

FISH COMMISSION OF OREGON

✓ BIENNIAL
REPORT
1972-1974

Our 97th Year of Serving Oregon



I pity tha man wha have never seen
the scudding cloud and rolling sea.
Better him whose hands are scarred from
net and line and whose face is seamed
with care and time.

The Bedford Woman - narrative
Anonymous

*To the Governor and Honorable Members
of the 58th Legislative Assembly
Salem, Oregon*

Governor Straub:
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, 1972 through June 30, 1974. These two years have presented us with exceptional problems in the management of one of Oregon's most fragile resources. New responsibilities demanded by an enlightened citizenry, internal growth and expansion and the unique response required of us in a complex Age all served to make for a challenging period of Commission activity. We feel that you will be gratified with the results of our efforts during this formative period. As we begin our 97th year of dedication to the Resources we administer and the people of Oregon, we are confident that the formidable challenges of the future will soon become the accepted accomplishments of our distinguished past. We look forward to what that future promises.

Respectfully Submitted,

FISH COMMISSION OF OREGON

Joseph I. Eoff
Chairman

Jack F. Shields
Commissioner

McKee A. Smith
Commissioner



The Fish Commission of Oregon

The Fish Commission of Oregon was formed in 1878. Its first obligation was the perpetuation of the fishery resources of Oregon. The first Fish Commissioner and Protector for Oregon was appointed in 1880. He began the first Tagging program of salmonids and chose the first sites for Oregon Hatcheries. He was lost in the Umpqua River on one such venture in December 1883. Over the years the Commission has altered its form and streamlined its scientific management in order to keep abreast of a continuing demand for a more sophisticated approach to Resource Management. This document emerges as we begin our 97th year serving Oregon. Today, far flung hatcheries and laboratories, a modern staff and the best technical facilities possible, combine to produce an exciting and enlightened approach to one of Oregon's most fragile natural resources...its fish and shellfish. Our motto effectually summarizes that commitment

Management Today... Protecting Tomorrow

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.



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.



JACK F. SHIELDS
Commissioner

Born in Canada, emigrated to the United States. Associated with Arden Farms for 15 years, founded Shields Refrigeration Company in 1946. Appointed Regional Manager National Association of Manufacturers in 1948. Charter member of Fly Fishers Club of Oregon, Member of Federation of Fly Fishermen. Avid fisherman, and outdoor enthusiast. Retired he leads an active life of travel combined with sport pursuits as well as offering trenchant leadership to commission hearings.



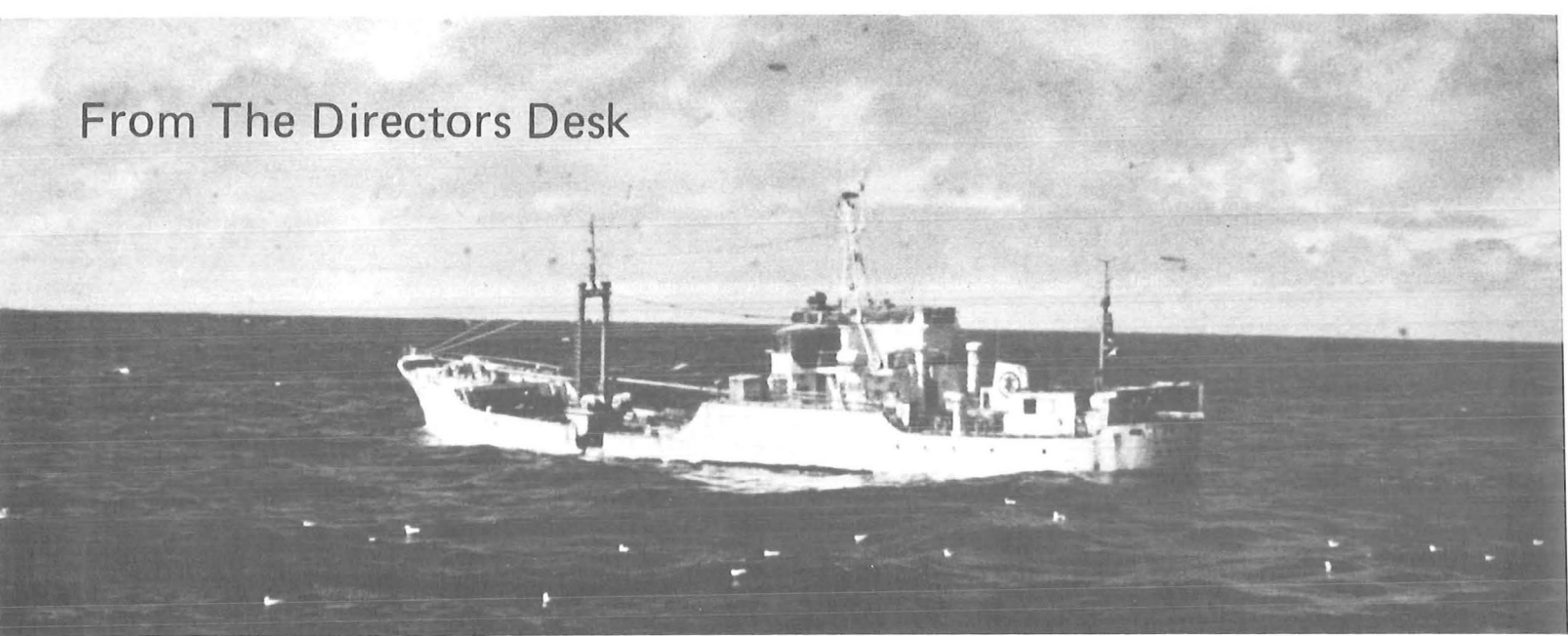
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From The Directors Desk



It appears traditional for the Director to comment in generally glowing terms on the progress made during the two years covered by each biennial report. I wish to break that trend and express dismay at the large number of problems that have not been solved even though considerable time was spent on them during this biennium. Foreign fishermen still harvest Oregon's resources, battles continue between sportsmen and commercial fishermen over who should harvest salmon and steelhead, our new fish ladder at Willamette Falls has had a problem in passing spring chinook salmon at high water flows, and we seem to make little progress in resolving the matter of treaty Indian fishing rights. Certainly there have been some successes and I am extremely proud of the accomplishments of my staff in many areas. The following comments will summarize the important situations as I viewed them in this biennial period, and will serve to point out the problems we must squarely face in the future.

FOREIGN FISHING

The continuing harvest of Oregon's food fish resource by foreign countries during this period expanded to include Poland and East Germany. The United States has attempted to alleviate fishing problems with Japan and the Soviet Union through bilateral agreements to provide orderly fisheries and some protection. However, no bilateral agreements exist for Poland or East Germany.

While these fisheries have had a serious impact on Pacific ocean perch, one of the rockfishes, other stocks off Oregon have not yet suffered serious damage. With the entrance of additional countries into the fishery, however, the potential for over-fishing has been greatly increased. Since so many

countries are dependent upon commercial fishing for income and as a protein source, there has been a great demand to resolve the problem of fishery jurisdiction in coastal waters beyond the 12-mile limit that most countries recognize. This has resulted in an agreement by countries to have a "Law of the Sea Conference" to look at this question along with some other ocean jurisdictional problems. The first Law of the Sea Conference held in 1974 did not result in international agreement. U.S. negotiators still believe that the follow-up conferences scheduled for 1975 have a good chance to develop a world wide acceptance of a 200-mile economic zone. Such a zone would permit the United States to control foreign fishing effort within 200 miles of our coast. If international agreement is not reached in 1975, it presently appears likely that the United States Congress will take unilateral action to protect U.S. coastal fishermen and fishery resources near our shores. In either event, the prospect of U.S. control of our coastal waters is closer than it has been at any time since the rapid expansion of distant water fishing fleets in the 40's and 50's.

STATUS OF STOCKS — COLUMBIA RIVER

One of the most discouraging situations we have faced with Columbia River salmon and steelhead stocks became apparent in 1974. Numbers of adult spring and summer chinook salmon and summer steelhead trout returning to the Snake River in 1974 were poor as a result of heavy mortalities to downstream migrating juveniles in 1972 and 1973. These mortalities were caused by problems associated with dams — high nitrogen levels, passage of juveniles through turbines, and use of slotted bulkheads, a measure intended to reduce the

nitrogen level and protect fish. Although the runs are expected to rebound in 1976, severe commercial fishing restrictions were necessary in 1974 to protect an escapement of spawning fish. Efforts by the state and federal biologists have identified the problems and developed procedures for correction. First, "ski" chutes on the dam spillways will reduce nitrogen supersaturation below major dams. Second, acceptable "screening" devices for turbines will permit juveniles to be collected at uppermost dams and trucked around the dams and will reduce mortalities to fish caused by turbines. The next two years will see a major effort by the Corps of Engineers to implement these fish-saving solutions making the future of the upriver runs brighter than ever.

WILLAMETTE FALLS

Returns of coho and fall chinook salmon to tributary streams below Bonneville Dam remained good and a particularly encouraging sign was the continually increasing numbers of fall chinook salmon passing Willamette Falls. The record count of 11,800 fall chinook in 1972 was exceeded by a passage of 22,000 fall chinook over the falls in 1973.

The new \$3.7 million fish ladder at Willamette Falls continues to provide excellent passage facilities into the upper Willamette system for summer and fall run salmon and summer steelhead. The combination of improved fish passage, pollution abatement in the Portland harbor, and increased plants of smolts into tributaries above the falls have combined to increase the runs of fall fish. As a further benefit, the agreements with Portland General Electric Company and Crown Zellerbach have resulted in a shutdown of power producing turbines during times of peak downstream migration of smolts. With this additional protection of small fish, the future of fish runs in the Willamette River is more promising than ever.

Problems still remain with upstream passage of

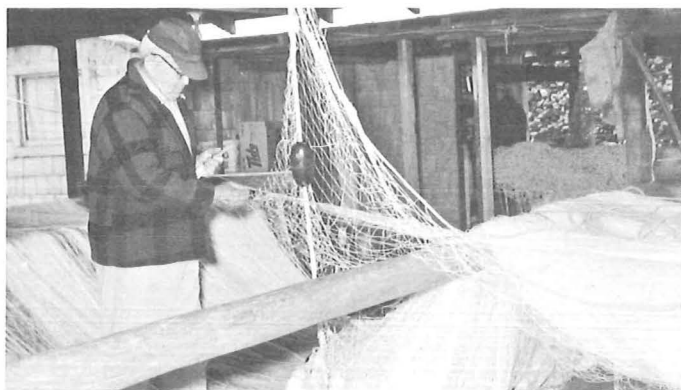
adult spring chinook salmon in some years. High water flows reduce fish use of the uppermost of the three fishway entrances. This has resulted in delay in the upstream movement in some years and caused damage to fish which jump into rocks. State and federal biologists are continuing to work on the resolution of this problem.

STATUS OF STOCKS — OCEAN FISHERIES

In looking at commercial landings of marine species for this period, we find catches were variable. The Dungeness crab fishery reached a low point in its cycle of abundance as the harvest dropped to 3.1 million pounds in 1973 down considerably from the record 14.9 million pounds landed in 1970 and 1971. Shrimp catches continued to increase with a record 25 million pounds landed in 1973 with no indication yet that we have reached the maximum sustained yield for this species. Albacore tuna landings remained high with 28 million pounds in 1972 and 17 million pounds in 1973. Commercial catches of salmon in the ocean troll fishery were about average in 1972 with 7.1 million pounds landed and above average in 1973 when 9.3 million pounds were caught. The total commercial harvest of all food fish in 1972 was 89 million pounds and in 1973 was 91.7 million pounds.

LIMITED ENTRY

Additional interest in restricting commercial fishing effort is being voiced by the fishermen and many economists. Although total landings have remained high for most stocks, the increased numbers of fishermen, gear, and boats have lowered the catch per individual. This excessive capitalization has resulted in far more gear than is necessary to adequately harvest some stocks. Alaska, British Columbia, and Washington have already taken steps to reduce the capitalization in the salmon fisheries. We will be giving this program careful study in the next biennium to see if a similar program will help Oregon's commercial fishermen.





SALMON HATCHERIES

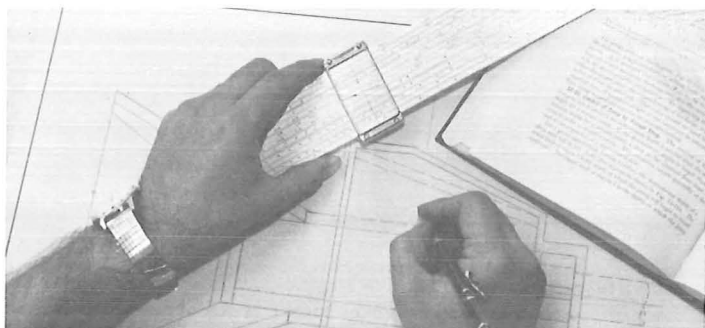
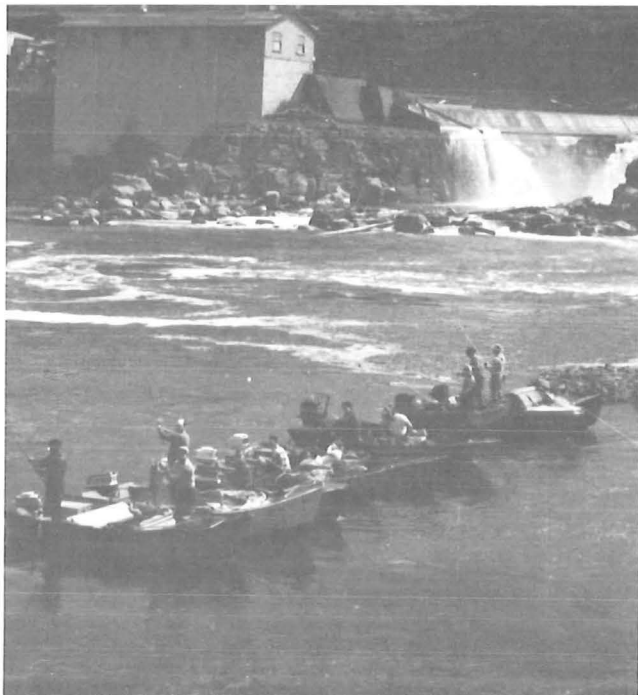
The Commission's salmon culture program is recognized as one of the best in the United States. Improved diets, disease prevention, and better hatchery practices have all combined to increase survival of hatchery smolts and improve catches for Oregon's sport and commercial fishermen. Production of salmon has also steadily increased with a record 3,160,000 pounds raised in our facilities in fiscal years 1973 and 1974.

The 1973 Oregon Legislature provided the Fish Commission with funds to construct two new hatcheries. One facility to be funded 50 percent by the Corps of Engineers would be located on the McKenzie River in the Willamette system. This hatchery would raise primarily spring chinook salmon for the Willamette system. The other hatchery is to be located on the Salmon River near Lincoln City and would raise chinook and coho salmon, and steelhead. New federal water quality laws adopted in late 1972 have required treatment of waste water from all fish hatcheries. Since the extent of treatment was not defined, design and construction of the hatcheries was delayed. The

McKenzie contract has now been awarded and the Salmon River facility is being designed. These two installations will provide greater flexibility to Oregon's salmon culture program and are expected to make an important contribution to Oregon's salmon and steelhead fishermen.

Along with Oregon's public salmon culture program, the state legislature granted the Commission authority to issue permits to private parties to construct artificial salmon hatcheries in Oregon. Our permit system has been designed to encourage public enterprise while protecting our native fish runs. During this period, six permits were issued and six applications were received. Three viable facilities were operating on July 1, 1974. One is on Sand Lake near Tillamook, one is at Newport, Oregon, and one is on a tributary of the lower Siuslaw River. The future of private hatcheries remains to be demonstrated, but a great deal of public interest and enthusiasm is evident. We believe the program is sound and offers a means of providing more salmon to Oregon's citizens at no cost to the state.





INDIAN FISHING

A continually perplexing problem in the Columbia River has been the treaty rights of the Indian tribes who fish on the Columbia River. Oregon is currently operating under the 1969 opinion of Judge Belloni, which gives the state the authority to regulate the Indian catch if the regulations meet certain criteria. Among these is the responsibility to provide the Indians with a "fair and equitable" share of the harvest. This wording has led to dissatisfaction by Indian fishermen to our adopted regulations and has resulted in continuing litigation to define the extent of Indian fishing rights.

Management and harvest options for anadromous fish stocks have been greatly reduced by the complex problem and regulatory decisions have been challenged not only as to their scientific basis, but also on whether they meet legal criteria. The Commission will continue to regulate on the best scientific data available, consider the needs of all users of the resource, and comply with court decisions as they are identified.

COMMISSIONERS' ACTIVITIES

Oregon state government continues to be well served by boards and commissions composed of responsible public citizens. Chairman of the Fish Commission, Joseph I. Eoff, guided the Fish Commission through many controversial meetings. In August 1972, Commissioner Edward G. Huffschtmidt retired after 13 years of service and was replaced by Jack F. Shields. Commissioner Shields is a devoted sport fisherman and a charter member of the Fly Fishers Club of Oregon. He brings to the Commission a considerable experience in working with Oregon's citizens as a

Regional Manager of the National Association of Manufacturers. Commissioner McKee A. Smith, the third Fish Commissioner, also took an active part in developing sound regulations to manage Oregon's food fish resource. The complex problems of Indian fishing rights and the user-interest conflict over who should harvest the fish resulted in many long hours of public testimony and deliberations in order to arrive at meaningful decisions.

I have briefly mentioned some of the more important issues which faced the Fish Commission in the 1972-74 biennial period. A more detailed description of our major responsibilities and actions is presented by our staff on the following pages. It is certainly fitting that I take this opportunity to commend the dedicated staff of the Fish Commission for the excellent progress we have made during these two years. Although many complex problems still face us, the protection of Oregon's food fish resource is assured as long as we can maintain the caliber of staff now serving the Commission.

DR. THOMAS E. KRUSE
State Fisheries Director



Commission Regulatory Action

One of the principal responsibilities of the Fish Commission is to protect the fishery resources under its jurisdiction from overfishing. To provide this protection, the Commission, after deliberation at public hearings, adopts regulations to control the harvest of the various resources. Nowhere are its regulatory decisions on commercial fishing more sensitive than on the Columbia River where the harvestable segment of the anadromous fish runs is taken by the sport fishery, the gill-net fishery below Bonneville Dam, and the treaty Indian fishery above Bonneville Dam.

The intense competition between the sport and commercial fisheries below Bonneville Dam led to a series of anticommercial fishery bills being introduced in the last session of the legislature. Only two of these bills, were passed into law. One was Senate Bill 94 which directed the Fish Commission to minimize the taking of striped bass while maintaining an optimum fishery for shad in five coastal rivers where commercial shad fishing is permitted. In complying with this new law, the Commission reduced the 1974 shad season in Coos Bay and River by 30 days and eliminated the use of set nets in Coos Bay proper.

The other law passed by the legislature relating to fishery regulations was Senate Bill 409 which for the first time provided the Fish Commission with authority to consider recreational and esthetic interests in developing its management programs and in setting commercial fishing regulations. This law was first considered in regulatory action by the Commission when the 1974 winter Columbia River gill-net season was set. This season was reduced from a normal 14 days to only 9 days, partly on the basis of the authority given the Commission by Senate Bill 409. This was the shortest winter season in history and the resulting reduction in commercial catch provided many more salmon to the sport fishery, especially in the Willamette River.

Since spring chinook are a prime sport fish and generate a tremendous sport fishery in the lower Columbia River, the Fish Commission staff was also prepared to offer modifications to the spring commercial season to improve sport fishing while not unduly curtailing the commercial catch. However, a below average spring chinook run and poor fish passage conditions over Columbia and Snake River dams limited a commercial season to only one day (May 11) on the lower Columbia River and consequently no modifications were made.

In Commission action relative to the Columbia River Indian fishery, a joint policy decision with the Washington Department of Fisheries was made in April of 1974 to open the spring commercial fishing season each year for treaty Indians above Bonneville Dam an undetermined number of days in advance of the opening of the non-Indian commercial spring season below Bonneville Dam. The amount of advance fishing time each year will depend on river conditions and the extent and pattern of salmon movement over Columbia River dams. This policy was adopted because of objections by Indian fishermen that when both the Indian and non-Indian seasons open concurrently the lower river non-Indian fishery intercepts most of the fish before they have a chance to move into the Indian fishing area and catches by the Indians are reduced. The first application of this policy would have been during the spring commercial fishing season, but the poor condition of the spring chinook run limited the Indian fishery to only two days (May 11 and 12) during the latter stages of the run and there was no opportunity to provide advance fishing time.

In another area of commercial fishing, the Commission took a significant step when it adopted a regulation to help enforce the opening date of the troll salmon season for coho. There has been a perennial problem of some troll fishermen catching coho salmon in advance of the June 15 opening of the Oregon coho troll season and then landing these fish soon after the season opens. In order to reduce this practice, the Commission will now require all troll salmon vessels 26 feet or over in length to be inspected at the start of the coho season for the absence of coho before being allowed to land this species in Oregon ports. This requirement will be in effect for the first 13 days of the season for those vessels which do not freeze their catch and all season for those vessels which do. Several hundred fishing vessels will be affected by this regulation.

The interest in private salmon hatcheries continues to grow in Oregon. The Fish Commission has the responsibility and authority for reviewing and issuing permits for such hatcheries. During the biennium, the Commission reviewed and approved four permits for private chum hatcheries and one each for coho and chinook hatcheries. A total of eight private salmon hatchery permits have now been issued in the state.

Administration

The Administration Division provides general supervision and coordination of the activities of the Fish Commission's operative divisions. 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, poundage 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 Fish Commission document, aimed at resource enhancement, represents considerable decision making and legislative fiscal liaison.

Approximately 22,700 1972 and 1973 fishing, boat, and dealer licenses were issued during the biennium. Poundage fees were collected and statistics were compiled on 184 million pounds of fish and shellfish landed in Oregon during 1972 and 1973. Income for the two-year period July 1, 1972 to June 30, 1974 to the state general fund from poundage fees was \$775,139.62 and from license sales \$1,000,773.00. 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.



Personnel

The function of the personnel section is to maintain an effective working force for the Commission through an active program of recruitment, selection, position review and employee relations. To accomplish this, activities are coordinated with the examination, classification, certification, and other sections of the State Personnel Division although registers for positions such as fish hatcheryman, experimental biology aide, and student scientific and technical trainee are maintained wholly by the agency.

PROJECTS

Completed and projected activities for the biennium include the reclassification of 12 positions, promotion of 12 employees, and the establishment of 54 positions (primarily temporary in nature). Although seasonal and temporary appointments are expected to be only about one-half the number of the 1970-72 biennium the seasonal peak payroll of 269 will be nearly the same and the average number on the payroll will increase from 228 to 245 this biennium. This increase resulted primarily from 7 Emergency Employment Act positions which were phased out by November 1973 and the Corps of Engineers financed Columbia River Peak-ing Study approved in December 1973 consisting of 6 regular staff and 26 temporary and seasonal positions.

TRAINING

Training is another responsibility of the Personnel Section. In this field, a three-day staff training conference was conducted at Bend, Emergency Employment Act training programs were coordinated and trainees assisted with job placement on termination, and a new Employees Manual was developed.

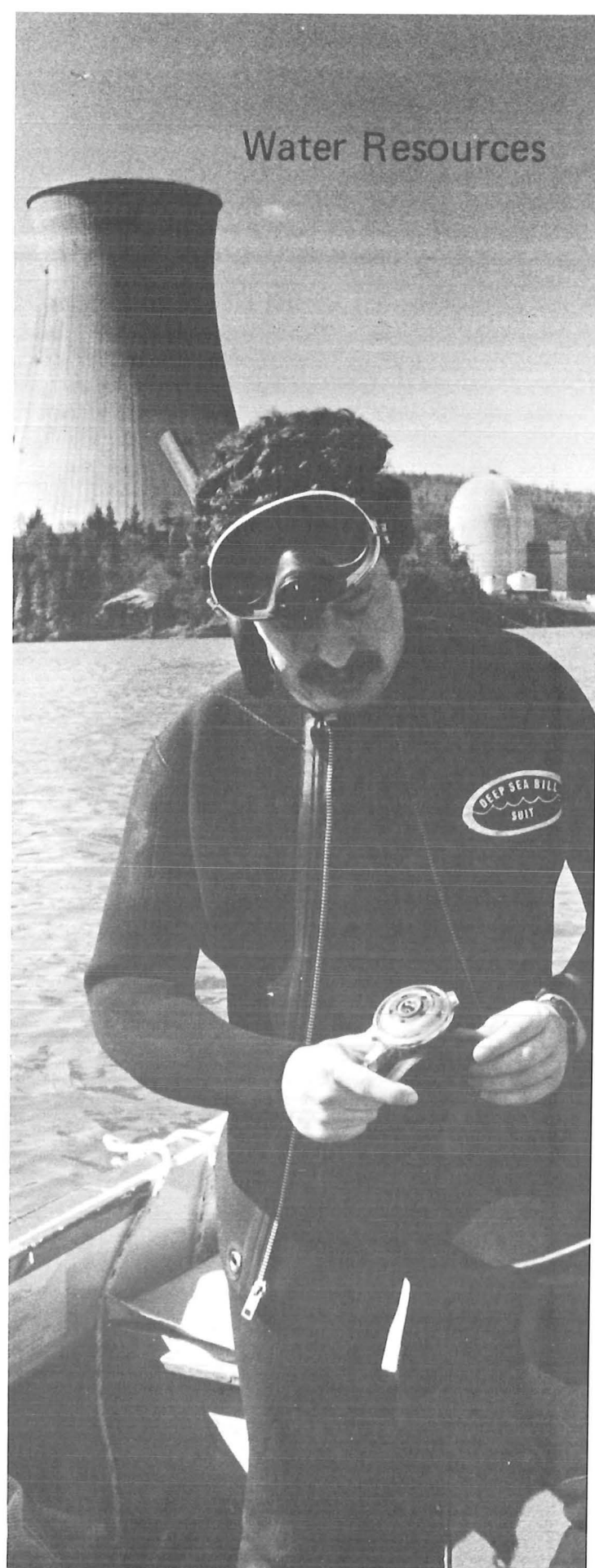


RESPONSIBILITIES

Growing demands on water resources of the state have made protection of aquatic life essential in planning for water and related land use. The Water Resources Section is charged with resolving fish resource conflicts that arise from water and land uses which affect the state's rivers, bays, and offshore waters. The Section's responsibilities include: (1) passage and protection of anadromous fish at dams and other man-made barriers in state and Columbia Basin waters; (2) compensation for fishery losses and enhancement of fish resources as a result of various federal, state, or local water projects; (3) monitoring of projects involving water pollution, river and harbor improvement, waterway material removal and fill, flood damage control or restoration, forest land operations, highway and bridge construction, submarine blasting, seismic exploration, chemical pesticide application, mining and mined land reclamation, water diversion and use, and thermal power plant siting; (4) investigation of flow needs for anadromous fish migration, spawning, and rearing; (5) coordination of the Commission's role in federal, state and local water and land resource planning activities; (6) representation on several technical interagency and interstate committees; (7) promotion of legislation to preserve and protect fish and aquatic environment; and (8) resolution of fishery conflicts resulting from nuclear and geothermal power plant development.

LONG TERM PLANNING

During the biennium the Section provided input to federal, state and local land and water use planning activities. These involved the Pacific Northwest River Basins Commission, The Oregon Coastal Conservation and Development Commission, counties and port districts. Formulation of the Lower Willamette River Management Plan, the Willamette Greenway Plan, Lower Columbia River plan, and guidelines for development along the state's coastline was of paramount importance. Creation of the State Land Conservation and Development Commission has cast the Section in a role of providing fish resource input to statewide planning activities. Waterway filling in all parts of the state is being scrutinized for compatibility with aquatic resource values and conformance with land and water use plans. Guidelines for resource protection were written into more than 1,400 state waterway activity permits. The protection of estuarine and marine fish environment is better assured through the Section's coordination of



resource information to a host of planning bodies. Similarly, fish resource values have been made a part of statewide nuclear and thermal power plant siting considerations.

HABITAT PROTECTION

The Section furthered fish resource protection by participating in the development of guidelines for federal, state, and private timber land operations. Agreement was also reached on guidelines for resolution of fishery problems at Portland General Electric Company's Bull Run Project on the Sandy River, Eugene Water and Electric Board's Leaburg and Walterville projects on the McKenzie River, and at several other structures causing fish losses.

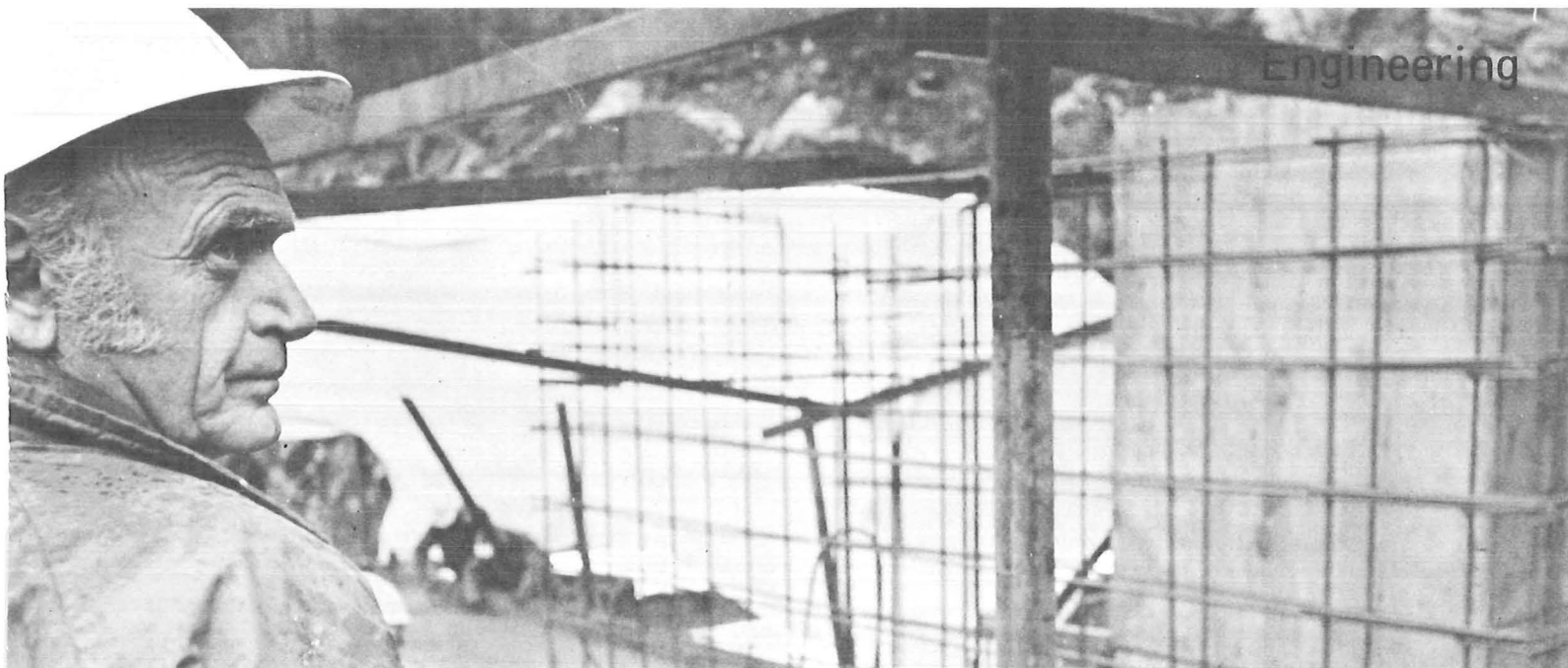
HYDROELECTRIC PROJECTS

Substantial time was spent on fish protection at Columbia River hydroelectric projects. We joined with sister agencies in Idaho, Washington and the federal government in seeking hatchery compensation for salmon and steelhead lost at the Corps of Engineers four lower Snake River dams. This program should return approximately 132,000 additional salmon and steelhead to the Snake River and many times that number to downstream fisheries. We and other fishery agencies are also negotiating with Idaho Power Company to finalize their compensatory responsibility at the Hells Canyon Project and provide for the return of an additional 22,000 adult salmon and

steelhead to the Snake River. Preliminary consideration was given to obtaining compensation for juvenile and adult salmon and steelhead killed in passing hydroelectric dams on the main Columbia River. The serious losses occurring at these dams over the years have been borne by the commercial and sport fisheries, which have been greatly reduced to permit adequate spawning escapement.

In representing the Commission on the Columbia Basin Fishery Technical Committee, section personnel continued their coordinative role in seeking solutions to serious fishery problems such as power peaking and nitrogen supersaturation. The Corps of Engineers' multimillion dollar research program to determine the impacts of power peaking on fish and to find means of preventing or compensating for related fish losses has been under way since 1972 and will continue through 1980. Research and development funded by the Corps to alleviate the nitrogen gas supersaturation problem has progressed satisfactorily. Nitrogen control devices (deflectors) have been installed in the spill bays at three projects (Loser Granite, Lower Monumental, and Bonneville) and installation is scheduled for other projects. Solution of nitrogen problems associated with the mid-Columbia PUD dams has progressed more slowly. The Section is participating in a joint Corps-fishery agency effort to improve the accuracy and efficiency of fish counts at main Columbia and Snake River dams.





Design, construction and specialized maintenance of department facilities, improving natural stream habitat, inspection and operation of fishways, and employee safety are services performed by the engineering division. Sixteen full-time specialists skilled in professional engineering, building construction and heavy equipment usage perform the duties of the division. Engineering and overall supervision are carried out in the department's Portland headquarters. The division maintains a warehouse in southeast Portland which is headquarters for field personnel and provides space for shops and equipment.

Most department facilities are designed by staff engineers. Private consultants with special expertise are retained from time to time to assist in project development. Regular employees aided by temporary labor handle most small repair, maintenance and system improvement jobs. Contractors are engaged through competitive bids to perform all major work, and small jobs where their specialties are required. Contract work is administered by the engineering division.

Design, construction and environmental protection codes and regulations have become increasingly restrictive. These apply to new work, maintenance, stream clearance operations and worker safety. Construction costs have been hard hit by inflation. As a result, planning and design have required more preparation, detailing and review. Additional time has been spent to develop alternatives in order to

satisfy newly imposed conditions and to offset some of the cost increases.

Major projects carried out by the engineering division during the biennium are as follows:

PROPAGATION FACILITIES

Construction preparations for new McKenzie River and Bonneville hatchery facilities were completed and preliminary plans for a new Salmon River hatchery were started. Construction plans, specifications and other contract documents for McKenzie were developed by the division. Design included a host of new regulatory requirements including hatchery waste treatment. The \$2 million hatchery is jointly funded by the state and Corps of Engineers Cougar and Blue River projects, and is intended to produce 160,000 pounds of salmon fingerlings when complete.

Bonneville Hatchery expansion construction was let for construction by the Corps of Engineers in April 1974. This \$7.5 million project mitigates for John Day Dam. The division was involved in functional planning and the development of some of the features.

Topographic maps of several Salmon River sites were made and preliminary schemes were developed for study. Land and water use restrictions and environmental considerations are of major concern. Tentative plans for this \$1.4 million station include a dozen rearing ponds, usual support facilities for spawning and incubation, and pollution control of hatchery waste water.

A variety of improvements have been made at existing stations. An electric barrier spanning the North Nehalem River was installed to direct adult salmon into an adjacent hatchery collection facility. The Marion Forks Hatchery intake and dam were rebuilt and the Alsea rearing lake was asphalt lined to reduce erosion and improve rearing environment. Maintenance varied from installing new roofs to replacing window frames. Over \$100,000 was spent for contract work, supplemented by a considerable amount of force account effort.

Plans were started for reconstruction of the Minto holding pond and additional rearing facilities at Big Creek Hatchery. Minto will be funded by the Corps. The latter will be charged to the Bureau of Reclamation to offset losses associated with their Scoggins Creek project.

The division began planning necessary improvements to domestic water systems at hatcheries. Collection of data and engineering computations required for waste discharge permits were also begun. The division received a small contract to assist National Marine Fisheries Service consultants who are developing pollution control schemes for federally funded hatcheries. This is expected to develop into a major design and construction program.

HABITAT IMPROVEMENT

Logjams, gravel, boulder and debris obstructions were removed from several tributaries of the Kilchis, Nestucca, Molalla, Smith, Chetco, Willamette and Columbia rivers. Rough-cut fish passageways were constructed over six rock falls, the largest of which was 15-foot high Lees Falls on the Tualatin River. Plans were also developed for a channel fish pass around Butte Creek falls and dam.

A new fishway was constructed at the old Oregon Iron and Steel Dam on the Tualatin River at a cost of \$18,000. The Fall Creek fishway on Wilson River was repaired at a cost of \$14,000 after sustaining heavy damage in the 1972 flood. Several other fishways required repair during the biennium. Willamette Falls fishway received a number of minor alterations including the installation of temporary flashboards along the dam crest to improve attraction.

Fishways were regularly inspected. Thirty-six of the 111 on inventory are state owned and therefore were also operated and maintained. An additional 19 rock-cut fish passes were checked and some minor corrections were required.

MISCELLANEOUS

Under a contract with the Corps, new display ponds were constructed at Bonneville Hatchery at a cost of \$50,000. A public information display including live intertidal animals was built at OMSI. Over 140 regulatory information signs were maintained along the coast.

Additional offices were constructed at the Management and Research Division's Clackamas headquarters. Administrative offices of the department were extensively remodeled to accommodate the public who purchases licenses.





The Fish Culture Division continues to work toward the objective of using its present facilities and the expertise of its personnel to produce maximum numbers of quality salmon and steelhead fingerlings released at the proper size, time and place to contribute to the expanding sport and commercial fisheries. There are 74 personnel currently staffing the division. Planning for improvements and expansion of programs continued. Our 15 hatcheries are distributed with five on the coastal tributaries (Elk, Alsea, Siletz, Trask and Nehalem rivers; six on Columbia River tributaries to the Willamette (North and South Santiam, McKenzie and mid-Willamette rivers). Four rearing ponds (East Fork Trask, Salem's Cascades Gateway Park, Aumsville and Stayton ponds) are operated to add to the production.

HATCHERY BIOLOGY

The Hatchery Biology staff of 11 biologists and 3 technicians with their laboratory facilities at the Sandy Hatchery and the Clackamas Management and Research Headquarters, provide an excellent balance of research ability and technical assistance to continually improve fish culture operations. Personnel in this section work on problems and

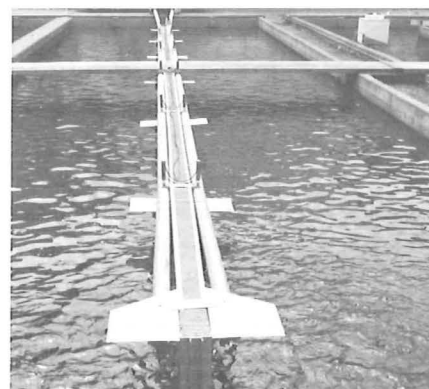
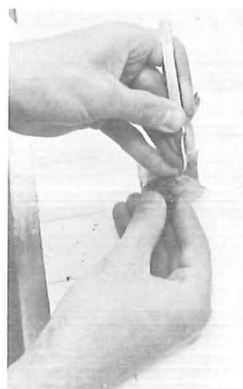
techniques dealing with nutrition-physiology, pathology and hatchery techniques. Contract studies with Oregon State University are included for each group.

LIBERATIONS—EGG TAKE

In this biennium we released 116 million juvenile salmon and steelhead weighing 3,159,500 pounds. This was 85,400 pounds more than in the previous period. We handled 224,400 adults and from these we took 155,514,500 eggs.

NEW FACILITIES

As reported in the 1970-72 Biennial Report, considerable time has been spent working with the Walla Walla District, Corps of Engineers, in design of 28 rearing ponds and related facilities at Bonneville hatchery. The work at Bonneville will provide facilities to rear the fingerlings to produce one half the adult fall chinook salmon (15,000) formerly produced from the Columbia River above the John Day Dam. The other 15,000 will be produced by enlargement of the Spring Creek National Fish Hatchery. Five contracts have been awarded with four being complete and one under-way. These contracts provided channel changes in



Tanner Creek, four deep wells with pumps and related structures to provide 15,000 gpm., parking areas for use during construction, and new trout and sturgeon ponds. The last contract is for construction of the 28 rearing ponds, two adult holding ponds, spawning and mechanical buildings and associated facilities. The bid for this last contract was awarded for \$6.5 million and the work is scheduled for completion in November 1975.

The summer steelhead rearing and release program at the South Santiam hatchery has reached moderate success with sport fishing quite good in this river. Sufficient adults and eggs are available for an increase in plants of smolts to the North Santiam River and for providing eggs to the OWC. Initial incubation and early rearing is conducted by the OWC at their Oak Springs hatchery because water quality at South Santiam hatchery is not adequate to allow growth to smolt size in one year.

Two years ago, a world-wide shortage of protein for animal feed developed. Feed manufacturers had a difficult time obtaining desired quantities of fish meal. Until then herring meal had been specified as the sole source of fish meal for our production diets. Such a limitation aggravated an already serious situation. As a result we devoted a substantial portion of our laboratory and field work to evaluate other fish meals for use in Oregon diets. The results of this work enabled us to make the Oregon Pellet formula more flexible by allowing the inclusion of other meals. We expect this to relieve problems with meal procurement and somewhat slow down price increases.

The stock improvement program, based on selective breeding, continued with coho salmon at the Big Creek hatchery. Returns from the high-survival line are expected to return in the fall of 1974, and should the results be favorable we expect to apply the results at other hatcheries in the near future.

The time and size experiment for Willamette River spring chinook revealed that a size of 10-12 per pound released in March of their second year produced the best results. These results are now being implemented into our production program.

Fish health continued to be monitored at our hatcheries and appropriate therapeutic measures prescribed as appropriate. Two vaccines against serious fish diseases (furunculosis and vibrio) are being evaluated in two of our hatcheries and we expect to go to production sized experiments in the future. If successful we are hopeful that the addition of these tools will significantly improve the survival of our hatchery fish.

Various virus diseases of fish are being detected at more locations. We are being more cautious in our transfer of fish and eggs with frequent inspections by our pathologists.

With the awarding of licenses to private interests for rearing coho and chinook salmon, we have developed a policy procedure and price for providing fish or eggs to these interests. Listed below are the eggs and fingerlings provided to private operations.

Private Interest	Species	Green Eggs	Fingerlings Fish/lb.	Number
Oregon Aquafoods	1973 Fall Chinook	514,000	37/lb.	
Oregon Aquafoods	1973 Summer Steelhead		37/lb.	60,828
Oregon Aquafoods	1973 Coho	492,300		
Oregon Aquafoods	1972 Fall Chinook		75/lb.	104,250

Hatchery personnel at Marion Forks two years ago noted spring chinook spawning below the hatchery. These were adult salmon which had been reared in Detroit Reservoir as land-locked spring chinook. In a small scale experiment to determine if this run could be increased, one female and two males were collected. About 1,000 smolts were released from this mating. The next year about 6,000 smolts were released into the reservoir. We will continue this program with interest.

Elk River hatchery, our newest hatchery, located on the south coast has had a fine production record during the first few years of operation. The hatchery production is mainly fall chinook which return in late fall and winter (Nov., Dec., and Jan.) as large, bright fish. These fish have been released mostly into the Elk and Chetco rivers. In 1971 hatchery fall chinook made up 72 percent of the 1,835 estimated sport catch in the Chetco River, in 1972 the estimated catch increased to 4,928 with a higher percent of hatchery fish, and in 1973 hatchery fish accounted for 56 percent of the 1,739 estimated catch. In Elk River in 1972 (the first year of sport fishery creel census), the Elk River catch was estimated at almost 2,075 fish with 80 percent originating from the hatchery, and in 1973 hatchery fish made up 81 percent of the 2,435 estimated catch. The sport catch in Elk River represented about 16 percent of the total estimated return of 10,000 hatchery fish to the river in 1972 and 24 percent of the 10,247 in 1973. In addition these fall chinook made large contributions to the Oregon ocean sport and commercial fishery from Newport to northern California. The program has been expanded to provide juvenile fish to Floras Lake, Coquille River and the Coos Bay system.

In the previous biennium we reported on the sale of salmon carcasses and the alleged problems to the commercial fishing industry. We also reported on the proposed change in our bidding procedure. From our observations the changes have substantially reduced negative comments from the fishing industry. The fish are now graded with the fish in category 3 being sprayed with a yellow dye so they cannot be used for human consumption.

The dirt rearing pond at Alsea hatchery was reshaped and lined with asphalt resulting in improved flows, reduction of fingerling loss (an annual problem in August), more efficient release of fish, and reduced labor required for cleaning.

A new water intake was constructed on Marion Creek for the Marion Forks hatchery.

An electrical barrier was built at the North Nehalem River Salmon hatchery to improve collection of marked salmon.

The land on which our Siletz hatchery is located is leased with facilities located in two areas. The upper area consisting of residence, incubation and storage buildings was returned to the owner. The buildings were in very poor condition. A mobile home was moved onto the lower site and a small storage building added resulting in a more compact and efficient operation.

In anticipation of a new hatchery, a joint venture of the Corps of Engineers and the Fish Commission, the McKenzie Hatchery was closed. Buildings and ponds will be razed in order to make way for the new hatchery.

NEW CONCERNS

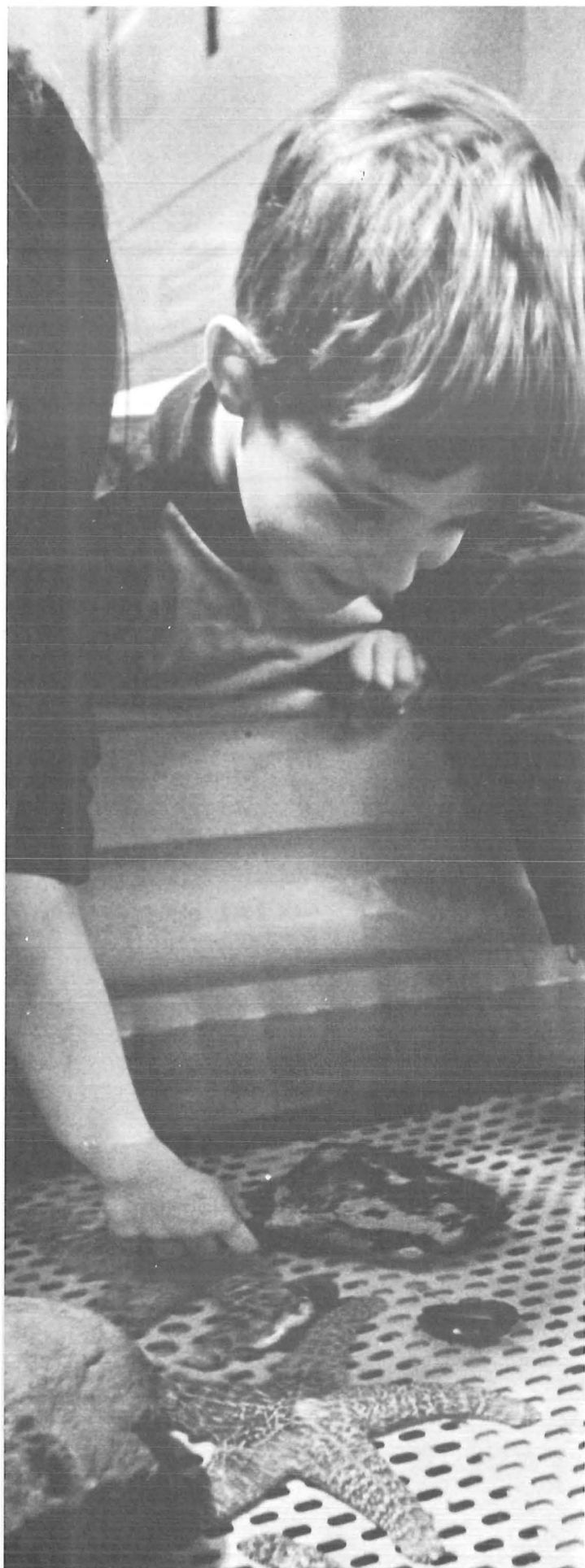
Poaching of adult salmon and steelhead from holding ponds increased as the price of these food items increased. Additional vigilance by hatchery personnel and the state police was required.

In 1973, projected high stream temperature in the middle Willamette River below Dexter Dam, a result of unfilled reservoirs and a general low summer streamflow, suggested we should move the adult spring chinook from the Dexter Ponds in order to reduce mortality caused by disease associated with warm water. South Santiam hatchery has natural cold water flow. Juvenile salmon were transferred from the South Santiam hatchery and all 10 rearing ponds were converted for use of adults. The lowermost water supply from Foster Dam was used to provide cold water. Temperatures were maintained in the low 50's; however, the mortality, even in the colder water, was excessive although egg survival was measurably increased.

On occasion fish losses do occur at the hatcheries or rearing ponds. An estimated 200,000 fall chinook were killed shortly after release when they entered an improperly screened irrigation ditch below our Stayton Pond. The intake is now screened adequately.

A year's production of winter steelhead (56,000) at the North Nehalem hatchery died when a large valve slipped off a pipeline from which a pump had been removed for annual maintenance. The water bypassed the ponds and the fish were lost.





Information — Education

RESPONSIBILITY

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.

PROJECTS

The Information and Education Section carried forward several important projects during the 1973-74 biennium. Production of signs for the smelt fishery on the Sandy River was completed. This newest of Commission responsibilities required public understanding of the new rules and regulations. Fifteen signs placed throughout the smelt dipping areas of the Sandy River were well received. The 300,000 synopsis of Oregon Sport Clamming and Crabbing regulations were put into stores and businesses for public convenience. Also 54 press releases, 61 principal talks, 26 television news stories and 34 radio news briefs were released during the biennium. In addition a radio public service campaign comprising 6 one-minute announcements was completed and aired in February, 1975. Each announcement speaks of Oregon history, the Commission's role during 96 of those formative years and today's modern approach to scientific fishery management. They were aired on 66 Oregon radio stations. Partially shot are 6 one minute and 6 thirty second television public service announcements for use in the fall of 1975. The closing days of the biennium saw completion of a complex exhibit at the Oregon Museum of Science and Industry. Three large tanks hold numerous species of intertidal life. One tank demonstrates tidal action, another wave action and the third typifies the ocean bottom in the tidal zone. A large "touch" tank has starfish, sea anemone and sea urchin in shallow water where children can touch them and examine these creatures at firsthand. Agreement was reached and a contract signed with the State Fair Commission for long term development of the aboretum area of the fairgrounds. This will be jointly coordinated with the Oregon Wildlife Commission and the State Department of Forestry. Under way is a revampment of the Commission's Bonneville Hatchery display and the completion of new fish feeders and informational

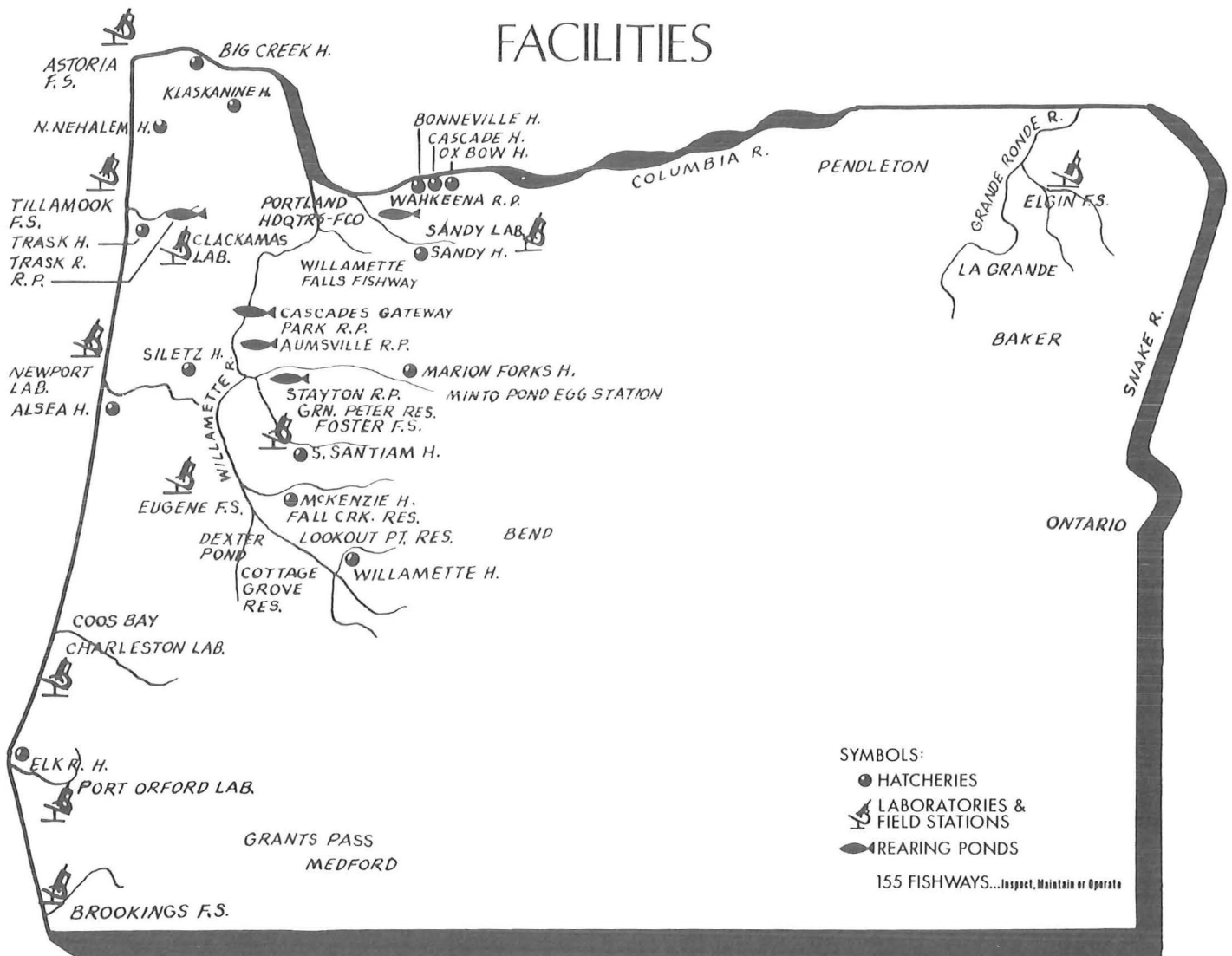
signs, in redwood, describing a special genetic strain of rainbow trout from the University of Washington and the ever popular sturgeon in the new display ponds at this historic hatchery.

Information and Education section was pleased to assist the Governors office in hosting the Western Governors Conference at Salishan. In addition we contributed to the Oregon Division, Izaak Walton

League of America in its fall, winter and annual meetings as well as prepared four presentations for National Award consideration. All four placed first in their respective categories.

In summary the Information and Education Section supplied logistical support and/or press coordination for 86 technical, public and special meetings held in 1973-74.

FISH COMMISSION FACILITIES



Managing Oregon's Marine, Coastal Rivers and Inland Waterways



The Management and Research (M&R) Division conducts activities and research studies to provide information which forms the base to manage the food fish resources of Oregon. The major finfish and shellfish groups classed as "food fish" in Oregon include abalone, clams, crabs, shrimp, albacore tuna, groundfish (flatfish such as sole and flounder, and roundfish such as perch, cod, and hake), smelt, herring, and anchovies, sturgeon, shad and salmon. The classification of striped bass was changed to game fish by the 1973 legislature.

The M & R staff consists of 55 biologists, 8 technicians, and 11 supporting positions. They are located at 10 laboratories and field stations (see map) with headquarters at Clackamas, Oregon.

The M & R budget for fiscal year 1974 (July 1, 1973-June 30, 1974) was about \$1.4 million. Federal funds (\$644,000) made up about 46 percent of the total while about 42 percent (\$593,000) came from State General Funds and 12 percent was from other funds (\$160,000 from Daily/Vacation Salmon Angler Licenses and \$7,000 from other states).

Anadromous fish activities took up 69 percent

(\$975,000) of the fiscal year 1974 M & R budget of \$1.4 million while the remaining 31 percent (\$432,000) was spent on marine fish and shellfish work. About 63 percent (\$874,000) of the M & R budget was used to conduct research studies and 37 percent (\$533,000) was used for management activities.

The Division is divided into three major sections, each containing several programs (see chart). Most of the programs include more than one project, and each project is led by a senior biologist. The following summaries give the highlights of activities during the biennium by species or area of study. For a more complete account of the commercial landings of finfish and shellfish refer to the table on page 33.

ALBACORE

Albacore landings were 12.0 million pounds in 1972, some 3.4 million pounds above the 10-year average, and 16.3 million pounds in 1973, or 3.8 million pounds less than the 10-year average. Our sampling efforts were substantially increased during the period, through PMFC-Sea Grant





funding, as a part of a coastwide effort to bring the sampling of the commercial albacore catch up to an adequate level. The American Fisherman's Research Foundation, which is funded by fishermen and packers, furnished matching money for the Sea Grant project along with the states along the Pacific Coast. This is the first time the industry has provided the major share of money for a coordinated coastwide research study. Results of this cooperative project are being watched closely nationwide.

BIOMETRICS

Three biologists and a research analyst staff a regional "Mark Processing Center" located at the Clackamas laboratory. Salmon fin-mark sampling information and age composition data are received from Washington, Oregon, and California and coded-wire tag recovery data from these areas plus British Columbia and Alaska. The center published annual fin-mark data reports for the 1971 sampling year in May 1973 and for the 1972 sampling year in May 1974. These reports summarize the contribution of identifiable hatchery programs to Pacific Coast salmon fisheries.

The section also gives assistance to other Fish Commission of Oregon personnel with experiment design and some computer programming.

CLAMS

The commercial razor clam fishery continued at the low level of the past few years. The level of production reflects the decreased number of commercial clam diggers rather than availability. The commercial landings were 13,000 in 1972 and 14,000 pounds in 1973. The sport fishery continued at a high level of participation with 64-76,000 razor clam diggers harvesting 0.9 million clams annually on Clatsop County beaches.

Commercial Fishery bay clam landings increased somewhat during the biennium with landings of 62,000 in 1972 and 17,000 pounds in 1973. The sport fishery on these species continued to increase in intensity each year but we do not have an estimate of total catch.

A federally funded clam rearing project successfully developed techniques for spawning and rearing Manila littleneck clams. Several million of these



clams were planted in selected estuaries and their growth and survival is now being monitored.

CRABS

Crab landings during the biennium declined to a record low of 3.1 million pounds in the 1973 season. The 1974 crab landings are expected to be slightly better. This decline was coastwide and followed the same pattern of decline in abundance as experienced in 1963 and 1964. It is believed that periodic declines are related to environmental conditions and not overfishing.

During 1973 the Fish Commission entered into a cooperative Dungeness crab study with California, Washington, and the National Marine Fisheries Service under a state-federal management program contract with PMFC. The objective of this program is to manage the Dungeness crab fishery on a basis consistent with sound biological principles to enhance the net benefits from the resource and promote an orderly fishery on a coastwide basis.

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.

The first phase of the study explored the efficiency of individual crab fishermen and a report was prepared on this analysis. Further study was halted by termination of the economist in the fall of 1972. Since the federal funds used for the project were of a short-term nature a replacement was not hired.

ESTUARIES

During 1971 an 8-month estuary resource use survey was conducted in 16 Oregon estuaries. The survey showed that from March through October 1971, 506,000 people spent 1.2 million hours harvesting 550,000 marine food fish, 1.8 million clams, 230,000 crabs, and 170,000 miscellaneous invertebrates. Yaquina, Tillamook, and Coos bays were the most utilized estuaries. The results of the survey were published in a series of reports by estuary so this information is now readily available to various planning entities.

During the spring of 1974 we started a cooperative estuarine survey of Tillamook Bay with the United States Bureau of Sport Fisheries and Wildlife. The primary purpose is to identify and determine the distribution of fish in the bay. The survey will provide baseline data and methodology for estimating the importance of various species in Tillamook and other bays.

GROUND FISH

Landings of groundfish since the arrival of foreign fleets in 1966 have stabilized in the 20 to 21 million pound range. The 1972 landing of 20.9 million pounds, while falling in this range, contained several increases and decreases in catch by species. Dover sole landings of 5.9 million pounds were the highest in 20 years. The 1.1 million pound landing of Pacific cod was the highest ever recorded in Oregon. These increased landings were balanced by a 1.0 million pound drop in Pacific ocean perch landings to a level of 0.6 million pounds, and a 1.1 million pound drop in the landing of fish used as animal food. In 1973 total groundfish landings dropped to 19.3 million pounds. This reduction resulted from problems with supply due to decreased abundance of Dover sole and Pacific cod, and the shifting of many vessels to the coastal shrimp fishery. Pacific ocean perch landings continued their steady decline, reaching a level of 0.5 million pounds. This is the lowest landing of Pacific ocean perch since 1948.

HERRING AND ANCHOVY

Herring and anchovy are the principal species harvested for bait purposes in Oregon. Landings of herring in 1972 amounted to 27,300 pounds and in 1973 the landings reached 41,600 pounds, most of which were taken from Yaquina and Winchester bays. Anchovy landings in 1972 and 1973 amounted to 9,500 pounds and 8,000 pounds, respectively, nearly all of which were landed in Brookings.

The principal work done on bait species has been to continue the spawning area surveys to determine where and when herring spawn in Oregon's estuaries. In 1973 we conducted a pilot herring tagging study in Winchester Bay to learn methods and techniques to be used later in a more definitive study on the movements and migrations of Oregon herring.

MISCELLANEOUS SHELLFISH AND INTERTIDAL ANIMALS

The bait fishery for mud and ghost shrimp in 1972 and 1973 produced landings of 10,000 and 13,000 pounds and the crayfish fishery produced 9,000 and 10,000 pounds of crayfish for food and bait, respectively. The magnitude of the sport fishery on this latter species is unknown; however, indications are that it is growing in popularity.

During the biennium, 583 intertidal nonfood animal collecting permits were issued; 260 in 1972 and 323 in 1973. Although the number of permits issued increased, the number of animals reportedly collected decreased.

SALMON

COASTAL RIVERS AND LAKES

Escapements of wild salmon stocks in Oregon coastal drainages were generally below long-term averages during the biennium except chum salmon which have shown signs of resurgence after several years of depressed spawning populations. The number of spawning coho salmon declined to less than one-half the long-term average in standard index streams during 1972 and 1973. Fall chinook salmon were below average in 1972 and above average in 1973.

Wild populations of coho were augmented by releasing surplus hatchery-reared adults into streams above natural barriers. Tributaries in several coastal drainages received 8,670 adult coho during 1972 and 1973, representing a total potential deposition of approximately 13 million eggs.

Coho salmon smolts from Trask and Alsea river hatcheries were released at several localities in the Alsea River drainage to improve the sport harvest and reduce the surplus adults returning to the hatchery. In 1973 hatchery-reared jacks comprised 81 percent of the total sport catch of all coho jacks in lower Alsea River and 94 percent in Fall Creek below the hatchery. The remaining percentages are from wild coho jacks. The study will terminate when the adults return in 1974.

Research on hatchery-reared and wild stocks of fall chinook salmon in south coastal rivers is starting to pay off. Fall chinook smolts released into Elk and Chetco rivers have made significant contributions to Oregon's south coastal troll fishery. These fish have also supported an intensive river sport fishery each fall, comprising 70-80 percent of the total catch in these rivers. Over 10,000 hatchery-reared chinook returned to Elk River in both 1972 and 1973. Survival has exceeded 5 percent for some experimental groups of smolts. We expect even greater benefits in the future as more knowledge is acquired from other experimental groups returning to the hatchery and to areas such as Floras Lake, Coquille River, and Coos Bay that were planted during the biennium.

In 1973 we stocked fingerling spring chinook in two municipal water supply reservoirs in the Trask and Nestucca river systems. Seven months later the Nestucca Reservoir was drained and over 46 percent of those stocked emigrated from the reservoir. This is considered a high survival rate. We were not able to estimate the outmigration from the Trask Reservoir but catches in test seine and gill-net sets indicated that the fish were rearing and

growing well. The two reservoirs were replanted with a total of 404,000 fingerlings in February 1974.

The 1973 Oregon legislature authorized the Fish Commission to issue private coho and chinook salmon hatchery permits in addition to private chum hatcheries permitted by the 1971 legislature. Since 1971 we have issued six private chum salmon hatchery permits and one permit each for coho and chinook. We obtained 520,000 chum fry from the U.S. Bureau of Sport Fisheries and Wildlife hatchery at Quilcene, Washington, in 1974. The fish were distributed to two private hatcheries on the Siuslaw and Yaquina systems under a special study agreement with the operators.

COLUMBIA RIVER

In the Columbia River, commercial landings of salmon and steelhead totaled 7.9 million pounds in 1972 and 10.8 million pounds in 1973 compared to an average of 7.7 million pounds since 1960. Minimum (size) mesh restrictions were again imposed in the winter and early fall gill-net seasons below Bonneville Dam to reduce the commercial take of steelhead.

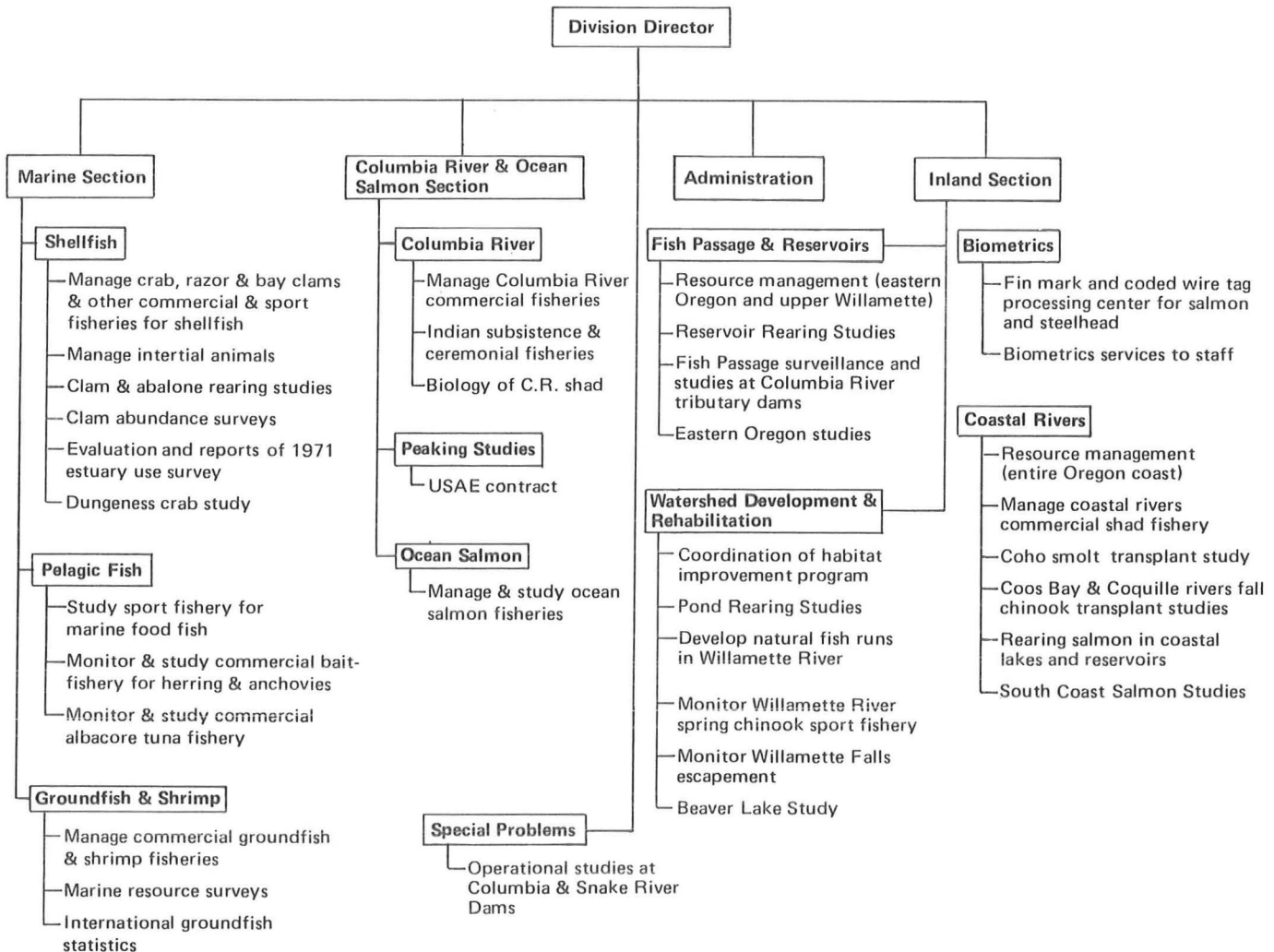
The 1973 run of spring chinook destined for above Bonneville Dam was 239,000 fish, the fifth largest run since 1938.

The 1973 Columbia River fall chinook run of 544,000 fish was the largest since 1950. The coho runs during 1972 and 1973 were 348,000 and 413,000 fish, both below the 1964-73 average. The 1973 summer steelhead run (189,000 fish) was slightly below average, while the sockeye run of only 60,000 fish was poor. The summer chinook run in 1973 was 49,000 fish, poorest on record since 1938. A remnant chum run continued in 1972 and 1973.

Operational studies at Columbia River dams are being conducted by the Fish Commission under contracts with the U.S. Army Corps of Engineers. A major concern of these studies has been the distribution of spill through the gates and the effect of that spill on guiding or blocking adult migrant salmonids as they approach the fishways. Since initial work at Ice Harbor Dam in 1967, recommended distributions have been developed for all Corps dams on the lower Columbia. New problems have required a reevaluation of these distributions. For example, the installation of three new turbines at Ice Harbor Dam (now being completed) will completely change the flow patterns for the

FISH COMMISSION OF OREGON
Management and Research Division

June 1974



recommended spill distributions. Consequently, a new distribution for use with the six-unit powerhouse was worked out in 1972. This was done by passing water through the three skeleton units with the use of slotted bulkheads to simulate flows from the enlarged powerhouse.

Another change in optimum spill distributions is being caused by the installation of spillway deflectors to reduce nitrogen supersaturation. Before installing such deflectors at any dam, hydraulic models of the dam are constructed with deflectors in the spill bays. Such models permit a very thorough study of the velocity patterns with different spillway distributions. We are presently studying spill patterns at Bonneville and Lower Monumental dams.

Controlled experimentation conducted by the Fish Commission at Ice Harbor and Lower Monumental dams in 1972 indicated that the efficiency of fishways associated with the powerhouse under heavy powerhouse flows is very poor compared to the efficiency of the shore fishway adjacent to the spillway. Consequently, increased power demands with peaking operations will increase fish passage problems. As with spillways, the distribution of flows through the various turbine units is also important and will be studied. Direct studies of fishway operations have continued as a part of our operational studies. In 1972 studies conducted at Lower Monumental Dam indicated that during periods of little or no spill, side entrances into fishways were very effective in moving adult

salmon and steelhead. These entrances are now being used at both Lower Monumental and Little Goose dams during periods when no water is being spilled.

A study was initiated on the Columbia River on March 1, 1973, under U.S. Army Corps of Engineers funding to determine the effect of peaking upon the timing and survival of upstream migrating adult salmon and steelhead and upon the efficiency of the Indian fishery. Peaking is the regulation of river flow to obtain maximum efficiency from flowing water for power production. We estimated a mortality of 26 percent and 21 percent for summer and fall chinook at Bonneville Dam and 13 percent for summer chinook at The Dalles Dam for the flow conditions which occurred during 1973. Spring chinook destined for Rapid River Hatchery were found to be timed earlier in their passage over Bonneville Dam than other stocks of chinook. The average efficiency of individual Indian setnets was greater in The Dalles pool in the spring season because this pool had the lowest concentration of nets.

In eastern Oregon a 10-year ecology study of spring chinook salmon in Lookingglass Creek was terminated. Information collected since 1964 on the early life history of native spring chinook, will be summarized in a final report.

OCEAN

Ocean commercial troll landings of chinook in 1972 and 1973 were 1.5 and 4.0 million pounds round weight, respectively. Both years exceeded the 10-year average and 1973 produced the best chinook landings since 1956. Coho landings of 5.6 and 5.9 million pounds for the same respective years about equaled the 10-year average.

An evaluation was made of the use of small "coded wire" tags placed in the snouts of juvenile hatchery salmon to detect their contribution to the ocean troll fishery. Contacts with Oregon salmon buyers revealed their willingness to cooperate in tag recovery efforts. The use of these tags is practical for ocean salmon studies and will greatly reduce the mortality associated with the former practice of fin removal.

The California Legislature changed their ocean troll coho regulations for the 1973 season allowing harvest of coho at a smaller size. We worked with California biologists to evaluate this change and other regulations that will be examined during a 4-year California regulation experiment. The majority of coho caught off California are produced by Oregon and Washington streams and hatcheries.

WILLAMETTE RIVER

Counts of fish at Willamette Falls in 1972 showed a record escapement of 11,830 fall chinook and somewhat lowered counts of 9,980 adult coho salmon and 23,160 winter steelhead. The spring chinook count was 26,050. In 1973 another record fall chinook escapement of 22,240 fish occurred. For the second consecutive year a small escapement of 5,170 adult coho was recorded. The 1973 escapement of spring chinook totaled 42,000 fish, up considerably from 1972. The winter steelhead escapement was 17,750 in 1973.

We are continuing our efforts to develop natural runs of salmon and steelhead in the Willamette system. In cooperation with the Fish Culture Division, over 2.5 million coho smolts were planted and 4,000 adult winter steelhead were transplanted into selected tributaries in 1973-74. Over 12 million juvenile fall chinook were released from the Salem-Aumsville-Stayton ponds in 1973 and approximately the same number will be released in 1974. Numbers of adult fall chinook returning to Mill Creek (Salem) continued to increase with 3,374 and 5,000 returning in 1972 and 1973, respectively. In addition, we reared and released 2.0 million and 0.5 million Cowlitz River (a late spawning race) fall chinook into Row River in 1972 and 1973, respectively.

We continued to supplement existing natural and hatchery runs of spring chinook by releasing small juveniles in Green Peter, Fall Creek, and Cottage Grove reservoirs, and Walterville Pond. These fish reared naturally in the reservoirs for several months before emigrating downstream. Adult spring chinook returns to Foster-Green Peter totaled 800 fish in 1972 and 1,900 in 1973. At Fall Creek Dam some 1,000 adult spring chinook returned in both 1972 and 1973. The percentage return of adult spring chinook to these projects from small fish released into the reservoirs has been similar to adult returns to Willamette hatcheries from releases of large downstream migrant smolts. Continuing large returns to these projects, despite severe adult spring chinook passage problems at Willamette Falls in 1972 and 1973, indicates that releasing juvenile fish into storage reservoirs provided with successful downstream passage at the dams can significantly enhance this run of fish.

Cottage Grove Reservoir produced 350,000 smolts in 1972 from a release of 1.1 million small fish. This substantial production was made possible by chemical treatment of the reservoir in 1971 to eliminate predatory fish. The production in 1973 from a similar release of small fish was 113,000

smolts. This reduction from 1972 was the result of chinook smolts remaining in the reservoir from the previous year and becoming predators. We are presently studying ways of removing all smolts from the reservoir each year. The first substantial adult returns to Cottage Grove Reservoir will be due in 1975. In 1972 and again in 1973, 100,000 small spring chinook were released into Walterville Pond, a 70-acre reservoir built near the McKenzie River in conjunction with a power canal. These releases have produced 35,000 smolts each year for release into the McKenzie River.

Studies were initiated on the Clackamas River to evaluate problems with adult spring chinook passage at the new upstream migrant fishway entrance constructed by PGE at River Mill Dam. Downstream migrant tests at the Faraday powerhouse intake showed that the downstream migrant facilities built by PGE collected few emigrants. Other methods for protecting downstream migrant salmon and steelhead at this project must be implemented.

SHAD

Shad are harvested commercially in Oregon in the Columbia River and in five coastal rivers (Siuslaw, Smith, Umpqua, Coos, and Coquille).

The Columbia River shad harvest remained low at 207,000 pounds during 1973 because of restrictive regulations designed to protect other species of fish. New shad fisheries established in the previous biennium continued in the John Day River (Clatsop County), Youngs Bay, and Taylors Slough; however, landings were small.

On the coast, slightly over 270,000 pounds of shad were landed in 1973. In 1974 the Fish Commission reduced the commercial shad season and eliminated setnets in lower Coos Bay to reduce the incidental catch of striped bass following a directive from the 1973 legislature.

SHRIMP

Shrimping continues as the most important commercial fishery on a coastal species. The 1972

season set a record landing of 20.7 million pounds. The record was subsequently broken during the 1973 season when landings totaled 24.5 million pounds. Surveys of shrimp on Oregon shrimp beds made during September 1973 and March 1974 indicate prospects are good for another above average catch in 1974.

SMELT

Landings of smelt from the Columbia River and tributaries totaled 2.3 million pounds in 1973, largest since 1958. A large run of smelt entered the Sandy River in 1974 for the first time since 1957.

SPORT FISHERY FOR OCEAN FOOD FISH

Preliminary surveys were conducted to determine areas along the open coast that receive high fishing pressure. Anglers were interviewed to determine the species composition of their catch in different areas at different times of the year. Plans were prepared for a comprehensive survey of open coast sport fishery for ocean food fish to be undertaken in the 1975-77 biennium.

STRIPED BASS

Striped bass are caught commercially along with shad in the Siuslaw, Smith, Umpqua, Coos, and Coquille rivers. The 1973 landings were just under 40,000 pounds.

A tagging study conducted in the Umpqua River in 1973 showed that commercial fishermen harvested 9.1 percent of the 34,600 fish estimated to be available to the fishermen.

STURGEON

Sturgeon are taken incidentally on the Columbia River during all commercial fishing seasons for salmon. The 1973 white sturgeon landings of 424,000 pounds were the largest since 1948. Green sturgeon landings of 32,000 pounds were less than average.



Tables

FINANCIAL STATEMENT
Summary Statement of Financial Transactions
July 1, 1972 – June 30, 1974

Unexpended balance of funds at beginning of biennium				\$ 131,815.61
Appropriations and Receipts:				
General Fund Appropriations:				
Operations and Maintenance:				
1971-1973 Appropriation		\$3,637,566.00		
Less:				
1970-1972 disbursements	\$1,786,100.56			
Reverted to State Treasury . . .	3,435.70			
Reservation for 1974-1975				
Expenditures	<u>44,167.86</u>	<u>1,833,704.12</u>	\$1,803,861.88	
1973-1975 Appropriation		\$3,980,071.00		
Less:				
Reservation for 1974-1975				
Expenditures		<u>2,021,478.43</u>	\$1,958,592.57	
Capital Construction:				
1969-1971 Appropriation:		273,000.00		
Less:				
1969-1972 disbursements	270,000.00			
Reverted to State Treasury . . .	<u>74.26</u>	<u>270,074.26</u>	2,925.74	
1971-1973 Appropriation		30,000.00		
Less:				
Reservation for 1974-1975				
Expenditures		<u>30,000.00</u>		
1973-1975 Appropriation		\$2,288,033.00		
Less:				
Reservation for 1974-1975				
Expenditures		<u>2,286,933.00</u>	<u>1,100.00</u>	
Total Net General Fund				
Appropriations for 1972-1974		\$3,766,480.19		
Receipts from Other Sources:				
Schedule "A" Fiscal Year				
1972-1973		\$2,400,098.98		
Fiscal Year 1973-1974		<u>2,033,937.28</u>		
Total Receipts—Other Sources			<u>\$4,434,036.26</u>	
Total Net Appropriations				\$8,200,516.45
Expenditures for period per				
Schedule "B":				
Fiscal Year 1972-1973			\$4,113,066.60	
Fiscal Year 1973-1974			<u>4,051,298.37</u>	
Total Expenditures for biennium				\$8,164,364.97
Unexpended balance June 30, 1974				\$ 167,967.09

ANALYSIS OF CASH BALANCE

As of June 30, 1974

Seal Control	\$ 8,632.23
Miscellaneous Receipts	16,590.38
Donation	14,965.71
Daily Ocean Salmon Angler Licenses (Transferred from Oregon Wildlife Commission)	127,778.77
Total All Funds	\$167,967.09

SCHEDULE "A"

Statement of Receipts

July 1, 1972 – June 30, 1974

GENERAL FUND RECEIPTS	Fiscal Year 1972-1973	Fiscal Year 1973-1974	Total for Biennium
Licenses:			
Bait Dealer	\$ 480.00	\$ 670.00	\$ 1,150.00
Bait Fishing	615.00	1,290.00	1,905.00
Boat	98,910.00	462,520.00	561,430.00
Buyer	1,920.00	4,880.00	6,800.00
Canner, Fish	2,250.00	4,800.00	7,050.00
Canner, Shellfish	75.00	200.00	275.00
Commercial Fishing	137,586.00	230,524.00	368,110.00
Gillnet, Nonresident	1,156.00	—	1,156.00
Gillnet, Resident	4,656.00	—	4,656.00
Lost License (Other)	66.00	90.00	156.00
Setline	48.00	—	48.00
Setnet	1,272.00	—	1,272.00
Single Delivery	8,786.00	10,540.00	19,326.00
Special Permit (Carp)	247.50	451.50	699.00
Tuna Landing	—	90.00	90.00
Wholesale	12,000.00	14,650.00	26,650.00
Total License Receipts	\$ 270,067.50	\$ 730,705.50	\$1,000,773.00
Other Receipts:			
Poundage Fees and Interest	\$ 344,948.41	\$ 430,191.21	\$ 775,139.62
Seized and confiscated property sales	5,413.58	5,903.30	11,316.88
Miscellaneous — all other	11,791.31	53,274.61	65,065.92
Total Other Receipts	\$ 362,153.30	\$ 489,369.12	\$ 850,522.42
Total General Fund Receipts	\$ 632,220.80	\$1,220,074.62	\$1,852,295.42
Less Transfer to State General Funds	\$ 632,220.80	\$1,220,074.62	\$1,852,295.42
Dedicated Fund Receipts			
Donation	\$ 8,415.85	\$ 25,426.42	\$ 33,842.27
Daily Ocean Salmon Angler Licenses (Transferred from Wildlife Commission)	387,287.00	185,000.00	573,287.00
Federal Funds	2,002,643.63	1,823,060.86	3,825,704.49
*Seal Fund	1,752.50	450.00	2,202.50
Total Dedicated Fund Receipts	\$2,400,098.98	\$2,033,937.28	\$4,434,036.26
*Seal Fund Detail			
Gillnet	\$ 1,352.50	\$ —	\$ 1,352.50
Canner	400.00	450.00	850.00
Total	\$ 1,752.50	\$ 450.00	\$ 2,202.50

SCHEDULE "B"
Statement of Expenditures
July 1, 1972 – June 30, 1974

	General Fund	Other Funds	Federal Funds	Total
ANADROMOUS FISH				
Propagation	\$1,085,817.93	\$154,859.88	\$1,813,199.12	\$3,053,876.93
Habitat Improvement	82,727.66	—	94,929.32	177,656.98
Management and Research	852,711.70	422,840.02	1,081,479.06	2,357,030.78
Storm Damage	—	—	85,891.86	85,891.86
Capital Construction	<u>1,100.00</u>	<u>—</u>	<u>42,992.02</u>	<u>44,092.02</u>
Total Anadromous Fish	\$2,022,357.29	\$577,699.90	\$3,118,491.38	\$5,718,548.57
MARINE FISH and SHELLFISH				
Operating	\$ 472,224.57	\$ —	\$ 337,802.32	\$ 810,026.89
Capital Construction	<u>2,925.74</u>	<u>—</u>	<u>—</u>	<u>2,925.74</u>
Total Marine Fish and Shellfish	\$ 475,150.31	\$ —	\$ 337,802.32	\$ 812,952.63
ADMINISTRATION	<u>\$1,268,972.59</u>	<u>\$278,695.96</u>	<u>\$ 85,195.22</u>	<u>\$1,632,863.77</u>
TOTAL EXPENDITURES	\$3,766,480.19	*\$856,395.86	\$3,541,488.92	\$8,164,364.97
*Other Fund Detail				
Curry County				\$ 5,829.73
Eugene Water and Electric Board				4,904.57
Daily Ocean Salmon Angler Licenses				
(Transferred from Oregon Wildlife Commission)				549,166.47
Miscellaneous Receipts				283,426.89
Private Salmon Hatchery Processing Costs				1,000.00
Washington Department of Game				1,565.16
Washington Department of Fisheries				3,130.34
California Department of Fish and Game				3,130.34
Oregon State Wildlife Commission				3,130.34
Seal Control				5.00
Portland General Electric				<u>1,107.02</u>
Total Other Funds				\$ 856,395.86

OREGON COMMERCIAL LANDINGS OF FINFISH AND SHELLFISH

(All Figures in Pounds)

FINFISH	1968	1969	1970	1971	1972	1973
Cod (true)	382,852	49,839	76,397	483,147	1,075,675	466,186
Flounders	522,473	418,003	585,038	613,714	521,900	463,583
Hake	4,140	-----	-----	5,935	-----	62,013
Halibut	116,479	89,700	103,411	71,601	68,571	51,601
Lingcod	1,609,326	1,267,825	1,121,325	1,534,302	1,663,760	2,312,925
Mink Food	2,942,326	2,687,696	2,053,163	1,814,030	733,121	612,080
Pacific Ocean Perch	1,663,935	937,966	1,612,600	1,738,991	588,244	570,145
Rockfish	4,932,877	5,977,126	4,223,955	4,193,510	5,273,373	4,845,238
Sablefish	426,899	531,657	161,845	274,570	449,010	1,298,698
Salmon and Steelhead						
Chinook	3,772,271	5,235,332	6,311,491	5,013,543	5,085,474	9,595,654
Chum	2,261	2,766	4,883	3,050	9,960	11,788
Coho	5,781,384	4,941,033	13,084,479	11,774,660	6,482,926	7,305,423
Humpback	4,708	298,555	1,004	10,412	132	16,363
Sockeye	61,961	71,397	40,675	163,440	153,722	10,944
Steelhead	393,293	382,936	186,370	313,130	457,276	461,329
Shad	816,392	553,229	698,248	473,822	640,844	450,747
Smelt	119,903	62,808	148,105	134,246	133,403	62,244
Sole						
Dover	4,357,712	5,625,388	5,606,116	5,718,550	6,014,291	4,572,561
English	2,358,945	1,809,242	1,887,586	1,804,012	2,195,609	2,378,570
Petrale	1,674,874	1,858,201	2,151,452	2,290,871	2,206,880	2,244,005
Other	1,345,624	1,779,924	1,662,580	1,360,665	1,771,128	1,675,254
Striped Bass	27,011	38,614	50,051	67,084	54,449	39,517
Sturgeon						
Green	45,844	55,385	40,017	39,920	33,823	22,247
White	106,733	227,857	172,631	201,708	202,665	268,582
Tuna	37,751,816	29,827,579	26,936,875	13,092,167	29,233,715	24,425,485
Other Fish	109,519	235,269	196,052	186,522	259,890	413,976
TOTAL FINFISH	71,331,558	64,965,297	69,116,349	53,377,602	65,309,841	64,637,158
SHELLFISH						
Clams						
Bay	27,866	22,001	25,884	28,746	62,168	18,200
Razor	92,462	25,124	14,806	30,007	12,550	16,252
Crabs	11,351,094	9,783,998	14,929,347	14,875,849	6,762,259	2,349,645
Shrimp	10,858,975	10,455,125	13,572,174	9,075,006	20,731,151	24,517,194
TOTAL SHELLFISH	22,330,397	20,286,248	28,542,211	24,009,608	27,568,128	26,901,291
GRAND TOTAL	93,661,955	85,251,545	97,658,560	77,387,210	92,877,969	91,538,449

LICENSES ISSUED

	1968	1969	1970	1971	1972	1973
Bait Dealer	-----	-----	-----	11	29	29
Bait Fishing	-----	-----	-----	17	35	40
Boat	3,048	3,042	3,025	3,487	3,314	3,567
Boat, Lost License	10	6	10	13	2	6
Buyer	91	95	102	118	135	121
Canner, Fish	16	17	15	17	18	17
Canner, Shellfish	4	4	5	4	2	1
Commercial Fishing	5,932	5,663	5,584	6,428	5,989	6,668
Fishing, Lost License	37	30	36	40	54	41
Gillnet, Nonresident	63	79	32	46	18	17
Gillnet, Resident	524	503	466	650	570	581
Retail	1,013	1,002	-----	-----	-----	-----
Setline	1	1	5	5	2	6
Setnet	89	97	121	130	91	159
Single Delivery	423	287	269	203	384	382
Special Permit (carp)	2	13	13	4	111	124
Wholesale	142	152	154	165	163	151
TOTAL	11,395	10,991	9,837	11,338	10,917	11,910

Disposition of Adult Salmon and Steelhead Returning to Fish Commission Hatcheries

(All Figures in Numbers of Fish)

July 1, 1972 – June 30, 1973

Species	Transplanted	Allowed to Pass Hatchery Rack	State & County Institutions	Sold by Public Bid	Buried	Total
Coho	8,276	2,736	2,044	34,555	4,547	52,158
Fall Chinook	—	2,871	84	23,308	1,106	27,369
Spring Chinook	10	14	—	4,010	2,045	6,079
Chum	—	274	—	—	—	274
Steelhead	1,248	2,648	249	—	273	4,418
					TOTAL	90,298

July 1, 1973 – June 30, 1974

Coho	6,496	3,148	4,148	62,825	2,464	79,081
Fall Chinook	104	1,829	75	36,873	697	39,578
Spring Chinook	—	2	124	6,134	3,620	9,880
Chum	—	34	—	—	3	37
Steelhead	3,276	1,269	393	—	588	5,526
					TOTAL	134,102

NUMBER OF EGGS TAKEN AT FISH COMMISSION HATCHERIES

July 1, 1972 – June 20, 1973

HATCHERY	FALL CHINOOK	SPRING CHINOOK	COHO	STEELHEAD	TOTAL
Alsea			3,370,800		3,370,800
Big Creek	19,665,900		2,102,500	758,300	22,526,700
Bonneville	22,357,900		4,342,200		26,700,100
Cascade			1,559,500		1,559,500
Elk River	2,571,000		5,100	73,600	2,649,700
Klaskanine			3,489,600		3,489,600
Marion Forks		2,335,000		129,500	2,464,500
McKenzie		163,000			163,000
Nehalem			2,088,100		2,088,100
OxBow					—0—
Sandy			4,967,400		4,967,400
Siletz					—0—
S. Santiam		1,101,800		662,500 ^{1/}	1,764,300
Trask	570,000	653,000	2,936,100		4,159,100
Willamette		1,589,500			1,589,500
TOTAL	45,164,800	5,842,300	24,861,300	1,623,900	77,492,300

^{1/} Winter Steelhead = 18,000 Summer Steelhead = 644,500

July 1, 1973 – June 30, 1974

Alsea			4,892,900		4,892,900
Big Creek	12,834,100		1,179,300	1,136,900	15,150,300
Bonneville	22,471,900		640,700		23,112,600
Cascade	4,665,600		4,239,900		8,905,500
Elk River	3,266,500		4,000		3,270,500
Klaskanine	29,000		1,756,100		1,785,100
Marion Forks		3,056,600		119,600	3,176,200
McKenzie		1,566,200			1,566,200
Nehalem			1,414,400		1,414,400
OxBow	385,500				385,500
Sandy			2,595,200		2,595,200
Siletz			513,000		513,000
S. Santiam		5,189,900		1,082,000	6,271,900
Trask	1,100,300	1,093,800	2,788,800		4,982,900
Willamette					—0—
TOTAL	44,752,900	10,906,500	20,024,300	2,338,500	78,022,200

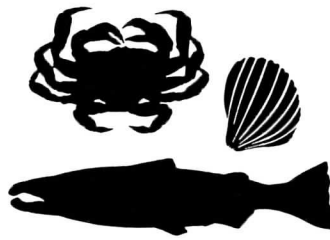
Numbers of Salmon and Steelhead Liberated into Oregon Waters
July 1, 1972 – June 30, 1973

Hatchery and Species	Unfed Fingerlings	Fingerlings	Yearlings	Total Number	Pounds	Location
ALSEA Coho		500,075	1,193,403	1,693,478	84,009	Fall Creek, Alsea R., Newport Res. & tribs. of Siuslaw & Yaquina R.
BIG CREEK Fall Chinook		5,573,396	97,749	5,671,145	85,327	Big Creek
Coho			724,621	724,621	51,036	Big Creek
Steelhead			80,731	80,731	13,813	Big Creek, & tribs. of Lewis & Clark R. & Klaskanine R.
TOTAL		5,573,396	903,101	6,476,497	150,176	
BONNEVILLE Fall Chinook		10,782,536		10,782,536	112,784	Tanner Creek
Coho			1,602,379	1,602,379	82,374	Tanner Creek, & tribs. of Marys, Mohawk, Molalla, Santiam & Yamhill R.
TOTAL		10,782,536	1,602,379	12,384,915	195,158	
CASCADE Coho		280,302	2,190,857	2,471,159	135,373	Tanner Creek & Santiam R.
ELK RIVER Fall Chinook		1,184,540	679,746	1,864,286	88,214	Elk River, Jack Cr. & tribs. of Coos, Millicoma R. & Floras Lake
Coho		272,484	112,453	384,937	14,301	Floras Lake
Steelhead			39,630	39,630	6,392	Chetco River
TOTAL		1,457,024	831,829	2,288,853	108,907	
KLASKANINE Coho		196,100	1,214,259	1,410,359	85,213	Klaskanine River
Steelhead			59,184	59,184	8,947	Klaskanine River
TOTAL		196,100	1,273,443	1,469,543	94,160	
MARION FORKS Spring Chinook			1,014,883	1,014,883	86,116	N. Santiam River & Fall Cr. Res.
Steelhead			117,741	117,741	16,886	N. Santiam River & Big Cliff Res.
TOTAL			1,132,624	1,132,624	103,002	
McKENZIE Spring Chinook		2,575	295,632	298,207	47,722	McKenzie River & Walterville Lake
NEHALEM Coho		552,847	1,191,303	1,744,150	76,816	Nehalem River
Steelhead			104,622	104,622	19,166	Nehalem River
TOTAL		552,847	1,295,925	1,848,772	95,982	
OXBOW Fall Chinook		1,459,332		1,459,332	17,373	Tanner Creek
SANDY Fall Chinook		789,956		789,956	7,448	Tanner Creek
Coho	1,601,177	162,300	959,303	2,722,780	66,331	Cedar Creek
TOTAL	1,601,177	952,256	959,303	3,512,736	73,779	
SILETZ Coho			444,623	444,623	31,742	Rock Creek
S.SANTIAM Spring Chinook		338,955	180,284	519,239	29,888	S. Santiam River
Steelhead	3,700	60,433	193,940	258,073	32,476	S. Santiam River, Minto, Lookout Point, & Green Peter Res.
TOTAL	3,700	399,388	374,224	777,312	62,364	
TRASK Fall Chinook			215,638	215,638	12,962	Trask River
Coho			1,109,777	1,109,777	60,947	Trask River & Alsea R.
Spring Chinook		93,000	116,178	209,178	19,231	Trask River
TOTAL		93,000	1,441,593	1,534,593	93,140	
WILLAMETTE Spring Chinook		1,419,062	1,561,926	2,980,988	212,925	Dexter & McKenzie R.
POND AND SPECIES AUMSVILLE (Upper and Lower)						
Fall Chinook		6,027,822		6,027,822	76,401	Mill Creek, Molalla, Row, & S.Santiam R.
SALEM POND Fall Chinook		2,799,976		2,799,976	38,552	Mill Creek & Willamette R.
STAYTON POND Fall Chinook		5,150,266		5,150,266	49,607	N.Santiam and Molalla R.
METOLIUS Spring Chinook		3,387,174		3,387,174	6,912	Fall Creek Reservoir, Sandy & Willamette R.
TRASK POND Coho			83,266	83,266	6,308	E.F. Trask R.
TOTAL OF ALL HATCHERIES AND PONDS						
COHO	1,601,177	1,964,108	10,826,244	14,391,529	694,450	
FALL CHINOOK		33,767,824	993,133	34,760,957	488,668	
SPRING CHINOOK		5,240,766	3,168,903	8,409,669	402,794	
STEELHEAD	3,700	60,433	595,848	659,981	97,680	
TOTAL	1,604,877	41,033,131	15,584,128	58,222,136	1,683,592	

Numbers of Salmon and Steelhead Liberated into Oregon Waters
July 1, 1973 — June 30, 1974

Hatchery and Species	Unfed Fingerlings	Fingerlings	Yearlings	Total Number	Pounds	Location
ALSEA						
Coho	1,762,934	644,924	1,139,902	3,547,760	80,351	Fall Cr. (Alsea), tribs. of Siuslaw, Yaquina R. & coastal lakes
Fall Chinook			97,889	97,889	11,124	Fall Creek
Spring Chinook	96,696			96,696	408	S.F. Alsea R.
TOTAL	1,859,630	644,924	1,237,791	3,742,345	91,883	
BIG CREEK						
Coho			858,771	858,771	59,908	Big Creek
Fall Chinook		6,168,557		6,168,557	76,182	Big Creek
Steelhead		31,680	56,607	88,287	9,374	Big Cr., Nehalem, & Pudding R.
TOTAL		6,200,237	915,378	7,115,615	145,464	
BONNEVILLE						
Coho			1,917,678	1,917,678	99,189	Tanner Cr., tribs. of Molalla, S.Santiam, & S.Yamhill R.
Fall Chinook		9,842,078		9,842,078	76,676	Tanner Cr.
TOTAL		9,842,078	1,917,678	11,759,756	175,865	
CASCADE						
Coho			1,974,218	1,974,218	103,113	Tanner Cr. & Molalla R.
ELK RIVER						
Fall Chinook	22,608	1,031,171	798,110	1,851,889	98,014	Chetco, Elk, & Coquille R., Floras Lake, & Pacific Ocean
Steelhead			60,789	60,789	8,810	Chetco R. & Jack Cr.
TOTAL	22,608	1,031,171	858,899	1,912,678	106,824	
KLASKANINE						
Coho			1,223,808	1,223,808	85,581	N.F.Klaskanine R.
Steelhead			57,185	57,185	8,664	S. & N.F. Klaskanine R.
TOTAL			1,280,993	1,280,993	94,245	
MARION FORKS						
Spring Chinook			1,029,920	1,029,920	61,307	Minto
Steelhead			9,972	9,972	1,545	Minto
TOTAL			1,039,892	1,039,892	62,852	
McKENZIE						
Spring Chinook			312,478	312,478	42,936	McKenzie R.
NEHALEM						
Coho		95,040	1,194,783	1,289,823	77,264	Nehalem R.
Steelhead			10,010	10,010	143	Nehalem R.
TOTAL		95,040	1,204,793	1,299,833	77,407	
OXBOW						
Fall Chinook		2,912,735		2,912,735	34,895	Tanner Cr.
SANDY						
Coho	494,250	107,283	949,424	1,550,957	58,020	Cedar Cr. & tribs. of Luckiamute, Molalla, Marys, Mohawk, Santiam, Yamhill, & Will. R.
SILETZ						
Coho			450,120	450,120	29,419	Rock Cr.
Spring Chinook		100,019		100,019	495	tribs. of Siletz
TOTAL		100,019	450,120	550,139	29,914	
SANTIAM						
Spring Chinook		3,261,890		3,261,890	6,548	Cottage Gr. & Green Peter Res., tribs. of McKenzie & Santiam R.
Steelhead			167,088	167,088	18,565	N. & S. Santiam R.
Fall Chinook		311,977		311,977	2,713	Row R. & Green Peter Res.
TOTAL		3,573,867	167,088	3,740,955	27,826	
TRASK						
Coho		117,955	402,850	520,805	23,782	Trask & Wilson R.
Fall Chinook		143,611	136,945	280,556	11,971	Trask R.
Spring Chinook		574,041	125,339	699,380	22,010	Nestucca & Trask R. & Tillamook Bay
TOTAL		835,607	665,134	1,500,741	57,763	
WILLAMETTE						
Spring Chinook		601,364	1,489,583	2,090,947	147,394	Fall Cr., Foster Dam, McKenzie & Will. R.
AUMSVILLE						
Fall Chinook		7,440,240		7,440,240	80,392	S. Santiam, Luckiamute,,Willamette R. & Mill Cr.
STAYTON						
Fall Chinook		6,641,455		6,641,455	89,014	N.&S. Santiam & Molalla R.
TRASK POND						
Coho			791,217	791,217	50,077	E.F. Trask R.
TOTAL OF ALL SPECIES						
COHO	2,257,184	965,202	10,902,771	14,125,157	666,704	
FALL CHINOOK	22,608	34,491,824	1,032,944	35,547,376	480,981	
SPRING CHINOOK	96,696	4,537,314	2,957,320	7,591,330	281,098	
STEELHEAD		31,680	361,651	393,331	47,101	
TOTAL	2,376,488	40,026,020	15,254,686	57,657,194	1,475,884	

FISH COMMISSION OF OREGON



Management Today... Protecting Tomorrow

