Janet Hall

Alaska Department of Fish and Game

1978 ANNUAL REPORT

JIM FOWLER 79

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

SUBPORT BUILDING
JUNEAU, ALASKA 99801

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

Dear Governor Hammond:

I am pleased to submit to you the 1978 annual report of the Department of Fish and Game. My policy, as initiated last year, is to submit the report as a "working document" early in the calendar year so it can be of some benefit to your staff and to the Legislature in the new year's deliberations concerning budgeting and the passage of new laws. In addition to summarizing the previous year's activities, we attempt to identify the major problems and needs facing the Department in the year(s) ahead.

My statement last year -- that the Department's responsibility for protecting and perpetuating Alaska's fish and wildlife resources is becoming increasingly more complex and difficult to carry out -- seems even more relevant a year later. The continued encroachment over the years by the Federal government upon the historical authority of States to manage their fish and resident wildlife was brought into sharp focus recently with President Carter's action in designating seventeen National Monuments and with Secretary Andrus' "withdrawal" of extensive lands for wildlife refuges. Strongly implicit in the language of the documents implementing these land actions is that the Federal government does have and will exercise authority to manage the fish and wildlife resources on Federal lands.

Loss of considerable area available for recreational hunting and fishing will compound our management problems as the sportsmen concentrate on those areas remaining open. Subsistence use is now by State law a priority among the various consumptive uses of our fish and wildlife. The Department and the Boards of Fisheries and Game are moving ahead to implement this new law under the fire of widely divergent views of the public. Another imminent issue we face next year is the return of marine mammal management to the State, with all the fiscal, social, and political problems associated with assuming that responsiblility.

Meanwhile we are continuing to reorganize the Department's structure and planning processes as we move into the "management by objectives" system being adopted by the State. In all we have an "exciting" year ahead -- once again full of challenges!

Respectfully and sincerely yours,

Ronald O. Skoog

Ronald O. Skoog
Commissioner

Alaska Department of Fish and Game

1978 ANNUAL REPORT

See: Alaska Board of Fish and Game . . .

STATE of ALASKA

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Governor

Ronald O. Skoog
Commissioner

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Overview of Events

No single issue of concern to rural Alaska has surfaced in recent years with the intensity of subsistence use of fish and wildlife resources and its possible impacts on related lifestyles and the management of these renewable resources. The 1978 Legislature formally recognized subsistence by statute as having the highest priority among consumptive uses. The right to barter subsistence foods with other subsistence people also was defined. A new Subsistence Section was created within the Department of Fish and Game, and it will be responsible for obtaining informative and qualitative data concerning subsistence needs and uses. It will serve as a major communication link between the Department and the rural areas of the State, and will be implemented with full staffing by the end of Fiscal Year 1979.

The Board of Fisheries and Game will consider proposals early in 1979 – developed in conjunction with the Department of Fish and Game and the Governor's Office, and in accordance with the Administrative Procedure Act – to improve the present system of local fish and game advisory committees and to provide for regional participation in the development of fish and game regulations. The basic elements of the proposals are to encourage and provide meaningful, effective and increased opportunities for public participation.

Ronald O. Skoog

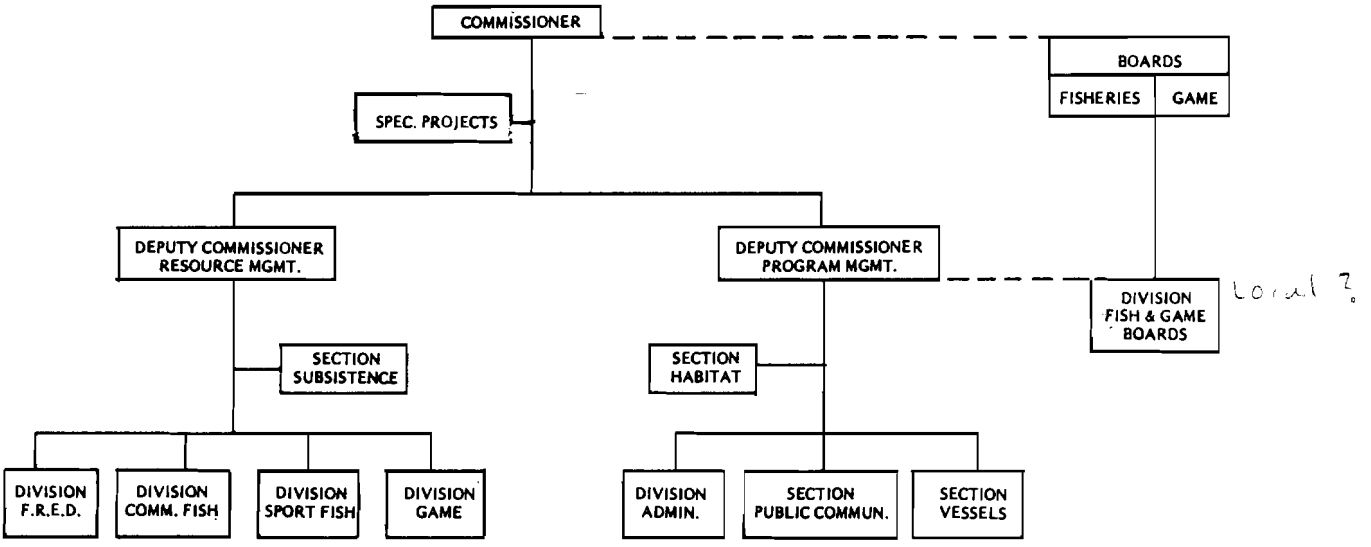
The State's salmon fishing resources continue to recover from the depressed levels of the recent past. Last year's harvest of 80 million salmon was the largest in 45 years. The strong salmon runs that supported this harvest can be attributed to strict harvest control and sacrifices on the part of Alaska's fishermen and processors the past few years. The State's shellfish harvest should reach an all-time high record before the present season is over. Since the enactment of the Fisheries Conservation and Management Act, or 200 mile fishery zone, Alaskan shell fishermen have rapidly replaced foreign fleets in the Bering Sea, where much of this record harvest occurred. Also as a result of this Act, Alaskan bottomfisheries have shown steady growth; substantial effort has been expanded by the Department of Fish and Game and the fishing industry to encourage this new fishery, one which will be a real economic boon to Alaska in the years to come.

The outlook for Alaska's commercial fisheries in 1979 is bright. Although the total shellfish harvest will decline slightly because of natural fluctuations in off-year class strength, the salmon harvest again should exceed the average annual take substantially.

The (d)(2) issue was not resolved this last session of the U.S. Congress; it is anticipated that future legislation will have significant negative impacts on Alaskan lifestyles associated with hunting, fishing and trapping. The continuing battle in Congress over fish and wildlife management involves basic state's rights issues and the degree of Federal intervention in State management of these resources. The Department will again oppose the loss of these rights in key (d)(2) compromise legislation in 1979.

Meanwhile, President Carter's invocation of the Antiquities Act will critically affect use of fish and wildlife resources in these designated areas. The Department foresees loss of 50-60% of the statewide sheep harvest, loss of up to 30% of the statewide black bear harvest, loss of 122 guide areas with displacement or loss of livelihood for these guides and an estimated 915 assistants, and the loss of many sport fishing areas due to means of access regulations. There will be a large increase in funds needed for the

COMMISSIONER'S OFFICE



more intensive management program necessitated by the Act and the Department envisions a general deterioration in the quality of hunting and fishing experiences on remaining lands because of increased user pressure.

The Department program for fisheries rehabilitation and enhancement continues to show significant advances.

The initial returns to existing hatchery facilities in operation indicate that adult production objectives will be reached for each hatchery. All 1976 bond issue hatcheries will be in production by 1980; design and studies for 1978 bond issue hatcheries are being negotiated, including a detailed evaluation of six possible hatchery sites in the Kotzebue area. The estimated production of the 1978 bond hatcheries will approximate 115 million chum salmon fry and eight million king salmon smolts.

An important and often overlooked area of economic growth is the contribution of the recreational-use angler to our State. During 1978 licensed sportfishermen numbered over 185,000 and contributed over 2 million dollars in license fees; the Department estimates that these anglers would spend in excess of 90 million dollars annually within our State pursuing a personal-use fishery. One of the State's most consistent and successful salmon enhancement efforts continues to be the Resurrection Bay sport coho-rearing program. Thirty-four percent of the coho harvested there by anglers were fish that had been released as juveniles from the Bear Lake facility – supplemental production that enabled the angler harvest to reach an acceptable level. This past year also saw the creation of a Fisheries Cooperative Research Unit at the University of Alaska, Fairbanks, a program supported by the Department through graduate student assistance. This program will permit the sorely needed development of resident expertise in Arctic and sub-Arctic freshwater fishery environments.

Game populations in several areas of the State also have shown encouraging signs of recovery from declines of a few years ago. The Nelchina caribou herd, the Western Arctic caribou herd, and the moose population near Fairbanks all show signs of recovery. Reindeer husbandry is becoming an attractive commercial endeavor in western Alaska, though associated problems, such as habitat competition with caribou, are likely to become even more acute with the recent establishment of National Monuments.

The Department has worked long and hard toward a waiver of the Marine Mammal Protection Act, and final action appears imminent. We look forward to the return of management of these species and their use by our citizens. *

Administration

Russell H. Clark, Director

ADMINISTRATION

The Division of Administration operates as the support services center of the Department of Fish and Game. Services provided by the Division include accounting, fiscal management, payroll, personnel, purchasing, property control, employee housing, contracts administration, budget services and administrative guidance at the Department's Headquarters and Regional Offices. In addition, the Division takes a lead role in the accomplishment of a variety of interdivisional and interdepartmental special projects.

The Division has two primary objectives. The first is to provide an adequate level of support services to the fish and game resource management programs to enable them to meet their objectives. The second is to insure that the Alaska Statutes, rules, regulations, and procedures are not violated in the administration of programs. Both objectives include insuring fairness to all vendors and job applicants, obtaining goods and services at the lowest possible price, reducing delays in purchasing and payments to vendors, and providing employees with prompt and accurate personnel and payroll services.

The Division of Administration is divided into six major functions: personnel and payroll, supply, library, contracts and leasing, fiscal management, and the Director's office which includes the Regional Administrative Officers.

PERSONNEL/PAYROLL

The Personnel and Payroll section provides a full range of services including employee records, payroll, development, recruitment and classification; labor contracts administration, and personnel actions to more than 1,300 temporary and permanent employees. A major accomplishment of the section during 1978 was the establishment of new classifications for the implementation of the Subsistence Section. Other accomplishments included conversion to the automated leave accounting system as the primary record for employee sick and annual leave balances and revamping employee records to reduce files search and maintenance time.

SUPPLY

The three major functions of the Supply Section are purchasing, inventory control and mail service. During the past year a mail study was completed which detailed the level of service required from the section; all recommendations of the study have been implemented at this time to the satisfaction of the users. The Supply Section continues to utilize Field Warrants extensively as an ordering and payment document, thereby providing vendors with payment for an order at the time an order is placed. The Section completed a review of its purchasing transactions which resulted in a number of recommendations to speed and improve the purchasing process. Also, the private carrier mail system which services Juneau, Anchorage, and Fairbanks was expanded during the past year to include Ketchikan. This service provides a 24-hour time frame on the delivery of payment documents and other Department correspondence.

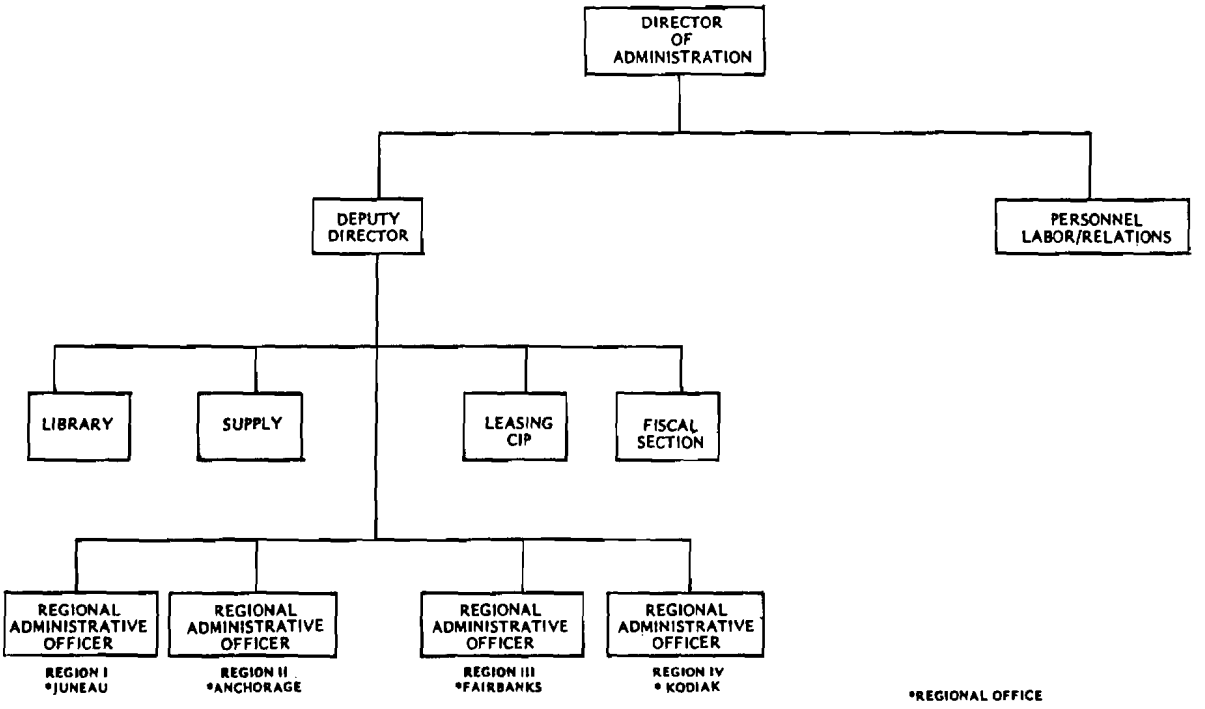
LIBRARY

The Library processes orders for research materials and technical publications, and serves as a collection point and repository for a limited amount of resource literature. Included in the service of this Section are the processing of interlibrary loans; a systematic scanning of current periodicals and publications for distribution of titles, tables of content, and abstracts to a variety of interested Departmental personnel; and literature searches in special technical and scientific subject areas. The Library continues with its efforts to recatalog a significant portion of its holdings, improve its microfilm collection, and integrate three major private collections which were donated to the Department. A new service initiated this year is the centralization of subscriptions for journals and magazines to reduce unnecessary duplication.

CONTRACT/LEASING

The Contracts and Leasing Section serves as the central point for contract and lease administration. It performs a full series of activities involving professional services, consultants, office and warehouse leases, and reimbursable services agreements between Departments. This Section is responsible for the maintenance of employee housing and office space.

DIVISION OF ADMINISTRATION
ORGANIZATION CHART
33 PERMANENT EMPLOYEES



During the year, work was begun to prepare for the transfer of the employee housing function to the Department of Administration. A major accomplishment of the Section during the year was the completion of a facilities needs assessment and recommendations on facilities in Anchorage, Fairbanks, Juneau, Ketchikan, Petersbury, Sitka, Kodiak, Dillingham, Nome and a variety of other locations around the State.

FISCAL MANAGEMENT

The Fiscal Section is the accounting center for the Department. It monitors all budgets, audits invoices, makes accounting adjustments, pays the bills, reviews expenditures against authorizations and processes travel claims. The Section underwent a major Legislative Audit during the year, the results of which will not be available until early in 1979. The preliminary findings indicate no serious audit exceptions. Accomplishments during 1978 include maintenance of an outstanding record of payment time to vendors. The Section currently averages less than 30 days from date of invoice to date of payment.

DIRECTOR'S OFFICE

The Director's Office is primarily responsible for coordination of special projects, management direction and planning, administration and execution of statutory requirements, and providing administrative guidance to the Regional and Headquarters operations. The office includes the Director, Deputy Director, Regional Administrative Officers, and staffs. A major project begun in 1978 has been the development of an output oriented management system for the Department called Management by Objectives for Results. With this system the results of a variety of activities are measured against a desired objective or accomplishment. It will take years for the system to be fully implemented to all levels of the Department, but it should improve planning, individual performance and overall accomplishments.

LOOKING AHEAD

The future should see continued improvement in the MBO management system for the Department. More clearly defined performance standards will be established for all activities within the Division as well as for individual employees. All current activities will be reviewed to see if new methods of performing an activity can generate savings of time and money. Offices and warehousing will continue to be a major priority and refinements to existing space plans will be made. Improvements in the budget process will be recommended to the Division of Budget and Management to reduce the amount of time, errors, and confusion associated with budget preparation. Collection on accounts will be improved to increase the cash flow to the State by billing on a monthly basis. Employee development training, and an affirmative action plan will be developed and implemented as well as training for supervisors in equal employment opportunity.*

Public Communication

Dolores A. Moulton, Chief

This Section is the information synthesizing and relay station between the Department of Fish and Game and the Public, a challenging and fast-paced job. The Department has statutory responsibility to inform the public of its research findings and the Boards' regulatory actions. An active public communication program is the Department's means of seeking the understanding of the public, as well as receiving the necessary feedback from the public to aid in prioritizing the Department's goals and objectives.

The four major programs of the Public Communication Section are as follows:

1. News – The Section issued over 200 news releases to media throughout the State in 1978. News releases typically provide information about Boards of Fisheries and Game regulations, Department activities, appointments, public hearings or news of immediate interest to the public. In addition, biologists and staff writers produced feature stories for newspapers and magazines, fish and wildlife related columns, and radio and television programs.

2. Magazine – 'Fish Tails and Game Trails', the Department's magazine, continues to be a popular and effective communication tool. Available free to all Alaska residents, this bi-monthly magazine with a circulation of 11,000 carries articles explaining research and management techniques, and how to make better use of the renewable resources at hand.

3. Public Service Announcements – In order to take advantage of the increasingly good telecommunications in our State, this Section produced a dozen television Public Service Announcements during 1978. These spots ranged in length from thirty to sixty seconds and contained information of general interest to the public about Department research activities and facilities.

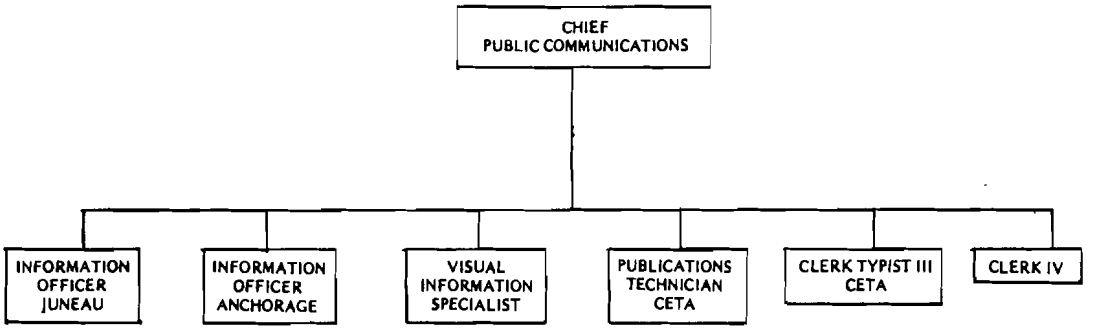
4. Information Requests – Throughout the year the Section received thousands of written and telephone requests for information. It attempted to answer every request received in a timely and thorough fashion, or when necessary to direct the inquirer to the most knowledgeable source.

In addition to these on-going programs, the Section assists Department staff in the preparation of various publications, presentations, special reports and projects. Photographic and film support also is supplied to the Divisions. During 1978 the Section published two new Wildlife Information Leaflets, 'Status of the Pacific Walrus', and 'Deer vs. Logging: A Clear Cut Dilemna'; one pamphlet, 'The Bears and You'; and ten new species sheets in the Wildlife Notebook Series. The Notebook Series, consisting of one page fliers picturing and giving basic biological life history for each of sixty species of fish and wildlife in Alaska, continues to be very popular with school children and residents and tourists of all ages.

The Section completed a film titled 'The Northern Pike in Alaska'. The film presents viewers with basic

Chris McQuitty of the Public Communications Section, Juneau interviews a construction worker at FRED Division's Hidden Falls Hatchery site. Photo by M. Rush

PUBLIC COMMUNICATIONS SECTION
ORGANIZATION CHART
5 PERMANENT EMPLOYEES



biological data on the northern pike and depicts sport fishing opportunities for this species throughout much of Alaska.

Two slide shows with scripts were organized for school use. The first concerned the need for sound wildlife management and presented the Department's guidelines for such; the second focuses generally on job opportunities within the Alaska Department of Fish and Game.

A coloring book entitled 'Where the Animals Live', and an accompanying teacher's guide were published and circulated to educators throughout the State. It has been well received and the Department is seeking sufficient funding to print both in the quantities requested.

Staff of the Section participated heavily in the preparation of a draft proposal for reorganization of the Boards' advisory committee structure. According to the Department's proposal, five regional councils would interface between the Boards and advisory committees, a system intended to enhance communication with and participation of the latter.

LOOKING AHEAD

During 1979 the Public Communication Section will add one further program to the four now performed. A bi-weekly news bulletin — summarizing Department and Board actions, activities, and issues will be published and circulated to news media and interested parties and persons throughout the State. Given the severe budget cutbacks all Departments in the State may undergo during the next fiscal year, it is uncertain at present if we can maintain all five programs. If not, the Section will determine which ones best serve the needs of the public and the Department and adjust priorities and programs accordingly. Since each of the programs is addressed to particular audience needs; cutback decisions will be difficult. difficult.

Now that the Wildlife Notebook Series is nearly complete and includes all the major fish and wildlife species within our State, as a next step the Section will supervise the production of a teacher's guide to 'accompany' this Series for distribution of this education package to schools. The Section will seek additional funding to cover printing costs, as has been done for the coloring book and its accompanying guide.

The many difficult issues facing the Department, such as (d)(2) legislation, President Carter's invocation of the Antiquities Act, subsistence, development impacts on fish and wildlife, and a wide variety of involvements in Federal and State projects will require expanded efforts to obtain effective 'public communication'. Fiscal and personnel constraints will continue to inhibit this Section's effectiveness in carrying out its ever-expanding responsibilities. ✱

Habitat

Richard E. Logan, Chief

The Habitat Protection Section is responsible for the protection, maintenance and improvement of fish and wildlife habitat. The Section's goal is to conserve, maintain and improve the integrity of all freshwater, marine and terrestrial habitats in order to optimize fish and wildlife populations and to sustain their species diversity. Three major functions — regulatory, land planning and management, and intradepartmental and intra-agency liaison are undertaken by the Section.

Regulatory

The regulatory process can add immeasurably to the quality of Alaska's environment and the maintenance of the State's fishery resources. Under the Section's regulatory function falls the responsibility for enforcing AS 16.05.870 (Anadromous Waters), AS 16.20.060 (Game Refuge) and AS 16.20.260 (Critical Habitat Areas). These statutes basically require those individuals who are proposing to undertake activities in anadromous streams, game refuges or critical habitat areas to notify the Section and obtain written approval of the activity prior to its occurring. Between January 1, 1978, and September 30, 1978, approximately 700 applications were reviewed.

The southeast regional office coordinated closely with the U.S. Forest Service and participated in numerous field inspections on the location of the Quartz Hill molybdenum mine access road. In addition, stipulations were included on timing of construction and clean up, revegetation and fill activities in the Keta River.

The greatest effort under the Section's AS 16.05.870 authority was done by the Section's Fairbanks regional office. All placer mining claim owners in the region were contacted to familiarize them with the concerns and objectives of our statutory responsibilities. Approximately 40% of the claim holders responded that their activities would affect designated anadromous streams. Once the miners were aware of the Department's concerns, they submitted applications for their activities. The Department's authorization of the mining activities contained stipulations to protect the fisheries resource from the impacts of placer mining.

Land Planning and Management

The Habitat Protection Section must respond to the rapidly changing land use and ownership patterns in Alaska. Possibly no other set of circumstances will have a greater long-term influence on fish and wildlife resources of the State. The Department's primary goal when addressing these issues is to participate in the development and implementation of land use plans which effectively maintain and protect the resource production capacity of important fish and wildlife habitats and yet are flexible enough to accomodate other uses of land and water.

During 1978 the Section played an active role in the development and implementation of major resource planning programs, including the Alaska Coastal Management Program, Southcentral Level 'B' Water Study, U.S. Forest Service's Tongass Land Use Management Plan, Soil Conservation Service's Susitna Basin Study, and State land selection, disposal and classification programs. The Section utilizes the basic resource information provided by the management and resource divisions as well as other sources to communicate the needs and values of fish and wildlife resources.

Some of the Section's major involvements with land planning and management activities follow:

Access

One of the most important roles the Department of Fish and Game has is the identification and reservation of public access areas on both governmentally and privately owned lands. If access to our lands and waters is diminished as a result of changing land status, the quality of life for Alaskans will be substantially altered through reduced opportunities for hunting, fishing, general recreation and other related activities.

A program for obtaining access to important fishing and hunting areas is undertaken by the Section. The success of this program is often dependent upon available funds and the willingness of the land owner to sell or lease rights.

Critical Habitat Legislation

The Habitat Protection Section annually solicits intradepartmental nominations for critical habitat areas, prepares justifications and drafts legislation for consideration by the legislature. In 1978 the legislature passed a revised bill entitled the Copper River Delta Critical Habitat Area which classified approximately 458,240 acres as critical wildlife habitat and increased the total legislatively recognized habitat acreage in the State by 88%.

Other critical habitat legislation centered around the Redoubt Bay State Game Refuge bill introduced by the Alaska Waterfowl Association. This bill passed the Senate in 1978 but was held up in the House during the final days of the session.

North Slope

Industrial exploration and development activities on the North Slope required the development of written policies both for these activities and for the management of the water and gravel resources in the Prudhoe Bay development area. Industry was assisted in developing proper water storage facilities in the Prudhoe Bay vicinity to help alleviate water shortages during the winter. As a result, industry will not have to withdraw water from North Slope surface sources; sources which are scarce to begin with and often important fish overwintering areas.

Marine and Coastal Habitat Management

Members of the Marine and Coastal Habitat Management (MCHM) project are involved in land and water planning and management. The MCHM project has statewide responsibility for evaluating the effects of all activities affecting fish and wildlife resources in Alaska's coastal zone and marine waters. MCHM is divided into environmental review and monitoring, coastal management, and coastal energy impact elements. The environmental monitoring and review element has been particularly active in the assessment of offshore oil and gas exploration and development activities. Major resource assessment and review documents were researched and prepared for the Pt. Thompson, Gulf of Alaska, and Cook Inlet – Shelikof Strait lease areas. MCHM has also been instrumental in developing comprehensive lease stipulations for oil and gas exploration and development in the Arctic. These stipulations have been designed to minimize adverse effects on fish and wildlife populations, while allowing oil and gas exploration to proceed expeditiously and at the lowest economic cost possible.

Other major review activities included siting and evaluation of the Alpetco and Pacific Alaska Petrochemical facilities, the establishment of the format and content of the environmental components of the State's social, economic and environmental analysis, and the development of a departmental response organization to provide assistance to the Coast Guard and EPA during oil spills.

The MCHM staff has played a major role in the development of the Alaska Coastal Management Program and has consistently worked for a program which will conserve fish and wildlife habitat while allowing orderly coastal development. Under its coastal management contract, MCHM identified the biological and physical processes which delineate the Alaskan coastal zone, and prepared a report entitled *Biophysical Boundaries for Alaska's Coastal Zone.* These boundaries have been formally adopted as the coastal zone planning boundaries for the State of Alaska. Other major accomplishments included preparation of a Land and Water Use Guide which explains the State and Federal laws governing the management of the eight habitats and seven coastal activities outlined in the State's Standards and Guidelines, and a systematic identification of important coastal fish and wildlife habitats by region. MCHM personnel are also working closely with planners and coastal districts to help them meet the requirements of the State act and to insure that fish and wildlife resources receive maximum consideration in district coastal management plans.

Because of the number of major projects and permit requests that MCHM would have to review as a result of the discovery of a major oil field, a coastal energy impact grant was applied for to provide funding to undertake preplanning in potential development areas. The grant was approved in May 1978 and work is currently underway to identify potential facility sites, pipeline routes and tanker terminals in the Lower Cook Inlet.

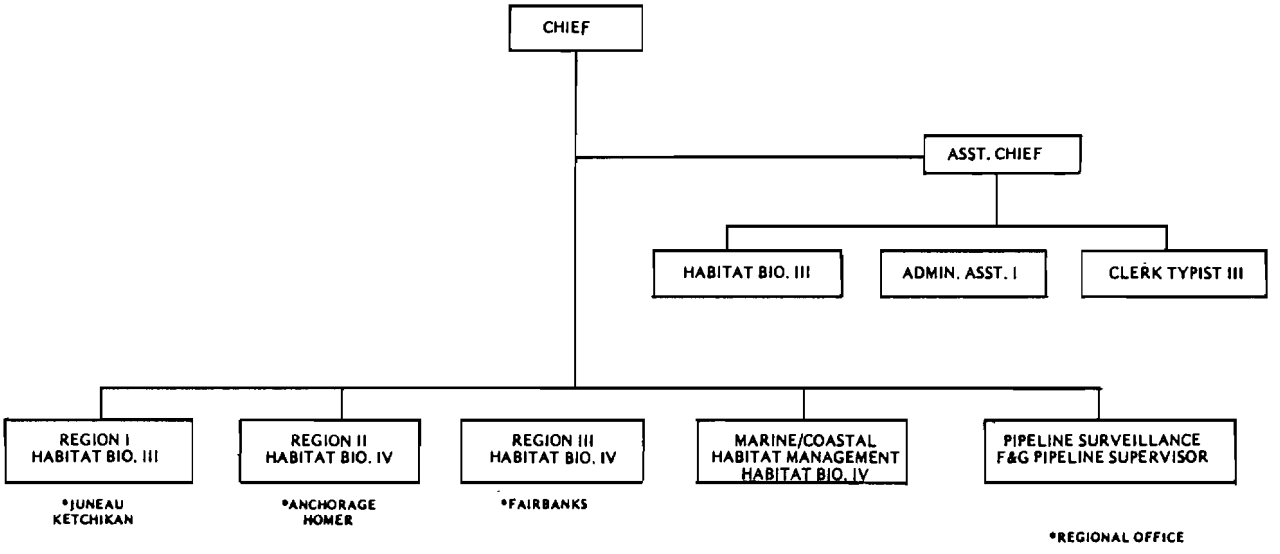
Pipeline Surveillance Team

Members of the Pipeline Surveillance Team are responsible for reviewing and monitoring all the projects which are associated with the Trans-Alaska Pipeline System, the Haul Road and the proposed Alaska Natural Gas Transportation System. Although the Team is under the supervision of the Chief of Habitat, it is housed with the State Pipeline Coordinator and acts as part of his staff.

Until June 30, 1978, the Pipeline Surveillance Team was funded by reimbursable monies from the Alyeska Pipeline Service Company. No general funds were appropriated for FY 1979. Consequently, the team has not been able to continue monitoring and review of the Trans-Alaska Pipeline System restoration and maintenance activities. Fortunately, most revegetation and rehabilitation work was finished satisfactorily by the summer of 1978.

Team members have dealt with culvert problems, Department of Transportation and Public Facilities' (DOT/PF) maintenance camps and the Bureau of Land Management's (BLM) Corridor Management Framework Plan. Improperly installed drainage structures created fish passage problems. Despite several joint field trips with DOT/PF, little corrective action has been taken. DOT/PF's requests for several maintenance stations along the Haul Road were reviewed

HABITAT PROTECTION SECTION
ORGANIZATION CHART
37 PERMANENT EMPLOYEES



and comments were prepared for consideration by BLM. The stations which were eventually permitted by BLM were in areas that presented fewer environmental problems than were associated with some of a DOT/PF's original locations. Comments were also prepared on BLM's Haul Road Corridor Plan.

Northwest Alaskan Pipeline has begun preliminary field activities in preparation for constructing the natural gas pipeline. These preconstruction activities are being reviewed and monitored by the team. Pipeline Surveillance staff considred with fish and wildlife biologists from various State and Federal agencies what studies Northwest needed to undertake for sufficient data to minimize damage to fish and wildlife during pipeline construction. Northwest has agreed to fund a raptor study and an aquatic and terrestrial habitat evaluation program. Team members also were extensively involved in drafting the State's right-of-way lease and lease stipulations, and the Federal lease and lease stipulations.

Intradepartmental and Interagency Liaison

The Section is responsible for coordinating responses to activities which would affect more than one division of the Department. As such, the Section is extremely active in the clearinghouse review process, responding to agency requests, and participating in formulating cooperative agreements.

A-95 Review

As may be seen in Table 1 in the appendix, the Section responded to hundreds of requests which were processed through the State's clearinghouse procedure. This process is extremely valuable because concerns for fish and wildlife and their habitat can be made at an early phase in project development. Developers can plan their activities to meet fish and wildlife needs if the right information is made known early in the project's design phase.

Agency Requests

When requested, the Section reviews documents prepared by other agencies or responds to needs for information. This year the Section coordinated the review of a variety of proposed regulatory changes. Examples are the Department of Natural Resources' revised land use classifications and the Department of Environmental Conservation's revised water quality standards and regulations.

In response to the proposed Susitna Hydropower Project, the Section coordinated the development of a comprehensive fish and wildlife study proposal for the Corps of Engineers. The Corps' studies are necessary to determine the feasibility of this proposed multi-billion dollar hydroelectric power development and will provide the justification for funding of fish and wildlife mitigation studies at a later date if the project proves feasible.

The Habitat Protection Section coordinated Department participation in the preparation of an environmental assessment for the proposed Willow capital site. A biological study outline and budget was prepared by ADF&G and accepted by the Capital Site Planning Commission.

Cooperative Agreements

During the past year, three new cooperative agreements were completed. The Portage Flats Wildlife Habitat Agreement represents a cooperative effort among six State and Federal agencies to protect and enhance fish and wildlife habitat in the vicinity of Portage, Alaska. An agreement was signed with the Soil Conservation Service to cooperate in the fish and wildlife resource inventory and evaluation program for the Susitna River basin for the purpose of enhancing the information base and management capability of the participating land and resource managers. The Soil Conservation Service is funding a position for the Department of Fish and Game's participation in the study. The third cooperative agreement signed was for managing the future recreational use of Sport Lake. The cooperative agreement provides a plan for public use of the lake, road maintenance, establishment of necessary visitor use facilities and lake stocking.

The Department's standing agreement with the BLM authorizes the agencies to enter into cooperative studies. As a result, a joint assessment of the effects of past mining practices on the Ungalik River (which is an important contributor to the Norton Sound Fishery) was conducted during the summer of 1977. A report of observations was drafted and should be available for distribution in the near future.

Looking Ahead

The framework for developing ADF&G goals and objectives, and comprehensive land and water resource planning should be outlined this next year. In 1979 the Section will take a major step forward in classifying fish and wildlife habitats and will develop criteria and guidelines for application to the State land classification system.

Policies and interim management plans should be developed and completed in the year ahead for many of the currently established State critical habitat areas. These policies and plans are fundamental to the regulatory and management responsibilities the Section has over these lands.

The aforementioned developments in land use planning and classification, and refuges and critical habitats should provide the basis for development of new regulations. Regulations are needed to provide consistency in land and water permitting among the three regions in the State. The development of these regulations should also further public awareness of the anadromous streams, refuges and critical habitat areas statutes.

To ease the tremendous amount of inventory and data handling demands placed upon the Section, the Section will in FY 79 investigate the opportunities available in various data storage/retrieval systems. It is extremely important to present fish and wildlife resource needs to land and water resource managers during the planning and decision-making stages. Ready access to basic resource data will facilitate this necessity.

The Section recognizes the need to acquire baseline habitat, fish and wildlife resources data for each area within the State refuge and critical habitat system. Photo and quantitative documentation of 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 system.

A dramatic increase in workload for MCHM is expected during the next few years. Based upon current State and Federal oil and gas leasing schedules, construction schedules associated with major facility development, and a projection of the present rate of increase for other types of coastal developments, MCHM will probably experience a 104% increase in the current workload in FY 1979-80 and a 538% increase in FY 1980-81. To adequately protect fish and game resources during this period of rapid development, innovative approaches will have to be developed. Some possibilities are: increasing existing staff levels through service contracts with consultants; providing rapid retrieval of impact and resource data through the use of computers; or obtaining grants from interested private or Federal agencies to work on specific problems.

It is anticipated that preconstruction work by Northwest will accelerate rapidly in 1979. This will necessitate a greater design review, field monitoring and permitting efforts on the part of the Pipeline Surveillance Team. In addition, most of the technical evaluation studies should be underway next spring. More people will be hired for both field monitoring and studies.

There is a possibility that part or all of the State Pipeline Coordinator's Office (SPCO) will be moving to Fairbanks in 1979. In that case, some ADF&G employees will accompany SPCO. Most employees, however, will remain in Anchorage.*

Fisheries Rehabilitation Enhancement & Development

Robert S. Roys, Director

The Division of Fisheries Rehabilitation, Enhancement and Development (F.R.E.D.) has been assigned the rehabilitation and enhancement aspects of the salmon, trout and other fishery management programs. Alaska possesses myriad lakes and streams capable of producing fish, and it is possible through the development and application of fish husbandry technology to substantially increase the allowable fisheries harvests for all user groups. Therefore, the F.R.E.D. Division is statutorily responsible for:

(a) developing and continually maintaining a comprehensive, coordinated State plan for the orderly present and long-range rehabilitation, enhancement and development of all aspects of the State's fisheries for the perpetual use, benefit and enjoyment of all citizens and to revise and update this plan annually;

(b) encouraging the investment by private enterprise in the technological development and economic utilization of the fisheries resources; and

(c) through rehabilitation, enhancement and development programs, doing all things necessary to insure perpetual and increased production and use of the resources of Alaskan waters and continental shelf areas (AS 16.05.092).

OPERATIONS

F.R.E.D. Division has fish husbandry facilities located statewide. Names of facilities presently operating or under construction and areas served are as follows:

* under design/construction

Name	Area Served
*Anchorage Area Hatcheries (include Fire Lake, Elmendorf and Fort Richardson)	Cook Inlet, Matanuska Valley, Kodiak, Interior
Beaver Falls	George Inlet, Southern Southeastern
Big Lake	Cook Inlet, Matanuska Valley
*Cannery Creek	Prince William Sound
*Clear	Interior
Crooked Creek/Kasilof	Kenai Peninsula, Cook Inlet
Deer Mountain (operated by F.R.E.D. for the city of Ketchikan)	Southern Southeastern
East Creek	Bristol Bay
Fish Creek Salt Water Rearing Pens	Northern Southeastern
Halibut Cove Lagoon	Lower Cook Inlet, Kachemak Bay
Hidden Falls	Southern and Middle Southeastern
*Karluk/Naval Station	Kodiak
Klawock	Southern and Middle Southeastern
Starrigavan	Sitka, Northern Southeastern
*Snettisham	Juneau/Taku River, Northern Southeastern
Russell Creek	Alaska Peninsula
Tutka	Kachemak Bay
Whittier Salt Water Pens	Prince William Sound

Specifics on operations and capacities of individual facilities are given in Table I on page 44.

Facility capacities and adult salmon returns were small in the first years after F.R.E.D. Division's inception in 1971, but dramatic adult returns are now beginning. Adult returns from hatcheries can be determined since a portion of all salmon fry and smolts released from F.R.E.D. Division facilities are marked by clipping certain fin combinations and/or by coded wire tags.

In many cases, new spawning runs have been created where none were observed previously. One example of this is at Halibut Cove Lagoon adjacent to Kachemak Bay. Here, F.R.E.D. Division developed runs of pink salmon as part of imprinting studies. In 1978, 23,000 adult pink salmon returned to Halibut Cove, and a special commercial fishery was opened to harvest the fish. The ocean survival rate of this experimental group of fish, which had been short-term reared, was 6.6 percent, one of the highest pink salmon survival rates experienced in the State. Biologists consider one percent to be the normally expected ocean survival rate of pink salmon.

An excellent supplemental salmon return to a small natural run occurred at the Tutka hatchery located near Seldovia. Of the 190,000 pink salmon harvested there in 1978, 141,000 were produced by the hatchery. The survival rate from the time fry were released into the ocean until return as adults was 3.3 percent.

At Kitoi Hatchery on Afognak Island, at least 45,000 adult pink salmon returned in 1978. Of these, 13,000 were taken by commercial fishermen. This year's returns were a 41 percent increase over adult returns observed in 1977.

The first significant return of adult chum salmon occurred this fall at the Beaver Falls facility near Ketchikan in Southeastern. Chum salmon were not indigenous to the facility site, and the return was a result of investigative research on run development. Eggs were taken from these chum for the continued establishment of a brood stock. A total of 2,414 chum attributed to the hatchery were caught in the commercial harvest.

Good adult coho returns were experienced in the Resurrection Bay area from an enhancement program provided by the Anchorage area hatcheries located at Elmendorf Air Force Station, Fort Richardson and Fire Lake. During the annual Seward Silver Salmon Derby Days, 42.2 percent of the coho caught by sport anglers were marked, or hatchery-released, fish. Creel counts indicated that 35 percent of the coho caught in this area during the entire season were marked fish, while 76.4 percent of the coho salmon caught from the beach were marked or hatchery-released fish.

There is no native run of king salmon at Halibut Cove Lagoon, so a stock is being developed there for a saltwater king salmon fishery in Kachemak Bay. In 1978, 528 king salmon returned to the facility and eggs were taken from them to assure continuation of this run.

The Kasilof Hatchery, located on Crooked Creek in Lower Cook Inlet, provided 13 percent of the returning king salmon run, and in Southeastern, 37.6 percent of the sport fish caught in the bay near Sitka were coho which had been incubated and reared at the F.R.E.D. Division facility at Starrigavan.

The sport fishing activity in Cook Inlet has an estimated growth rate of 7.5%. Filling this increased demand for sport fish is the primary function of the Anchorage area hatcheries where rainbow trout, grayling and sheefish are incubated and reared. Steelhead are also being reared for planting in the Kenai Peninsula area.

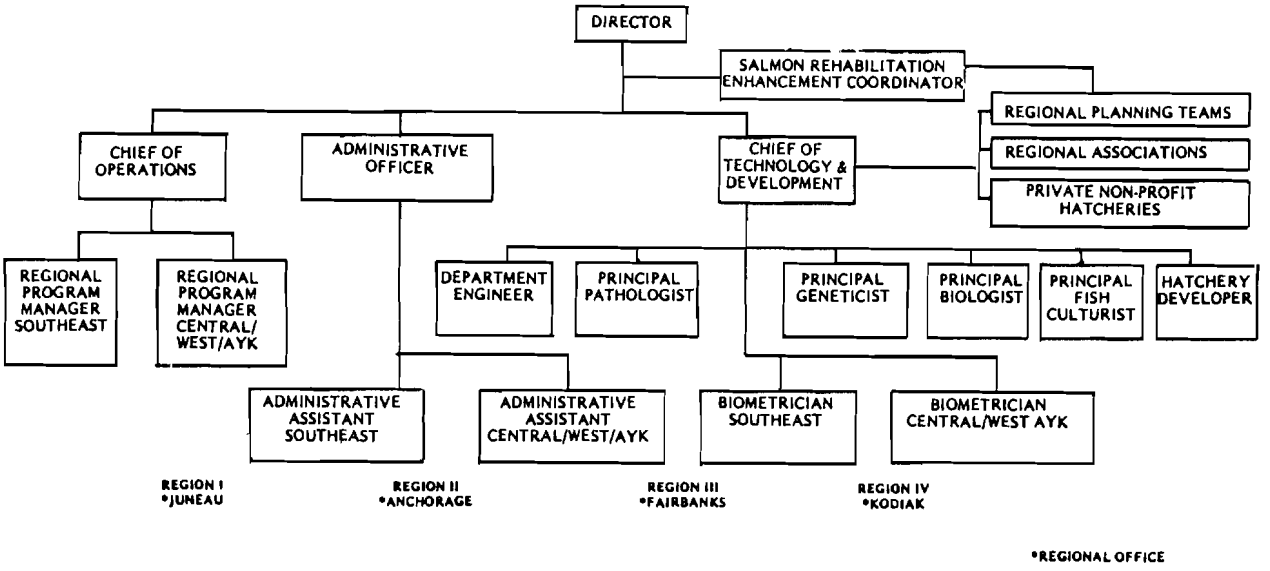
There are fewer sport anglers in Southeastern, but regional fishing pressure for rainbow trout necessitates plans for enhancement of this species. Steelhead stocks are currently being enhanced on a small scale, particularly at Deer Mountain Hatchery and Crystal Lake. F.R.E.D. Division operates Deer Mountain Hatchery through a cooperative agreement with the City of Ketchikan. Because the hatchery is located near other tourist attractions, information shelters are being constructed to educate visitors about hatchery activities.

Lake & Stream Stocking

An extension of the hatchery approach is lake stocking. Catchable and fingerling rainbow trout are planted in lakes in upper and lower Cook Inlet. Grayling are presently being stocked in thirteen lakes in this area. Since most are fished out every year by sportsmen, these lakes will never be able to develop a sustained brood stock. F.R.E.D. Division maintains the rainbow trout brood stock at the Anchorage area hatcheries.

Throughout Alaska there are natural areas that potentially can be utilized for rearing sockeye and coho fingerlings to smolts. At present, these areas may be inaccessible to normal salmon runs or underutilized due to poor escapement or limited spawning grounds. For several years, sockeye and coho fry have been planted in lakes on the Kenai Peninsula and at Big Lake near that Hatchery. As these smolts leave Kenai Lake, they are counted to determine lake survival rate. This year 26 percent of the sockeye smolts

DIVISION OF FISHERIES REHABILITATION, ENHANCEMENT AND DEVELOPMENT
ORGANIZATION CHART
147 PERMANENT EMPLOYEES



which migrated to sea from Big Lake were hatchery produced. At Hidden Lake on Kenai Peninsula, a 5.5 percent survival rate was recorded from the time the sockeye fry were released in the lake until the smolts migrated to the ocean.

The return of adult salmon to the lakes used for rearing is also monitored. At Fox Creek on Caribou Lake, Kenai Peninsula, a new run of coho has been developed by lake stocking. Between 2,400 and 3,200 coho returned to the creek this year. These values do not include the coho produced by this system and caught in the commercial and sport fisheries. Packer's Lake, in the same area, had its first return this year of sockeye adults since the lake was rehabilitated and restocked. A 9.8 precent ocean survival rate was achieved. The commercial and sport catches and stream escapement records at Seldovia Lake showed that half of the coho returning there were due to F.R.E.D. Division's stocking program. Returns of adult hatchery salmon are expected to increase statewide even more during 1979.

As of November 11, 1978, the following numbers of salmon fry and smolt had been released during this year: 24.0 million pink; 10.7 million sockeye; 3.0 million chum; 1.0 million king and 3.1 million coho salmon. Fish produced and released for sport fisheries numbered 10,741 steelhead, 375,976 grayling, 24,747 sheefish and 264,963 rainbow trout.

Release numbers in Southeastern were decreased when it became necessary to destroy the Crystal Lake Hatchery stock because of disease problems. After the hatchery was completely sterilized, 35,000 king and 329,000 coho eggs were taken from local stocks, putting the Hatchery in production again. An accelerated rearing program with heated water is under way, and the first coho returns are expected as early as fall, 1980.

Data on egg takes during the late summer and fall of 1978 were not complete at the time this report went to press. With incomplete data, this year's egg takes statewide totaled 94.6 million eggs (all species of salmon, trout, grayling, steelhead and sheefish), approximately a 32 percent increase over the previous year. Small sockeye escapements to the Big Lake and Lake Nunavaugaluk systems decreased the numbers of sockeye eggs taken. Chum salmon runs throughout Southeastern were disappointing; therefore, egg takes of this species were below expectations.

Egg Planting

Another approach to salmon enhancement is being studied at Karluk Lake on Kodiak Island, where eggs are being eyed at a small hatchery belonging to the Sport Fish Division and the Conservation Club. The eyed eggs are then planted in tributaries of Karluk Lake. Evaluation of this method of salmon enhancement will be made as adult salmon return to the lake.

Fish Passes & Stream Clearance

In addition to enhancement programs, F.R.E.D. Division is involved in rehabilitating salmon resources by habitat maintenance and improvement. One such program is the installation of fishpasses over barriers that prevent returning salmon from reaching spawning areas. A new fishpass, constructed this year in cooperation with the U.S. Forest Service, at Logging Camp Creek, Prince William Sound, will allow pink and coho access to upstream reaches of that system. Fishpass construction will begin in 1979 at Red Creek, where a fifteen foot waterfall impedes progress to spawners when stream flow is low. At Solf Lake, a rock fall caused by an earthquake was removed to open lake access for returning sockeye. A fishpass at Russian River on the Kenai Peninsula is also under construction, and a contract has been let for construction of a fishpass at the Irish-Keku Creek system in Southeastern. All of the fishpasses under construction will be operational when salmon runs begin in 1979.

Maintenance of existing fishpasses continues in Southeastern at Navy, Pavlof, Anan, Ketchikan and Falls creeks; in Prince William Sound at Shrode, Billy's and Control creeks; on the Alaska Peninsula at Humboldt Creek; on Afognak Island at Seal Bay, Little Kitoi, Paul's Lake, Gretchen Lake and Portage; and on Kodiak Island on the Frazer River.

In addition to having a low maintenance cost, ladders have been highly successful in establishing new salmon runs in streams and lakes blocked by barrier falls. At Frazer River, the construction of an additional fishpass was necessary to accommodate the growing number of returning adults. In 1978, 141,981 sockeye were counted over the fishpass compared to 139,548 in 1977 and 744 during the 1956-1960 period when runs were first being established. 191,000 pink salmon used the fishpass at Anan Creek in Southeastern. When the pass was built in 1977, escapement goals above the barrier falls were 200,000 pinks.

Stream clearance projects are also a part of F.R.E.D. Division's activities. A salmon count of a cleared stream at Humpy Cove (Unalaska) showed a five-fold increase over the past ten year's average in pink salmon. A channel through a log jam in a stream on Kupreanof Peninsula allowed 230 pink salmon to pass upstream where no escapement had been recorded in previous years. Additionally, beaver dams have been removed or flumes installed through them to allow fish passage in many locations in the Kodiak, Alaska Peninsula and Southcentral regions.

F.R.E.D. Divsion repaired the water control structure at Eyak Lake near Cordova. This structure had eroded and was threatening to drain the lake, potentially destroying present sockeye beach spawning grounds where over 13,000 sockeye and 300 coho were counted in 1977.

TECHNOLOGY AND DEVELOPMENT

Research is on-going within all F.R.E.D. operational and technical elements, and with the cooperation of Sport Fish and Commercial Fisheries Divisions. In 1978, a Fish Culture course was held in Juneau and two four-day workshops on Fish Disease were conducted in Sitka and Anchorage. Participants in the school were from National Marine Fisheries, Private Nonprofit Corporations, University of Alaska and the Department of Fish and Game. Lectures were given also by F.R.E.D. scientists at a University of Alaska Fish Culture course.

Gravel is the natural substrate or material in which salmon eggs develop. A F.R.E.D. Division biologist was the first to conceive the idea of using Intalox Saddles for substrate material in hatcheries to incubate eggs. Intalox Saddles are plastic media used in

Intalox saddles used as substrate material for egg incubation.

Photo by ADF&G

the chemical industry to mix fluids. The spaces between the saddles are much greater than the spaces within gravel substrates, thus enabling more eggs and alevins to be incubated within the plastic substrate. The plastic substrate is also lighter than gravel and causes less damage to alevins.

Research is being conducted in lake fertilization, a process by which fertilizer is introduced to a lake to increase the food supply to fish rearing in the lake. Scientists feel that sustained heavy salmon harvesting has resulted in fewer spawners, less nutrients because of fewer carcasses, fewer food organisms and, therefore, fewer salmon smolts. This chain reaction could be a major reason for the decline of salmon along the Pacific coast. Such reasoning has led to the suggestion that missing nutrients, the first link in the chain to produce more food organisms for fish, might be replaced artificially. Experiments are under way in Canada and parts of the U.S., with preliminary studies beginning in Alaska.

F.R.E.D. personnel are working on detailed studies of diets suitable for salmonids. The studies include the feasibility of using Alaskan manufacturers to produce suitable food for these fish.

A 'Fish Disease Policy,' designed to insure protection of the wild fish stocks of Alaska as well as hatchery fish, was put into effect this year. Along with the 'Fish Disease Policy,' several research projects in the pathology discipline were pursued including:

(1) studies to determine the cause of soft shell condition and a rust disease in some Tanner and king crab;
(2) production of Vibriosis vaccine; one hundred sixty liters of vibrio bacteria were produced in the Anchorage pathology laboratory with a commercial value of $52,000; fish at six facilities were vaccinated;
(3) an intensive four week sample collection and developmental research effort on IHN virus and identification of its effect on sockeye runs; this was the final phase of a three year study at Lake Nerka, a paper was presented on this subject by our pathology staff at the Northwest Fish Culture Conference.

A 'Fish Genetics Policy' was signed this year, which will minimize possible detrimental effects of artifical fish propagation and management. One of the main objectives of research at the Department's salmon bio-chemical genetics laboratory in Juneau is to obtain background information on all salmon populations in preparation for determining the genetic effects of hatchery operations upon wild salmon stocks. The F.R.E.D. Division geneticist has established procedures for and begun a concentrated program of genetic analysis of chum salmon stocks on a statewide basis. This effort will be expanded to pink and eventually all salmon species.

Department engineering staffs are maintained in Juneau and Anchorage and provide engineering liaison with other State and Federal agencies and consulting firms involved in construction of Alaska Department of Fish and Game facilities. The engineering staff designs fishpasses and hatchery facilities, 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.

The Division engineers are responsible for overseeing the majority of monies spent on F.R.E.D. projects. Added to on-going projects are the funds approved November 7, 1978 for three new facilities at Snettisham, Main Bay and in the Kotzebue area, and also expansion of the Anchorage area hatcheries.

Cooperative agreements have been encouraged between F.R.E.D. Division and other public agencies and the private sector. Stream rehabilitation projects on the Kenai Peninsula were carried out this year in cooperation with the Cook Inlet Aquaculture Association, a regional nonprofit corporation. In accordance with an agreement with the Alaska Power Administration, incubation studies continue at the Snettisham power project in preparation for construction of a full scale hatchery there. F.R.E.D. Division participates in cooperative research with the National Marine Fisheries Service (N.M.F.S.) at two locations in Southeastern. Various incubator systems for the production of high-quality pink fry are being tested at the first, Auke Bay. At the second, Little Port Walter, F.R.E.D. Division is utilizing the N.M.F.S. facilities to meet the need for improved king salmon brood stock in Southeastern Alaska. This project released approximately 40,000 king salmon smolts in 1978. A N.M.F.S. and F.R.E.D. Division program to evaluate the natural rearing capacity of Lake Nunavaugaluk, site of F.R.E.D. Division's East Creek Hatchery, is in the final stages.

The U.S. Forest Service (U.S.F.S.) and F.R.E.D. Division cooperate on stream improvements with joint investments on fishpasses throughout Alaska. In conjunction with Department of Health and Social Services, pathology and genetics laboratories are maintained in Juneau. The United States Geological Survey is installing a stream gauge at Karluk Lake to

provide hydrological information for F.R.E.D. Division projects there. Under contract to the Alaska State Energy Office, F.R.E.D. Division investigated the application of geothermal energy to hatchery production of salmon. The final report, entitled 'An Investigation of Selected Alaska Geothermal Spring Sources as Possible Salmon Hatchery Sites,' was released in the fall of 1978.

ORGANIZATION

In 1976, the Legislature asked the F.R.E.D. Division to reorganize to include the Hatcheries Division and the Engineering Section of ADF&G. This reorganization is now complete. The decision was made to operate the Division under a matrix system, which will allow the greatest interchange of ideas and operations, to benefit the Division and Department. F.R.E.D. Division is thus divided into three major functions: (See Organization Chart)

Administration
Technology and Development
Operations

Administration

The Administration function provides budget and fiscal controls, accounting and clerical services.

Technology and Development

Technology and Development contains the elements of biology, engineering, pathology, fish culture and genetic disciplines. This technical staff is responsible for research and development for the continued improvement of the F.R.E.D. program.

Operations

The most visible function of F.R.E.D. Division is Operations which involves hatchery facility operation and maintenance, project management and operational assistance to private nonprofit hatcheries. The Operations Branch is comprised of a permanent managerial staff; other disciplines and functions are assigned from the Administration and the Technology and Development branches for specific operational projects and facilities. This function's emphasis has been on salmon enhancement (hatcheries, lake stocking and egg plants) and on salmon rehabilitation (fishpasses and stream clearances).

Private Nonprofit

Another part of the organizational function is to provide strategic planning for both the private and public sectors. F.R.E.D. Division continues to coordinate, and cooperate with, and assist the private nonprofit sector in establishing and achieving objectives that will contribute significantly to the rehabilitation and enhancement of the salmon resource. Regional Planning Teams, consisting of user group representatives and Department personnel, are functioning in Prince William Sound, Cook Inlet, Northern Southeast and Southern Southeast. A Regional Planning Team is being established in the Bristol Bay region. Development of Comprehensive Regional Salmon Plans will integrate the activities of public and private facilities to prevent duplication of effort and to establish needs for all user groups.

LOOKING AHEAD

Since Alaska has vast natural spawning and rearing areas, fisheries management based upon optimum escapement will yield, when controlling environmental factors are favorable, significant natural salmon and trout harvests. However, when controlling environmental factors are unfavorable, poor catches occur and commercial, sport and subsistence groups are disssatisfied. In addition, a rapidly increasing number of sport anglers are competing for fewer fish at easily accessible locations.

Historical declines and continued extreme fluctuations in the catches of the five salmon species indicate that this renewable resource needs short- and long-term rehabilitation and enhancement. Reliable, cost effective salmon husbandry technology to increase the production of fry, fingerlings and smolts can result in increased adult salmon harvests. Needs for enhancement and/or rehabilitation of fish populations will continue to be established via direct testimony and synthesis of public comment with Departmental research findings as expressed in the Alaska Fishery Plan, and with input from Regional Planning Teams, advisory boards, and Federal and State agencies.

Potential areas for rehabilitation and enhancement are numerous throughout Alaska, though most have not been identified in detail. Once identified, these will be incorporated into the Divisional goals and objectives. Cooperative baseline studies will continue to determine stream modifications necessary to increase salmon production, to establish the benefit/cost ratio of various projects and to arrange projects in order of priority. Since successful fish production is ultimately based on the quality of the water, a critically needed limnological program has been initiated in Alaska, both to ascertain the productivity and water quality of candidate lakes, and to follow and evaluate the success of nutrient enhancement. Background and experimental data will be gathered for fertilization of low productivity lake systems in the Kenai Peninsula-Cook Inlet areas.

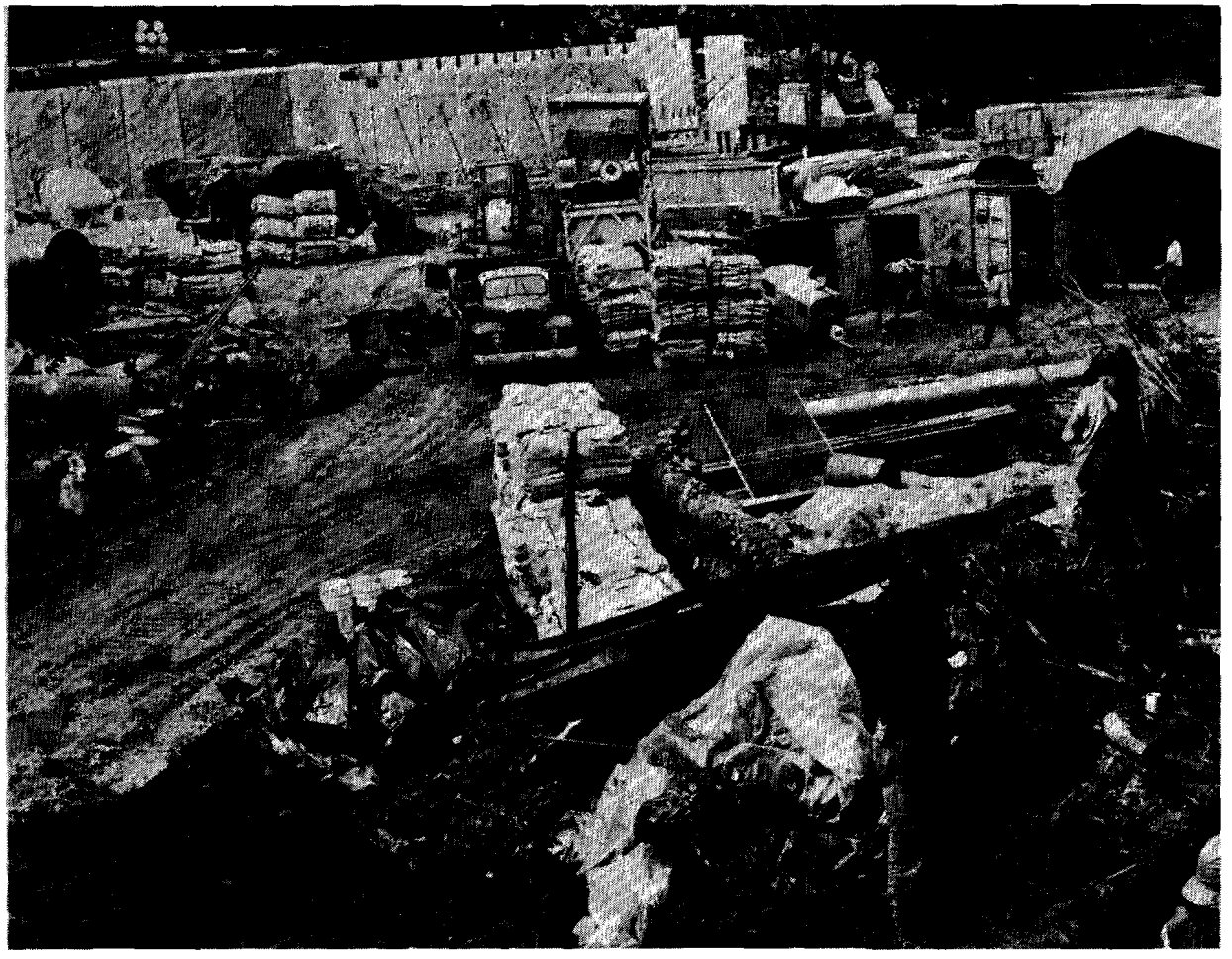
Investigations of potential hatchery sites will continue on a year round basis. At proposed hatchery

sites, F.R.E.D. Division teams will continue to monitor water flow and complete water study tests, monitor fish species for the presence of disease, and determine desirability of certain stocks as hatchery eggs sources.

Construction of all hatcheries funded by the 1976 bond issue continues or is nearing completion. Eggs are being incubated at the Klawock Lake Hatchery on Prince of Wales Island. The Hidden Falls Hatchery on Baranof Island is still under construction, while eggs are being incubated at Snettisham for release of fry at Hidden Falls next spring. Russell Creek Hatchery at Cold Bay is 90 percent completed, but unforeseen power problems made it impossible to incubate eggs during 1978. Construction of the Cannery Creek Hatchery on Prince William Sound began in September 1978, and pink salmon eggs are being incubated at another site for development of the brood stock. A study began in May, 1978, to determine the quality and quantity of water available for a hatchery in the Moose Creek/Tern Lake area on the Kenai Peninsula when the Hidden/Skilak hatchery site became unavailable. Hatchery design will begin on the Moose Creek/Tern Lake facility if water studies are favorable. At Clear Air Force Station near Fairbanks, a hatchery also funded by the 1976 bond issue is in the design stage.

Four new hatcheries were funded in the 1978 bond issue. Snettisham, near Juneau, has been involved in feasability studies since 1976 with the incubation and release of summer chum salmon and rearing of king salmon. Site investigations have been in progress for two years at Main Bay in Prince William Sound where eggs are presently being incubated to develop brood stock. In the Anchorage area, additions and expansions will be made to the existing complex. Funds for hatchery development in the Kotzebue area were also included in the 1978 bond issue and investigative work has been launched to determine water sources which do not freeze during the long Arctic winters. ✱

In the foreground of this picture U.S. Forest Service archeologists are working at the Hidden Falls Hatchery Site where a midden, or refuse heap, believed to be about 10,000 years old was uncovered during construction of the new F.R.E.D. Facility.
Photo by M. Rush



Commercial Fisheries

Steven Pennoyer, Acting Director

The Division of Commercial Fisheries is charged with the responsibility of managing all commercial and subsistence fisheries in the State, with the exception of halibut, 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. Management techniques may be 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, supports regional administrative functions and coordinates the activities of the Division.

With an operating budget of $9.1 million in 1977-78, the Division of Commercial Fisheries managed commercial fisheries grossing $340.4 million for the fishermen.

MANAGEMENT

Salmon Harvest

The 1978 salmon fishery produced a statewide commercial salmon harvest record for recent years with 79.4 million salmon caught. This is the largest annual harvest since 1943. Table 1 displays the preliminary estimated harvest by species and management area and Table 2 lists the catches since 1943.

Due primarily to poor survival rate during the extremely cold years of 1970-71 and 71-72 statewide salmon runs and harvests were very low during 1973-76. The 1978 return continues a trend in run recovery.

The salmon runs that supported the 1978 harvest are attributed to the good escapements, achieved through strict harvest control and sacrifices on the part of the fishermen and processors in 1974-76, and improving survival conditions the last three years. Fisheries managers this season continued to regulate area harvests so that most escapement requirements were met.

In Southeast Alaska the 1978 all species salmon harvest totaled over 22 million salmon and represents the best salmon catch in the region since the 1968 harvest of 30 million salmon. The 17.0 million pink salmon harvest in southern Southeast is the highest pink salmon catch for this area since 1949. The Southeast pink salmon runs have been in a depressed condition since the early 1970s when individual stocks received excessive commercial fishing pressure in mixed stock fishing areas and extreme weather conditions greatly impacted winter survivals. During subsequent years, fisheries managers have emphasized stock specific escapement management and the fishing industry is now receiving the direct benefits. Escapements to southern Southeast pink salmon spawning streams were generally good in both distribution and timing.

Due to a substantial improvement in escapement size and distribution the last two years the northern Southeast harvest is expected to contribute a larger proportion to the total Southeast pink salmon harvest starting in 1979.

Despite pre-season fears that Southeast salmon processing plants would not have the capacity to handle the salmon harvest, the canneries kept pace with the harvest and avoided placing the purse seine fleet on limit. The increased capacity was largely due to plant improvements and extensive brine tender capacity available this season. Also, Alaskan tenders transported 871,000 salmon from Southeastern waters to Prince Rupert for processing in Canadian plants.

The Bristol Bay harvest of 16.3 million salmon was the largest since 1970. The total sockeye run of 19.7 million was 3½ times larger than average for a non-peak year. The sockeye catch of 9.7 million was the largest non-peak year catch since 1936. Escapement goals were met or exceeded in all systems except the Ugashik River.

A phenomenal pink salmon run, estimated at over 16 million fish, produced a record catch of 5.2 million, largely in the Nushagak district. The Nushagak district was also the main contributor to the second

largest catch in history for king salmon: 174,000. Escapements were also the highest ever recorded. The chum salmon catch of 1.2 million was twice the average with excellent escapements. Late season effort produced a coho catch of 82,000, twice the average for this species.

Lower Cook Inlet even-year pink salmon appear to be recovering from a long term decline related to the 1964 earthquake. The Outer district was opened to fishing for the first time since 1970 and excellent escapements were achieved in some key areas.

The upper Cook Inlet total salmon catch of 5.0 million was the largest since 1964. The 1978 sockeye catch of 2.6 million is the second largest on record. Escapements were good to all major systems. The pink salmon catch of 1.6 million was the largest since 1968 with a large escapement to the Susitna River. This run appears to have fully recovered from the depressed 1970-74 period for the even-year cycle. Chum and coho salmon harvests were average.

The Prince William Sound pink salmon total run of 3.8 million fell a little short of the 4.2 million forecast, however the best even-year escapement since 1968 was realized. The Copper River sockeye fishery was severely curtailed in a successful attempt to achieve adequate escapement from a weak run.

In Kodiak the all species harvest of 16.9 million salmon is the best harvest since the 1937 harvest of 19.2 million salmon. The Kodiak pink salmon harvest of 15.0 million was the best even-year recorded and second only to the 1937 harvest. Kodiak sockeye runs and harvests have been severely depressed since the late 1940s. The 1978 harvest of 1.1 million is the best since 1948 and escapements to most systems were good.

The Chignik area's sockeye run produced an above average 1.6 million catch, while escapement requirements were met for both early and late run components.

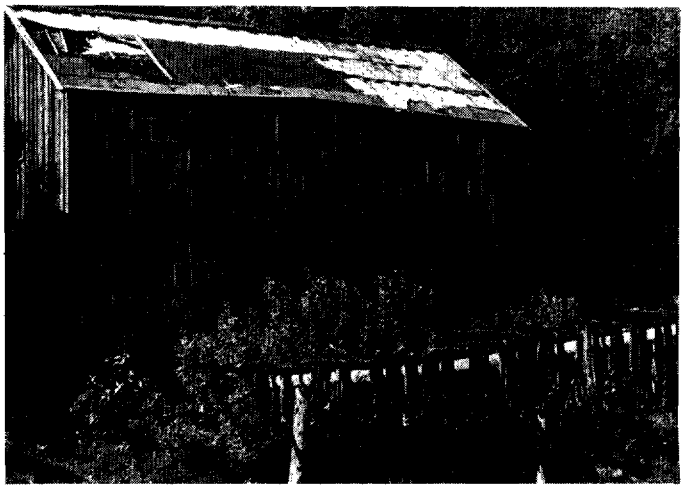
The Alaska Peninsula pink salmon run also produced a new record harvest for recent years of 6.3 million which marks an extremely good recovery from the depressed runs observed in the early 1970s. The most recent harvest of similar magnitude was 1942 with 6.8 million pink salmon harvested. Escapements in all areas were adequate to exellent.

The 1978 pink salmon runs in Norton Sound, chum salmon runs on the Yukon River and the all species record harvest on the Kuskokwim River has produced a new record commercial salmon harvest of 2.6 million salmon for the Arctic-Yukon-Kuskokwim Region. The region's king salmon harvest of 154,000 is also the largest ever recorded with the majority of these from the Yukon and Kuskokwim systems.

Herring Harvest

During the 1977-78 winter bait and food fishery, Southeastern Alaska purse seine fishermen harvested 4,000 tons of herring. This catch is approximately 37% below that of the prior season. Although increased demand, primarily for crab bait, resulted in increased effort in the fishery, hydroacoustic assessment of the stock showed that mature herring had declined in most areas.

A total of 2,210 tons of herring were taken by Southeast purse seine and set gill net fishermen during this year's spring herring roe fishery. Prices for good quality roe herring increased sharply this season and ranged as high as $1,000.00 per ton of fish.



Fish-drying racks for subsistence salmon catch. Russ Dixon photo

Bristol Bay was the scene of a new and rapidly growing herring roe fishery with a record catch of 6,961 metric tons taken in the Togiak district. Additionally, 165 tons of herring spawn on kelp were harvested in that area. Further up the coast 273 metric tons were harvested from Security Cove and Norton Sound. An estimated 3.6 metric tons of spawn on kelp was also harvested in the St. Michael's Bay area of Norton Sound. Subistence catch of herring by residents of the western Alaskan coast was estimated at less than 150 metric tons with the majority taken in the Nelson Island area. Commercial herring fishing is restricted from the entire Nelson Island-Nunivak-Etolin Strait area to protect the subsistence harvest.

The herring run in the Kamishak district of Cook Inlet and the Prince William Sound harvest areas were disappointing with 463 tons and 1,400 tons taken respectively. Both harvests are the lowest since 1972.

Shellfish Harvest

The 1978 shellfish harvest for Southeastern Alaska and Yakutat will total nearly seven million pounds. The dungeness crab catch of 2.8 million pounds was the highest since 1964 and represents renewed economic interest in the fishery and increased stock abundance over recent years. The Southeastern Tanner crab fishery has been fully developed since 1974. The 1978 catch of 2.6 million pounds was the lowest since 1973 because of reduced effort throughout the region.

The historic beam trawl fishery for pink shrimp in the Petersburg-Wrangell area of Southeastern will harvest one million pounds in 1978, one of the better seasons in recent years. Although effort was below average, catch per unit effort was very high from some areas and indicated that stocks may be returning to the healthy levels of the 1960s.

The 1977-78 Cook Inlet king crab harvest of 1.67 million pounds was the lowest catch on record due to low abundance of eligible crab. The 5.4 million pound Tanner crab catch was good, although below the long term average. The 5.6 million pound shrimp harvest was above average, due in part to favorable market conditions, thus high fishery effort.

Prince William Sound had a 4.8 million pound Tanner crab season, almost double the previous season when a minimum size was first established. The dungeness crab catch also doubled the previous year's with a 1.9 million pound harvest.

The Westward region Tanner crab season commenced on November 1, 1977, and closed on September 3, 1978 with total catch of 114 million pounds. The previous season's catch was 86 million pounds. The stocks should sustain similar harvest levels in 1978-1979.

The king crab season opened on September 10, 1977, and was still in progress at the time of this reporting. The catch to date was 100 million pounds, primarily from the Bering Sea, compared to 87 million pounds landed in 1977. This year's catch is expected to reach 110 million pounds before the season closes.

The shrimp season opened in June, 1978, and is still in progress in the Kodiak district. The to date harvest of 55 million pounds was down from the 1977 harvest of 110 million. The cause of the decline is not clearly evident, however, environmental changes, and over fishing have had some effects on the stocks. The 1979 shrimp harvest may possibly be lower than this year's since research survey cruises conducted by the Department have shown no upward trends in stock abundance.

The dungeness season commenced on May 1, 1978, and was still in progress at the date of this report. The catch to date is 1.3 million pounds, compared to 113,000 landed in 1977. The reason for the increased harvest is based on good market conditions thus increased fishery effort and does not necessarily reflect stock abundance.

Fishing and processing operations in Nome conducted by a Kodiak-based fleet during the summer of 1977 were highly visible from town and rekindled interest in the development of a local winter commercial fishery. A total of 25,000 pounds of red king crab was harvested by 37 fishermen from January to May of 1978. This unique fishery occurs within several miles of the community of Nome, and access to the fishing grounds is by foot or snow machine. The pots, which are considerably smaller in size than conventional gear, are pulled by hand through holes chopped in the three to five foot Bering Sea ice.

Groundfish Harvest

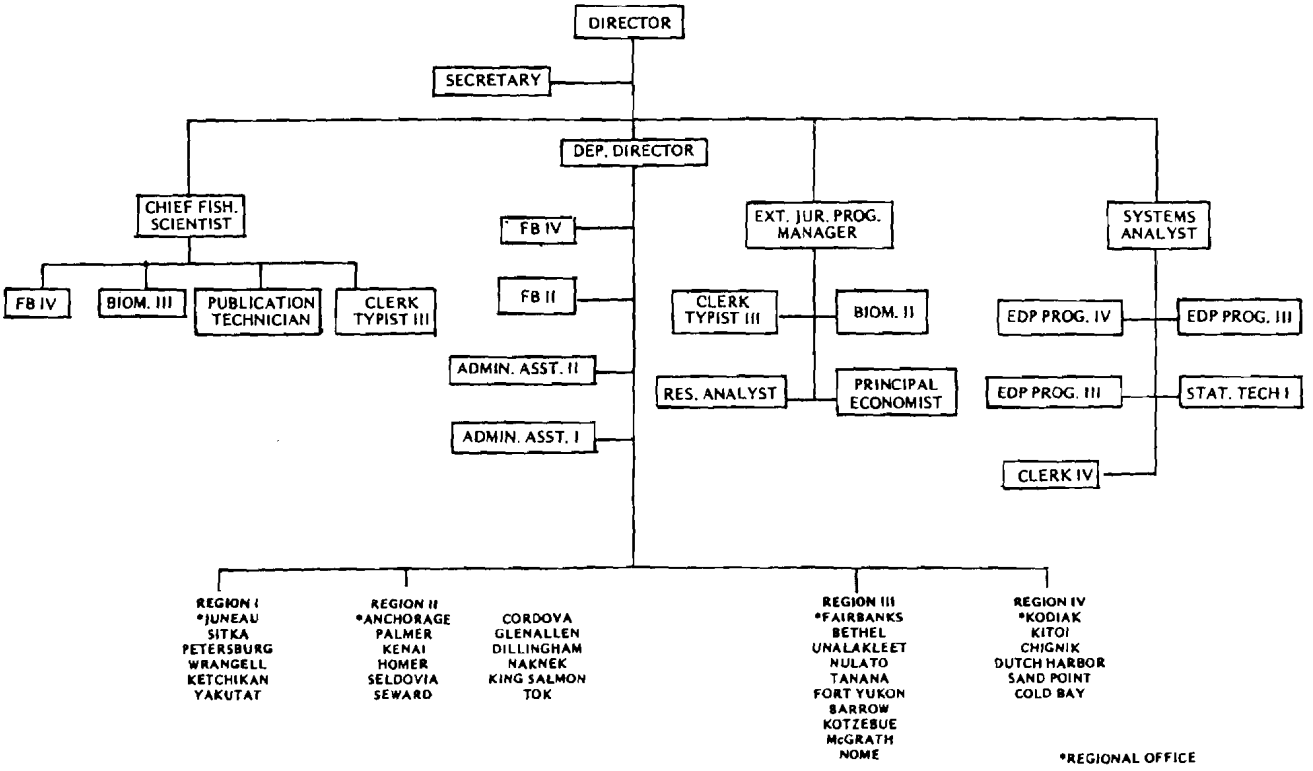
There are over 20 species of groundfish which have significant commercial potential at present, and a substantial effort has been expended both within the Division and industry to encourage the development of this new fishery.

Groundfish landings in 1978 from Southeastern Alaska of 6.2 million pounds exceed the 1977 harvest by two million pounds. Catches increased for all species except flounder and lingcod. New effort and increased catches in off-shore waters resulted in a record sablefish catch of 3.2 million pounds in 1978. Only 1.8 million pounds were landed in 1977. There is room for additional expansion of the Southeastern Alaska sablefish fishery in off-shore waters; the inside waters are fully exploited and presently showing some decline in productivity.

During the first nine months of 1978, Central region harvest of groundfish reached 161,000 pounds. Prince William Sound accounted for 100,000 pounds with starry flounders the dominant species. The Cook Inlet production of 61,000 pounds was dominated by gray cod. Interest in this fishery is high and with improved market conditions, 1979 should show a significant increase in harvest.

The Westward region groundfish fishery has been extremely sporadic, however, 1,886,715 pounds were landed through September. The predominant species were pollock (1,023,484 pounds), gray cod (706,607 pounds), and flounder (103,067 pounds).

DIVISION OF COMMERCIAL FISHERIES
ORGANIZATION CHART
147 PERMANENT EMPLOYEES



ADMINISTRATION

The Extended Jurisdiction (EJ) Section of the Commercial Fisheries Division helps coordinate the interaction between the State, the North Pacific Fishery Management Council (NPFMC) and other organizations associated with Federal jurisdiction in the Fishery Conservation Zone (FCZ), from 3 to 200 miles offshore. During 1978 the Department received over $450,000 from the NPFMC. This support aided projects for management plan development, computer software enhancement and fisheries research.

The Department is lead agency for eight fishery management plans. Bering Sea herring was added in 1978 to the established list of plans: king crab, Tanner crab, Dungeness crab, scallops, Bering Sea surf clams, Gulf of Alaska shrimp and high seas salmon.

The preparation and implementation of management plans for these fisheries, whose historical management has predominately been by the State, have been significant from the standpoint of: 1) assuring continuity of management in both State and Federal waters; 2) formally documenting the management strategies and their impacts on the resources and users; and 3) providing opportunities for critical evaluation by the Department, Board of Fisheries, Federal government and the citizens of Alaska.

RESEARCH

Salmon

Stock separation studies continue to receive increasing emphasis throughout the State. During 1978 the staff of the "Statewide Salmon Stock Separation Project" examined more than 20,000 scales from all five species of salmon collected at locations from Kotzebue Sound to Dixon Entrance. The technique involved measurement of two or more dimensions per scale, computer analysis and statistical comparison of known-origin stock samples with mixed-fishery samples. The method was applied to stock identification problems in Kotzebue and Norton Sound chum salmon; Yukon River chum and king; Cook Inlet sockeye, king and coho; Southeastern pinks; and Kodiak, Alaska Peninsula and Bristol Bay sockeye.

Research in Bristol Bay concentrated on determining the extent of stock mixing in lower reaches of major rivers and the impact on escapement enumeration. In Cook Inlet an intensive in-season stock separation experiment was again conducted. Following collection and analysis of reference scales from the major spawning rivers, mixed stock samples from the drift gillnet fishery could be examined within 24 hours and stock composition estimates provided to fishery managers.

In its second year, the Southeastern stock separation project conducted a major pink salmon tagging study. Extensive spawning-ground tag recovery efforts in the inside waters of northern Southeastern were extremely successful. About 2,000 of the 18,000 tagged fish released in upper Chatham Strait were recovered on the spawning grounds and an additional 2,500 tags were turned in by commercial fishermen.

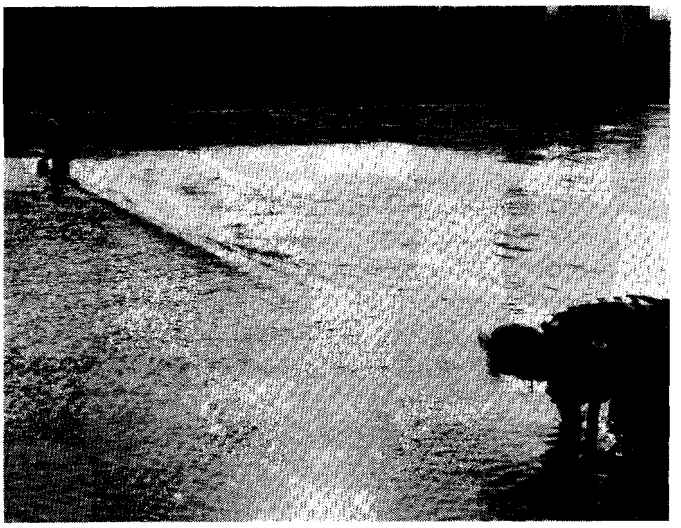
The results of these investigations will provide valuable information for solving the pink salmon stock separation problems in Southeastern and, in turn, lead to better management of the resource.

A new stock separation tagging project was initiated at both Nome and Unalakleet to assess stock distribution and abundance in the Norton Sound fishing districts. Tags recovered to date total 305 (13% of those released), mostly from Norton Sound fishing districts; some chum salmon tags have been returned from the Yukon River and Kotzebue areas. The information gained will enhance the Department's ability to manage these fisheries on a stock specific basis.

During the 1978 salmon season in Bristol Bay a computer data file of catch and escapement statistics served Department biologists as a powerful tool in monitoring and managing the highly valuable sockeye runs. The computer data file was used in combination with pre-season forecasts of run strength and timing, and with in-season indicators from test gill net fishing within the fishing districts and in the lower reaches of major rivers near Port Muller. The computer system allowed fisheries managers to repeatedly assess the strength of incoming runs and to compare with that of prior years. Computer data files are also being assembled for upper Cook Inlet and Prince William Sound to facilitate a more timely and thorough review of past data.

Investigations continued into methods to decrease predation of Arctic char on sockeye salmon smolt within the Wood River lake system in Bristol Bay. It has been found that the char can be efficiently seined at the mouths of certain interconnecting rivers and held live in large floating impoundments during the period of smolt outmigration to reduce predation. During 1978 at least 11,800 char were concentrated near the Agulowak River mouth, of which nearly half were captured and penned. At Agulukpak River mouth at least 4,350 char were concentrated, of which over one-third were captured. Smolt consumption of the char at large and potential consumption of those captured was estimated from periodic samples of stomach contents of unpenned char, water temperatures, and digestion rates. The efforts stopped predation of approximately 1,200,000 sockeye smolt at Agulowak River and approximately 56,800 at Agulukpak River. Based on smolt-to-adult survival rates and the 1978 commercial value of adult sockeye to Bristol Bay fishermen, the estimated benefit to cost ratio of the project was about 10:0.

Development and application of sonar equipment to count adult salmon in turbid rivers continued during 1978. Side scanning sonars were used for the first time in the Susitna and Copper Rivers to enumerate adult salmon escaping the fishery to spawn. Although this was the first year for side scanning sonar on the Copper, it was of tremendous value in managing commercial and subsistence sockeye fisheries. Due to unexpectedly poor sockeye returns, severe restrictions of the fisheries were required to insure the future of the stocks. Salmon escapement enumeration projects also using sonar salmon counters continued in 1978 in the Yukon and Kuskokwim rivers. This project is intended to allow adjustments in fishing effort in the lower river fisheries based on in-season escapement trends.



ADF&G Personnel positioning sonar fish counter on Kenai River.

Photo by Russ Dixon

Pre-season 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 Bristol Bay during even-year returns. Chum salmon returns are forecast in Prince William Sound. These forecasts are usually based on the relationship between pre-emergent fry density indices and subsequent adult returns. Correlations of past returns with other factors such as sea surface and air temperatures have proven useful in forecasting the returns.

In Southeast the pink salmon forecast, which included analysis of parent year escapements, pre-emergent fry values, observations on air and ocean

temperatures and the results of early marine studies, accurately predicted the record salmon return in 1978. The preliminary forecast for 1979 indicates another strong return, but somewhat below the 1978 levels. For southern Southeastern the 1979 forecast is 15.4 million and in northern Southeastern the 1979 return should be just over 9 million pink salmon.

Pre-season 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 is collected to provide a more accurate forecast of adult returns. The number of smolts 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.

In the second year of its activities the Ocean Troll Fisheries Project continued research to determine migration patterns and stock contributions to the various commercial and sport fisheries in Southeast Alaska. Approximately 5,000 coded wire tags were recovered in 1978 from Juneau, Petersburg, Ketchikan, Craig, Sitka and Pelican. Of the recoveries of coded wire tags from kings, 40% were of Canadian origin, 30% were of Washington State origin, and 20% were tagged in Oregon. The remaining 10% of king tag recoveries were from other federal and state hatcheries in the Pacific Northwest and Alaska. Approximately 99% of the silver salmon tag recoveries were of Alaskan origin.

Herring

A three year outer continental shelf assessment of finfish resources was completed this year with distribution and relative abundance information recorded for Bering Sea herring spawning stocks from Point Hope to the Yukon River.

As a basis for management of the growing herring roe-on-kelp fishery in the Togiak area, a study was made of the intertidal plant community in Metervik Bay. Preliminary results indicated that the herring roe-on-kelp harvest at its present level takes a substantial share of the available intertidal kelp material. However, fisheries managers will need to further assess the effects of the roe-on-kelp harvest on the herring stocks.

As in past years, Department vessels equipped with advanced echo sounding equipment provided 'biomass' estimates of herring bait and sac roe stocks in Southeastern, estimates which are used as the basis for management of this important fishery.

Shellfish

Research stock assessment cruises provide both abundance estimates of legal crab prior to each year's commercial fishing season and population size predictions for legal males 1-3 years in advance. The results of the 1978 Kodiak charter cruise confirmed earlier years predictions that the 1978-79 harvest would be lower than at any time within the last 20 years.

Biologists captured and studied a total of 84,788 king crab and 14,389 Tanner crab in 1978. Newly developed permanent tags were placed on 1,771 king crab of legal age. A total of 1,755 Tanner crab were tagged with a temporary carapace dart tag. The subsequent recovery of these tags by commercial fishermen and cannery workers provides research biologists with stock estimates which permit more precise in-season management. Important data on crab migrations, growth and mortality is derived from studies of recaptured tagged crabs.

Special studies on Tanner crab were conducted to determine its life history, concentrating on age, growth and reproductive requirements. A permanent Tanner tag that will remain on the crab throughout successive molts is being tested. Migration data is being plotted by computer to aid in stock separation. Research is underway to determine capabilities of female Tanner crab to fertilize more than one egg clutch from a single mating using stored sperm. It is important to learn what the reproductive requirements are in order to determine appropriate management strategies.

The amount of growth per molt and molting frequency of king crabs are being studied to insure that current growth rates are similar to those indicated from studies conducted 16 or more years ago. The relationship between pot soak times and catch is being studied with special interest in tidal effects upon catch. The number of crabs entering pots during daylight hours versus night-time is also part of this research studies. Finally, progress is encouraging on the development of an improved king crab tag able to withstand being submerged in the ocean while attached to a crab for at least 4 years.

The population dynamics of shrimp are being studied in the Kodiak, Chignik-Alaska Peninsula and Aleutian Island regions. Studies on catch and effort of the fleet, shrimp density and distribution, catch composition, and relative abundance of major stocks are constantly being evaluated and refined. This project has been

vital to the development of the management plan for commercially caught shrimp.

Since 1975 shrimp population abundance levels have dramatically declined in the Chignik-Alaska Peninsula and Kodiak areas. These declines, first noticed in the broad off-shore fishing areas, were subsequently observed in the historically productive in-shore grounds. This has led to regulatory reductions of harvest levels in the Kodiak area in 1977 and the Chignik-Alaska Peninsula area in 1978.

Shellfish research in Cook Inlet includes investigations of king, Tanner, and dungeness crabs and several species of shrimp harvested in trawl and pot fisheries. King and Tanner crab studies involve fishing with commercial-type pots in established schooling areas to provide indices of abundance of legal and sub-legal size classes and females. Mating success of mature females is also determined. The results of the 1978 work indicate that a strong age class of king crab is likely to become available to the fishery in 1979. Good Tanner crab fishing is expected in the Southern district in December 1978. Dungeness crab studies consist of tag-recapture experiments to determine fishing mortality and migrations.

Shrimp pot and trawl fishing is also conducted throughout commercial fishing areas to determine species composition and abundance. A logbook program has been conduced to determine catch per unit of effort.

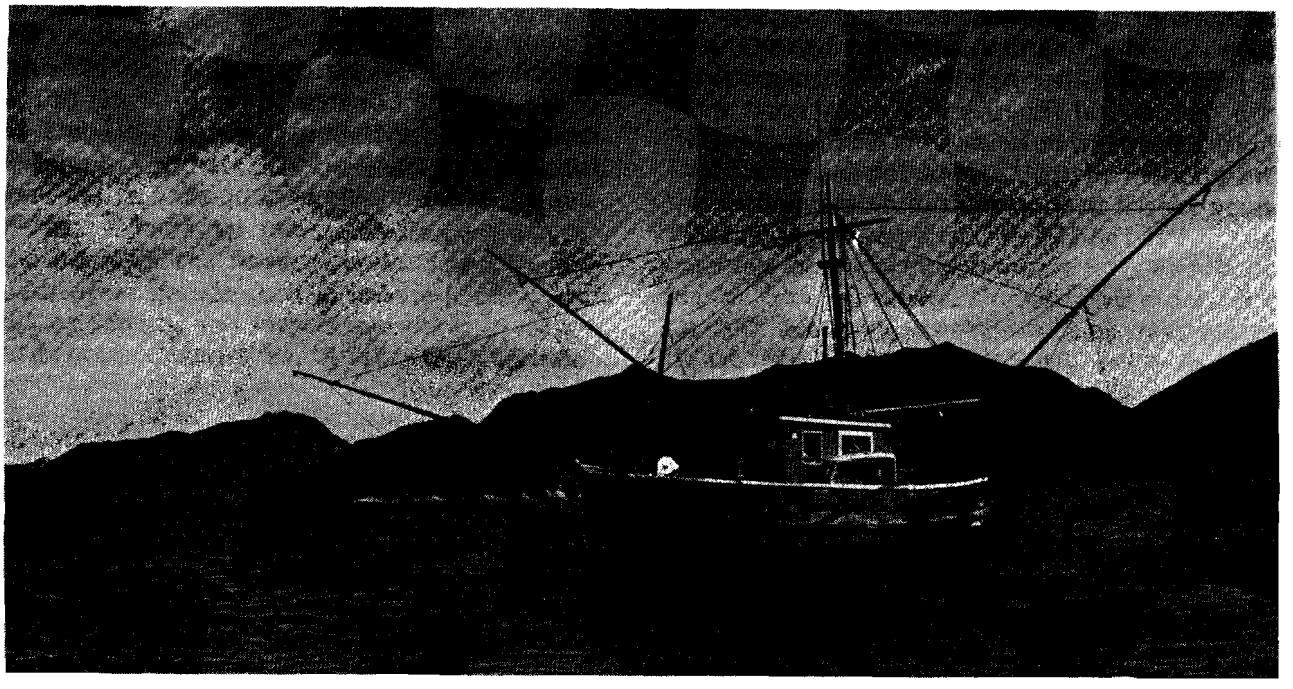
Shellfish research in Prince William Sound focuses on Tanner and dungeness crabs. Pot index fishing, tagging experiments, logbook programs and catch sampling are conducted. The Tanner crab studies suggest that the imposition of a minimum size limit on male Tanner crabs retained by the commercial fishery has led to an increased number of eligible crabs entering the fishery, an increase in average size of legal males and a higher rate of reproductive success of females.

LOOKING AHEAD

Overall, the Division's management personnel were successful in securing the desired salmon escapement levels and distributions in most fisheries through regulation of the harvests. These escapements should provide a solid foundation for future salmon runs and enable the State to sustain these important fisheries at a high level of abundance.

Another large commercial salmon harvest is anticipated in 1979. The catch expected to be at least 50 million fish, and will probably exceed 70 million. Small increases are likely in sockeye and chum harvests, and moderate declines from the exceptional catch levels of 1978 are likely for other species. The total shellfish harvest is expected to decline slightly in 1979. Although king crab catches should remain near recent levels, the very large 1978 Tanner crab harvest will probably not be equaled and the shrimp catch is expected to fall below the 55 million pound 1978 figure.

Salmon troller near Sitka. Photo by Russ Dixon



The majority of the research performed by the Division are long-range projects which will, of course, be condinued in 1979. Developments are underway to take advantage of new sonar technology allowing accurate counts of salmon in large silty rivers and estuaries. The new multi-transducer unit, entitled 'fan scan' will be tested during the 1979 season. If the new system tests successfully in the field, a broad fisheries application in Alaska will hopefully provide salmon enumeration within major fishing districts where alternative methods have not been effective.

Further herring research funded by the North Pacific Fishery Management Council and the Department on the status of Bering Sea herring stocks will continue in 1979. Emphasis will be directed at assessing the status of in-shore spawning, and winering Bering Sea herring stocks and the estimation of year class strength. The determination of stock identity in the mixed stock wintering grounds is being studied with cooperation from the national Marine Fisheries Service.

Commercial Fisheries

The Southeastern salmon hand troll fishery will present a special challenge to fishery managers in 1979 due to the rapid increase in participants and related harvest capability. Managers may have to severely restrict fishing time to secure adequate coho and chinook escapements unless limited entry is applied and effectively reduces the effort to manageable levels. The Board of Fisheries will be completing consideration of this problem at a special meeting in January.

Cook Inlet fisheries were managed in 1978 according to Board policy directing that runs entering the Inlet prior to June 30 and after August 15 be managed primarily for recreational fisheries. For many sport and commercial fishermen, however, this decision did not solve the pborlem of their competing interests. Accordingly, a special hearing on Cook Inlet was held in Anchorage on November 11, 1978, and proposals for management change were considered at the Board of Fisheries' December meeting. The Board ruled to allow sportsmen to harvest a majority of early run Susitna River king salmon and late run Kenai River coho and made appropriate changes in commercial fishing regulations in the area. It does not seem possible to fulfill all the demands of all user groups in the Cook Inlet area, but hopefully the new regulations are an adequate compromise.

The U.S.A. and Canada have been meeting for many years in attempts to resolve salmon interception problems. Now that extended jurisdiction legislation has been passed by both countries, pressures to formally settle the salmon interception issues have intensified. A fairly complete draft treaty was prepared at the September negotiations in Seattle and further progress toward agreement was made at negotiations in Vancouver in December. Special problems being considered in detail include those associated with salmon spawning in Canadian portions of transboundary rivers, such as the Yukon, Alsek, Taku and Stikine, and with 'high seas' rearing areas for mixed salmon stocks. The Department will continue to participate in these negotiations, attempting as best it can to protect the fishing rights of Alaskans.

It is probable that the present U.S.A. - Canada halibut treaty will expire April 1, 1979. Bilaterial comprehensive non-salmon talks are not making much progress. The North Pacific Fisheries Management Council and the State Board of Fisheries are moving to implement regulations covering this fishery for 1979, including the abolishment of the Canadian harvest of halibut in U.S.A. waters. Legislation is being introduced into the Congress to fund transfer of the International Pacific Halibut Council staff and research functions to the National Marine Fisheries Service, and this action should be supported by the State. *

Sport Fisheries

Rupert E. Andrews, Director

The Sport Fisheries Division is responsible for managing and developing Alaska's vast sport fish resource. Based on current growth trends, the number of people of all ages who sport fish in our State will increase from 234,000 in 1978 to approximately 627,000 by 1990. To meet the challenge of providing good fishing experiences for increasing numbers of fishermen, the Sport Fish Division has selected the following goals: (a) to maintain the present level of natural sport fishery resources, (b) to enhance sport fishing opportunities to satisfy present and future angler demands, and (c) to promote and maintain an economically viable sport fishery industry.

Consistent with these goals, the Division conducts investigations throughout the State to insure that adequate habitat is maintained and managed; that potential fishery areas, as yet either underutilized or unutilized are evaluated; and that life requirements of sport fish are sufficiently understood to insure their protection. In addition, areas are studied to assess their potential for rehabilitation, which includes techniques in undesirable fish species removal, restocking from hatchery stocks, and altering the aquatic environment to better facilitate fish production.

Using the latest techniques, equipment, information, computer systems and technology, the Sport Fish Division's administrators, managers and biologists integrate the many facets of the statewide program to fulfill the needs of the fishing public. The Division works with other groups such as private landowners for access easements, and loggers and other developers to help preserve sport fishing areas from adverse impacts.

MANAGEMENT

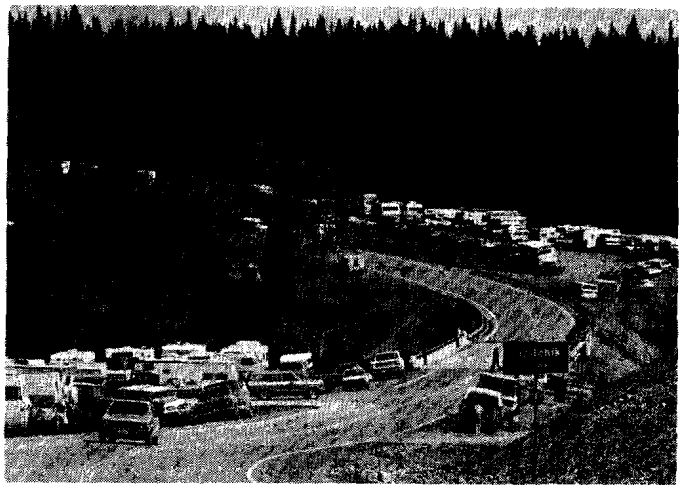
Sport fish management involves a multifacted approach to provide a well-regulated harvest of desirable fish to the recreational angler. The basis of this program is the identification of needed information in order to: determine the availability of fish; determine the quantity of fish that can be harvested and the need for supplemental stocking or production of desirable fish species; provide for a reasonable distribution of catch so anglers with varying skills can participate in this harvest; and insure that the people of the State have reasonable access to these resources. Management therefore provides, among other things, the identification of needed research investigation programs to provide the data management requires to control the harvest and establish the necessary protection of the wide range of recreational fisheries in Alaska.

Because many of Alaska's waters and specific stocks are being fished at or close to capacity levels, the task of managing the sport fisheries is complex. Recreational angling effort in the State has been increasing at an average rate of 8-10 percent annually. In 1977, 201,058 licensed and unlicensed anglers spent 1,197,600 man-days of effort to harvest in excess of 2,300,300 fish of all species. Through active staff participation in sportsmen organization meetings, local Chamber of Commerce meetings, local advisory committee meetings, and appearances at local special interest organizations, the Division maintains a close awareness of the desires of the general public and user groups in management of the recreational fisheries.

Perhaps the best example of this participation is the Division's special Statewide Sport Fish Harvest Survey and the public's response to it. Eighty percent of those surveyed responded (8,302 out of 10,388), perhaps one of the highest response rates ever accounted in this type of survey. Conservative estimates based on past economic surveys indicate that the recreational fishery effort is presently worth in excess of $100 million to Alaska's various communities and businesses.

Public Access

Public access is one of the most important and critical elements of the nonbiological activities associated with the management of the recreational fishery resource. Without access to fish and wildlife resources, little public use can take place. In a state like Alaska,



Weekend fishing crowd on the Ninilchik River.

Anglers line the banks of the Russian River during the 1978 fall sockeye run. Photos by M. Rush

such a statement and concern might appear ludicrous, yet loss of access is occurring and further loss is imminent through the increase of private land holdings. As more public lands become private, Alaskans will not be able to fish wherever they wish without restrictions. The Sport Fish Division has pursued an active public access policy. Access is being purchased for the public on many high-use recreational waters. The most recent purchase has been a site on the Funny River at the confluence of the Kenai River. This 14-acre site will provide angler access to the upper 16 miles of the Kenai River where over 200,000 man-days of angler effort will occur. The Division is continuing to identify, and where appropriate, select for withdrawal and purchase other key sites for angler access.

Land Use Studies

Alaska is in a stage of rapid industrial and municipal development. Industry within the State is expanding while major oil, gas and other petrochemical exploration continues to increase. Additional pipelines are under consideration or development and continue to require impact evaluation. Population is growing and municipalities are all experiencing housing and residential developments in many areas. All these activities, including timber removal, can have adverse impacts on the habitat of our native fish species. Careful management can often minimize these effects.

On-going research on logging's effects on fish habitat indicated the continuing need for improved techniques preventing siltation of fish over-wintering areas. Additional information is being gathered to evaluate the long-term effects of forest canopy removal on the aquatic ecology. Canopy removal affects the winter water temperature and thus summer food production of these rearing streams, resulting in adverse and subtle changes in the habitat for rearing salmonids.

Work is continuing on the inventory and cataloging of the State's waters. Effort this year again centered on the North Slope, specifically with the PET-4 reserve; the upper headwaters of the Bristol Bay drainages; the off-road lake systems in upper Cook Inlet; and fly-in systems in Southeastern. In all of these areas, data collected will provide baseline parameters before extensive development or angler use increases to disturb existing ecological conditions.

Fish Stocking

Surveys of the State's anglers indicate that approximately 73 percent of them fish fresh waters (lakes and streams). Though much of the effort in coastal and near-coastal areas provides a substantial anadromous salmon harvest, landlocked lakes and interior streams yield a major harvest of trout, char, pike and grayling. Near the population centers, stocked landlocked lakes provide substantial 'trout' harvests, reducing the pressure on wild stocks.

Ever-increasing pressure on the sport fisheries near urban areas dictates expansion of supplemental fish production. The Division stocks more than 100 lakes each year, depending on availability of fish from Department hatcheries. Prime species for lake stocking are rainbow trout, coho salmon and grayling. Experimental stocking of other species such as sheefish and king salmon is being conducted. An aggressive lake rehabilitation program is necessary to maintain fish stocks adequate to meet existing and immediate future demands. In almost all instances such rehabilitation requires chemical treatment of these landlocked waters to eradicate undesirable species prior to introduction of acceptable sport fish. A major companion

program to the fish stocking effort is the lake productivity studies being conducted in Upper Cook Inlet and Southeastern. The purpose of these investigations is to evaluate stock suitability and stocking ratios for planted lakes.

The value and fish returns of stocked lakes provide a fishery level that cannot be maintained with existing 'wild' stocks. This program is perhaps the most visible and yet least recognized effort of the Division. For example, anglers at Resurrection Bay harvested 15,550 coho salmon this year during 22,300 man-days of effort. An estimated 5,449 marked coho were from the Division's supplemental stocking program, thus contributing 34 percent of the sport coho harvest in this area.

RESEARCH

Stream and Lake Investigations

Inventorying and cataloging the fish in Alaska's 12 million acres of fresh water continued during 1978. Streams, rivers and lakes throughout the State were systematically studied to determine species present and their abundance. Additional information on the chemical, physical and biological conditions in selected freshwater bodies was collected to supplement and help explain the fisheries data. Factors such as available food, spawning areas, flow rates, overwintering areas, and water chemistry all function to either limit or enhance the fishery. All this information contributes to management decisions for such diverse problems as recreation potential, possible rehabilitation, water allocation, improved access for sport fishermen and determination of catch limits necessary to conserve resident stocks.

Enhanced management of lakes and streams sometimes requires supplemental stocking with existing, or previously existing fish species. However, modern fisheries biology has provided several strains of a given species from which to choose. Growth rates of the various strains have been, and continue to be researched and compared with growth rates of resident populations. These investigations are designed to provide the best suited species, in terms of growth, for each of the managed areas. Comparisons have been made with rainbow trout, coho salmon, and Arctic grayling.

Life History Studies

Sport Fish Division biologists also studied life histories of important fish species throughout the State. Attempts were made to spawn, hatch and rear sheefish in an effort to expand this species to areas where they have not been previously available. Habitats have been more clearly defined for life stages of cutthroat and steelhead trout, chinook salmon and several whitefish species. Arctic char studies continue in streams of the Nome area and in the Kivaline-Wuklik rivers of northwest Alaska. These studies identify key factors in fish reproduction and survival and provide information essential for proper habitat protection, lake stocking, hatchery rearing programs and many other aspects of management.

Land Use Studies

Land use studies provide detailed information about the effects of various types of development upon fish habitat. In Southeastern Alaska a considerable amount of effort was expended, in conjunction with other State, Federal and private groups, to identify the resource values of lands within the Tongass National Forest so that reasonable land management policies and land use designations can be established. Additional land use studies included: the effects of logging slash removal on the rearing fish environment, the value of small spring-fed streams to overwinter survival, the effects of forest canopy removal on the rearing environment during the winter, and preliminary data base studies related to proposed open pit mining.

In the Interior, monitoring of the Chena River Flood Control Project continued throughout the year. The 250 acre lake created by the project will be studied to determine sport fishing potential. Industrial activity on the North Slope is continuing at a rapid pace and the Sport Fish Division is observing these activities and reviewing permit requests where fishery values are concerned. A comprehensive land use planning study is also underway in the Delta Junction area. The Division is identifying and monitoring sport fish waters in the area to protect environmental quality and access.

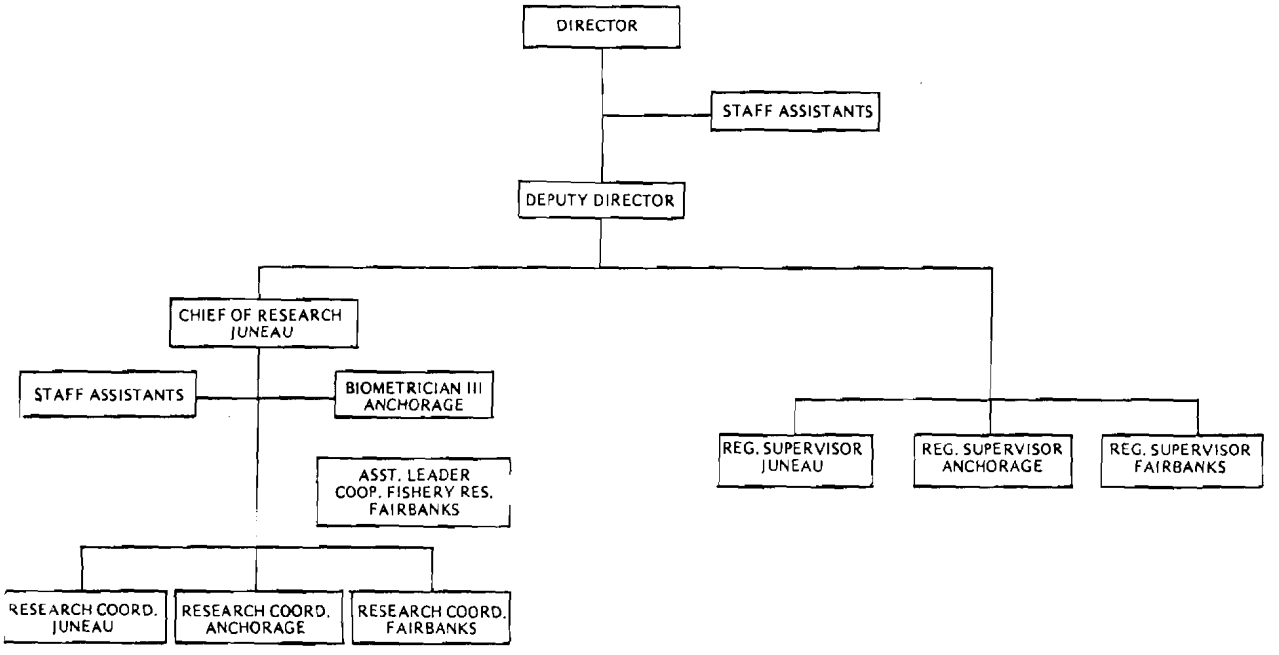
Harvest Studies

Harvest studies were conducted primarily in the heavily fished areas of the State. Using standard creel census methods and, in some cases specifically designed censuses, statistics are used to evaluate the fishery, predict success rates, and protect the fishery from over-utilization. Comparisons with data obtained during previous years allow the statistics to be refined and the predictions to become more accurate. Harvest studies provide an excellent opportunity for conversation with Alaska's anglers and discussing the management-research of the sport fish resource with them.

LOOKING AHEAD

The total number of anglers utilizing Alaska's fishery resources will continue to increase, adding to an already heavily burdened staff work load. Constant and intensive monitoring by divisional staff biologists is required to prevent long term adverse impacts to

DIVISION OF SPORT FISHERIES
ORGANIZATION CHART
59 PERMANENT EMPLOYEES



stock levels. Monitoring programs are inherently manpower oriented, accounting for extraordinary program costs. Southcentral Alaska marine and fresh waters will continue to experience the most significant impacts due to increased population trends.

Adequate funding for divisional programs will be the major problem. The two sources of funding (license fees and matching Federal aid programs) available to the Sport Fish Division will experience an estimated $615 thousand program short fall. With this expectation, the Division will reduce and eliminate a number of programs and services to the public, including the closing of several field offices in southcentral and southeastern with the transfer of staff to central offices.

Salmon allocation problems will continue between the commercial and recreational user groups, with Southeastern Alaska and Juneau identified as the most significant problem area. The Juneau sport troll fishery is the terminal fishery for several coho stocks and chinook bound for the Taku and Chilkat systems. Hand troll and power troll fisheries harvest these same stocks; in the migratory routes leading to the Juneau area and in the terminal fishing areas both commercial fisheries are in competition with the recreational troll fishery. Declining coho and chinook stocks in the Juneau area, evidenced by catch per unit of effort and other harvest studies, are viewed by staff biologists with alarm especially because of increasing numbers of sport and commercial trollers.

With implementation of the Cook Inlet Salmon Management Plan, adopted by the Board of Fisheries, it is expected that problems of salmon allocation between commercial and sport fishing user groups in this area will tend to stabilize. This will take several years, but the tool for this allocation problem is operational.

The Division's trout stocking program is failing because of technical and biological problems beyond staff control. Difficulties encountered in this Department's hatcheries, in disease control and in rearing adequate numbers of trout for release are being resolved with new facilities and fish cultural practices. However, the outlook for the 1979 lake stocking program appears pessimistic.

Recreational fishing in Alaska is a multi-million dollar industry, employing hundreds of Alaskans on a seasonal basis. This service-oriented industry is growing annually and is a primary industry in rural areas. To assist this industry, the Sport Fish Division, in cooperation with the Division of Tourism, will compile and publish a list of sport fishing lodges and individual services provided throughout the State.*

Game

Ronald J. Somerville, Director

The Division of Game is responsible for the protection and management of all the bird and mammal resources of Alaska. It is the Division's goal to maintain and enhance these resources while providing for their appropriate beneficial human use. Game Division activities break down into three major functions: Management, Hunter Safety, and Investigations.

Management activities include some law enforcement but mainly involve planning and meeting with other agencies and the public to ensure wildlife and its habitat receive adequate protection from human activities. Managers work closely with Alaskan citizens to resolve wildlife-related conflicts and to determine the proper and most beneficial allocation of wildlife resources. In addition, they attempt to keep the public informed on wildlife and wildlife associated matters.

The Division's Hunter Safety program is designed to enhance public enjoyment of wildlife resource and to ensure that activities such as hunting and shooting are accomplished safely.

Investigations are those activities which provide the information base needed for beneficial resource management. Because wildlife populations are dynamic, that is, their numbers and ecological relationships are subject to constant change, it is necessary to monitor their status and the status of their habitat regularly. More or less routine surveys and inventories determine the current health of these populations and provide the basis for determining allowable harvests of hunted species. More intensive investigations, or research, provide necessary basic information on biological needs of a species, measure the impact of man's activities on a species, or contribute to development of improved techniques for use in management.

Management

In order to insure statewide balance in wildlife management and protection and at the same time maintain an understanding of local citizens' needs, the Game Division has placed Area Management Biologists in most major communities of the State. These Area Biologists, supported by Regional staffs in Nome, Fairbanks, Anchorage and Juneau, gather up-to-date information on game populations and their habitats for use in allocating harvests; they also maintain close liaison with the citizens residing within these areas. All of this information is essential to understanding the wildlife resource and the people who wish to use it. During 1978, newly established Area Biologists in Kotzebue, Bethel and Galena were able to work closely with area residents. Because many of these citizens depend solely or largely upon fish and wildlife resources for their livelihood, development of Game Division services and programs in these communities will do much to ensure that citizens' needs are met and that the Game Division will have a better understanding of local game populations.

Although the Federal Government had not as yet relinquished control of most marine mammals to the State by year's end, the Division made major strides toward more effective management of walruses during 1978. Managers implemented a new walrus ivory sealing program which will provide an accurate assessment of walrus harvest yet keep the Division out of regulating commerce of raw ivory. Annual harvest quotas (2300 walruses in 1978) will mainatain harvests at a level commensurate with optimal sustainable walrus numbers. The comprehensive rehabilitation plan for the western arctic caribou herd continued through 1978. A new permit system, governing the harvest of males only from this herd, was implemented through which permits were made more readily available to villagers throughout the herd's range. Very considerable effort was committed to gaining better overall compliance with new, more restrictive hunting regulations for this herd. By year's end these regulations, plus excellent cooperation from the people in this area, resulted in major increases in herd size. Surveys during 1978 suggested that the herd numbers about 100,000 animals, up from the low of 65-75,000 in 1976.

The moose management program in Unit 20A continued in 1978 with Division personnel removing 39

wolves from this area (Tanana Flats) during the 1977-78 winter. Wolf carcass necropsy indicated high productivity in this wolf population necessitating the removal of additional wolves in winter 1978-79 to ensure sustained depression of wolf numbers. Spring 1978 moose surveys in Unit 20A revealed good overwinter calf survival, and total moose numbers in this Unit continued the upward trend existing since this program began. Pelts from the 39 wolves were sold at a well-received public auction in Fairbanks, and proceeds from the sale were returned to the program to reduce its overall cost.

In 1973 the Game Division initiated a limited permit system for persons desiring to photograph the concentration of brown bears fishing for salmon at the McNeil River State Game Sanctuary. Experience of subsequent years has reinforced the wisdom of this decision as human pressure on the Sanctuary has increased each year, reaching 134 visitors in 1978. Thanks to the strictly regulated permit system, much of this increased pressure has been accommodated without adverse impacts upon bear numbers or behavior or injuries to visitors. Management of the McNeil River Sanctuary is an excellent example of the Division's efforts to meet increasing demands for nonconsumptive wildlife use areas through implementation of biologically sound management policies and regulations.

In Southeastern Alaska the single, most time-consuming management activity for the Game Division was the establishment of wildlife values throughout the Tongass National Forest and ranking these concerns in relation to all other forest values for the purpose of U.S. Forest Service planning in this area. Division biologists, serving on a Forest Service Interdisciplinary Team, helped make forest management recommendations which would duly consider all resource values, including wildlife. Later they drafted a Department position on the Forest Service Tongass Land Management Plan and worked closely with the Department of Natural Resources to establish a State position on the Tongass Plan. Other Forest Service related activities included evaluating proposed timber sales for the 5-year period, 1981-86.

Public comments on the Division's Draft Proposal for a Statewide Wildlife Management Plan were solicited, analyzed and summarized in 1978. The goal of these plans is to establish priorities for the various types of human interaction with wildlife. These priorities are designed to vary from area to area and from species to species in an attempt to assure that adequate provision is made for the complete spectrum of possible human uses of Alaska's wildlife resources. It is expected that additional modifications of the preliminary plans will be required to meet this year's legislative mandate giving subsistence users the highest priority in utilization of wildlife. Modification will also be necessary in order to adjust management goals to correspond with Federal guidelines on (d)(2) lands. A final draft of the Management Plans will be published once these modifications are completed.

Banding a trumpeter swan in migratory waterfowl studies at Copper River Delta. ADF&G photo

In 1978 the second volume of *Alaska's Wildlife and Habitat* was published. Volume I, published in 1973, provides life history and distributional information on big game, marine mammals, waterfowl and seabirds as well as information on Alaskan physiography and

accounts of the individual Game Management Units. Volume II deals with furbearers, small game, upland game birds, selected raptors, and additional seabirds. Both books are available for purchase and may be found in libraries throughout Alaska. They provide Alaskans with easily understandable and up-to-date information on the State's wildlife.

Outbreaks of a viral pox disease (ovine contagious ecthyma) in captive muskoxen in 1976 and 1977 and in an experimental flock of Dall sheep in 1977 led to a major controversy in 1978. Concern over the possibility that the sometimes-lethal disease might spread to highly-susceptible wild sheep populations prompted formation of a special committee to investigate the likelihood of further disease problems with wild animals. Division personnel collected blood specimens from dozens of wild and domestic Dall sheep and domestic goats to determine the presence of the disease in existing populations. Substantial evidence that the disease was already present in at least two wild Dall sheep populations was obtained, and it now appears that the initial outbreak on the University Muskox Farm in 1976 was derived from infected domestic sheep and goats kept on an adjacent farm. Considering that domestic sheep and goats were present in the Yukon Valley in the late 1890's and along the coast as early as the late 1700's, it seems very likely that contagious ecthyma was introduced into wild sheep populations many years ago and that they now have a natural resistance to it. There was no further outbreak of the disease in 1978 in the captive muskox or Dall sheep herds.

Cooperative Federal-State efforts to restore populations of the endangered Aleutian Canada goose continued in 1978. Hopefully eradication of foxes on several islands followed by transplants of hand reared geese will expand present nesting populations of this unique subspecies. Development of federal refuges and curtailment of goose hunting on Californian wintering areas are other elements of this recovery program.

Hunter Safety

During 1978 the Division's Hunter Safety Training Program expanded its efforts into rural portions of the State. Volunteer instructors, under the guidance of the Division Hunter Safety Officer, provided 1450 students the training fundamentals designed to make them safer, more knowledgeable hunters and shooters. Assitance was provided in Soldotna, Homer and Glennallen to establish functional outdoor shooting ranges for use in Hunter Safety Training classes and for recreational shooting. Funding and assistance also was provided for the development of an indoor, small bore range in the North Pole High School.

Investigations

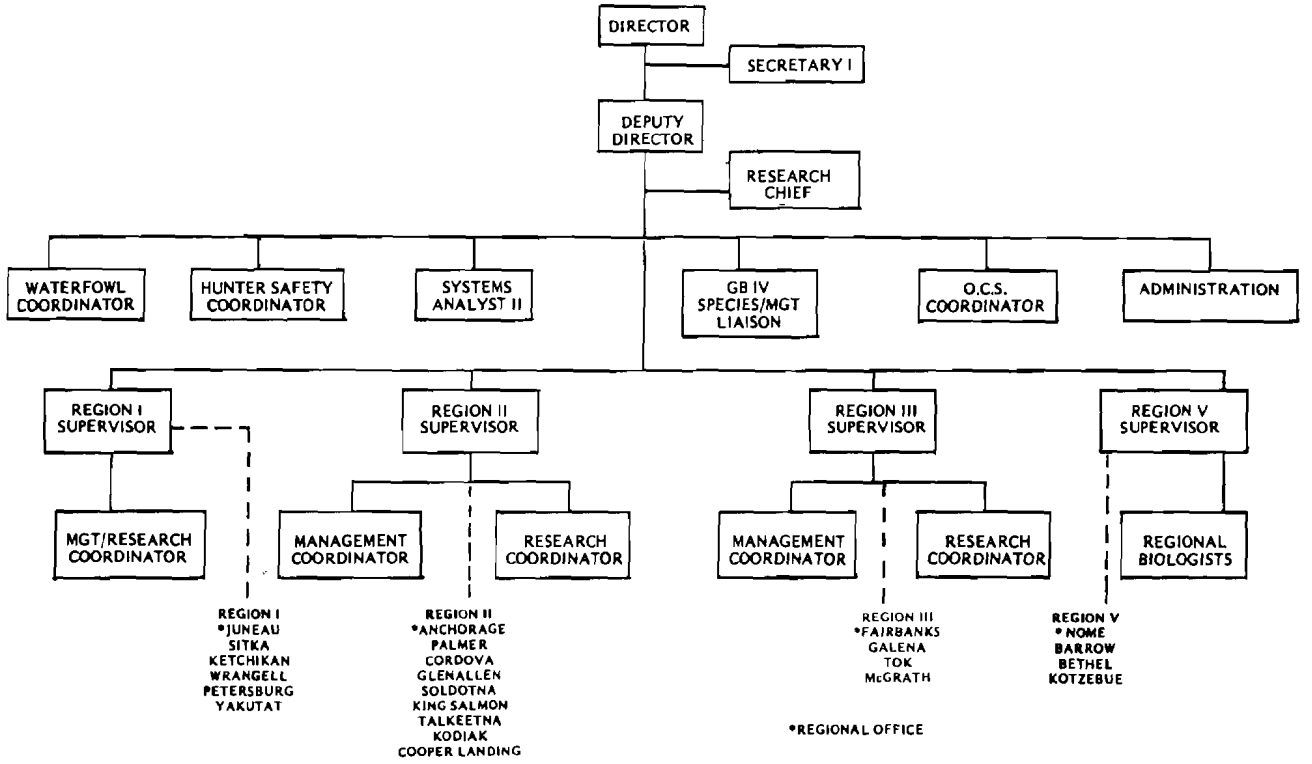
Routine and continuing survey and inventory activities aimed at monitoring the status of game populations were expanded to some extent in 1978. With staffing of a new area office at Galena, moose surveys were initiated in many new areas in the Koyukuk and Nowitna River drainages. Moose survey activities in 1978 also include some new areas in the upper Yukon Valley. According to local residents calf survival has been good there but yearlings are scarce. Surveys the next two years in these same areas will provide better trend data upon which to manage these moose populations. Caribou surveys were also accomplished in the Ray Mountains and Kokrines Hills.

Grouse and ptarmigan were abundant in most portions of Alaska during fall 1978, particularly in the Interior and Southcentral regions. During 1978 a program to monitor small game hunting pressure was initiated on several popular hunting areas in the interior. Information obtained from this relatively minor program, in conjunction with that from existing annual grouse and ptarmigan surveys, will forewarn the staff of any situations requiring corrective regulations and will enable staff biologists to provide useful support to prospective small game hunters, viewers and photographers.

A diversity of research activities was maintained throughout 1978. Much-needed studies in Southeastern on deer/logging relationships were initiated in cooperation with the Forestry Sciences Laboratory of the U.S. Forest Service. Deer use of logged and unlogged areas was compared in clearcut areas 1-147 years old and adjacent old-growth forest. Summer and winter use of clearcuts by deer averaged one-sixth that of the use of old-growth forests. The Division, in cooperation with the U.S. Forest Service, sponsored a black-tailed deer conference at Juneau in February, 1978. This meeting brought together experts on deer ecology from California, Oregon, Washington, British Columbia and Alaska. Proceedings will be published early in 1979.

Research activities in Southcentral Alaska focus on the effects of predation upon moose populations. Studies of radio-collared wolf packs continued and intensive investigations of bear predation on moose calves were completed. In the Nelchina Basin, 24 brown bears, 1 wolf and 75 moose calves were equipped with radio collars and on the Kenai Peninsula 16 black bears, 4 brown bears and 42 moose calves were similarly equipped. The specially designed radio transmitters placed on calf moose indicate when the animal has been killed by a predator and allow Department biologists to locate the animal to determine the cause of death. By tracking radio-collared

DIVISION OF GAME
ORGANIZATION CHART
106 PERMANENT EMPLOYEES



bears from the air, individual kill sites can be located and predation attributed to individual bears.

Other studies conducted in Southcentral included moose-range relationships on the Kenai Peninsula, development of improved techniques for counting and classifying mountain goats, and the distribution and movements of black bears in western Prince William Sound. The latter study is designed to determine whether glaciers and fjords in the region act as barriers to black bear movements. If they do, managers must recognize the existence of discrete populations which can easily be overhunted in areas readily accessible to hunters. At the Walrus Islands State Game Refuge in Bristol Bay, cooperative studies with the U.S. Fish and Wildlife Service were initiated, and several walruses were fitted with radio transmitters. These studies are designed to reveal what happens to walruses that are disturbed by humans so that regulations can be written which minimize human impacts on this famous walrus population.

In the Arctic, baseline research was conducted to provide information necessary to avoid adverse impact of oil development on grizzly bears in National Petroleum Reserve-Alaska (NPR-A). These studies revealed that although bear densities are generally low on the North Slope, the population in the vicinity of the calving grounds of the western arctic caribou herd is much higher. Within this area, 83 grizzlies were captured for age and sex determination; 27 of these bears were fitted with radio transmitters so that their movements, home range size, habitat requirements and denning site preferences could be determined. Wolves and wolverines were also studied in NPR-A. Seventeen wolves in three packs were radio-collared and subsequent monitoring showed that two of these packs abandoned their summer range in NPR-A in early winter and moved south to areas where caribou overwintered. Both packs returned to NPR-A summer ranges in the spring. These studies have demonstrated that caribou are the primary prey of wolves in NPR-A. Ten wolverines were radio-collared in early 1978 and their movements and food habits are being studied.

During 1978 Game Division marine mammal researchers continued and expanded biological and ecological studies of ringed, bearded, spotted and ribbon seals, sea lions and beluga whales. These studies, funded by the Federal Government as part of the national Outer Contintental Shelf (OCS) program are designed to provide information necessary for the exploitation of offshore oil and gas reserves. Productivity, natural mortality, abundance, distribution, movements, habitat selection, food dependencies and interactions among the various species are being researched. Satellite imagery (LANDSAT and NOAA) is being used in habitat studies. This research involved cooperating with investigators from the University of Alaska, the National Marine Fisheries Service and several agencies in the Soviet Union.

Finally, Division waterfowl managers, faced with Federal demands to implement steel-shot-only regulations

in the Upper Cook Inlet, completed studies in 1978 designed to determine the effect of lead shot ingestion by waterfowl in Alaska. Specimens from over 500 ducks were collected in this area and samples are being chemically analyzed to assess the relationship between tissue lead accumulations and shot ingestion rates.

Biologists tattooing lip of brown bear near Glenallen.
Photo by Russ Dixon

Looking Ahead

As Alaska's human population increases and development of the State's nonrenewable resource proceeds, ever increasing demands will be placed upon the Game Division to maintain Alaska's wildlife and its habitat. From 1960 until now, Division programs have been almost totally self supporting—that is, they have been funded by hunting license revenues and Federal Pittman-Robertson (Federal Aid in Wildlife Restoration) funds. Until now, funds from these two sources have been adequate, but if the Division's programs are to be maintained even at minimally acceptable levels an additional source of funds must be found.

Needless to say, resource management specialists and many concerned citizens feel strongly that at this time in Alaska's history it is imperative that the State maintain a very strong and active wildlife management program. The Division must possess the best information possible in order to manage and protect our wildlife resources for future generations, it must maintain and improve upon existing programs to more adequately meet the recreational and subisistence needs of our citizens, and it must continue to gather new information on its wildlife resources so needed industrial development can proceed in the face of strict federal environmental laws.

The Game Division's present financial problems are not unique; nearly every conservation agency in the country has been severely impacted by shortages of funds since 1975. Most are faced with the same problems: inflation which reduces the relative value of existing funds, steadily increasing numbers of wildlife resource users, and more complex environmental laws which place a greater burden upon these agencies to supply definitive information on a state's fish and wildlife resources. Several states have responded to these problems by enacting legislation through which those who don't hunt or purchase firearms and ammunition (and thereby help support conservation programs financially) can or must help fund these programs. In other states, legislatures have appropriated monies for conservation purposes direct from general tax revenues.

1979 will be a landmark year for the Game Division in Alaska. Either additional funding sources beyond hunting license revenues and P-R funds will be tapped and very necessary programs thereby maintained, or Divisional programs will be sharply curtailed. It is no longer possible for the Division to fulfill its responsibilities to the people of the State and Alaska's wildlife resources using existing revenue sources alone. Only the future can tell if Alaskans, their legislature and the State Administration will be financially responsive to the priceless and irreplaceable wildlife species of this great State.

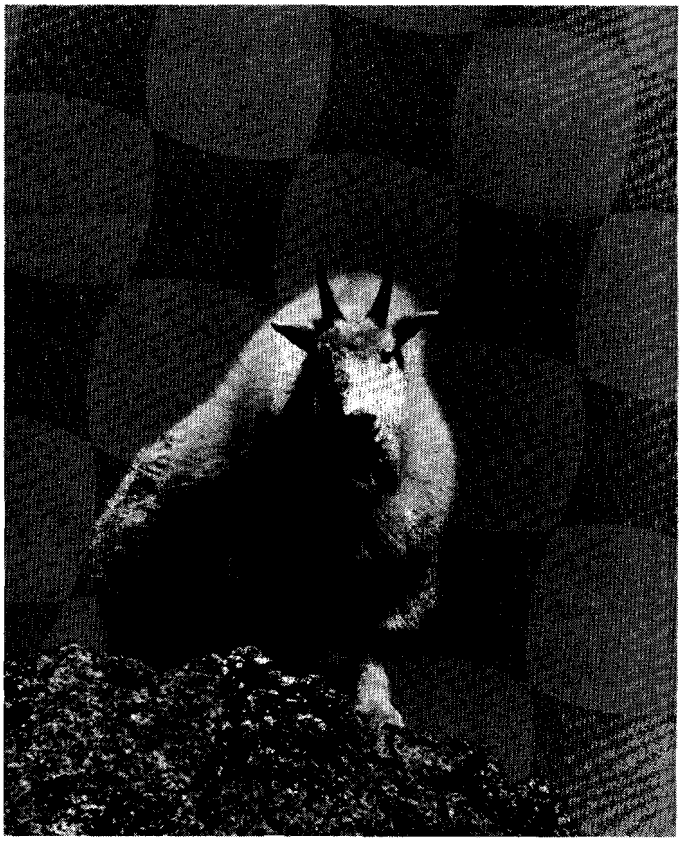


Photo by Irene Vandermolen

Appendix

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PERMIT & PROJECT REVIEWS
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STATE	
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ADEC Waste Discharge	86
Miscellaneous Land Use Permits	211
Highway Plans	52
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Tideland	66
Timber Sales	32
Miscellaneous	132
Total	1,910

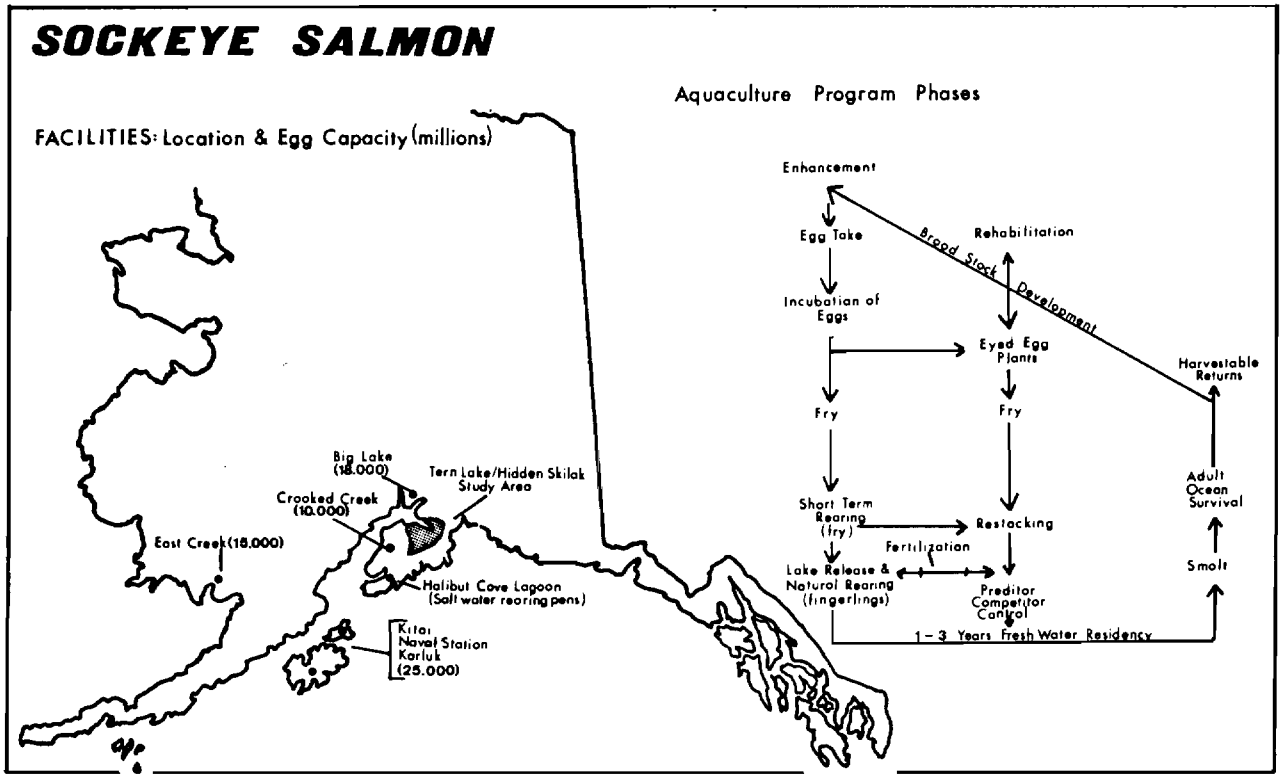
FEDERAL	
Corps of Engineers	257
USGS	49
USCG	6
BLM	37
EPA Discharge	24
EIS	12
Miscellaneous	26
Total	411

TOTAL STATE/FEDERAL 2,321

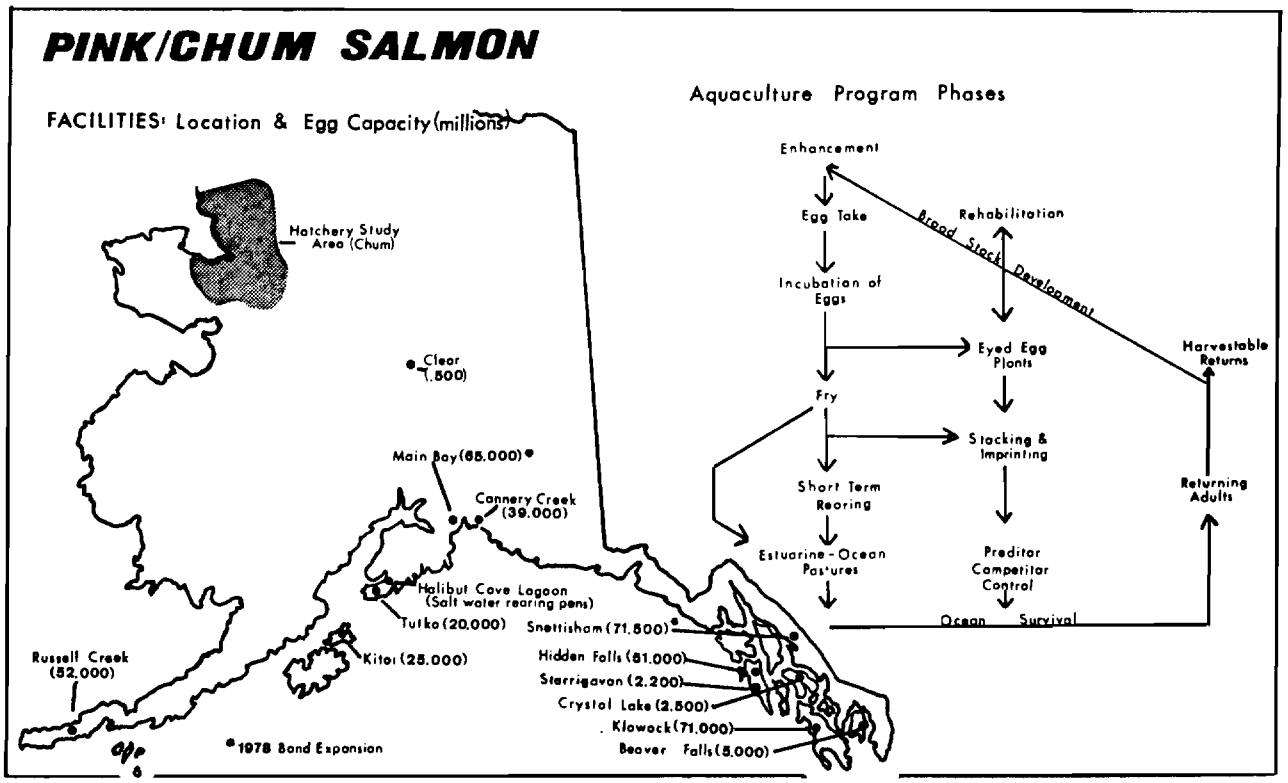
F.R.E.D.

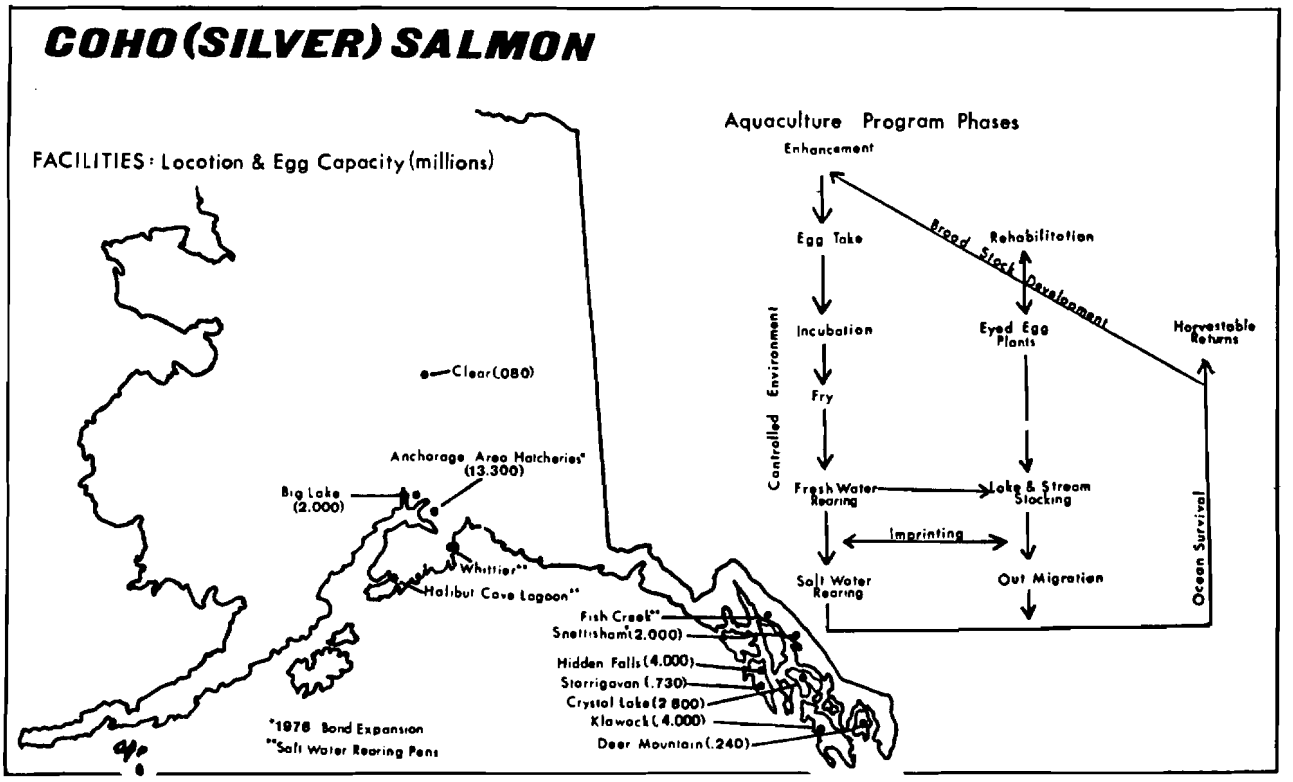
FACILITIES BY SALMON SPECIES

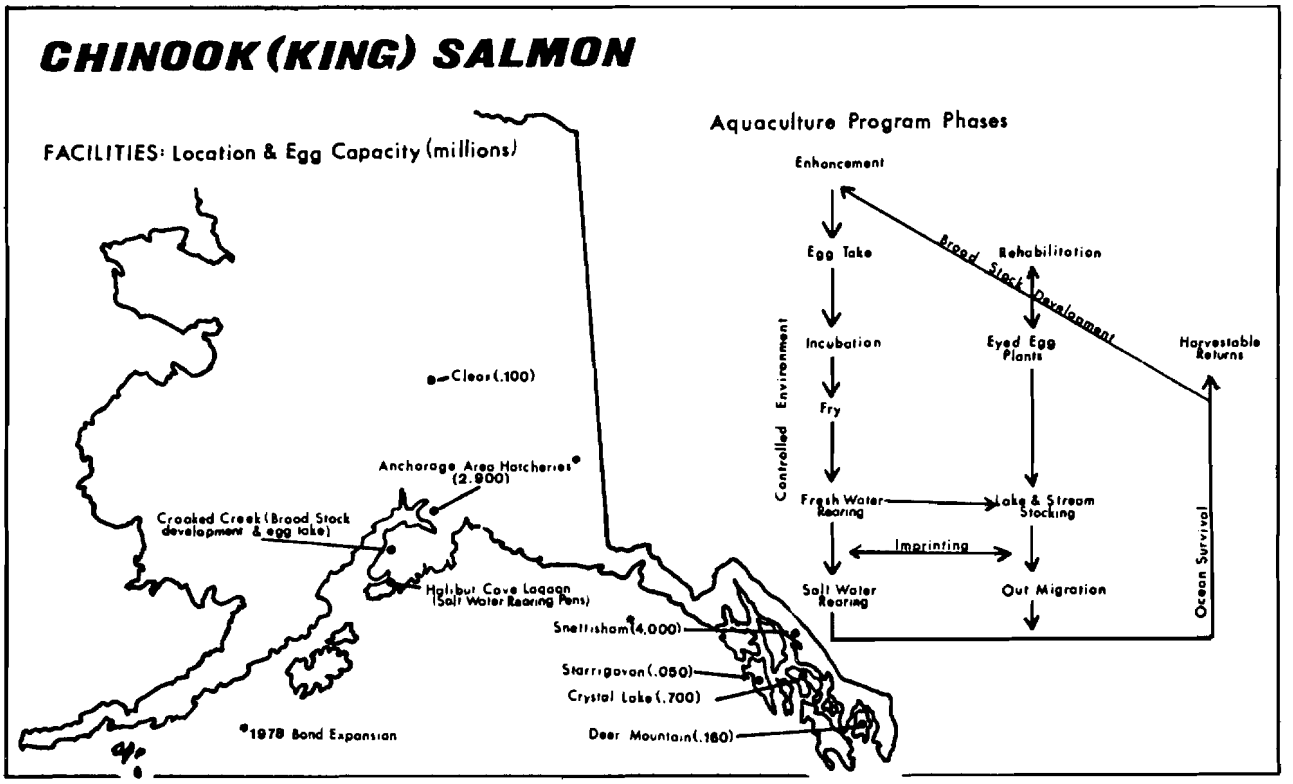
SOCKEYE SALMON



PINK/CHUM SALMON




COHO (SILVER) SALMON
FACILITIES: Locotion & Egg Capacity (millions)
Clear (.080)
Anchorage Area Hatcheries* (13.300)
Big Lake (2.000)
Whittier**
Halibut Cove Lagoon**
Fish Creek**
Snettisham (2.000)
Hidden Falls (4.000)
Starrigavan (.730)
Crystal Lake (2.800)
Klawock (.4.000)
Deer Mountain (.240)
*1978 Bond Expansion
**Salt Water Rearing Pens
Aquaculture Program Phases
Enhancement
Egg Take
Rehabilitation
Broad Stock Development
Incubation
Eyed Egg Plants
Harvestable Returns
Fry
Controlled Environment
Fresh Water Rearing
Lake & Stream Stocking
Imprinting
Salt Water Rearing
Out Migration
Ocean Survival


CHINOOK (KING) SALMON
FACILITIES: Location & Egg Capacity (millions)
Clear (.100)
Anchorage Area Hatcheries* (2.900)
Crooked Creek (Brood Stock development & egg take)
Halibut Cove Lagoon (Salt Water Rearing Pens)
Snettisham (4.000)
Starrigavan (.050)
Crystal Lake (.700)
Deer Mountain (.160)
*1978 Bond Expansion
Aquaculture Program Phases
Enhancement
Egg Take
Rehabilitation
Broad Stock Development
Incubation
Eyed Egg Plants
Harvestable Returns
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Controlled Environment
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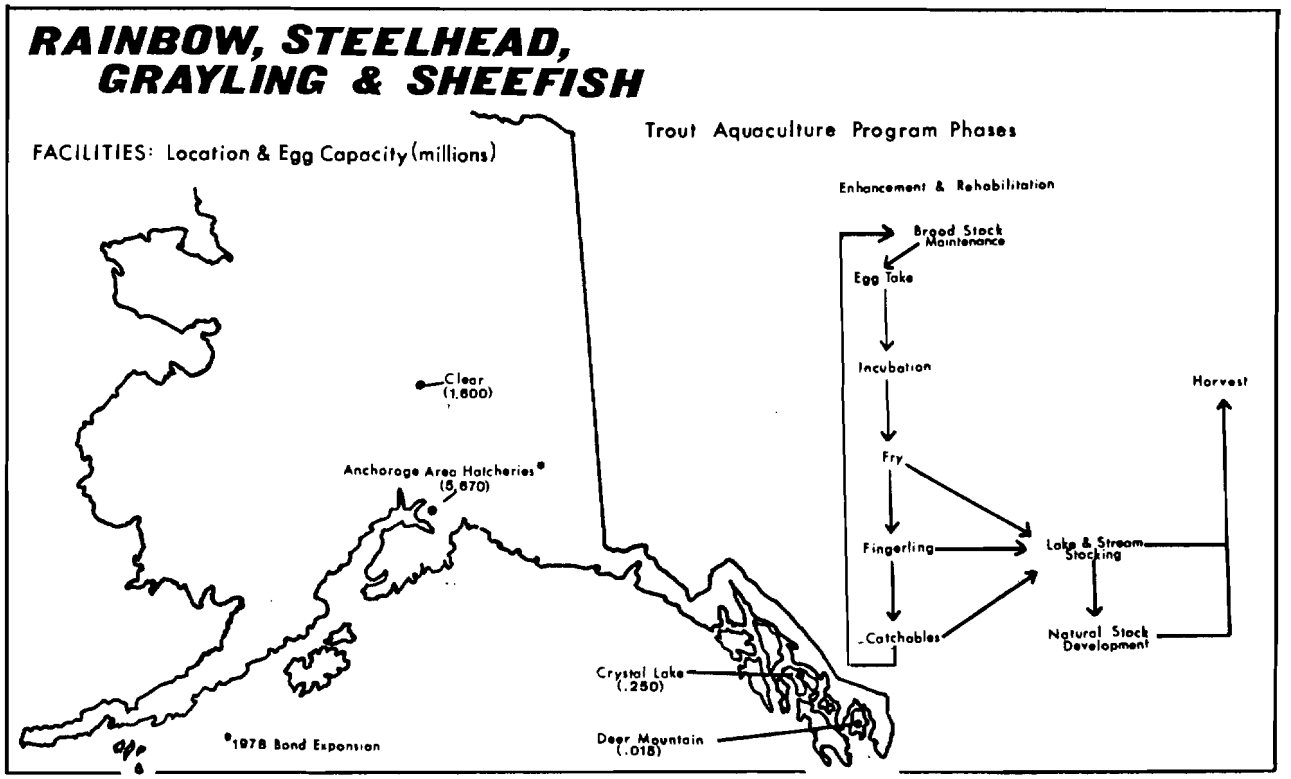

TABLE 1

FISHERIES REHABILITATION, ENHANCEMENT AND DEVELOPMENT FACILITIES

(1978 Releases)

FACILITY	LOCATION	SPECIES	77 BY EGG TAKE (Millions)	77 BY RELEASES	78 BY EGG TAKE (Millions)	DESIGN EGG CAPACITY (Millions)	PROJECTED ADULT RETURNS OPERATING AT DESIGN CAPACITY
Anch. Area Hatch.	Cook Inlet	Chinook	1.240	788,524	1.300	2.2	24,000
*(Fire Lake, Ft.		Coho	2.560	1,423,566	2.200	2.2	420,000
Rich., & Elmend.)		RBT/	1.495	244,136	3.500	4.5	100,000 catch
		Grayling		400,976 (1978BY)	2.000	2.0	+2.5 million
		Sheefish		24,747	.369	2.0	rainbow finger.
Beaver Falls (R&D)	Southeast	Chum	4.919	2,435,104	5.405	5.0	77,000
Big Lake	Central	Coho	.600	368,419	.725	2.0	30,000
		Sockeye	12.190	8,142,465	10,800	18.0	300,000
Cannery Creek	PWS	Chum			3.924	39.0	600,000
		Coho				.303	
Clear	AYK	Chinook			.100		
		Coho			.080		
		Chum	.100	55,000	.500		
		RBT/					
		Sheefish					
		Grayling					
Crooked Creek/	Kenai Pen.	Sockeye	.860		9.770	10.0	200,000
Kasilof		King		150,000**			
Crystal Lake	Southeast	Chinook	1.270	104,162	.035	.700	13,000
		Coho	1.476	933,712 (BY76)	.455	2.600	160,000
		Chum/Pink	.074 (Destroyed) (Do have design capacity per FY 80 budget)			2.500	39,000
		Steelhead	.036	10,741	.015 (Destroyed)	.265 (Present Capacity - No long range objectives set)	-0-

TABLE I *continued*

FACILITY	LOCATION	SPECIES	77 BY EGG TAKE (Millions)	77 BY RELEASES	78 BY EGG TAKE (Millions)	DESIGN EGG CAPACITY (Millions)	PROJECTED ADULT RETURNS OPERATING AT DESIGN CAPACITY
Deer Mountain	Southeast	Chinook	.090		.111	.160	3,000
		Coho	.158		.048 (in prog.)	.240	15,000
		RBT			.013	.015	(Present capacity - no long range objectives set
East Creek	Bristol Bay	Sockeye	2.1	1,660,721	2.5	15.000	200,000
		Chum		9,279***			
Fish Creek	Southeast	Coho	-0-	228,625 (BY76)			
Hidden Falls	Southeast	Coho				4.0	60,000
		Chum	.575	212,551	2.436	61.0	939,000
Karluk	Kodiak	Sockeye			6.089	25.0	200,000
Kitoi Bay	Afognak Is.	Chinook	.072***				
		Sockeye	.930***				
		Pink	26.800	17,323,454	25.000	25.0	380,000
Klawock	Southeast	Coho			.006 (in prog.)	4.0	60,000
		Chum			.300	71.0	1,093,000
Kotzebue Hatch.*	AYK	Chum				10.0	
Main Bay*	PWS	Pink/Chum			.667	65.0	1,000,000
Russell Creek	Alaska Pen.	Pink/Chum				52.0	800,000
Snettisham*	Southeast	Chinook	.066			4.0	74,000
		Coho	.		.189	2.0	123,000
		Chum	.413	253,321	.151	71.5	1,101,000
Starrigavan	Southeast	Chinook	.029	(Kings are in design per FY 80 budget)		.050	1,000
		Coho	.480	136,789 (BY76)	.428	.730	32,000
		Chum		19,581**	.003		
		Pink	2.107	1,849,240	2.399	2.200	34,000
Tutka	Cook Inlet	Pink	7.082	4,867,000	13.003	20.000	271,000
		Chum		1,200,000**	.564**		
		Sockeye		646,000			

* 1978 Bond Hatchery
** Incubated elsewhere but released from this hatchery.
*** Until brood stock is sufficient to produce number of eggs for design, other species will be raised.

COMM. FISHERIES

STATEWIDE HISTORICAL SALMON HARVEST, 1943-1978

Year	Total Harvest	Year	Total Harvest
1943	86,723,436	1961	45,035,225
1944	70,133,183	1962	62,809,379
1945	74,872,238	1963	47,479,068
1946	72,463,761	1964	65,725,076
1947	69,865,569	1965	56,340,827
1948	58,166,652	1966	64,041,470
1949	78,176,851	1967	20,889,544
1950	44,821,629	1968	62,299,888
1951	49,511,003	1969	41,909,516
1952	48,039,984	1970	68,453,501
1953	37,048,764	1971	47,497,476
1954	44,304,923	1972	31,958,671
1955	39,628,962	1973	22,319,310
1956	50,596,197	1974	21,886,344
1957	34,375,311	1975	26,228,537
1958	41,007,099	1976	44,423,685
1959	25,133,456	1977	50,809,566
1960	42,489,589	1978	1/ 79,390,000

1/ Preliminary data

1978 ALASKA SALMON CATCHES IN THOUSANDS OF FISH BY AREA AND SPECIES

Area	King	Red	Coho	Pink	Chum	Total
Southern Southeast	204	338	651	16,963	386	18,542
Northern Southeast	195	221	477	2,509	173	3,575
Yakutat	3	128	130	30	6	297
Prince William Sound	30	505	313	2,789	489	4,126
Cook Inlet	19	2,770	227	2,010	641	5,667
Bristol Bay	175	9,704	82	5,187	1,166	16,314
Kodiak	3	1,072	49	15,004	1,814	16,942
Chignik	2	1,576	20	925	120	2,703
South Peninsula	1	560	49	5,834	542	6,986
North Peninsula	14	893	54	478	162	1,601
A-Y-K	154	12	247	387	1,837	2,637
TOTAL	800	17,779	2,299	52,176	6,336	79,390

BUDGETS:

Administration

Operational Budget
Division of Administration

	FY 78 Actual	FY 79 Authorized
Personnel Services	1063.7	922.7
Travel	37.2	8.5
Contractual	863.9	906.5
Commodities	87.7	84.8
Equipment	29.7	2.5
Lands/Buildings	242.8	240.0
Grants, Claims	45.0	15.0
Total	2370.0	2180.0

Public Communications

Operational Budget
Public Communications Section

	FY 78 Actual	FY 79 Authorized
Personnel	126.2	143.1
Contractual Services	30.3	39.0
Commodities & Equipment	7.8	11.2
Travel	4.6	4.9
Total	168.9	198.2

Habitat

Operational Budget
Habitat Protection Section

	FY 78 Actual	FY 79 Authorized
Land & Water Conservation	288.8	284.3
Administration & Support	176.8	268.1
Environmental Monitoring	546.0	490.2
*Gas Pipeline	76.0	1050.1
*Oil Pipeline	481.9	214.8
Total	1568.5	2308.5

F.R.E.D.

Operational Budget
Division of F.R.E.D.

	FY 78 Actual	FY 79 Authorized
Operations	5851.9	6975.9
Technology & Development	149.3	1242.7
Administration	939.9	845.3
Total	6941.1	9063.9

Commercial Fisheries

Operational Budget
Division of Commercial Fisheries

	FY 78 Actual	FY 79 Authorized
Research	1840.9	2175.1
Management	4088.9	4578.5
Administration & Support	678.7	840.4
Federal Aid	1364.7	1442.0
Total	7973.2	9036.0

Sport Fisheries

Operational Budget
Division of Sport Fisheries

	FY 78 Actual	FY 79 Authorized
Investigations & Research	2107.7	2775.3
Management	739.6	851.7
Restoration	46.7	58.2
Administration & Support	192.7	204.9
Total	3086.7	3890.1

Game

Operational Budget
Division of Game

	FY 78 Actual	FY 79 Authorized
Investigations & Research	4209.6	4511.9
Management	412.5	552.9
Administration & Support	318.5	387.1
Hunter Safety	117.9	126.1
Total	5058.5	5578.0

Department of Fish & Game
Subport Building
Juneau, Alaska 99 801

SECOND CLASS PERMIT