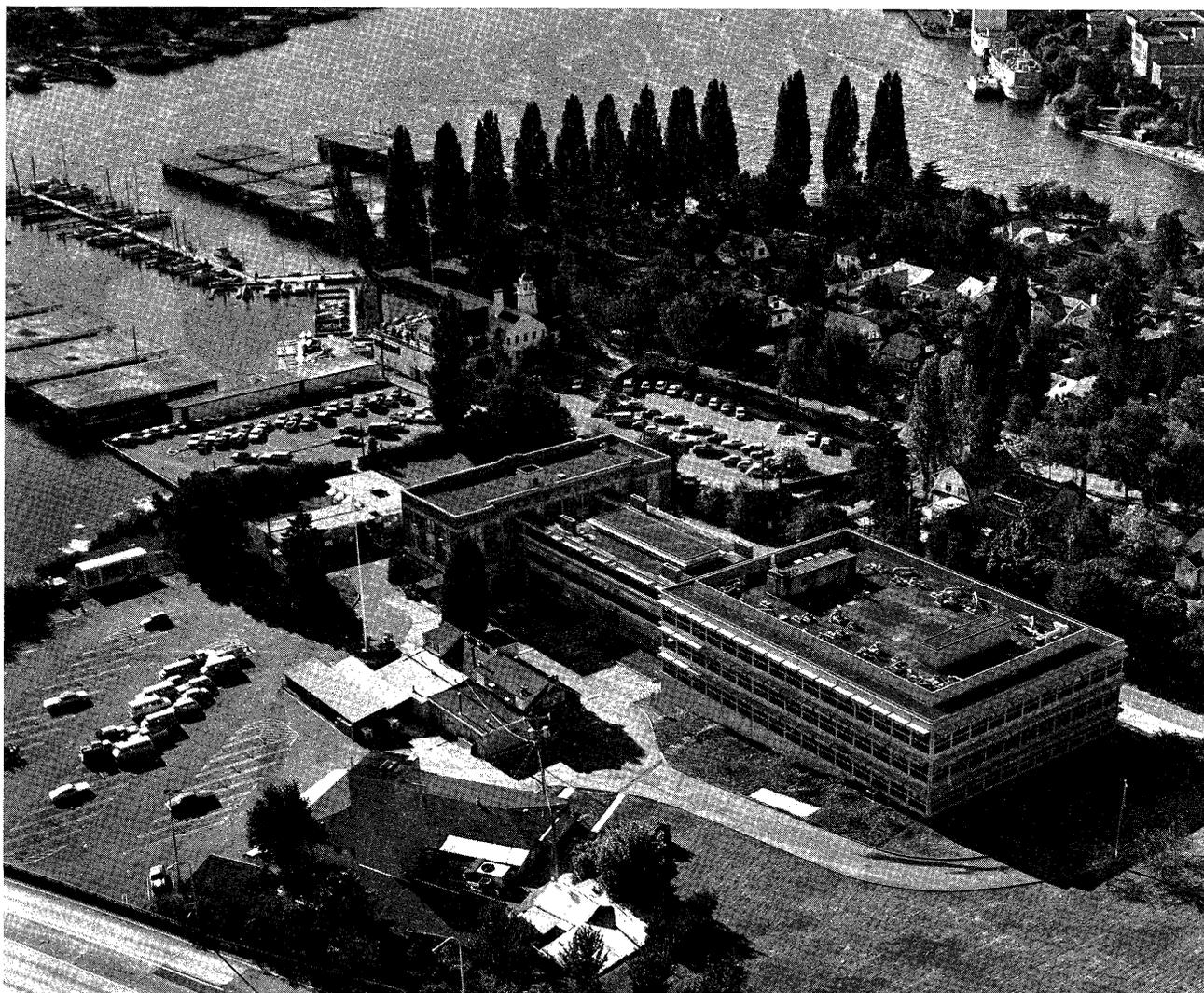


The Northwest and Alaska Fisheries Center, 1971-1981

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Developments in fisheries studies, beginning in the late 19th century, led to the establishment in 1971 of the Northwest Fisheries Center (NWFC), now the Northwest and Alaska Fisheries Center (NAFAC). Scientific programs of the several agencies which eventually

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came together in 1971 to form the Center were described earlier.

The Northwest and Alaska Fisheries Center is one of four research centers administered by the National Marine Fisheries Service. The Center's work is a part of the federal research effort of the National Oceanic and Atmospheric Administration (NOAA), an agency of the Department of Commerce.

The Center is staffed by personnel trained in fishery biology, wildlife biology, oceanography, chemistry, physiology, histology, serology, genetics, mathematics and statistics, computer operations, electronics, engineering, veterinary medicine, and economics. Administrative support activities are handled by staff personnel with training in accounting, procurement, and personnel matters. In addition, persons with training and experience related to planning, programming, budgeting, graphics, technical writing, and public affairs contribute to the overall management of the Center.

The Center consists of two principal laboratories: the Seattle Laboratory, which is sometimes called the Montlake laboratory and the Auke Bay Laboratory. The Seattle Laboratory consists of six research divisions and the National Marine Mammal Laboratory; the Auke Bay Laboratory is divided into four major investigations. NOAA-owned research vessels supporting fisheries research are the responsibility of the National Ocean Survey's Pacific Marine Center.

CENTER FACILITIES

Center facilities are located in Washington, Oregon, and Alaska; a detailed description follows.

Washington

Seattle Laboratory.--NWAFC headquarters occupy a multi-building facility located on 7.2 acres bordering Portage Bay, Lake Union. The research complex includes a 17,000 ft² office and laboratory building with connecting walkways to a 72,000 ft² library and

auditorium and a 65,000 ft² office and laboratory. The facilities also include an adjacent 3,000 ft² office annex, a technological pilot research building, and aquaculture facilities. Housed at this facility are the staffs for the Center Director's Office and the six divisions: Resource Assessment and Conservation Engineering (RACE), Resource Ecology and Fisheries Management (REFM), Environmental Conservation (EC), Fisheries Data and Management Systems (FDMS), Coastal Zone and Estuarine Studies (CZES), and Utilization Research (UR). The National Marine Mammal Laboratory (NMML) occupies 19,000 ft² of office and laboratory and storage space at Sand Point. The conservation engineering and hydroacoustics tasks of the RACE Division and the electronics and machine shop of the CZES Division, are also located at Sand Point.

Manchester Biological Field Station (CZES Division).--An aquaculture and fisheries enhancement research facility located on 22 acres at Clam Bay on Puget Sound. This facility consists of several buildings which provide 1,900 ft² of laboratory space, 2,100 ft² of office space, 1,000 ft² of shop space, 8,000 ft² of storage space, and saltwater rearing pens.

Mukilteo Biological Field Station (EC Division).--This 7,000 ft² combined laboratory and office, where research is conducted to determine the effects of various pollutants on marine organisms, is located 25 miles north of Seattle in a facility leased from the U.S. Air Force.

Pasco Biological Field Station (CZES Division).--This leased laboratory, office, shop, and storage space, totaling 23,000 ft², is used for research related to the ecological effects of dams on anadromous fish in

the Columbia River Basin.

Clarkston Biological Field Station (CZES Division).--This facility consists of 1,000 ft² of leased office and storage space where research related to the ecological effects of dams is administered.

Oregon

Hammond Biological Field Station (CZES Division).--Located on the Columbia River estuary, studies are conducted on fish, benthic invertebrates, and physical parameters of the Columbia River mouth and estuary in relation to man-caused environmental disturbances. The facility consists of 3,200 ft² of laboratory and office space, and 3,500 ft² of storage space.

Newport Aquaculture Laboratory and Support Facility.--This laboratory is made up of 60,000 ft² adjoining the Marine Science Center of Oregon State University (OSU), Newport, Oregon. The research program is conducted and funded primarily by OSU, while NWAFC supports the Laboratory Administrator, provides operation and maintenance funds, and carries out a small research program in cooperation with OSU. A primary responsibility of the Laboratory Administrator is to supervise and help coordinate the NWAFC research efforts with those of OSU scientists.

Prescott Field Station (CZES Division).--This floating laboratory, on two 32 x 110 ft barges moored in the lower Columbia River, serves as laboratory and support facility for in situ environmental research.

Rufus Biological Field Station (CZES Division).--This station consists of 2,200 ft² of office, shop, and

storage space used for research and administration of research related to ecological effects of dams on anadromous fish in the Columbia River.

Alaska

Auke Bay Laboratory.--This is the major NMFS facility in Alaska, located 12 miles north of Juneau on 3.2 acres bordering a saltwater bay and adjacent to a salmon stream flowing from nearby Auke Lake. Both the bay and the stream serve as natural freshwater and estuarine experimental areas and provide water for fresh and seawater laboratory systems. The main laboratory building has 10,000 ft² with space for approximately 50 staff members. An annex, located one-half mile from the ABL, provides 2,000 ft² of office and laboratory space for 16 staff members; a Butler building provides an additional 7,200 ft².

Little Port Walter Field Station (ABL).--This is the major salmon aquaculture research station in Alaska, located approximately 90 miles southeast of Sitka near the tip of southern Baranof Island. It is situated in a compact estuarine environment adjacent to Chatham Strait near the open Gulf of Alaska. There are numerous nearby lakes for testing fishery enhancement concepts. The station comprises six buildings totaling 9,000 ft² with experimental hatcheries and rearing facilities served by a controlled water source capable of delivering 900 gallons per minute. In the spring of 1939, with the aid of a 20-man Civilian Conservation Corps work force provided through the Alaska Forest Service, a steel and reinforced concrete, salmon counting weir was constructed in the mouth of Sashin Creek. This large structure permits biologists to observe

and count both the adult upstream migrating salmon and the very young downstream migrating fry. These upstream and downstream counts have been made each year since 1939; they provide valuable information on the survival of salmon in freshwater and marine environments. (Also see Little Port Walter in the Biological Research at Auke Bay section).

Kasitsna Bay Field Station (ABL).--- Located on 27 acres on lower Kenai Peninsula near Homer, Alaska, this station serves as a year-round, on-site facility for studying shellfish resources of lower Cook Inlet. It is currently used by the University of Alaska under a Memorandum of Understanding.

King Salmon Field Station (ABL).---This station is a staging area for field operations and research on sockeye salmon in the Naknek Lake watershed area. It is maintained by the U.S. Fish and Wildlife Service under a Memorandum of Understanding.

Kodiak Field Station (RACE and UR Divisions).---Investigations of the RACE and UR Divisions are located in a renovated building on the U.S. Coast Guard Base, Utilization Research activities occupy 5,000 ft² of laboratory and office space with a 3,000 ft² pilot plant located at Gibson Cove. The Resource Assessment staff occupies 19,000 ft² of office, laboratory, and storage space.

The multi-disciplinary research programs of the Seattle Laboratory and the Auke Bay Laboratory are designed to provide: 1) a better understanding of living marine resources of the northeast Pacific Ocean and Bering Sea and the environmental quality essential for their existence and 2) options for utilization of these resources

consistent with national needs and goals.

Seattle Laboratory

Resource Assessment and Conservation Engineering.---Resource surveys to monitor variations in abundance and distribution of fish and shellfish populations in the North Pacific Ocean and eastern Bering Sea are conducted by the Resource Assessment and Conservation Engineering Division (RACE). Data collected provide fundamental information to establish the status of stocks being harvested, to enhance the ability of U.S. citizens to use underutilized resources, and to develop policy on man-caused effects on marine resources.

The resource assessment activities of RACE are divided into four components: groundfish assessment, pelagic fish assessment, shellfish assessment, and latent resource assessment. Resource surveys are conducted from NOAA ships and chartered commercial fishing vessels. These surveys provide information on distribution, abundance, and availability of selected stocks and on important parameters such as age, growth, mortality, and recruitment.

Fisheries gear technology research, aimed at enhancing the NMFS goals of full efficiency and wise utilization of marine resources, is the mission of the conservation engineering and fishery development unit of RACE. Primary thrusts are in the areas of:

- 1) development and introduction of selective harvesting systems to conserve non-target species or to provide a higher quality product to the consumer, 2) development of fishing systems to harvest latent resources and to eliminate resource waste, and
- 3) development and interpretation of

sampling systems.

Resource Ecology and Fisheries Management.--The Resource Ecology and Fisheries Management Division (REFM) conducts research on the biology, ecology, and utilization of marine resources to assist in development of management policies for both U.S. and foreign fisheries in the northeastern Pacific Ocean and Bering Sea.

The REFM Division is composed of two major elements: 1) research on the status of stocks for development of management recommendations and 2) research on resource ecology. The status-of-stock element provides real-time estimates of the condition of fishery resources for immediate management application.

Recommendations are based on single-species models with input from assessment programs within the RACE Division, ongoing observer programs aboard foreign vessels, and analysis of domestic and foreign catch statistics. Much of the work of the resource ecology element is theoretical and developmental. These studies serve as guides to planning; results applicable to fisheries management are expected at a later date. Environmental information is utilized to explain certain biological phenomena, but it eventually provides the basis for predictive management.

Some specific activities of REFM include

- A scientific observer program aboard Japanese, Soviet, and Polish vessels to determine the incidental catches of species reserved to U.S. fishermen, to verify catch statistics and compliance with provisions of fishery management plans as required by the Magnuson Fishery Conservation and Management Act of 1976 (P.L. 94-265),

and to collect biological data.

- Management studies which incorporate biological information with information from economics and other social sciences to develop models pertaining to optimum yield--the basis for management under the Magnuson Fishery Conservation and Management Act of 1976.

- Analysis and documentation of status of all principal species of the Bering Sea and northeastern Pacific Ocean for use by the Pacific and North Pacific Fishery Management Councils in making management decisions.

- Development of ecosystem models to quantify the interrelationship of marine mammals, fish, plankton, and the physical environment.

Utilization Research.--The major objective of the Utilization Research Division is providing the technological knowledge needed for full use of fishery resources. Research emphasizes solving problems of expanding the domestic fisheries for underutilized species and their use for food.

Tasks include: 1) improving preservation, storage, and processing methods; 2) determining the characteristics and composition of the species and the nutritive value and safety of the fishery products; 3) measuring changes in fish quality and their significance to processing alternatives; and 4) providing information as needed for science, industry, and consumer use.

Research problems include

- Methods of handling and preservation at sea and ashore with industrially underdeveloped species (e.g., walleye pollock).

- Determination of quality changes by sensory, chemical, and microbiological criteria.

- Chemistry and characteristics of the muscle and proteins of various species.

- Evaluation of product concepts and use of fish in a variety of processed food systems.

- Determination of nutritional values such as composition, proteins, trace elements of nutritional and health concern, and organic contaminants from the environment.

- Microbiological research on pathogens in fish with emphasis on Clostridium botulinum growth and toxin formation, and development of safe processing methods for smoked fish and intermediate processed products.

- Aquaculture feeds, nutrition, and disease including alternative protein sources for salmonid feeds, low-energy processed feeds from fish waste, nutritional imbalances related to trace element availability, and salmonid botulism and disease related to environment.

Coastal Zone and Estuarine Studies.--

Research activities of the Coastal Zone and Estuarine Studies Division (CZES) are separated into three tasks: ecological effects of dams, habitat investigations, and fishery enhancement.

The Ecological Effects of Dams Task undertakes applied research relating to migration of anadromous fish between spawning areas and the sea. Research is focused on the Columbia River watershed which covers an area of 259,999 sq. mi. in Washington, Oregon, Idaho, Nevada, Wyoming, Montana, and Canada. Studies are carried out on the effects of water resource developments on the river ecology, on passage and survival of various stocks of anadromous fish, and on the development of systems for alleviating adverse effects.

The focal point for research activities of the Habitat Investigations Task is the Columbia River estuary. This unique body of water covers about 150 mi² and extends from the Pacific Ocean to about River Mile 46. The estuary is an extremely important and complex area involving a variety of biological and physical interactions. It is an important link in the life cycle of some of the Northwest's most important food fishes, e.g., salmon and steelhead. It is also an area subject to changes, both subtle and drastic, brought about by man's activities.

Through the Habitat Investigations Task, the Division monitors the biological effects of changes and predicts the consequences of contemplated actions by evaluating of pilot programs. The expertise of the staff is sought by agencies such as the U.S. Army Corps of Engineers and Portland General Electric Co., whose activities such as dredging and cooling have potential impact on the estuary.

The Fishery Enhancement Task is located in Puget Sound, an inland sea with over 2,300 miles of shoreline. Research is directed toward the development and improvement of fresh and saltwater fish rearing systems and the detection and prevention of fish disease in these systems. Other research is designed to assess the status of smoltification and fitness for ocean survival of chinook and coho salmon and steelhead and to identify salmon stocks in mixed-stock fisheries.

Environmental Conservation.--Research conducted by the Environmental Conservation Division (EC) is directed toward determining the impact of environmental changes and the effects of contaminants on life processes of marine resources in the northwestern United States. This research is being

conducted at Seattle and Mukilteo, Washington.

The analytical capabilities provided by the EC Division are enhanced by the NOAA National Analytical Facility (NAF) and the Electron Microscopy (EM) Unit. Foremost among the services provided by the NAF is the capability to measure and identify contaminants at low levels found in environmental samples. Both a transmission and scanning electron microscope are used in the EM Unit to assist in determining initial stages of abnormal developments in fish and shellfish.

National Marine Mammal Laboratory.--The National Marine Mammal Laboratory (NMML) conducts research on principal marine mammal species of concern to the United States, thus ensuring maintenance of the various populations at satisfactory levels. This research meets the requirements of the Marine Mammal Protection Act of 1972 and is the rationale for U.S. participation in international contractual obligations within the International Whaling Commission and the North Pacific Fur Seal Convention.

Marine mammal species currently being studied include pinnipeds (northern fur seals of the Pribilof Islands, harbor seals, two species of sea lions, and the northern elephant seal); cetaceans (bowhead, killer, sei, sperm, gray and humpback whales); and the Dall's porpoise.

International obligations and the Marine Mammal Protection Act require continuing information on the status of fur seal stocks of the Pribilof Islands. Research by the NMML entails population dynamics, counts of estimates of year-class size, abundance and age composition of the harvest, magnitude and causes of natural

mortality, influence of disease on population size, and development of techniques to achieve desirable population levels.

Current pinniped research is expanding knowledge about the status of stocks and pelagic migration patterns, the effects of environmental contaminants and diseases, and observations of marine mammal-fishery interactions.

Data collected from whale research activities provide the basis for developing national conservation measures as well as international management proposals.

Research on endangered species of pinnipeds is conducted to determine the status of stocks, to collect data for international negotiations, and to prepare management recommendations for these species.

Fisheries Data and Management Systems.--NWAFC tasks encompass a broad range of studies on marine fish and shellfish, environmental conservation, marine mammals, coastal zone and estuarine resources, and international fisheries problems. These studies involve the design of experiments and analysis of large sets of scientific and fishery data. The Fishery Data and Management Systems Division (FDMS) provides assistance in biometric and statistical methodology and theory.

Additional technical services provided by FDMS include preparation of the Center's Monthly Report, preparation of scientific illustrations and graphic material, editing technical reports and manuscripts prepared by Center scientists, and operation of the Seattle Laboratory Library.

Office of Fisheries Information Systems.--The Office of Fisheries

Information Systems (OFIS) reports to the Center Director. OFIS directs the fishery information network and computer system of the NWAFC and responds to the need to facilitate fishery management, regional consolidation, and timely analyses of fisheries data on Alaska and Pacific Northwest resources. Services include: 1) data entry; 2) computer processing, computer graphics, and data storage and retrieval through operation and maintenance of in-house computer systems; 3) data communications with computers at Kodiak and Auke Bay, Alaska, and with numerous other interactive terminals on site and in the field; 4) programming consultation, assistance and training for users; and 5) data base maintenance and report generation. Users include NWAFC personnel, NMFS's Alaska and Northwest Regional Offices, and fishery agencies in California, Washington, and Oregon.

Auke Bay Laboratory

Anadromous Fishes Investigation.-- Research at the Auke Bay Laboratory (ABL) to enhance Alaska salmon resources, with particular emphasis on ocean ranching, is divided into four areas of activity: incubation systems, supplemental rearing systems, natural rearing systems, and genetic problems.

Spawning and incubation systems emphasize the development and evaluation of low-cost gravel and plastic substrate incubators which produce fry that compare favorably with wild fry in terms of their capacity to grow and survive at sea.

Supplemental rearing systems emphasize the development and evaluation of floating feedlots (pens and raceways) designed for low construction and operating costs. Natural rearing

systems of immediate interest are lake and inshore marine nursery waters.

Genetic problems are probably the cause of greatest uncertainty concerning long-term feasibility of salmon ocean ranching. Understanding basic genetic adaptations of wild salmon is essential for proper management of salmon stocks as well as development of cultured stocks.

Environmental Impact Investigations.-- Environmental impact studies are conducted at ABL to determine effects on marine resources of environmental alterations resulting from industrial developments in Alaska. Research includes both laboratory experiments and collection and analysis of data at locations throughout Alaska.

Multidisciplinary studies involve exposing a variety of Alaskan species to oil and monitoring biological responses in a variety of ways. Studies are also being conducted to determine the effects of logging on aquatic ecosystems.

Biometrics and Resource Assessment Investigations.--Biometrics and resource assessment investigations provide population dynamics analyses of fisheries as well as development of the statistical estimators required to provide information to management on growth, mortality, reproduction, and population estimates for Alaskan fisheries. Experimental designs are developed and used for research conducted by all ABL investigations to assure the statistical validity and precision of experimental results.

Marine Investigations.--Marine investigations at the ABL involve studies on the biology, ecology, distribution, and population dynamics of Pacific herring and other pelagic

and demersal fish of commercial importance in southeastern and central Alaska.

Information on abundance, distribution, and movements of herring stocks in southeastern Alaska is being gathered to provide biological rationale for regulations that would help sustain the yield of this resource. Other marine organisms that share the same environment with herring are being identified and their ecological relationships established to aid in forecasting trends in herring abundance.

Fishery oceanography research supports various anadromous fish, marine fish, and environmental investigations through analyses of natural and man-induced environmental conditions affecting fish abundance, behavior, and distribution.