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ALASKA DEPARTMENT OF FISH AND GAME 1977 ANNUAL REPORT



The Honorable Jay S. Hammond Governor of Alaska Pouch A Juneau, Alaska 99811

Dear Governor Hammond:

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I am pleased to submit to you the 1977 annual report of the Department of Fish and Game. My policy this year and in future years is to publish the report early in the calendar year so that it can be of some benefit to your staff and to the Legislature in the new year's deliberations concerning budgeting and passage of new laws.

The format has been changed and standardized for each of the Division presentations to facilitate review. I hope we can continue to improve this report so that it can become in fact a truly working document rather than a simple summary of the past year's activities. We have attempted to identify some of the major problems and needs facing the Department now and in the years ahead.

Alaska is changing rapidly, much to the alarm and chagrin of most longtime Alaskans. The continued impacts of expanding populations and commercial development unfortunately will result in a continued decline in both the quality and quantity of habitat necessary to sustain our fish and wildlife populations. Ever increasing pressures as evidenced throughout 1977 for the consumptive and so-called nonconsumptive use of these wild resources make the resource allocation decisions difficult to say the least.

The Department's responsibility for protecting and perpetuating Alaska's wildlife resources is becoming increasingly more complex and difficult to carry out. It is obvious that both our organization itself and our management strategy must by dynamic and flexible to cope with these changes in an effective manner. The problems of subsistence, constraints on our fisheries, recreation demands, exploitation of nonrenewable resources, Federal "inroads" and preemption of State's rights, and mere population expansion do indeed provide a real challenge. I look forward to meeting this challenge head-on during the coming year, and I believe the forthcoming plans for reorganization and strategy shifts will help us to keep pace with "tomorrow's" Alaska.

Respectfully and sincerely yours,

Ronald O. Skoog Commissioner

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PREPARED BY INFORMATION AND EDUCATION SECTION ALASKA DEPARTMENT OF FISH AND GAME

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# ALASKA DEPARTMENT OF FISH AND GAME

### State of Alaska JAY S. HAMMOND GOVERNOR

**Carl L.** Rosier, Director Commercial Fisheries Division Robert S. Roys, Director FRED Division Robert A. Rausch, Director Game Division Rupert E. Andrews, Director Sport Fish Division

#### **BOARD OF FISHERIES**

Gordon Jensen (Chairman) Petersburg

\*Nicholas G. Szabo Kodiak

James E. Beaton Juneau

Theodore R. Dunn Anchroage

Herman Schroeder Dillingham

\*\*Samuel S. Demientieff Fairbanks

\*\*Dannie Garroutte Ninilchik

### RONALD O. SKOOG COMMISSIONER

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Jeffrey J. Morrison, Director Administration Division E. Richard Logan, Chief Habitat Section Dolores A. Moulton, Chief Information-Education

#### **BOARD OF GAME**

Dr. Samuel J. Harbo, Jr. (Chairman) College

Clint Buckmaster Sitka

Charles D. Evans Anchorage

Darrell Farmen Anchorage

Sidney Huntington Galena

Urban C. (Pete) Nelson Juneau

Jim D. Rearden Homer

\*Elected Chairman at the Dec., 1977 meeting of the Board for a one-year term.

\*\*Demientieff and Garroutte left the Board during 1977. Their vacant seats were taken by Dr. Calvin M. Fair (Soldotna), and James Huntington (Galena).

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# **ADMINISTRATION**

#### JEFFREY J. MORRISON, DIRECTOR

The Division of Administration serves as business manager for the Department of Fish and Game, providing support for the other programs of the Department. Services provided by the Division include personnel, payroll, accounting, supply, communications, property control, warehousing, office and repair facilities, budget counseling and monitoring as well as administrative guidance at the Department's Regional Offices. The Division is also responsible for the operation and maintenance of Department-owned vessels and for the planning, coordination and leadership of interdivisional and interdepartmental special projects.

The overriding goal of the Division is to provide prompt, accurate and efficient administrative assistance and services to the Department. This includes insuring fairness to all vendors and job applicants, obtaining goods and services at the lowest possible cost, reducing delays associated with purchasing and payments and providing employees with prompt, accurate personnel and payroll services.

The Division of Administration is divided into seven major functions: fiscal control, personnel, payroll, supply, library, vessels, special projects and general administration.

#### **Fiscal Control**

The Accounting Section serves as the Department's watchdog over budget obligations and payments. As such, it provides assistance and monitoring throughout the budgeting process, monitors expenditures against authorizations and processes payments for debt obligations. Accomplishments during 1977 included the improvement of filing systems for reimbursable and cooperative agreements, initiation of a new cross-training program and the elimination of excessive delays in payment of field purchase obligations.

#### Personnel/Payroll

Personnel and payroll functions are combined in a single section. In addition to the normal duties of processing personnel actions and reclassifications, assisting job applicants and maintaining records on over 1,000 temporary and permanent employees, the Section created 35 new Departmental positions and six new position classifications. Other accomplishments included bringing the new automated leave system records for sick and annual leave into conformance with Departmental manual records and expansion of an ongoing study of support personnel. Supply

The Supply Section's four major areas of responsibility are the purchasing, receiving, storing and distributing of supplies, maintaining inventories of Departmental equipment, operating the mail room and general services administration for the Department. The Supply Section is the first such section in the State to utilize Field Warrants extensively as an ordering and paying document, thereby providing vendors with payment for an order at the time of ordering. The Section also initiated a new private carrier system for routing its correspondence between the Anchorage, Fairbanks, and Juneau offices. This system guarantees 24-hour service and has greatly improved expeditious payment to vendors, payroll actions, purchasing documents, and other Departmental correspondence.

#### Library

The library processes orders for research materials and serves as a collection point and repository of technical and resource-associated literature. Included in these services are the processing of interlibrary loans, a systematic scanning (or 'current awareness') service which circulates title pages, tables of content, abstracts, etc., to Departmental personnel, and literature searches in specialized subject areas. A significant achievement occurred in the spring when the library staff began the first library reorganization since 1964. This included a thorough weeding and reshelving of the entire collection, reviewing and integrating the materials from three donated collections, preparation of a duplicate exchange list for distribution among Departmental biologists, and reviewing and preparing a large portion of the library collection for binding and microfilming. A contract with the Alaska Environmental Information Data Center in Anchorage will result in the microfilming of 500,000 pages thereby significantly reducing storage space while improving retrievability of the materials.

#### Vessels

The Vessels Section provides, operates and maintains a fleet of vessels both crewed and crewless. These vessels are used for working platforms, mobile housing accommodations for field personnel, experimental fishing research and freight hauling. Seven crewed vessels range in length from 54 to 92 feet and are variously equipped for commercial fishing and research. They are based in Ketchikan, Petersburg, Juneau, Cordova, Homer, and Kodiak. Eight unmanned vessels are also provided ranging in length from 31 to 36 feet and are normally operated by temporary employees hired by the using Divisions. Construction began in 1977 on a new 70-foot vessel to replace the 44-foot power barge "SHAD" and will be equipped for herring research, trawling, and crab fishing. It will have facilities for three crewmen and



A 70-foot fisheries research vessel is under construction in Seattle to take the place of the Shad.

six scientists. Built on the lines of a commercial fishing vessel, it is expected to be a moderately high performance vessel.

#### **Special Projects**

This function of the Division is responsible for the coordination, leadership, direction and completion of various interdivisional and interdepartmental special projects. Projects initiated and underway in 1977 included studies of the Department's communication and vessels' needs which will result in plans for acquisition and improved use of this equipment.

Data and data processing studies were initiated both within the Department and the Governor's Office to define the data which have been and are being collected, to reduce or eliminate any redundancies found in the collection and processing of the data, and to determine the feasibility of establishing departmental and statewide data base systems. In addition, an interdepartmental Data Processing Long-Range Task Force was created (coordinated within Fish and Game through Special Projects) which is to prepare a statewide plan to meet the State's future data-processing needs. The results of this plan should provide the Department of Fish and Game with substantially improved data-processing capability and efficiency.

#### **General Administration**

In addition to handling the many miscellaneous administrative matters which do not fit into one of the other seven categories, this function is responsible for facilities planning, procurement and management as well as obtaining professional services, leases, land and utilities for the Department. Among its achievements in 1977 were the implementation of a new housing policy for State-Owned Housing. This policy represents a major stride in improving the ongoing maintenance of housing units and other Fish and Game facilities. A second achievement in 1977 was the opening of a new office facility for the Divisions of Sport Fisheries and Game in Delta Junction. This new building, made possible by the cooperation of the Alaska Court System, will fill an important need for a departmental office in that area. The Division has developed a building manager system to provide for upgrading State-owned and leased buildings to OSHA and Safety Guidelines and Fire Marshal Recommendations. We are also making a major effort to upgrade departmental operating procedures which State growth has caused to become inadequate. **Operating Budget** 

The operating budget for Administration and Support in fiscal 1977 was \$1,924,000. Not included in this total are \$177,200 in the Office of the Commissioner, and \$189,700 in the Information and Education Section. In addition to the staff of Administrative Services, this budget also funds Departmentwide insurance payments, centrally purchased office services, supplies and lease and maintenance costs for buildings shared by other Divisions in the Department.

#### **Regional Activities**

The Division of Administration differs from the other Divisions in Fish and Game in that although it maintains Regional Administrative Officers and a small staff in each of the Anchorage, Fairbanks, Juneau and Kodiak Regional Offices, it does not have unique regional programs. The Regional Administrative Officers provide advice and assistance to the other Division's regional staffs.

#### **Planning for the Future**

1978 should see the completion of the vessels and communications plans and a resultant increasing improvement in the usefulness of these tools to the Department. The Alaska Department of Fish and Game library's periodical holdings will be included in the University of Alaska's computer-generated Alaska List of Serials, a basic reference tool which indicates periodical holdings of major Alaskan libraries. Inclusion of these holdings, together with the previously listed holdings of the NOAA library and the Alaska State Library will provide a more comprehensive picture of the periodicals available in Southeastern Alaska. In addition, the Library plans to develop one comprehensive card catalog, complete the reclassification of the collection to the Library of Congress, and to distribute a monthly accession list to all departmental staff. Other Division goals for 1978 include obtaining additional office space in Juneau for Headquarters staff; continuing the cross-training of personnel within the Sections of Accounting, Personnel, Supply and Federal Aid; developing a long-range plan for statewide office improvements and/or replacements; improving the Department's overall budget presentation; and providing further administrative training to Administrative Assistants and Regional and Area Office Administrative Staffs.



Southcentral Regional Administrative Officer John Wayman confers with Receptionist Ginger Williams. Both perform essential functions in the Department's Anchorage office.

DIVISION OF ADMINISTRATION ORGANIZATIONAL CHART



# **MEDUCATION**

**DOLORES MOULTON, CHIEF** 

The I and E Section is charged with the responsibility of coordinating a program for the Department of Fish and Game which provides the public with information concerning the wildlife resources of the State and information concerning the research and management activities of the Department. The Information Section is the link between the public and the Department.

The primary goal of the information program is to foster the public's understanding and appreciation of Alaska's wildlife resources. Other goals include providing the public with factual information about fishing and hunting opportunities and publicizing regulations governing harvests and other information concerning the availability and status of the fish and wildlife of the State.

A staff of four professionals in the field of communications and public information is located in the headquarters office in Juneau and another information officer is located in Anchorage. The Section's work is greatly augmented by several temporary positions and support from Department personnel throughout the State.

Photographic and graphic support is provided to all Divisions in the Department. Films, video releases, news releases, feature stories, radio programs, pamphlets, personal appearances and a bimonthly magazine with a circulation of 10,000 are all part of the Section's activities.

In 1977, in addition to assisting in the preparation of the regular reports and publications of the various Department Divisions and the magazine, the graphics team of the Section prepared for printing the full-color publication entitled "Big Game of Alaska."

This publication and the wildlife photography contest which preceded it were in response to legislative action taken in 1975. The Department was required to hold a contest designed to encourage the appreciation of the State's big game animals for their beauty, as well as for meat and trophies. The prizewinning photos from the contest were required to be published in book form. The result was "Big Game of Alaska."

The visual information efforts of the section were greatly increased in order to better meet the Department objective of raising the level of understanding of the public concerning the Department research and management activities. Production of a commercial fisheries film was undertaken with a full-length film expected to be finalized in 1978.

The educational aspect of the I and E program made its first real advances in 1977 with the addition of an Education Specialist position partially funded with Federal funds. With the addition of this position, it was possible to almost completely revise and reprint the much-requested Wildlife Notebook Series, a set of informational leaflets on the wildlife and fish of Alaska. In addition to the Wildlife Notebook Series, a great deal of effort was directed toward providing information for teachers concerning the wildlife resources of the State.

The effort put forth by the Section to meet the goals and objectives set forth by the Information/ Education task force established by the Department in 1976 produced a much stronger informational program and offered Alaskans a better opportunity to understand the Department's role in managing the resources.



Mainstay of I & E, Jan Lockridge, responds to dozens of requests every day.

Serious and substantial problems continue to face the managers of Alaska's resources. Although inadequate funding and personnel levels are still a problem, the Information/Education Section's activities will play a critical role in the future. The Section will be called on to improve communication within the Department, to provide a more efficient and comprehensive information service to the public, to offer more and better educational services and to help build and maintain a greater rapport between the public and the managers of the fish and wildlife resources of the State.



Busy laying out ADF&G's annual report, Dennis Kaill, graphic artist, and Chris McQuitty, publication technician.



#### INFORMATION & EDUCATION SECTION ORGANIZATIONAL CHART

### HABITAT

#### **RICHARD LOGAN, CHIEF**

Habitat in Alaska is experiencing increased pressure from extensive modification, environmental contamination and a variety of other socioeconomic pressures. The Habitat Protection Section is responsible for the protection, maintenance and improvement of fish and wildlife habitat through planning, coordination and regulatory activities which are designed to minimize adverse impact of land and water use on freshwater, marine and terrestrial habitats. The Section is involved in every major land and water planning issue presently facing the State: oil and gas pipelines, coastal zone management, OCS development, D-2 land proposals, Native and State land selections, environmental legislation, hardrock mineral development, forest management practices and water resource development. The Section's primary functions are: 1) to enforce Alaska Statute 16.05.870 by reviewing all anadromous stream permit applications, 2) to identify critical habitat areas and



**Checking new culvert installations for possible** damage to fish streams is just one of the functions of the Habitat Protection Section.

insure compatible use within those areas (Alaska Statute 16.20.260 and Alaska Statute 16.20.270), 3) to insure compatible use within game refuges (Alaska Statute 16.20.060) and 4) to obtain, analyze and disseminate basic biological information which can be used to guide Federal, State and private entities in their resource-related decisions.

The Section's four programs are Land and Water Protection, Land and Water Management, Marine/ Coastal Habitat Management (M/CHM) and Pipeline Surveillance. Under the Land and Water Protection program all anadromous stream permit applications are reviewed along with reviews of other State and Federal agencies' permits and project proposals. The following list summarizes the Section's participation in this review activity from January 1, 1977 to October 15, 1977.

#### STATE

Clearinghouse	115
ADEC Waste Discharge	58
Miscellaneous Land Use Permits	212
Highway Plans	56
Section 16	376
Water Use	154
Tideland	48
Timber Sales	11
TOTAL	1,030

#### FEDERAL

Corps of Engineers251USGS20USCG5BLM36EPA Discharge13EIS5Miscellaneous23TOTAL353GRAND TOTAL STATE/FEDERAL1,383		
USGS20USCG5BLM36EPA Discharge13EIS5Miscellaneous23TOTAL353GRAND TOTAL STATE/FEDERAL1,383	Corps of Engineers	251
USCG 5 BLM 36 EPA Discharge 13 EIS 5 Miscellaneous 23 TOTAL 353 GRAND TOTAL STATE/FEDERAL 1,383	USGS	20
BLM36EPA Discharge13EIS5Miscellaneous23TOTAL353GRAND TOTAL STATE/FEDERAL1,383	USCG	5
EPA Discharge13EIS5Miscellaneous23TOTAL353GRAND TOTAL STATE/FEDERAL1,383	BLM	36
EIS5Miscellaneous23TOTAL353GRAND TOTAL STATE/FEDERAL1,383	EPA Discharge	13
Miscellaneous23TOTAL353GRAND TOTAL STATE/FEDERAL1,383	EIS	5
TOTAL353GRAND TOTAL STATE/FEDERAL1,383	Miscellaneous	23
GRAND TOTAL STATE/FEDERAL 1,383	TOTAL	353
	GRAND TOTAL STATE/FEDERAL	1,383

The Land and Water Management program encompasses the Section's planning and land classification projects. Information on the fish and wildlife resources throughout the State are collected for use in State land selection classification projects.

The Section's M/CHM Program is responsible for evaluating activities affecting fish and wildlife resources in Alaska's coastal zone and marine waters. M/CHM is divided into environmental review and monitoring, Kachemak Bay studies and the Coastal Zone Management project. During 1977, M/CHM reviewed or monitored 439 projects, developments, laws and actions having potentially adverse impacts on fish and wildlife resources. The Kachemak Bay studies have been compiled into a 12-volume report titled Environmental Studies of Kachemak Bay and Lower Cook Inlet. The Coastal Management project, which is statewide, has the lead responsibility in the Department for coastal zone planning.

The Pipeline Surveillance program represents the State's component of the Joint State Federal Fish and Wildlife Advisory Team (JFWAT). JFWAT provides field surveillance, design review, technical evaluation and permit review and issuance for Alyeska oil pipeline construction while maintaining the maximum number of management options along the pipeline corridor for future resource and land managers.

Because most of the land in Region I is owned and managed by the U. S. Forest Service, most of the work done by the Region I Habitat staff is related to Forest Service projects. The Fishery Task Force, which was designed to develop fishery habitat information and necessary protection measures for the Tongass Land Use Management Plan, required Section participation. The Section also participated on several Forest Service Land Use Planning Teams and the Regional Forest Service Road and Culvert Review. Personnel also served on the State Forest Lands Selection Team which is responsible for selection of 400,000 acres of land from the Chugach and Tongass forests. Each selection was reviewed and a recommendation based on wildlife resources was made.

The Habitat Protection Section also participated in other resource planning efforts such as the initiation of the Southcentral Level B Study (Alaska Water Study Committee), the Susitna Basin Cooperative Study (U. S. Soil Conservation Service-Alaska Department of Natural Resources) and the Prince William Sound Transportation Study (Alaska Department of Highways).

The Section's Access project has focused pr marily on obtaining public access on and across ..nds selected by the Native corporations as provided by the Alaska Native Claims Settlement Act with emphasis on obtaining and providing justification and amount of use for the requested public easements. Public easements published by the Bureau of Land Management were received on and across lands selected by 61 villages and regional corporations. During the year the Natives received title to 796,323 acres of land. Easements reserved for public use on this acreage consisted of 20 campsites, 61 trails, 14 roads, and 18 streambanks.

The Department of Fish and Game has long recognized the need for cooperative management of the fish and wildlife populations and their habitat. Section personnel are active in the initiation, drafting, and review of the Department's 59 Cooperative Agreements with various Federal, State and private organizations.

Projects involving Alaska's coastline and marine waters require review and evaluation by Habitat personnel who also provide pertinent data to other agencies and industry. Activities undertaken by Habitat staff to protect our marine coastal resources include evaluating environmental impacts, writing environmental stipulations for Federal lease sales, drafting environmental regulations for the State's energy and minerals leasing process, developing an oil spill contingency plan and response team, identifying Coastal Zone Management boundaries, developing a marine and coastal lands classification system, and providing technical assistance to coastal districts which are developing coastal management plans.

The Delta Land Use Plan required extensive involvement by the Habitat Section. Our input was partially responsible for recommendations regarding a bison management area consisting of approximately 77,595 acres; a 2,000-acre refuge on Clearwater Lake; a 56,650-acre critical wildlife habitat to protect areas for bison calving, salmon spawning, and sheep mineral lick areas; a policy to establish protective greenbelts along significant watercourses; and the recognition of approximately 188,000 acres of wildlife habitat as the priority use in designated resource areas.

The Pipeline Surveillance team has documented a number of problems that constitute nonconformance with environmental stipulations. Restoration of unacceptable environmental conditions identified by JFWAT will be begun during the summer of 1978.

Energy development has involved Habitat in working with other agencies and industry to avoid adverse impacts in the Prudhoe Bay development area. The Section also reviewed the proposed plans of



Careful observation of the effects of the trans-Alaska Pipeline formed a big part of the Habitat Protection Section's job.

operation for oil and gas exploration activities on National Petroleum Reserve-Alaska.

Short- and long-term objectives and specific guidance were provided to industry prior to proposed action. Subsequent applications illustrated the effectiveness of this input and expedited agency approval. A comprehensive documenting of all policies and procedures by industry is being developed by the Habitat Protection Section in cooperation with the Alaska Division of Lands and the Alaska Department of Environmental Conservation.

Habitat's FY78 budget amounted to \$2,008,600 (see Table 1). The total consisted of \$952,100 in program receipts for pipeline surveillance, \$687,500 in general funds and \$369,000 in Federal aid funds. Because restrictions are placed on the types of work performed by personnel paid by Federal funds, the Section would like to increase the ratio of general funds to Federal funds. Federal funding restrictions limit assigning personnel to projects which require additional manpower but entail work that can only be done by personnel being paid with Federal dollars.

#### WHAT'S IN STORE FOR THE FUTURE

The continued development of Alaska's resources is expanding the work load of Habitat personnel. Although reorganization of existing personnel is planned, staffing will have to expand or the quality of the Section's services will decline substantially. Oil exploration activities will increase M/CHM's work load by approximately 40-50 percent annually over the next four years if no oil is found, and approximately 300 percent annually if significant deposits are located. An additional Habitat biologist is needed in Petersburg to continue the coordination and review of the proposed timber sale areas and to review the upcoming development of new mining areas and hydroelectric facilities.

JFWAT will be disbanding as the oil pipeline project winds down. It is hoped that money will be made available soon to fund a gas pipeline team. The proposal for overseeing construction of the gas pipeline utilizes the same staff and approach used to oversee the trans-Alaska pipeline operation and maintenance activities and the use of the Yukon River to Prudhoe Bay Haul Road during construction of the gas pipeline.

To provide the tremendous amount of inventory and data handling required to delineate important wildlife habitat and public use areas, the Section would like to obtain a computer with a storage/ retrieval system. It is extremely important to present fish and wildlife resource needs to the land and water resource managers during the planning and decision stages before classification, disposal, or use of lands important as fish and wildlife habitat.

The Section must also acquire baseline habitat and fish and wildlife resources data for each Legislatively designated area within the State refuge and critical habitat system. Photo and quantitative documentation of the major fish and wildlife resources as well as habitat types need to be obtained and evaluated. This baseline information is necessary to accurately assess and judge the compatibility and impact of any proposed development projects on the habitat and related wildlife within our refuge, critical habitat and sanctuary systems.



HABITAT PROTECTION SECTION ORGANIZATIONAL CHART

# FISHERIES REHABILITATION ENHANCEMENT & DEVELOPMENT

#### **ROBERT S. ROYS, DIRECTOR**

The Division of Fisheries Rehabilitation, Enhancement and Development (F.R.E.D.) has been assigned the nonregulatory rehabilitation and enhancement aspects of the total salmon management program. The F.R.E.D. Division is responsible for 1) developing and continually maintaining a comprehensive, coordinated State plan for the orderly present and long-range rehabilitation, enhancement and development of all species of the State's fisheries for the perpetual use, benefit and enjoyment of all citizens and to revise and update this plan annually; 2) encouraging the investment of private enterprise in the technological development and economic utilization of the fisheries resources; and 3) doing all things necessary through rehabilitation, enhancement and development programs to insure perpetual and increasing production and use of the food resources of Alaskan waters and continental shelf areas.

To achieve these goals F.R.E.D. Division has 13 facilities for incubating and rearing salmon in active operation and seven facilities in design or construction stages. Prior to 1976 capacities of these facilities were small, as were the adult returns, but dramatic increases in numbers of eggs taken and fry released are now being experienced (Fig. 1).

During 1977 a major reorganization of the F.R.E.D. Division and the Hatchery and Engineering sections of the Division of Administration took place, streamlining activities and eliminating duplication of effort. Reorganization has divided F.R.E.D. Division into three major functions: operations, administration, and technology and development.

Operations is involved with facility operations and maintenance, project management and operational assistance to private nonprofit hatcheries.

Administration provides strategic planning for both the public and private sectors, divisional management control, inter- and intradepartmental and agency coordination, budget and fiscal control, and clerical and accounting services.

Technology and development contains biological, engineering, pathological and genetic components.

Biological functions include research, maintenance of technical standards, facility development and evaluation, and technical assistance to private nonprofit hatcheries. Departmental engineering staffs are maintained in Juneau and Anchorage to provide engineering liaison with other State and Federal agencies and consulting firms who influence construction of Alaska Department of Fish and Game projects. Designing fishpasses and hatchery facilities are part of engineering activities as well as assisting hatchery managers with technical support for maintenance and expansion. All hatchery construction is monitored by the Department of Transportation and Public Facilities in cooperation with F.R.E.D. Division engineers.

Pathology is an important activity of technology and development. Numerous diseases have been and will be encountered during fish propagation. The success of artificial salmon propagation will depend to a large extent on the effectiveness of the disease prevention and control programs. The Alaska Fish Pathology Laboratory is maintained in Anchorage. In 1977 a branch laboratory was opened in Juneau. Objectives of the pathology program are to protect the health of Alaska's wild fish and shellfish, to prevent the spread of disease from one locality to another, to assist in diagnosis and treatment of existing disease problems and to carry on an active research program on fish and shellfish health programs.

Since the IHNV (infectious haematopoietic necrosis virus) has the capability of decimating populations of sockeye fry, fingerlings and smolt, research has continued on its incidence and distribution. Data from this survey will be used for hatchery site selection, egg source selection, stock transfers and determination of future vaccination needs.

In the spring and early summer 1977, vibriosis vaccinations were prepared and administered to salmon at certain hatcheries in the State.

Bacterial kidney disease (BKD) has recently been detected in Alaska. This disease has been implicated as the major cause of chronic mortalities in salmoid husbandry on the West Coast. Research is underway to determine its incidence and distribution in this State.

The bacterial disease furunculosis has caused mortalities in rainbow trout and prevents the export of Alaska grayling eggs into Canada in spite of a Federal request. The Virology Rabies Unit of the Department of Health and Social Services in Fairbanks is assisting in the development of a vaccine program.

The study of genetics is another part of technology and development's functions. A biochemical salmon genetics laboratory was opened in 1977, the first of its kind in Alaska. One of its main objectives is to determine the genetic effect of hatchery operations upon salmon stocks through analysis of the gene frequencies in hatchery stocks compared to wild stocks in the same area. The F.R.E.D. geneticist is establishing procedures for a concentrated program of genetic analysis of salmon stocks on a statewide basis.



Worker dresses new concrete raceway for the Ship Creek complex.

#### Nonprofit Hatchery Programs

F.R.E.D. continues its responsibilities to coordinate and cooperate with and assist the private nonprofit hatchery sector in establishing and achieving objectives that will contribute significantly to the rehabilitation and enhancement of the salmon resource.

Planning responsibility both interdivisionally and with the private nonprofit salmon hatchery operators was shifted to F.R.E.D. Division in 1977. Regional planning teams consisting of user group representatives and departmental personnel were established. These teams will coordinate all salmon rehabilitation and enhancement activities within the Department with the private sector.

#### **Cooperative Programs**

Cooperative agreements have been encouraged between F.R.E.D. Division and other public agencies and the private sector. F.R.E.D. has contracted with the nonprofit organization Alaska Aquaculture Foundation to test an egg planter in streams on Kodiak Island.

According to an agreement with the Alaska Power Administration, incubation studies continue at the Snettisham Power Project. F.R.E.D. Division also participates in cooperative research with the National Marine Fisheries Service (NMFS) at two locations in Southeast Alaska: Auke Bay and Little Port Walter. At Auke Bay various incubator systems for the production of high-quality pink fry are being tested. At Little Port Walter F.R.E.D. Division is utilizing the NMFS facilities in a cooperative program to meet the needs for improved chinook salmon brood stock for Southeast. Approximately 200,000 chinook salmon eggs taken in 1977 have produced 156,000 fry. These, along with 40,000 fingerlings from 1976 eggs, are being reared. NMFS and F.R.E.D. Division are also cooperatively participating in the evaluation of the natural rearing capacity of Lake Nunavaugaluk.

The U. S. Forest Service (USFS) and F.R.E.D. Division cooperate on stream improvements with joint investments on fishpasses throughout Alaska. The Western Fish Disease Laboratory of the U. S. Fish and Wildlife Service, located in Seattle, has been developing fish disease control measures with F.R.E.D. Division. In conjunction with the Department of Health and Social Services, a pathology laboratory and a genetics laboratory, the first in the State, have been opened in Juneau.

F.R.E.D. Division, under contract to the Alaska State Energy Office, initiated investigations to determine the technological feasibility for the application of geothermal energy to hatchery production of salmon. The seven sites studied were Akutan in the Aleutian Islands, False Pass, Port Moller, Mother Goose Lake on the Alaska Peninsula, Ophir Creek north of Bethel, and Bailey Bay and Bell Island Hot Springs north of Ketchikan in Southeastern.

#### Habitat Maintenance and Improvement

In other activities to rehabilitate salmon resources F.R.E.D. Division has installed fishpasses over migration barriers to allow spawner access to unutilized areas.

Two fishpasses, funded by the 1976 bond authorization, were constructed during 1977 at Ketchikan Creek and Anan Creek near Wrangell and both were utilized during the 1977 season. Another new fishpass was constructed at Humboldt Creek on the Alaska Peninsula in cooperation with the Sand Point School Aquaculture program, Division of Commercial Fisheries and the USFS.

Maintenance of existing fishpasses continues in Southeastern at Navy, Pavlof and Falls creeks, and in Prince William Sound at Shrode, Billy's and Control creeks. Six steep passes are located in the Kodiak area. These ladders have been highly successful at low maintenance cost in establishing new salmon runs in streams and lakes blocked by barrier falls. In 1977 a total of 139,548 sockeye ascended the fishpasses compared to 744 during the 1956-1960 period when the runs were first being established. In addition, 205 chinooks, 11,061 pinks and 87 chums utilized the ladder, making a total of 150,901 salmon utilizing a system where prior to the mid-1950's no run existed. Additional steep-passes are planned on the Frazer River to accommodate a rapidly growing salmon run.

The Russian River fishpass will be constructed during 1978 over a falls where salmon have been airlifted in time of high-water flows.

#### **REGIONAL REPORTS**

#### SOUTHEAST REGION

#### Crystal Lake, Petersburg

The Crystal Lake hatchery was constructed under the \$2.5 million 1968 bond issue. Basically complete in 1973, it was operated by the Hatchery Section until 1977 when that Section was incorporated into F.R.E.D. Division.

Designed for production of coho and king salmon smolts, the facility also handles steelhead and rainbow trout. More eggs can be incubated than the number of smolt reared so excess eggs and fingerlings are transferred to fish-rearing facilities at Fish Creek and Starrigavan. They are released at these sites to establish or enhance salmon runs.

During 1977 many improvements to the facility were made. Changes in water supply and pond design eliminated fish pond water nitrogen supersaturation which has hampered operations previously. A chiller unit added to the incubation water system enabled Crystal Lake hatchery to successfully incubate chinook and chum eggs in spite of extremely high water temperatures during the summer.

A successful chinook egg take on Andrews Creek, a tributary of the Stikine River, yielded 195,000 eggs of which 27,000 were sent to the Snettisham project. Approximately 300,000 eggs were taken from 260 king salmon that returned to the hatchery from 1975 releases. This second year of returns contained larger fish than last year's, some weighing 30 pounds.

Adult coho runs began in November and eggs from these fish will be incubated and reared during 1978-79.

#### Starrigavan, Sitka

The Starrigavan incubation and rearing facilities, located in Starrigavan Bay, seven miles north of Sitka, have the capability of incubating and rearing all five species of salmon. The major emphasis has been on coho, but chinook salmon have received high priority whenever brood stock is available. Salmon are raised from egg to fry stage in the incubation facility and transported a short distance to estuarine pens where they are reared until time of release.

This year 29,000 eggs are being incubated from 16 adult chinook salmon which returned to Starrigavan Creek from earlier releases.

This year's egg take goal has been achieved with 500,000 eggs taken from adult coho returning to the facility. Resultant fry will be started in 12 new fiberglass tanks before placement in new vertical raceways at the estuarine rearing facility.

To evaluate new production incubators designed for use at the facilities of Hidden Falls and Klawock Lake, 2.1 million pink eggs are presently being incubated. The fry will be released into Starrigavan Creek in spring 1978.

#### Beaver Falls, Ketchikan

The Beaver Falls facility was designed and continues to operate as an applied research station for the investigation of chum salmon aquaculture technology. To test rearing substrates and incubator design, 4.6 million chum eggs were taken this fall at Disappearance Creek on Prince of Wales Island. Results of research are applied to major production facilities.

To evaluate results of the program, a percentage of the fish released have been marked by fin clipping and with coded wire tags. Marked returns from the 1974 brood stock were found in the fall chum salmon fishery by monitoring the two cold storages in Ketchikan and by daily monitoring of the Disappearance Creek weir. A crew of technicians ground surveyed streams to measure the effects of straying into other systems. No marked fish were found from these periodic carcass checks. Some fish returned in 1977 but the majority are expected to return in 1978 and 1979.

#### Deer Mountain Hatchery, Ketchikan

The Economic Development Administration (EDA) provided \$680,000 to the City of Ketchikan for remodeling and making additions to the existing Deer Mountain salmon hatchery which will be operated by F.R.E.D. Division.

Built in 1954 by the Ketchikan King Salmon Derby Committee, the building has most recently been leased by F.R.E.D. Division and used for eyeing of eggs for the Beaver Falls facility. The proposed hatchery, to be completed by July 1978, will provide facilities for producing and releasing 150,000 coho smolts and 150,000 chinook salmon smolts annually.

Because the existing hatchery is located near other tourist attractions the City of Ketchikan plans to incorporate information shelters to educate visitors concerning hatchery activities.

As brood stock for the hatchery 100,000 chinook salmon eggs were incubated this summer, but high mortalities occurred due to high incubation water temperatures experienced in an unseasonably warm August.

Coho salmon returned to the Deer Mountain hatchery this fall from a release of 2,000 smolts, cooperatively cared for by F.R.E.D. personnel and the Ketchikan High School marine biology class. Eggs taken from these returning adults will provide brood stock for the expanded facility.

#### Fish Creek, Juneau

The estuarine rearing pens at Fish Creek have been devoted to coho fingerlings since October 1974. In the past coho salmon eggs taken at Mendenhall ponds were incubated at Crystal Lake hatchery and fingerlings initially reared at Mendenhall Ponds. However, in 1977, the latter step was eliminated when the facility's capacity was expanded. Over 500,000 fingerlings were placed directly into the estuarine rearing pens at Fish Creek.

In addition to providing adult salmon for the Juneau area fisheries, the facility continues to test methods to improve pen rearing efficiency. A comprehensive review of the Fish Creek 1976-77 project was published this year.

#### Snettisham

A feasibility study begun in 1976 at the Snettisham Power project south of Juneau in cooperation with the Alaska Power Administration gave initial indications that it is possible to utilize water of nearly constant 41 degrees for production of salmon. Fry from a small test lot of summer chum salmon eggs were reared and released at Port Snettisham for an anticipated return starting in 1980. To continue the study 400,000 chum eggs were taken from nearby streams. An additional 550,000 eggs were taken from streams adjacent to the planned Hidden Falls facility. These will be incubated at Snettisham but imprinted and released at Hidden Falls to develop a brood stock for that hatchery. Approximately 25,000 eved chinook salmon eggs are also being incubated and the resultant fry will be reared in a floating raceway in the tailrace of the power project.

#### Hidden Falls, Baranof Island

A contract was awarded in November of this year for the construction of the Hidden Falls hatchery on Baranof Island. This hatchery, funded by the 1976 bond issue, will have a capacity of 47 million chum fry and three million coho smolts.

#### Klawock Lake, Prince of Wales Island

Excavation for the foundations and subsurface drainage system nears completion at the new Klawock Lake hatchery site. Funded by the 1976 bond issue, this hatchery will eventually produce and release 47 million chum fry and three million coho fingerlings. Construction will be completed in time for egg take in September 1978 at which time an estimated 15 to 20 million chum eggs and three million coho eggs will be taken.

A temporary weir across Klawock River has been maintained for the past two years to document availability of brood stock, return timing and average number of eggs per female. Water temperature and flow are monitored at both Klawock Lake and in the estuary.

#### CENTRAL REGION

#### Ship Creek Complex

The Ship Creek complex includes the traditional hatchery facility at Fire Lake near Eagle River and rearing facilities at Elmendorf Air Force Base and Fort Richardson. The complex provides rainbow trout, chinook and coho salmon smolts to rehabilitate the sports fishery in the entire Cook Inlet area and Whittier Arm. The goal is to release five million smolts a year.

Fire Lake hatchery incubates all eggs for the Ship Creek complex. Primary rearing has been provided before the fingerlings are either planted or moved to heated ponds at Elmendorf Air Force Base or Fort Richardson. Smolts are then returned to the site where the eggs were taken.

Fort Richardson's cooling ponds from the army post's power plant provide heated water for rearing fish. The rainbow trout, coho and chinook smolts from this rearing facility are used to stock Cook Inlet basin. A small incubation trailer is located here to eye eggs.

At Elmendorf Air Force Station the cooling ponds from the base power plant provide heated water for rearing smolts. Ten new raceways were completed in 1977 to provide capacity for rearing 1.5 million coho and king smolts. These will be used to benefit sport fishermen in Kachemak Bay, Resurrection Bay and at Whittier.

In addition to salmon eggs, grayling and sheefish eggs from the Interior are being incubated for these developing sport fisheries.

This facility will continue to be the mainstay of the rainbow trout program. Adult rainbow are held for brood stock to furnish eggs and fry for Sport Fish Division lake stocking.

Lack of additional quality water sources will prevent further expansion of this facility. A water survey is being conducted by consulting engineers to determine how much additional water is available. If positive results are obtained, F.R.E.D. Division will go into a design phase for expansion of rearing raceways to double the present capacity. Plans would include a coho/chinook hatchery with a capacity of possibly 30 million eggs.

#### **Big Lake**, Wasilla

The Big Lake facility, located on Meadow Creek, is the hatchery for the upper Cook Inlet sockeye rehabilitation project. In addition to enhancing runs in Big Lake, sockeye runs will be established in Nancy, Red Shirt, Wasilla and Cottonwood lakes.

At present approximately 9.2 million eggs are being incubated. Of these, 2.1 million sockeye eggs were taken at Nancy Lake and the fry will be returned to that lake next spring.

Coho return to the Big Lake system in early August, a time considered by sportsmen to be more desirable than runs which return in early winter. Consequently, Big Lake coho are being used to establish brood stock to rehabilitate coho runs along the Susitna River and its tributaries. Five hundred thousand coho eggs are being incubated and the fry will be short-term reared before being placed in the Big Lake system.

Economic Development Administration (EDA) funds have been received to develop three water wells to provide water needed to expand the hatchery to the projected 20 million-egg capacity next year.



Freshly taken eggs at Big Lake, near Wasilla.

#### Kasilof, Soldotna

The Kasilof hatchery, located on Crooked Creek, is the site of the lower Kenai Peninsula chinook salmon rehabilitation program. In 1977, 3,194 chinook salmon were counted through the Crooked Creek weir and spawned naturally. In addition 455 chinook salmon were held for an egg take which produced about 1.5 million eggs.

Hatchery crews took approximately 4.3 million sockeye eggs at Tustumena Lake for incubation at the Big Lake hatchery. An additional 700,000 Tustumena sockeye eggs were sent to Tutka Lagoon to be incubated. Due to a low adult return to Hidden Lake, only 236,000 eggs were obtained for incubation at Big Lake for return to Hidden Lake. About 116,000 kokanee (nonmigrating sockeye) eggs were obtained to determine if their progeny will remain in the lake or migrate to sea as do sockeye.

The Kasilof hatchery is one of the first built by F.R.E.D. Division. The water for use in the hatchery was originally pumped directly from Crooked Creek to the egg incubators without benefit of screening or filtration. Resulting debris in the water limited success of the operations. A new water intake system is presently being constructed. Screens at water intake filters within the hatchery will assure clean incubation and rearing water. With these improvements the Kasilof hatchery will be at full capacity next season.

#### Tutka Lagoon, Seldovia

Tutka Lagoon hatchery, on the lower Kenai Peninsula, is entering its second season at full capacity. During the present season 7.1 million pink eggs and approximately 700,000 sockeye eggs from Tustumena Lake are being incubated.

About 7.7 million pink salmon fry emerged from the incubators in the spring of 1977. Of these, 478,000 were transported to Halibut Cove Lagoon for short-term rearing and release. The remainder were released directly into Tutka Lagoon. In 1978 fifty percent of the pink fry will be released directly into the lagoon and the remainder held in floating pens and fed for approximately one month prior to release.

A settling pond filtration unit is being installed to correct the water quality and siltation problem. Future plans are to expand the facility to a 15-million-egg capacity to further enhance and rehabilitate the pink and chum salmon streams on the lower Kenai Peninsula.

#### Halibut Cove Lagoon, Homer

One estuarine rearing facility is now operating in the lower Kenai Peninsula area. The objectives at Halibut Cove Lagoon rearing facility are to develop brood stocks of chinook and coho where none originally existed and to produce these species for developing sport fisheries. Secondary objectives include



Female coho is netted for egg-take at Halibut Cove Lagoon.

studies on fish disease, short-term pink salmon rearing and short-term sockeye rearing followed by lake rearing.

This year 324,000 pink fry, 91,000 sockeye fry, 7,200 coho smolt and 48,900 chinook smolt were reared and released in the Lagoon and nearby Leisure Lake. Chinook and coho smolt were delivered from Fort Richardson's rearing ponds after incubation at Fire Lake hatchery. The pink fry came from Tutka Lagoon and sockeye fry from Kasilof Incubation facility.

Sockeye fingerlings reared at Halibut Cove Lagoon were transported to nearby Leisure Lake in September 1977. Sockeye handled in a similar manner in 1976 doubled their size while overwintering in this lake and the survival rate was 50 percent or greater. Studies will continue in an effort to determine the feasibility of utilizing advance rearing capacities in lakes for fish which have been short-term reared.

Subsistence and sports fishermen at Homer Spit, Glacier Spit and Halibut Cove Lagoon were interviewed to determine numbers of tagged adult coho caught. This data established a known three percent ocean survival of coho returning to Halibut Cove Lagoon, but adult returns were thought to be higher.

#### East Creek, Dillingham

A 15-million-egg capacity hatchery at East Creek for rehabilitating depleted sockeye stocks in Lake Nunavaugaluk was completed in late 1976. The water intake systems, however, required substantial upgrading in 1977 by the contractor. The incubator system within the hatchery building is being assembled and the hatchery will be operational in 1978.

East Creek is a spring-fed stream and for the last three years has supported instream incubation boxes at its headwaters about 1.5 miles from the present hatchery. These boxes, which have incubated as many as 3.5 million sockeye eggs in one year, are constantly attended by F.R.E.D. personnel. This year a very small sockeye adult return to Lake Nunavaugaluk resulted in the collection of only 2.0 million eggs.

#### Cannery Creek, Prince William Sound

An incubation facility located at Cannery Creek in Unakwik Inlet was funded in the 1976 bond issue. Applications for special use permits, topographic surveys and soil and water investigations have been made. Consulting engineers are in the process of completing final designs for the hatchery.

The hatchery will be capable of producing and

releasing 30 million salmon fry of which 20 million will be pink, nine million chum and one million coho. In addition to hatchery production, a run of coho salmon will be developed at Whittier. Eggs were taken from streams in the vicinity and are being incubated and reared in the Ship Creek complex. One hundred thousand coho smolts will be imprinted at Whittier and released in 1979. Returning adult coho will be utilized by the developing small boat fleet and sport fishery.

#### WESTERN REGION

#### Kitoi Bay, Afognak Island

The Kitoi Bay hatchery has been in existence since the 1950's as a pink and sockeye research station but was converted in 1976 to a pink salmon production facility. A total of 20.8 million pink eggs are being incubated in 1977.

Approximately 1.2 million of the 4.7 million fry released at Kitoi Bay in the spring of 1977 were short-term reared. Preliminary results from previously marked fry returning as adults indicate a substantial increase in marine survival for those reared for a short term over fry released directly into Kitoi Creek.

Eighty-four percent of the total 1977 run of pink salmon to Kitoi Bay were attributed to fry released from the Kitoi Bay hatchery. A return of 31,999 pink salmon was recorded.

Fry incubated at the hatchery continue to be returned to Seal Bay Creek on Afognak Island to establish a run above a fish ladder installed in 1972. About 6,700 adult pinks, which had been hatchery incubated as eggs, returned to Seal Bay Creek in 1977. About 1,200 of those used the fishpass to reach spawning grounds above the falls, indicating that the fish had imprinted to the site of release. The Seal Bay study provides positive evidence of rehabilitating pink salmon stocks from a centrally located hatchery.

#### Karluk Lake, Kodiak Island

Although much controversy surrounds the descriptions of the historical sockeye runs at Karluk Lake, biologists seem to be in agreement that the center portion of the run was depleted and has not reestablished itself. Efforts will be directed toward rehabilitating specific spawning stocks within the lake system. A combination of eyed egg plants in stream gravel and incubation and release of fry has been proposed.

A million eyed sockeye eggs were planted in 1977 to evaluate the effectiveness of that method.

#### Russell Creek, Cold Bay

Construction began in August 1977 on a 50million-egg capacity chum/pink hatchery at Russell Creek near Cold Bay. Excavation and grading for the hatchery site has been completed. The foundations for the hatchery and maintenance buildings will be finished by the fall of 1977. According to the contract, construction is to be completed by July 15, 1979.

This facility is intended to enhance the salmon production of Russell Creek utilizing indigenous brood stock. However, once in production, the hatchery can be programed to rehabilitate numerous stocks in the surrounding streams.

#### NORTHERN REGION

#### Fairbanks

F.R.E.D. Division completed its first year of operations in the Interior. Here a hatchery program is being developed to provide enhancement information on salmon which have long freshwater migration routes. In addition, salmon incubation and rearing methodologies suitable for Interior temperature regimes are being tested. Much time was spent on a survey of streams and warm-water sources to find sites most promising for salmon enhancement.

At Clear Air Force Station there appears to be an unlimited supply of good well water suitable for incubation of eggs. A facility at Clear would give an opportunity to mix well water and heated water to provide constantly controlled incubation temperature.

F.R.E.D. Division obtained permission from the Air Force to incubate 100,000 chum eggs taken at Delta River. An additional 50,000 chinook salmon eggs were taken at the Salcha River to incubate and rear at Fire Lake. The resultant smolts will be released in the Interior during May of 1978. These egg takes were the first for Yukon River chinook and chum salmon.

Other activities included testing incubators in the Fairbanks water treatment plant, investigations of geothermal sites, conducting a poll of Yukon River fishermen to learn which species are in greatest demand for enhancement, and conducting a seminar on salmon culture for fishermen on the lower Kuskokwim and lower Yukon rivers.

#### SUMMARY OF WHAT'S AHEAD

Historical declines and continued extreme fluctuations in the catches of the five salmon species indicate that this renewable resource needs short-term and long-term rehabilitation and enhancement if harvests are to become a dependable part of the Alaskan economy and meet the needs of all user groups. Application of reliable, cost effective salmon husbandry technology that increases the production of fry, fingerlings and smolts will result in increased adult salmon harvests.

In a continued effort to rehabilitate and enhance

salmon stocks, the 1976 bond issue provided funds for new hatcheries. Construction has begun on hatcheries at Russell Creek at Cold Bay, Klawock Lake on Prince of Wales Island and Hidden Falls on Baranof Island. Construction of the Cannery Creek hatchery in Prince William Sound will begin next year. Design is continuing on the three other hatcheries funded by the 1976 bond issue.

Seven hatcheries are proposed for the 1978 bond issue as outlined in the Alaska Salmon Fisheries Plan. Future development work will consist of approximately eight hatcheries per bond cycle.

Operations will continue at existing F.R.E.D. facilities, and by 1979 it is projected that statewide artificial adult production capacity, based upon existing facilities and those constructed with 1976 bond monies, will be 4.6 million adults (268.8 million eggs): 1.5 million sockeye salmon adults (89.8 million eggs), 548,000 coho salmon adults (8.9 million eggs) and 74,900 chinook salmon adults (4.6 million eggs). Total realization of this objective is dependent upon

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the availability of Alaska brood stocks and securing conventional hatchery space for smolt rearing.

Considerable opportunity exists in Alaska to enhance coho and sockeye salmon fisheries through utilization of freshwater rearing habitat presently underutilized. Stocking of lakes with fry or fingerlings produced in hatcheries will decrease the need to construct expensive artificial smolt producing facilities throughout the State. Development and application of lake stocking techniques will increase design capacity an additional 188,000 coho adults (11 million eggs).

Planning efforts will continue, with regional planning teams to review and establish numerical salmon species objectives by salmon registration area, to meet the needs of all user groups. The teams will improve, establish and finalize departmental policies and procedures in cooperation with the public and private nonprofit sectors relative to harvest strategies, brood stock development, facility siting, permitting and operational and technical assistance.



DIVISION OF FISHERIES REHABILITATION ENHANCEMENT AND DEVELOPMENT ORGANIZATIONAL CHART

# COMMERCIAL FISHERIES

#### CARL ROSIER, DIRECTOR

The Division of Commercial Fisheries is charged with the responsibility of managing all commercial and subsistence fisheries, with the exception of halibut, in the State; and to provide for the sustained production of these valuable renewable resources. To fulfill this objective, the Division is divided into three major functions: management, research and administration. Management involves the regulation of commercial harvests by area, seasons and quotas which are based on the regulations, policies and directives of the Board of Fisheries as modified in-season by current biological information on stock condition. Research provides timely and essential biological assessments of the resource on which management decisions can be made. Administration makes policy decisions and coordinates the activities of the Division.

With an operating budget of \$7.9 million in 1976-77, the Division of Commercial Fisheries managed commercial fisheries grossing \$126.7 million for the fishermen and \$291.2 million for seafood processors (1975 figures). Subsistence harvests of fisheries resources continued to provide essential sustenance to many rural Alaskans.

#### MANAGEMENT

#### Salmon Harvest

The 1977 preliminary harvest estimate of 48.8 million salmon is the largest catch since 1970. The statewide pink salmon catch was the best in six years and the sockeye catch was the largest in the last five years. Both king and coho catches were slightly below recent averages but the chum salmon harvest was above average. Table 1 displays the preliminary estimated harvest by species and management area.

Catches through the 1966-76 period averaged over 40 million salmon per year. Despite the generally good escapement levels realized in the late 1960's poor salmon survival due to extremely harsh climatological conditions during the winters of 1970-71 and 1971-72 precipitated a disastrous decline in salmon runs statewide. Harvests from 1971 through 1975 averaged only 30 million salmon per year with a low of 22 million in 1974. In 1976 fishermen harvested 44 million salmon, a definite improvement over the previous four-year period. While one or two years comprise too short a period to insure a trend, the 1977 harvest and total run indicate that the situation is improving.

Especially gratifying is the apparent recovery of pink and chum salmon runs in the Chignik-South Peninsula areas and the improved status of pink salmon runs in northern Southeastern Alaska. Pink and chum salmon runs in the Chignik-South Peninsula area had declined to nearly total closure levels starting in 1972. Catches and escapements continued to be minimal through 1975 and it was not apparent that these stocks would recover without supplemental production assistance. However, in 1976 harvests of both pinks and chums improved to nearly pre-1972 abundance, and escapements were generally good. This trend continued in 1977.

Since 1973 pink salmon fisheries in northern Southeastern have been allowed only in very localized situations. Total runs and escapements of this species have been generally poor. In 1977 a better than expected return allowed a harvest of over two million pink salmon in the Sitka area. This return also resulted in improved escapements to many areas of northern Southeastern Alaska, but overall the total was still below desired levels.

Some other high points of this 1977 season:

The commercial harvest in the Arctic-Yukon-Kuskokwim Region was the third largest ever recorded. Chinook salmon runs and escapements to both the Yukon and Kuskokwim Rivers were strong and reversed a recent short-term decline. A record coho salmon catch and total run was experienced in the Kuskokwim River.

The Bristol Bay chum salmon catch was the largest in history and the Nushagak chinook salmon run and escapement were exceptionally large. The sockeye run was larger than forecast and about twice the average production for this particular cycle year. Escapement goals were achieved in most river systems.

The Chignik-area sockeye salmon catch was the second highest ever recorded and escapements were excellent.

The Kodiak pink salmon catch was the largest odd-year cycle catch since 1969. Escapement numbers and distribution were excellent. Kodiak sockeye harvests were well above normal for recent years and escapements to most systems were good. Kodiak chum salmon returns were exceptionally strong; an above-average harvest and good escapements were achieved.

The Cook Inlet sockeye salmon harvest was the largest since 1951 and escapements to all systems were good. Although not presently fished, a record escapement of Susitna River king salmon was recorded. Chum salmon harvests were well above recent averages.

The Lower Cook Inlet pink salmon harvest of 1.1 million was the largest catch since 1962. Excellent escapements were achieved in all major spawning streams.



Salmon scale patterns are analyzed to identify fish from different streams.

The Prince William Sound chum salmon harvest and pink salmon return were well above average. Pink salmon escapements were adequate both in numbers and distribution.

Southern Southeastern fishermen caught over 10 million pink salmon in 1977, well above the 1960-75 average. The return was the largest since 1951 in this area and is the result of good escapement levels in 1975. This year's return indicates that the current management strategy of reducing effort in mixed stock fishing areas until escapement levels are building well in schooling areas will be successful. Escapements of pink salmon in 1977 were excellent in most major producing areas. Southeastern sockeye catches were very good this year.

Salmon catches and runs statewide were average or above average in most areas. These runs are the result of an apparently improving survival situation for salmon coupled with the achievement of good parent escapements through regulation of the commercial harvest. These escapements were generally achieved from poor runs returning in the early to mid-1970's and at great sacrifice on the part of the commercial fishing public and industry. This strategy is apparently paying off and preliminary forecasts for 1978 are indicating an even larger harvest statewide than in 1977.

Assuming survival conditions remain the same and the Department continues to secure desired escapement levels and distribution, the situation should continue to improve through the late 1970's and early 1980's.

#### Shellfish Harvest

This year's total shellfish harvest is expected to be close to the 1976 harvest of 317 million pounds. The king crab catch in the Bering Sea will reach about 85.5 million pounds this year, an increase of 14.0 million pounds over the 1976 catch due primarily to expanding fishing effort. All other areas of the State are expected to produce below-normal king crab catches.

The 1977 Westward region tanner crab fishery is expected to produce a record harvest of over 85 million pounds, a 22-percent increase over the 1976 catch. The expansion of fishing effort into the eastern Bering Sea by the U. S. fleet accounts for the major increase of harvest. Before 1974, the eastern Bering Sea tanner crab harvest occurred as an incidental catch to the king crab fishery. Recent developing markets for United States processors have accelerated the harvest from five million pounds during 1974 to 51 million pounds in 1977.

Tanner crab production in Prince William Sound and Cook Inlet decreased sharply from the 1975-76 season with a harvest of 2.3 and 4.6 million pounds respectively. Most of the decrease was related to new minimum-size regulations imposed this past season, but price negotiations also delayed fishing in Prince William Sound.

Dungeness crab catches increased in Prince William Sound, but decreased in Cook Inlet. The 1977 total estimated production of 600,000 pounds for both areas is on a par with last year.

The Westward Region shrimp harvest stands at 77 million pounds for the year. The general trend is downward for shrimp stocks in the Westward Region with a catch of 100 million pounds projected, 21 million pounds below last year's harvest. Trawl shrimp production in Cook Inlet reached the 5.0 million-pound quota with an additional 243,000 pounds of pot shrimp being reported. The scallop fishery has continued to decline in effort level the past four years, primarily due to other more profitable fisheries and it does not appear that any effort will be placed on this resource in 1977. The availability of the stocks would allow catches within the range of previous harvests.

#### Herring Harvest

Herring fishing in Southeastern Alaska provided off-season income for participating purse seiners, gillnetters and for processing plant employees during 1977. Approximately 2,200 tons of high-quality roe herring were harvested during short openings in special roe herring fishing areas near Juneau and Ketchikan. The majority of the Southeastern Alaska herring harvest takes place in the winter months. Herring taken during this time period are used primarily for bait and for human food. The total Southeastern Alaska herring catch in recent years has been between 7,000 and 10,000 tons but historical catches indicate that harvests of 50,000 tons and above are possible during periods of high herring abundance.

A seine fishery was initiated in Bristol Bay this year and nine seine vessels took the bulk of the 2,700-ton harvest. Large quantities of herring were observed in the Togiak area, but the catch this year was limited by both the fleet size and processing capabilities. Increased effort and yield is anticipated in this fishery.

Herring production in Prince William Sound and Cook Inlet were both down slightly from last season with yields of 2,283 and 3,225 tons respectively.

Effort in the herring spawn-on-kelp fishery in Prince William Sound was surprisingly high in view of stringent new regulations that restrict harvesting to underwater handcutting. A total of 203 tons was harvested in 1977. Studies are continuing to evaluate this fishery and develop appropriate management methods. The spawn-on-kelp fishery in Bristol Bay was on a par with last year with a 150-ton harvest.

The 1977 statewide herring harvest totaled approximately 21 million pounds.

#### RESEARCH

#### Salmon

Preseason forecasts of pink salmon returns are made in many areas of the State: Southeastern Alaska, Prince William Sound, Lower Cook Inlet, Kodiak, Chignik, the south side of the Alaska Peninsula and even-year Bristol Bay returns. Chum salmon returns are forecast in Prince William Sound. These forecasts are usually based on the relationship between preemergent fry density indices and subsequent adult returns. Correlations of returns with factors such as sea surface and air temperatures have proven useful in forecasting the returns. Efforts are now underway in several areas to produce computer data files to provide more accurate relationships on which forecasts can be based. The data files will then be used to test by site, stream and area the value of each area in the forecast program. This breakdown is needed to improve the quality of the forecast, revise it into subarea forecasts and streamline the sampling program.

Preseason sockeye salmon forecasts are made for two areas of the State: Chignik and Bristol Bay. Because of the more complex life history of this species compared to pink salmon, additional data are collected to provide a more accurate forecast of adult returns. The number of smolt migrating to the ocean each year provides an index for forecasts. The escapement-return relationships, marine maturity schedules and fry densities in the rearing area may also contribute to the forecast. In-season information obtained from offshore test fishing provides further refinement of the forecast prior to the fishery.

Stock separation studies are receiving increasing emphasis throughout the State. In Southeastern Alaska such a study was initiated in 1977 with a pink salmon tagging program in upper Chatham Strait. About 16,500 adult pink salmon were tagged with highly visible color-coded Peterson disc tags. A chartered seine boat was used to capture the fish.

Extensive spawning stream tag recovery efforts in the inside waters of northern Southeastern were very successful. About 2,000 tagged fish were recovered on the spawning grounds. An additional 1,000 observations of the color-coded tags were noted. Analysis of these data should provide valuable information for resolving the pink salmon stock separation problems of northern Southeastern, and in turn, lead to better management of the resource.

A new project to develop and test new techniques for salmon stock identification was funded and put into operation in the fall of 1976. Early testing with some scale measuring equipment originally developed in British Columbia indicates scale growth patterns can be used to separate stocks of chum, sockeye, and coho. This equipment is being improved and data analysis techniques are being perfected. Sampling in Bristol Bay and Cook Inlet was fairly extensive in 1977 to collect the data needed to use scalemeasuring technology for stock identification. Testing of Yukon River chums and Kodiak sockeye was also carried out. Application of the technique to in-season management in Bristol Bay was assessed. Results to date are encouraging.

The Yukon River tag and recovery project for fall chum salmon, in its second year of operation, is an attempt to define the temporal and spatial separation of fall chum stocks in the Yukon River. Results of 1976 work showed that even as far downriver as the Galena area, discrete stocks of fall chum salmon bound for spawning grounds in the Canadian Yukon, and upper Yukon tributaries in Alaska follow the north bank while those bound for the Tanana River and its tributaries follow the south bank. More than four times as many fish were tagged in 1977 than in 1976. The ability to identify fall chum stocks in the mid- and lower Yukon will enhance the management of discrete stocks.

Additional research projects are continuing throughout the State. In Southeastern Alaska, coded wire tagging of coho salmon juveniles in major northern Southeastern rearing systems was conducted for the second year in 1977. This program worked well and 66,417 coho juveniles were tagged between May and October. A total of 45,514 coho juveniles were tagged in 1976. Returns of these fish through the common property fishery in 1978 and 1979 will provide information on distribution, timing and rate of exploitation of the different stocks of coho.

Chum salmon research in Southeastern includes studies of age and size composition of stocks, investigation of methods of stock assessment applicable to the Chilkat River chum salmon and identification of potential donor stocks for private and public hatcheries. The age-weight-length studies culminated in Technical Data Report No. 34 which is a valuable compilation of statistics collected from 1958 to 1976 by several biologists of the National Marine Fisheries Service and the Alaska Department of Fish and Game. The Chilkat River chum salmon investigations included tag and recapture experiments, sampling with fish wheels and use of side scanning sonar counting units.

A new offshore salmon test fishing program was started in lower Cook Inlet in 1977. The project was designed after the successful Bristol Bay program, and catches of sockeye and chums seem to be at least as good as Bristol Bay catches relative to inshore-run strength. This project will be valuable in helping the managers understand run timing and strength by species.

Sonar projects to count adult sockeye salmon in the Kenai and Kasilof rivers were continued with the addition of a new side-scanning sonar system on the Kenai River. The new system, operating from a solar power cell, was highly effective and will replace older systems on both rivers in 1978. This new sonar system will also be used to enumerate escapements in selected Arctic-Yukon-Kuskokwim rivers in 1978. A test net at the mouth of the Kenai River further contributes to run timing information in the river.

In the Susitna River, the major producer of salmon in northern Cook Inlet, efforts are being made to estimate total salmon escapement on the lower river. A tag and recovery program used fish wheels in



Minnow traps are used at Berner's Bay, near Juneau, to aid coho salmon research.

1977, and will be supplemented with side-scanning sonar in 1978. Only in 1975 and 1977 have total estimates been made for Susitna escapements. Only the sockeye escapement was estimated in 1975 and sockeye, coho and chum salmon in 1977.

Other salmon studies include an Arctic char predation control project in Bristol Bay that successfully seined and impounded several thousand char at two sites in Wood River lakes in 1977. This impoundment resulted in an additional 1.2 million sockeye smolt escaping to the estuary. In 1976 fish were impounded at only one site resulting in a savings of 340,000 smolt.

An adult salmon sonar counting unit was employed with success for the first full season on the Anvik River in 1977. Comparisons with tower counts indicate that the unit can be used under muddy water conditions at a site nearer the river mouth in 1978 to provide accurate counts of the entire chum salmon escapement to this stream. The Anvik River is the single most productive summer chum salmon river in the AYK Region with escapements estimated to exceed one million chum salmon during some years.

Pipeline evaluation studies in 1977 continued to monitor the abundance and distribution of both king and chum salmon in the Salcha River. These studies are also monitoring the impact of pipeline construction and operation upon juvenile and adult fish, and studies continued in the upper Tanana drainage to assess pipeline impact there. These studies have increased our knowledge of chum and king salmon distribution and abundance in Interior Alaska. New fall chum salmon spawning areas have been found in spring areas in and adjacent to the upper Tanana River, and fall chums were observed in the Salcha River for the first time in 1977.

#### Shellfish

Assessment surveys are a valuable research tool for indexing shellfish populations and are used to evaluate most of the important shellfish populations in Alaska.

In Cook Inlet selected king, tanner and shrimp populations are assessed by pot and trawl surveys. In the Westward Region continuing king and tanner crab stock assessments provide the information needed to estimate the abundance of crab just prior to each year's commercial season. These studies also provide information needed to assess the strength of developing year classes from one to three years before they reach commercial size.

Biologists captured a total of 225,000 king crab and about 56,000 tanner crab in the Westward Region in 1977. Tags were placed on over 6,000 crabs of legal size. The subsequent recovery of these tags by commercial fishermen provides resource managers with estimates of fishing mortality which permits better in-season management. These studies confirm that a large increase in the abundance of legal-size king crab will occur in the Kodiak and Shumagin Island Regions by the 1979-80 season.

In addition to the population studies, special tanner crab research is being conducted. The main objective of this research is to determine the life history of tanner crabs, concentrating on age, growth and reproductive requirements.

#### Shrimp Research

Shrimp studies are conducted annually in the Kodiak, Alaska Peninsula and Aleutian Island Regions. These studies concentrate on developing trawl surveys as an effective management tool. Other potential management tools such as the voluntary trawl log book and commercial catch sampling programs are also being evaluated. Shrimp vary widely in catchability and availability to trawls. Log books (used to determine catch per unit effort), and catch sampling programs, which are common fisheries management tools, have not yet proven effective for shrimp.

Shrimp fisheries in the Chignik-Alaska Peninsula area expanded to near full resource utilization in 1976 and 1977. Results of population abundance studies conducted jointly by the Department and National Marine Fisheries Service indicate that shrimp abundance has been declining since 1974. This decline is apparent even in areas without significant commercial utilization, which suggests that natural factors and not just commercial fishing are responsible.

#### Herring

Biomass estimates of herring bait and sac roe stocks were conducted by three Department vessels equipped with digital echo sounder integraters. These vessels are utilized to gather information on the distribution and abundance of the various stocks of herring throughout Southeastern Alaska. In addition, age growth and spawn deposition analysis provide critical data to the fishery managers on the stock status of the Southeastern Alaska herring.

#### ADMINISTRATION

It has been approximately 14 months since the North Pacific Management Council was formed under the provisions of the Fishery Conservation and Management Act of 1976. During that time the Commercial Fisheries Division of the Alaska Department of Fish and Game has become increasingly involved in extended jurisdiction matters. The Council has appointed the Alaska Department of Fish and Game as lead agency to develop seven management plans for commercial fisheries in the conservation zone. These include tanner crab, king crab, dungeness crab, shrimp, scallops, troll salmon and Bering Sea surf clams. Lead agency responsibilities include: providing the majority membership on the plan drafting teams



Crab test fishing near Kodiak lets biologists determine the relative abundance of legal and sub-legal size crab. together with a tagging program, it provides necessary management information and allows crab populations in succeeding years to be predicted.

and the drafting team leader, presentation of the finished draft to the Council and advisory committees, attending public hearings on the plans and conducting final redrafting of the plan before it passes to the Secretary of Commerce. Other Division personnel have and are serving on drafting teams for High Seas Salmon, Gulf of Alaska Groundfish and Bering Sea Groundfish (National Marine Fisheries Service—lead agency).

To date two plans have been developed by the Alaska Department of Fish and Game, a tanner crab plan which is now being reviewed by the Secretary of Commerce and a troll salmon plan. The North Pacific Fishery Management Council is currently conducting hearings on the salmon plan and it is expected that this plan will be sent to the Secretary of Commerce in December (1977). Two additional plans are under active development—king crab and Bering Sea surf clams.

The Coastal Zone Management project is in its final stages with the completion of two statewide fisheries volumes this year. A Fish and Wildlife Resource Inventory of the Alaska Peninsula, Aleutian Islands and Bristol Bay (Vol. 2, 557 pp), and a Fish and Wildlife Resource Inventory of the Cook Inlet-Kodiak Area (Vol. 2, 2nd draft, 443 pp.) were completed and published in 1977. Work is continuing at present to complete mapping and wildlife resource inventories for Southeastern, Western and Arctic Alaska.

#### **OUTLOOK FOR THE FUTURE**

The commercial salmon harvest is expected to reach 63.0 million in 1978, 14.3 million greater than the 1977 catch and 24.3 million over the previous 10-year average. The harvest is not expected to be less than 55 million or larger than 75 million. The expected increase is due primarily to strong pink salmon runs to all regions. The returns of all other species are expected to be below 1977 levels. The total shellfish harvest is expected to exceed the 1977 harvest by 10 to 15 million pounds. The majority of this increase will be from the Bering Sea area with larger catches of both king and tanner crab.



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The Commerical Fisheries Division must manage a multi-million dollar industry. This fish-buying boat is unloading at a cannery in Bristol Bay.



COMMERCIAL FISHERIES DIVISION ORGANIZATIONAL CHART

## **SPORT FISHERIES**

#### RUPERT ANDREWS, DIRECTOR

The Sport Fish Division is responsible for managing Alaska's sport fish resources. The goal of the Division is to provide the largest number of sport fishing opportunities while maintaining fish stocks at a high level of productivity. The Sport Fish Division functions through 15 permanent field offices and several temporary field stations as well as the Juneau Headquarters. This network allows the Division to closely monitor sport fishing throughout the State and keep in close touch with local sport fishermen.

A staff of 42 field biologists conduct investigations and carry out management decisions. Current research involves activities such as monitoring fish population levels, recording sport fish harvests, evaluating the effects of development such as logging on sport fish populations and establishing hatchery brood stocks of sport fish species. Improving lake stocking techniques and determining sport fish biological and environmental requirements are additional major programs statewide. Computer systems help organize the mass of accumulated data.

Management biologists protect sport fish populations by programs regulating fishing seasons and limits, controlling numbers of competing fish species, and stocking lakes suitable for producing desirable fisheries. Sport Fish Division management must also negotiate with other user interests such as private landowners for access easements, loggers, and other developers in order to preserve sport fishing opportunities from adverse impacts.

#### **Economics of Sport Fishing**

While sport fishing does not provide a direct cash profit for the fisherman, recreational fishing does play an important economic role in Alaska. Over 250,000 people sport fished in Alaska during 1977, and their activities supported hundreds of businesses from sporting goods stores to guide services and remote lodge operations. The sport fishing recreational traffic bolstered the economies of many rural and remote areas. The sport fish guide register now lists over 51 lodges and services which cater to anglers. With the aid of consultants the Sport Fish Division is attempting to create a method of determining the actual dollar value of sport fishing in Alaska including the value of the fish, the recreational industry, travel and spin-off benefits. The dollar estimate should help the Division in documenting the benefits of sport fishing to assist the Board of Fisheries in making decisions concerning the fisheries resource.

The Alaska Legislature increased license fees this year in an effort to keep pace with rising management expenses. Although some resistance to the fee increase was expected, the number of licenses sold as of November 1, 1977 was virtually the same as the number sold in 1976. The fee increase has resulted in a 63 percent increase in revenue over 1976. Sales in 1977 provided close to \$2 million for the Division. Federal funding provided an additional \$1.2 million in 1977 to support the Division's fishery investigation programs.



A Sport Fish creek census on upper Chena River obtains information from successful anglers.

#### GENERAL RESEARCH

Research provides the essential tools for all fisheries and habitat management stratagies. The Sport Fish Division conducts several types of basic research programs;



#### Stream and Lake Inventories

Regular stream and lake inventories provide the Division with information on how many and what kinds of fish there are in different areas of the State and on the recreational potential of various waters. At this point the fish populations of much of Alaska's 12 million acres of freshwater still remain completely unknown, primarily in Interior and Northwestern regions. Commercial Fish Division surveys of fish populations provide additional information on the status of the fisheries. In 1977, the Sport Fish Division conducted inventory and cataloging projects in the following areas:

4011

#### **1977** Inventory and Cataloging Projects

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Southeast Alaska	13 lakes
Southcentral Alaska	
Kodiak	15 lakes, 2 streams
Kenai Peninsula	7 lakes
Matanuska-Susitna	
Valley	12 streams
Bristol Bay	18 streams and rivers
Cook Inlet	8 streams
Prince William Sound	17 lakes, many streams
Kuskokwim	15 lakes, 9 streams
	and rivers
Interior Alaska	
National Petroleum	
Reserve, Alaska	
(North Slope),	78 lakes, 29 streams
Noatak and	·
Chandalar drainages	

#### Harvest Studies

The Sport Fish Division conducts harvest studies to monitor the status of the heavy-use fisheries (Table 2). Field biologists continued to conduct many harvest studies using standard creel census methods in the field. Management biologists also initiated a statewide catch survey which was mailed out to nine percent of the licensed sport fishermen in 1977. The statewide survey will provide information on all species of sport fish and should provide more accurate catch statistics than those obtained from creel census methods. The statewide survey will compile especially valuable information on harvests of species such as steelhead and trout. Creel census surveys have generally focused on salmon harvests. So far the response rate to the statewide survey has been excellent.

#### Life History Studies

Life history studies provide information which permits the sport fish management to predict future fish population parameters so that harvests can be appropriately regulated. These studies also identify key factors in fish reproduction and survival. This information is essential for proper habitat protection, lake stocking, artificial fish rearing programs and many other aspects of management. This year's life history research projects included an intensive Taku River king salmon research project begun in 1971 which includes tag-recovery analyses to determine timing and patterns of migration. Proper management of these kings is essential for the Juneau area sport fishery. Other life history studies this year focused on steelhead and coastal cutthroat in Southeastern Alaska and on rainbow trout in Bristol Bay.

#### Land Use Studies

Land use studies provide detailed information on the effects of various types of development upon fish habitat. This year, biologists in Southeastern Alaska completed a research program on the effects of logging debris removal on juvenile salmonids and made a tentative proposal with the Geophysical Institute in Fairbanks to study the effects of timber canopy removal on winter stream temperatures. The Sport Fish Division also initiated an aquatic study of the Keta River, site of the U.S. Borax molybdenum mining operation. In the Southcentral region biologists conducted studies this year on salmon populations, water quality, and other hydrological parameters in the Devil's Canyon area of the Susitna River where hydroelectric development is under consideration. Findings to date reveal that dam construction will have serious adverse effects on Susitna drainage anadromous fisheries, particularly rearing species of salmonids. Biologists in the Interior region studied effects on Chena River fisheries of a new sewage disposal plant built in Fairbanks.

#### **Fisheries Management**

Sport fish management assesses the various collected data on fish population escapements and life history in order to predict the maximum level of fishing that different fish stocks can support without damage from overharvest. Because more and more of Alaska's waters are being fished to capacity levels the task of managing the sport fisheries increases steadily. Based on biological data as well as knowledge of local factors such as economic and subsistence needs, sport fish management recommends and establishes harvest time rates, fishing area quotas, methods, means and bag limits. Sport fish management also establishes research priorities.

This year's population and harvest data revealed the results of past management programs and indicated where new programs are needed. As a result of recent conservative management of Taku River kings, spawning escapements have increased dramatically in the past two seasons. This year, the Taku drainage had the largest escapement since 1959 and managers hope this population can be restored to former levels of abundance. In Juneau, managers initiated regulatory proposals that will protect and enhance Dolly Varden fisheries that have declined greatly since 1960. In 1960, catches averaged 4.2 char per person per day as compared to 0.21 in 1977. Fishing effort was heavy in the Kenai River this year and sport fish managers invoked emergency regulations to close the fishery four days ahead of schedule because harvest limits, set by the Board of Fisheries, had been reached. The king salmon harvest in Cook Inlet and the coho harvest in Resurrection Bay were both very good because of careful management practices. In the Interior the Chena River continues to experience the heaviest grayling fishery in the State. Because of this river's importance, Sport Fish managers have made it a priority for continued research.

#### **Habitat Studies**

Development can have detrimental effects on fish rearing habitats but careful management can often



A shocker boat is used in Chena River to capture grayling for population estimates.

minimize these effects. Legislation which would require development practices on private lands to minimize impacts on fishery habitat would help to achieve maximum protection of the sport fish resource.

Based on research of the effects of logging on fish habitat, sport fish managers have been able to demonstrate the need of improved techniques to prevent siltation and to protect overwintering habitat. Sport Fish Land Use Project personnel participated this year in a Forest Service management review of stream crossing drainage structures in the Tongass National Forest. This review will lead to improved stream crossing techniques and devices.

In the Interior, the Sport Fish Division and the National Marine Fisheries Service conducted a joint study under contract with the Army Corps of Engineers to determine how grayling would utilize an Alaska steeppass fish ladder. This type of ladder could be incorporated into the Chena River flood control dam now under construction. The fish ladder was fully accepted by migrating grayling and recommendations were made to the Corps of Engineers as to the optimum water flow parameters for grayling passage over Chena Dam.

An active habitat management project took place this year on the Russian River. In this case, habitat problems were due to natural causes rather than development activities. Exceptionally high water at Russian River Falls prevented migrating sockeye from reaching upstream spawning grounds. Sport Fish personnel initiated a fish rescue operation during the early run using a helicopter to transport 8,477 sockeye over the falls to lower Russian Lake. During the late run, high water necessitated a second helicopter rescue of 7,436 sockeye.

Sport Fish managers prioritize potential development sites based on the amount of damage development activities would do to habitat and recreational areas. Management was a major function of the Sport Fish Land Use Project and Sport Fish personnel contributed to the Fisheries Task Force of the U. S. Forest Service Tongass Land Management Planning Team. In the Land Use Project our personnel have compiled all available information on sport fish resources in Southeastern Alaska and developed a fishery rating system to determine the relative value of each watershed in the Tongass National Forest.

Lake inventories conducted in Southeastern Alaska this year will allow Sport Fish management to suggest site priorities for the proposed hydroelectric project near Ketchikan. Similarly, in the Southcentral Region Sport Fish management will be taking a close look at data collected this year on the potential effects of the Devil's Canyon hydroelectric project for final site selection recommendations.

#### **Fish Stocking**

The ever-increasing pressure on sport fisheries near urban areas has created a need for expanded supplemental fish production. In some areas supplemental production is required to bring depressed fisheries back to normal production levels.

The Fire Lake Hatchery near Anchorage produces nearly all of the fish used for stocking throughout Alaska. Sport Fish management determines numbers and species needed for planned stocking programs, the fish are raised at the hatchery, and then the Sport Fish Division determines the actual stocking process. Sometimes intermediate rearing is done at the Bear Lake or Crystal Lake facilities. The Sport Fish Division conducts egg-takes for hatchery propagation and this year rainbow, grayling, sheefish, coho and king eggs were collected from various areas of the State.

Thirty-four percent of the coho harvested in the Resurrection Bay coho fishery in 1977 were finmarked fish originating from Sport Fish Division projects located at Bear Lake and Seward Lagoon. During the August coho derby the percentage of fin-marked fish reached a high of 52 percent, the highest ever recorded.



Anesthetized coho smolt are prepared for coded wire tagging at the Mendenhall pond facility near Juneau.

The Sport Fish Division initiated a king and coho brood stock development program in 1972 at the Mendenhall Lakes near Juneau. Results have been encouraging. Adult coho returns from smolt releases have ranged from 5.5 to 10.6 percent, a range which is equal to or better than that for production from wild stocks.

During 1977, the Sport Fish Division stocked 26 waters of the Interior Region, primarily along the road system, with 242,150 rainbow trout, 831,660 coho salmon and 250,000 grayling. A grayling enhancement program is in progress in the Delta Clearwater area. Grayling fry are reared in shallow ponds on Fort Greely during the summer and transferred to the Clearwater in the fall. Approximately 27,000 fingerlings have been stocked since 1975 and these fish comprised nearly 75 percent of the one- and two-year-old grayling present this summer. The stocked fish will be contributing to the sport fish harvest in 1978.

The development of successful rearing and stocking programs requires a great deal of research. The Sport Fish Division continued several long-term lake stocking efficiency studies in 1977. In the Matanuska-Susitna Valley area, a variety of stocking practices involving different species and strains of fishes were evaluated in lakes of varying fertility. Biologists also continued studies on six lakes to determine what rainbow trout strains should be retained as hatchery brood for Alaska recreational stocking programs. Stocking studies were also continued in the Kodiak and Fairbanks-Delta areas.

#### Looking Ahead to 1978

We expect the number of anglers to increase during 1978 to an estimated 275,000 persons, an increase of 25,000 over the 1977 estimated total. The majority of the increase will take place in the Cook Inlet area, where over half of the State's population presently resides.

Anglers will increase their efforts to harvest salmon, particularly chinook and coho, statewide. The majority of angler-harvested salmon are taken in freshwater after the fish have passed through one or more other fisheries. Terminal management of salmon stocks requires extremely close monitoring of harvest and escapement. Each year, more and more stream systems require close surveillance to prevent overfishing of target species along with special regulations to distribute angler pressure and the allowable harvest. During the next calendar year, a reorganization of staff and available program monies will take place to reflect these needs in the Southcentral region.

Increasing land use is expected to present continuing problems for sport fish management. U. S. Borax Corporation is presently operating an open-pit mine on the Keta River in Southeastern Alaska which may cause heavy siltation of spawning areas. Logging activities in Southeastern Alaska and Afognak Island continue to disrupt critical spawning habitats. A number of lakes in the Ketchikan area are being considered as potential hydroelectric project sites and a Susitna River hydroelectric project is under final consideration in the Southcentral Region. In the Interior, a flood control dam is under construction on the Chena River and proposed and ongoing oil drilling may affect sport fish stocks in the Beaufort Sea area.

Additional legislation to maintain and protect quality fish habitat is needed. We hope that pending legislation to allow fish to have legal rights for water appropriation and to extend habitat protection to watersheds that lie within private ownership will be passed. These legislative tools are critically and undeniably required.



SPORT FISH DIVISION ORGANIZATIONAL CHART



#### **ROBERT RAUSCH, DIRECTOR**

The Game Division is responsible for management of Alaska's rich and diverse wildlife resources. This responsibility includes maintenance of healthy wildlife populations and wildlife habitat, determination of acceptable harvest levels for those species which may be hunted, scientific assessment of the basic biological needs of Alaskan wildlife species, provision of a system through which the Board of Game may most appropriately allocate wildlife, and improvement of public understanding of and appreciation for Alaska's wildlife resources. The Division also provides a statewide hunter safety program designed to enhance public enjoyment and safety. All of these responsibilities are reflected in the overall goal of the Game Division: to provide sustained optimum human benefits from Alaska's wildlife resources, while ensuring the well-being of these resources.

Because of the vastness of the State and the great diversity of its wildlife species and habitats, Game Division activities are decentralized into four distinct administrative regions: Southeastern, Southcentral, Interior and Arctic, with central Headquarters in Juneau. Each region is supervised by a Regional Supervisor and staffed with program coordinators and regional biologists, with area biologists in outlying communities.

The bulk of the Division's functions, manpower and budget is directed at information gathering and analysis through surveys and inventories designed to provide up-to-date information on the current status of game populations and research designed to (1) provide improved game management techniques, (2) provide new insight into the biology, ecology and habitat requirements of Alaskan species, and (3) measure the impact of man's developmental activities on these species. Other Division functions include planning and meeting with other agencies to ensure wildlife and its habitat receive adequate consideration in their programs and planning, working with the public to resolve wildlife-related problems and to determine proper allocation of wildlife resources, and providing information for Department Information and Education programs.

#### **Operating Budget**

Game Division activities are funded completely with hunting license revenues and federal receipts from an excise tax on firearms and ammunition (P-R funds). Investigational programs, planning efforts, the hunter safety program and overall coordination and



A newly-born bearded seal appears to wave at the camera during a study of seals in the Bering Sea.

administration of Divisional activities are partially funded (up to 75%) with P-R (Pittman-Robertson) funds. Such management activities as law enforcement, information and education and formulation of regulations, however, must be funded 100 percent with state license revenues. In 1977 the Division received additional federal funds to conduct research on marine mammals and birds under Outer Continental Shelf studies and on Arctic big game species in National Petroleum Reserve-Alaska.

#### **Regional Activities**

In keeping with the Division goal of providing better game management and communication at the local level, area biologist positions were established in three additional communities during 1977. Kotzebue and Bethel received game biologists in early summer and by October, a new biologist was staffing an office in Galena. In addition, a new regional office was established in Nome to provide better coordination with Western and Arctic coastal residents whose livelihood is closely aligned to the wildlife resource.

About midyear it was announced that the Federal

hearing judge who had conducted the public hearings regarding return of management authority over marine mammals to the State, suggested formally that this be done. Considerable Division input was required in commenting on this judge's suggestions for management. It now appears that by mid-1978 the State will again be managing the marine mammal resources.

Public meetings were held throughout summer and fall 1977 to review draft game management plans and to gather public input necessary for the planning process. The Alaska public appeared to appreciate this planning effort and many constructive suggestions were received. By late 1977 efforts were initiated to develop comprehensive operating plans at the area office level based on the overall goals and objectives of the recently completed strategic plans.

A new and simplified system for administering special permit hunts was inaugurated in 1977. This eight-page newspaperlike pamphlet containing permit application envelopes was generally well received by the public. It allows a prospective hunter who wishes to participate in permit hunts to review all such hunts, decide which are of interest and apply for a permit with a minimum of effort. Selection of those lucky enough to obtain a permit is done by computer, eliminating the possibility of selection bias.

To bolster numbers of muskoxen previously transplanted to Cape Thompson the Game Division moved an additional 35 muskoxen from Nunivak Island to this area in 1977. Animals previously transplanted in 1970 have increased satisfactorily though the Cape Thompson transplant to date hasn't been as successful as those on the North Slope and Seward Peninsula. Hopefully, infusion of these new animals will result in a nucleus herd which will be reproductively successful.

Working closely with U. S. Bureau of Land Management personnel in summer 1977, Division biologists were able to help establish priorities for wildfire suppression which were in the best interests of wildlife. As a result, those fires on tundra areas which could have caused extensive damage to caribou and furbearer ranges received primary emphasis by fire suppression crews, while those in forested areas where fire is beneficial for the habitat of species like moose were allowed to burn. Similarly, continued active involvement with the U. S. Forest Service in Southeastern through their Wildlife Task Force and planning and interdisciplinary teams insured consideration of wildlife values and minimization of adverse impacts upon wildlife habitats by timber harvest.

Authorization of subsistence areas by the Legislature during spring 1977 required the Division staff to hold public meetings in areas proposed for this classification. Many problems were worked out at the local level concerning proposals, procedures and public input. Implementation of this new law required a considerable increase in Division expenditures for **travel to these** public meetings, expansion of efforts



Ear-tags, measurements and even radio collars are all tools used by this wolf research team near Glennallen.

to obtain better data on wildlife and subsistence use and preparation of special reports for meeting participants, petitioners and the Board of Game.

Near Fairbanks, Division biologists again were successful at reducing wolf numbers to a ratio of one wolf per 100 moose, but a proposed wolf control program in the range of the Western Arctic caribou herd was halted by litigation instigated by protectionist groups.

Ongoing research on the Western Arctic caribou herd resulted in a comprehensive rehabilitation management plan. This plan, which has been generally well received by the public, includes sharply reduced hunting seasons and bag limits, at least until the herd has increased to approximately 100,000 animals. At the end of 1977 it appears that this new management regime, aided by remarkably good calf overwinter survival in the Western Arctic, has resulted in a substantial increase in caribou numbers. In the Eastern Arctic, a census of the Porcupine caribou herd was completed, the first taken since 1972. Contacts were established in 1977 to cooperate with Canadian authorites to manage this international herd.

Several new research programs were initiated in 1977, perhaps the most important being a study in Southeastern designed to quantify the effects of timber harvesting upon deer populations. The main objective of this study, conducted jointly with personnel of the U. S. Forest Service, is the development of logging practices which minimize adverse effects of timber harvesting on deer populations.

Continuing Federally funded studies on Alaska's Outer Continental Shelf provided a better understanding of numbers, distribution and natural history of harbor seals and sea lions in Prince William Sound and numbers and distribution of all seals using the ice front west of Bristol Bay. This work also provided much management information on the natural history of ringed and bearded seals in the northern Beaufort and Chukchi seas. Newly funded research efforts, particularly on grizzly bears, wolves, and wolverines, were initiated on National Petroleum Reserve-Alaska in response to needs for information by the federal government prior to oil development in this area (the Western North Slope).

Research on the relationship between moose, wolves and other predators, initiated in 1975 in the Nelchina Basin, continued through 1977. In an intensified effort to pinpoint causes of moose calf mortality in this area about 50 calves were fitted with radio collars just after they were born. These calves were monitored daily and the predators responsible for their demise determined. A similar program was initiated in cooperation with the U. S. Fish and Wildlife Service on the Kenai National Moose Range. Bear, black and grizzly, wolves and accidents combine to inflict considerable mortality during the first two months of the calves' lives.

Staff biologists completed analyses of wolf carcasses obtained during wolf control efforts in Game Management Unit 20A and the wolf research program in Unit 13. A major report resulting from the large sample of carcasses necropsied provides valuable information for understanding the biology of wolves in Alaska and their relationship with other wildlife species. The Game Division's wildlife disease specialist again visited the U.S.S.R. under the auspices of the U. S.-U.S.S.R. Environmental Protection Treaty for which he is the U.S. coordinator of activities concerned with northern wild animal diseases. While in the U.S.S.R. he examined feral reindeer, snow sheep, brown bears and moose and exchanged knowledge with Soviet counterparts. It is of particular interest that the snow sheep, which is closely related to Alaska's Dall sheep, is infested by a lungworm similar to one causing problems in Dall sheep.

#### **Planning** for the Future

An extensive and progressive game research program has provided a wealth of information on Alaska's game species, but priorities for expenditures of limited funds have essentially precluded studies on species which are not harvested by humans. Today's demands for "ecosystem management," increasing expansion of man's activities into wildlife habitats, and an increased public awareness of the values of unhunted animals necessitate evaluation and management of the full spectrum of Alaska's wildlife resources. Although many Game Division programs presently provide for nonhunting use of wildlife and provide some protection and enhancement of unhunted species, there is an increasing need for additional programs of this type.

The Game Division's present funding sources (license revenues and P-R funds) are no longer sufficient to maintain minimal programs for even hunted species. If these programs are to be maintained at minimally acceptable levels, and if the Division is to expand its efforts into unhunted species, an additional source of funds must be found. Congress is presently considering passage of a law which would provide Federal aid funds to the States for "nongame" species. Should this source of funds become available, it will be necessary to match these Federal dollars with State funds.

Complex problems, not the least of which is settlement of the Alaska Native Claims Settlement Act and ensuing changes of land ownership, will have an increasing impact on game management practices in Alaska. As Alaska's human population increases and development of this great State's nonrenewable resources proceeds there will be increasing demands placed upon our wildlife resources and their habitat. In order to meet these demands wildlife management programs of the Division must be intensified and expanded. This will not be possible until additional funds, logically from new sources, become available.



Effective management calls for effective research. This Ivishak River grizzly is about to receive a radio collar that will enable biologists to follow his travels during the next year.



\* STATIONED IN REGION II, BUT WITH STATEWIDE RESPONSIBILITIES.

\*\* RESEARCH CHIEF AND DEPUTY DIRECTOR HAVE TECHNICAL SUPERVISION OF THE RESEARCH AND MANAGEMENT PROGRAMS RESPECTIVELY.

\*\* REGION V DESIGNATION BECAUSE OTHER DIVISIONS UTILIZE REGION IV IN KODIAK.

#### GAME DIVISION

#### ORGANIZATIONAL CHART

### TABLE 1.HABITAT PROTECTION SECTION FISCAL YEAR 1978

PROJECT	STATE	FEDERAL	OTHER	TOTAL
Administration & Support	185,500			185,500
Land & Water Protection	189,700	36,500 (Pittman-Robertson) 38,300 (Dingell-Johnson)		264,500
Land & Water Management	135,800	75,600 (Pittman-Robertson) 58,600 (Dingell-Johnson)		270,000
MCHM/CZM	176,500	160,000 (CZM)*		336,500
Pipeline Surveillance			952,100 (Reimbursable)	952,100
	687,500	369,000	952,100	2,008,600

\*More funding may become available in January, 1978.

### TABLE 2. CREEL STATISTICS FOR SOME REPRESENTATIVE MAJOR SPORT FISHERIES

LOCATION		SPECIES	1977	1976	1975	3-YEAR AVERAGE
Southcentral	Russian River	sockeye (early run)	20,400	3,380		
		sockeye (late run)	27,400	13,700		
	East Cook Inlet	razor clams	889,960	939,000		
	Kenai River	kings	7,321	6,031	2,970	5,441
	Resurrection Bay	coho	16,345	9,118	19,793	15,085
Interior	Badger Slough	grayling	3,594	3,117	5,639	12,350
	Upper Chena River	grayling	9,406	4,161	14,047	9,205

# TABLE 3.1977 PRELIMINARY SALMON CATCH<br/>(in numbers of fish)

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	KING	RED	COHO	PINK	CHUM	TOTAL
Northern Southeastern—Net gear	2,225	243,105	158,573	2,108,036	265,429	2,777,368
Southern Southeastern-Net gear	6,011	572,454	107,594	10,338,200	359,558	11,108,817
Southeastern—Troll gear	300,000		400,000	175,000	—	875,000
Yakutat	2,333	183,699	82,779	74,537	8,284	351,632
Southeastern Region Total	310,569	999,258	748,946	12,420,773	663,271	15,112,817
Prince William Sound	632	310,147	804	4,509,260	570,497	5,391,340
Copper-Bering Rivers	22,122	629,880	179,491	22,898	601	854,992
Bristol Bay	132,322	4,706,513	100,425	2,020	$1,\!599,\!157$	6,540,437
Cook Inlet	$13,\!595$	2,114,041	192,875	1,827,396	1,365,123	5,513,028
Central Region Total	168,671	7,760,581	473,593	6,361,574	3,535,378	18,229,797
Yukon	96,414	_	37,837	-	821,220	955,471
Kuskokwim	58,376	18,532	263,727	434	298,492	639,561
Norton Sound	4,461	—	1,398	49,231	203,085	$258,\!175$
Kotzebue		—		—	131,547	$131,\!547$
Arctic-Yukon-Kuskokwim Total	159,251	18,532	302,962	49,665	1,454,344	1,984,754
Kodiak	557	624,262	24,476	6,273,880	1,070,883	7,994,078
Chignik	713	1,959,794	16,999	593,289	119,531	2,690,326
South Peninsula	600	273,000		1,361,500	264,000	1,899,100
North Peninsula	5,000	417,000	28,300	—	101,000	551,300
Westward Region Total	6,890	3,274,056	69,775	8,228,669	1,555,414	13,134,804
All Alaska Total	645,381	12,052,427	1,595,276	27,335,681	7,178,407	48,807,172

#### TABLE 4

#### DEPARTMENT OF FISH AND GAME

#### Operating Budget Summaries (Rounded to nearest \$1,000)

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	FY'77 Actual	FY'78 Authorized	FY'79 Request
Commerical Fisheries - Total	\$7,315.9	\$7,973.2	\$9,160.3
Funding: Federal Receipts	640.6	633.5	633.5
Matching General Fund	427.1	442.7	442.7
General Fund	6,217.4	6,872.0	8,059.1
Program Receipts	30.8	25.0	25.0
Game - Total	4,464.0	5,058.5	6,032.5
Funding: Federal Receipts	2,825.6	3,219.7	3,876.7
General Fund	163.9	20.0	
Fish and Game Fund	1,474.5	1,818.8	2,155.8
Sport Fish - Total	2,618.6	3,086.7	3,929.7
Funding: Federal Receipts	1,136.9	1,269.9	1,359.9
General Fund	539.9		
Fish and Game Fund	941.8	1,816.8	2,569.8
F.R.E.D Total	4,695.5	6.975.1	9,335.5
Funding: Federal Receipts	84.4		
General Fund	4,611.1	6.975.1	9,335.5
Administration - Total	2,290.9	2,667.8	2,824.8
Funding: Federal Receipts	365.6	319.5	350.0
General Fund	1,763.0	2,144.4	2,269.0
Interagency Receipts	139.7	75.2	75.2
Program Receipts	22.6	128.7	130.6
Vessels - Total	1,080.6	1,219.2	1,321.1
Funding: General Fund	1,072.6	1,194.2	1,311.1
Interagency Receipts	8.0	25.0	10.0
Habitat - Total	\$1,105.7	\$ 896.5	\$1,023.6
Funding: Federal Receipts	226.2	209.0	
Matching General Fund	81.7	83.5	
General Fund	722.5	604.0	814.6
Interagency Receipts	75.3		
Pipeline Monitoring - Total	867.8	952.1	1,288.0
Funding: Federal Receipts			154.0
Program Receipts	867.8	952.1	1,134.0
Boards of Fish and Game - Total	143.4	158.3	316.7
Funding: General Fund	143.4	158.3	316.7
Crab Board - Total	224.2	336.8	285.9
Funding: Program Receipts	224.2	336.8	285.9
Total Department Budget	24,806.6	29,324.2	35,518.1
Funding: Federal Receipts	5,279.3	5,651.6	6,374.1
Matching General Fund	508.8	526.2	442.7
General Fund	15,233.8	17,968.0	22,106.0
Interagency Receipts	223.0	100.2	85.2
Program Receipts	1,145.4	1,442.6	1,575.5
Fish and Game Fund	2,416.3	3,635.6	4,934.6

### FIGURE 1. FROM F.R.E.D. REPORT PAGE 9



EGGS TAKEN, FRY PRODUCTION (IN MILLIONS) AND PERCENT SURVIVAL FROM GREEN EGG TO FRY BY BROOD YEAR FOR STATE OPERATED HATCHERIES

 $\pm$  / PREVIOUS TO 1976, HATCHERY FRY AND EGG CAPACITY WAS SMALL

**BROOD YEARS** 

1976 (ACTUAL)
 1977 (GOAL)
 1978 (GOAL)

