOTAL FINFISH	58,751,428	70,885,789	71,331,558	64,965,297	69,116,349	53,377,602
SHELLFISH						
Clams						
Bay	47,258	27,605	27,866	22,001	25,884	28,746
Razor	83,980	122,523	92,462	25,124	14,806	30,007
Crabs	10,548,238	9,621,251	11,351,094	9,783,998	14,929,347	14,875,849
Shrimp	4,684,548	10,155,251	10,858,975	10,455,125	13,572,174	9,075,006
TOTAL SHELLFISH	15,364,024	19,926,630	22,330,397	20,286,248	28,542,211	24,009,608
GRAND TOTAL	74,115,452	90,812,419	93,661,955	85,251,545	97,658,560	77,387,210

LICENSES ISSUED

	1966	1967	1968	1969	1970	1971
Bait Dealer	-----	-----	-----	-----	-----	11
Bait Fishing	-----	-----	-----	-----	-----	17
Boat	1,868	2,433	3,048	3,042	3,025	3,487
Boat, Lost License	11	12	10	6	10	13
Buyer	78	88	91	95	102	118
Canner, Fish	15	16	16	17	15	17
Canner, Shellfish	5	4	4	4	5	4
Commercial Fishing	3,448	4,553	5,932	5,663	5,584	6,428
Fishing, Lost License	27	28	37	30	36	40
Gillnet, Nonresident	30	80	63	79	32	46
Gillnet, Resident	432	530	524	503	466	650
Retail	1,123	1,082	1,013	1,002	-----	-----
Setline	1	-----	1	1	5	5
Setnet	140	125	89	97	121	130
Single Delivery	354	372	423	287	269	203
Special Permit (carp)	2	3	2	13	13	4
Wholesale	151	138	142	152	154	165
TOTAL	7,685	9,464	11,395	10,991	9,837	11,338

**DISPOSITION OF ADULT SALMON AND STEELHEAD
RETURNING TO FISH COMMISSION HATCHERIES**
(All Figures in Numbers of Fish)

Species	Transplanted	Allowed to Pass Hatchery Rack	State & County Institutions	Sold by Public Bid	Buried	Total
July 1, 1970 – June 30, 1971						
Coho	13,535	2,273	3,046	136,592	4,502	159,948
Fall Chinook	-----	1,960	107	22,945	2,422	27,434
Spring Chinook	29	48	27	4,899	5,966	10,969
Chum	-----	152	-----	-----	-----	152
Steelhead	3,299	1,610	-----	33	210	5,152
					TOTAL	203,655
July 1, 1971 – June 30, 1972						
Coho	16,866	2,492	6,420	78,125	3,294	107,197
Fall Chinook	-----	150	1,141	23,380	2,241	26,912
Spring Chinook	-----	91	31	5,652	3,546	9,320
Chum	-----	689	-----	-----	1	690
Steelhead	1,790	1,473	276	-----	480	4,019
					TOTAL	148,138

EGGS TAKEN AT FISH COMMISSION HATCHERIES
1970 – 1972 Biennium

Hatchery	Fall Chinook	Spring Chinook	Coho	Steelhead	Total
July 1, 1970 – June 30, 1971					
Alea			4,808,000		4,808,000
Big Creek	33,395,000		1,083,300	882,700	35,361,000
Bonneville	8,288,400		3,316,200		11,604,600
Cascade	4,112,700		2,883,000		6,995,700
Elk River	907,700				907,700
Klaskanine			2,411,300		2,411,300
Marion Forks		3,626,500		151,000	3,777,500
McKenzie		304,500 ¹			304,500
Nehalem			2,490,500		2,490,500
OxBow	1,391,900				1,391,900
Sandy			3,089,400		3,089,400
Siletz					-0-
South Santiam		352,600			352,600
Trask	877,400	109,000	2,394,800		3,381,200
Willamette		2,552,100			2,552,100
TOTAL	48,973,100	6,944,700	22,476,500	1,033,700	79,428,000

¹ Taken from adults received from Willamette.

Hatchery	Fall Chinook	Spring Chinook	Coho	Steelhead	Total
July 1, 1971 – June 30, 1972					
Alea			3,284,100		3,284,100
Big Creek	22,304,200 ¹		899,400	985,400	24,189,000
Bonneville	24,036,100		4,514,200		28,550,300
Cascade			2,178,300		2,178,300
Elk River	969,000			67,600	1,036,600
Klaskanine			3,576,500		3,576,500
Marion Forks		3,355,900		157,000	3,512,900
McKenzie		722,800 ²			722,800
Nehalem			1,997,400		1,997,400
OxBow					-0-
Sandy			2,246,600		2,246,600
Siletz			824,500		824,500
South Santiam		1,807,400		704,400	2,511,800
Trask	633,100	563,900	4,674,200		5,871,200
Willamette		6,191,000			6,191,000
TOTAL	47,942,400	12,641,000	24,195,200	1,914,400	86,693,000

¹ Includes 1,909,700 eggs taken from adults hauled to Cascade and 594,000 eggs taken from adults hauled to Oxbow.

² Includes 593,900 eggs taken from adults hauled from Fall Creek.

NUMBERS OF SALMON AND STEELHEAD LIBERATED INTO OREGON WATERS

1970 – 1972 Biennium

JULY 1, 1970 – JUNE 30, 1971

Hatchery & Species	Unfed Fingerlings	Fingerlings	Yearlings	Total Number	Pounds	Location
Alsea						
Coho	1,055,487	351,995	1,062,271	2,469,753	72,444	Fall Cr. (Alsea), Floras Cr. & tribs. of coastal & Will. R.
Big Creek						
Coho			851,295	851,295	56,906	Big Creek
Fall Chinook		8,928,050		8,928,050	50,299	Big Creek
Steelhead		39,586	54,907	94,493	10,275	Big Creek & Molalla R.
Total		8,967,636	906,202	9,873,838	117,480	
Bonneville						
Coho	4,442		2,813,178	2,817,620	187,497	Tanner Creek
Cascade						
Coho			1,276,982	1,276,982	79,287	Columbia R. & Will. R. Tribs.
Elk River						
Coho		262,002	316,208	578,210	27,918	Floras L. & tribs. of Coos & New R.
Fall Chinook		409,092	333,328	742,420	42,365	Chetco & Elk R.
Steelhead			45,185	45,185	6,548	Chetco R.
Total		671,094	694,721	1,365,815	76,831	
Klaskanine						
Coho	723,768	100,000	1,265,474	2,089,242	86,608	Klaskanine, Lewis & Clark, & Youngs R.
Fall Chinook		1,778,507		1,778,507	8,239	Tanner Cr.
Steelhead			54,929	54,929	7,847	Klaskanine R.
Total	723,768	1,878,507	1,320,403	3,922,678	102,694	
Marion Forks						
Spring Chinook			977,625	977,625	91,465	Santiam R.
Steelhead		79,348	80,121	159,469	11,118	Big Cliff Res. & Santiam R.
Total		79,348	1,057,746	1,137,094	102,583	
McKenzie						
Coho	883,235			883,235	784	Abiqua Cr., Little Fall Cr. & Luckiamute R.
Spring Chinook			661,041	661,041	64,441	McKenzie R.
Total	883,235		661,041	1,544,276	65,225	
Nehalem						
Coho	882,560	256,054	1,267,621	2,406,235	86,794	Nehalem R., McMinnville & Hillsboro Res., Devils Lake, tribs. of Elk Cr., Nestucca & Wilson R.
Fall Chinook			232,305	232,305	11,305	Nehalem R.
Steelhead			44,519	44,519	6,452	Nehalem R.
Total	882,560	256,054	1,544,445	2,683,059	104,551	
Oxbow						
Fall Chinook		8,054,865		8,054,865	43,205	Tanner & Wahkeena Cr.
Sandy						
Coho			997,850	997,850	66,263	Sandy R.
Siletz						
Coho			529,198	529,198	35,757	Rock Cr.
South Santiam						
Spring Chinook		1,401,581	335,176	1,736,757	45,559	Green Peter Res. & S. Santiam R.
Steelhead		34,562	75,289	109,851	12,116	Green Peter Res. & S. Santiam R.
Total		1,436,143	410,465	1,846,608	57,675	
Trask						
Coho		130,115	283,867	413,982	18,917	Nestucca & Trask R.
Fall Chinook		349,118		349,118	7,914	Trask R.
Spring Chinook			61,659	61,659	11,010	Trask R.
Total		479,233	345,526	824,759	37,841	
Willamette						
Spring Chinook		2,710,831	1,444,918	4,155,749	143,085	Willamette R. & Fall Cr. Res.
Aumsville (Lower & Upper)						
Fall Chinook		5,323,698		5,323,698	66,200	S. Santiam R. & Mill Cr.
Dexter Pond						
Spring Chinook		112,675	355,946	468,621	65,163	Willamette R.
Salem Pond						
Fall Chinook		1,504,617		1,504,617	23,929	Mill Cr. & tribs. of Will. R.
Stayton Pond						
Fall Chinook		3,737,296		3,737,296	45,733	Clackamas & N. Santiam R.
Trask Pond						
Coho			630,087	630,087	45,330	E.F. Trask R.
Total of All Hatcheries & Ponds						
Coho	3,549,492	1,100,166	11,294,031	15,943,689	764,505	
Fall Chinook		30,085,243	565,633	30,650,876	299,189	
Spring Chinook		4,225,087	3,836,365	8,061,452	420,723	
Steelhead		153,496	354,950	508,446	54,356	
GRAND TOTAL	3,549,492	35,563,992	16,050,979	55,164,463	1,538,773	

NUMBERS OF SALMON AND STEELHEAD LIBERATED INTO OREGON WATERS

JULY 1, 1971 - JUNE 30, 1972

Hatchery & Species	Unfed			Total Number	Pounds	Location
	Fingerlings	Fingerlings	Yearlings			
Alsea						
Coho	631,250	779,083	1,337,060	2,747,393	92,695	Fall Cr. (Alsea) & tribs. of coastal & Will. R. & coastal lakes
Big Creek						
Coho	397,240		759,087	1,156,327	55,354	Big Creek
Fall Chinook		10,037,534	123,282	10,160,816	140,816	Big Creek
Steelhead			50,808	50,808	8,762	Big Creek
Total	397,240	10,037,534	933,177	11,367,951	204,932	
Bonneville						
Coho			2,601,265	2,601,265	180,296	Tanner Creek
Fall Chinook		1,207,371		1,207,371	11,418	Tanner Creek
Total		1,207,371	2,601,265	3,808,636	191,714	
Cascade						
Coho	1,272,286		1,284,824	2,557,110	88,498	Col. R., Wahkeena Pond & tribs. of Will. R.
Fall Chinook	806,055	3,340,581		4,146,636	24,902	Col. R. at Bonneville & Clackamas R.
Total	2,078,341	3,340,581	1,284,824	6,703,746	113,400	
Elk River						
Fall Chinook		2,314,665	337,655	2,652,320	42,971	Chetco, Elk & Row R.
Klaskanine						
Coho	1,162,892		1,196,047	2,358,939	83,437	Klaskanine, Col., Pudding & Tualatin R.
Fall Chinook		1,023,344		1,023,344	10,442	Klaskanine R.
Steelhead			50,783	50,783	7,580	Klaskanine R.
Total	1,162,892	1,023,344	1,246,830	3,433,066	101,459	
Marion Forks						
Spring Chinook			1,103,624	1,103,624	65,842	Minto
Steelhead			82,795	82,795	8,808	Minto
Total			1,186,419	1,186,419	74,650	
McKenzie						
Spring Chinook			296,493	296,493	36,222	McKenzie R.
Nehalem						
Coho	520,400		947,656	1,468,056	67,618	Nehalem R., Fall & Rock Cr. & Fishhawk Lake
Fall Chinook			205,979	205,979	18,942	Nehalem R.
Steelhead			42,713	42,713	7,910	Nehalem R.
Total	520,400		1,196,348	1,716,748	94,470	
Oxbow						
Fall Chinook		2,601,420		2,601,420	22,725	Tanner Creek
Spring Chinook		936,633		936,633	3,792	Herman Cr. & Cottage Gr. Res.
Total		3,538,053		3,538,053	26,517	
Sandy						
Coho	798,056		1,080,924	1,878,980	76,054	Cedar Cr. & Salmon R.
Fall Chinook		540,881		540,881	1,712	Cedar Cr.
Total	798,056	540,881	1,080,924	2,419,861	77,766	
Siletz						
Coho			460,371	460,371	33,158	Rock Creek
South Santiam						
Spring Chinook		1,075,089	305,316	1,380,405	44,402	S. Santiam R., Foster & Fall Cr. Reservoirs
Steelhead			73,366	73,366	8,881	S. Santiam R. & Foster Res.
Total		1,075,089	378,682	1,453,771	53,283	
Trask						
Coho			409,881	409,881	30,129	Trask R.
Fall Chinook			404,329	404,329	33,246	Trask R.
Spring Chinook			58,059	58,059	9,457	Trask R.
Total			872,269	872,269	72,832	
Willamette						
Spring Chinook		3,846,063	1,491,264	5,337,327	161,643	Dexter, Fall Cr. & Gr. Peter Res.
Steelhead			20,936	20,936	2,835	N. Santiam R.
Total		3,846,063	1,512,200	5,358,263	164,478	
Pond & Species						
Aumsville						
(Upper & Lower)						
Fall Chinook		4,313,419		4,313,419	44,126	Mill Cr., Molalla & S. Santiam R.
Salem Pond						
Fall Chinook		1,868,859		1,868,859	21,256	Mill Cr. & Will. R.
Stayton Pond						
Fall Chinook		4,854,615		4,854,615	49,172	Stayton Pond outlet & Will. R. tribs.
Trask Pond						
Coho			619,050	619,050	40,161	Trask R. & tribs. of Nestucca & Tillamook Bay
Total of All Hatcheries & Ponds						
Coho	4,782,124	779,083	10,696,165	16,257,372	747,400	
Fall Chinook	806,055	32,102,689	1,071,245	33,979,989	421,728	
Spring Chinook		5,857,785	3,254,756	9,112,541	321,358	
Steelhead			321,401	321,401	44,776	
GRAND TOTAL	5,588,179	38,739,557	15,343,567	59,671,303	1,535,262	



Managing Oregon's

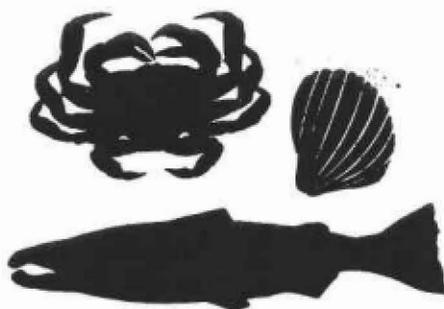
Marine

Coastal Rivers

and Inland Waterways

FISH COMMISSION OF OREGON

Established 1878



Management Today...

Protecting Tomorrow

