

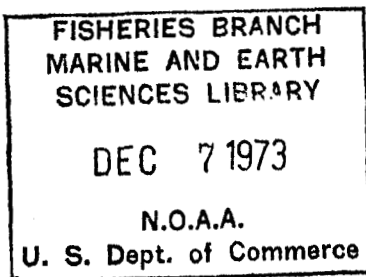


U.S. DEPARTMENT OF COMMERCE
Frederick B. Dent, Secretary
National Oceanic and Atmospheric Administration
Robert M. White, Administrator
National Marine Fisheries Service
Robert W. Schoning, Director

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1970/71

Report of the
//
National Marine Fisheries Service

for the Calendar Years



1970 and 1971

National Oceanic and Atmospheric Administration

Report of the United States Commissioner of Fisheries

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THE SECRETARY OF COMMERCE
Washington, D.C. 20230

President of the Senate
Speaker of the House of Representatives

Sirs:

I have the honor to transmit herewith the Report of the
National Marine Fisheries Service for Calendar Years
1970 and 1971.

This report covers a period of transition of the Federal
fisheries agency, which was a part of the Department of
the Interior until October 5, 1970, when it became that
component of the newly-formed National Oceanic and
Atmospheric Administration, Department of Commerce, which
deals with the living resources of the sea. The report
describes the restructuring of the organization
consequent upon that transfer, documents the organization's
progress toward achieving new and broadened goals of
fisheries research in the national interest, and lists
the publications of its staff during the 1970-71 period.

Sincerely,

A handwritten signature, likely of the Secretary of Commerce, is written over the word "Sincerely,". The signature is in dark ink and appears to be "P. J. ...".

Secretary of Commerce

Enclosure

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INTRODUCTION

This report is submitted in response to the requirement of Section 9(a) of the Fish and Wildlife Act of 1956, as amended 16 (U.S.C.) 742(a). It covers calendar year 1970 and calendar year 1971, a period of transition and redirection for the Federal fisheries agency which began the period as the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service in the Department of the Interior and in October 1970 became the National Marine Fisheries Service (NMFS) in the National Oceanic and Atmospheric Administration, Department of Commerce.

The Federal fisheries agency completed its 100th year during this period. Operating under different titles and located in different segments of the Executive Branch, the agency had its beginnings in the Act of February 9, 1871, which authorized appointment of a Commissioner of Fish and Fisheries to study the decrease of the food fishes of the seacoasts and lakes of the United States and to suggest remedial measures. Recognizing the anniversary, the President, by proclamation, designated 1971 as Fisheries Centennial Year.

The Office of the Commissioner of Fish and Fisheries functioned as an independent establishment of the Government from February 9, 1871, to July 1, 1903, when, by the Act of February 14, 1903 (32 Stat. 827), the Fish Commission and the Office of the Commissioner of Fish and Fisheries were placed in the Department of Commerce and Labor which was created by the latter Act. That same Act transferred from the Department of the Treasury to the Department of Commerce and Labor jurisdiction, supervision, and control over the fur seal, salmon, and other fisheries of Alaska (32 Stat. 828). Thereafter, this entity was called the Bureau of Fisheries.

By the Act of March 4, 1915 (37 Stat. 736), the Department of Commerce and Labor was divided into two separate departments and the Bureau of Fisheries remained with the Department of Commerce until July 1, 1939, when the 1939 Reorganization Plan No. II (53 Stat. 1433) transferred the Bureau of Fisheries to the Department of the Interior. This Plan also transferred to Interior from the Department of Agriculture the Bureau of Biological Survey.

The Bureau of Fisheries and the Bureau of Biological Survey, both in the Department of the Interior, were consolidated into one agency to be known as the Fish and Wildlife Service by the 1940 Reorganization Plan No. II (54 Stat. 1232), which became effective June 30, 1940.

The terms of the Fish and Wildlife Act of 1956, approved August 8, 1956, (70 Stat. 1119) established, within the Department of the Interior to succeed the existing Fish and Wildlife Service, the United States Fish and Wildlife Service consisting of two separate agencies, each with the status of a Federal Bureau—the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife.

Effective October 3, 1970, Reorganization Plan No. 4 of 1970 (84 Stat. 2090) transferred to the Secretary of Commerce the functions vested by law in the Bureau of Commercial Fisheries and the functions vested by law in the Secretary of the Interior or the Department of the Interior which were then administered through the Bureau of Commercial Fisheries. Four functions of the Bureau of Commercial Fisheries were excluded from the transfer:

- 1) Great Lakes fishery research and activities related to the Great Lakes Fisheries Commission
- 2) Missouri River Reservoir research
- 3) The Gulf Breeze Biological Laboratory at Gulf Breeze, Florida
- 4) Trans-Alaska pipeline investigations

Also transferred to the Secretary of Commerce by this Plan were the functions of Interior relating to migratory marine species of game fish as authorized by Public Law 86-359 (16 U.S.C. 760e-760g).

As part of this transfer of functions, there was created in the Department of Commerce the National Oceanic and Atmospheric Administration (NOAA), of which the National Marine Fisheries Service (NMFS) is a unit. The reasons for the transfer of functions and the creation of the mechanism for executive management of them were clearly stated by the President when he transmitted the plan to the Congress. In his transmittal message the President said:

The Oceans and the atmosphere are interacting parts of the total environmental system upon which we depend not only for the quality of our lives, but for life itself.

We face immediate and compelling needs for better protection of life and property from natural hazards, and for a better understanding of the total environment—an understanding which will enable us more effectively to monitor and predict its actions, and ultimately, perhaps to exercise some degree of control over them.

We also face a compelling need for exploration and development leading to the intelligent use of our marine resources. The global oceans, which constitute nearly three-fourths of the surface of our planet, are today the least-understood, the least-developed, and the least-protected parts of our

earth. Food from the oceans will increasingly be a key element in the world's fight against hunger. The mineral resources of the ocean beds and of the oceans themselves, are being increasingly tapped to meet the growing world demand. We must understand the nature of these resources, and assure their development without either contaminating the marine environment or upsetting its balance.

Establishment of the National Oceanic and Atmospheric Administration—NOAA—within the Department of Commerce would enable us to approach these tasks in a coordinated way. By employing a unified approach to the problems of the oceans and atmosphere, we can increase our knowledge and expand our opportunities not only in those areas, but in the third major component of our environment, the solid earth, as well.

These organizational changes, therefore, are directed toward a better understanding of the Nation's living marine resources, the environment in which they are found, and the interaction between the two. The knowledge to be gained will provide the basis for allocating fishery resources among the increasing numbers of persons wanting to fish either commercially or for recreation. It also will improve the decision-making process by which the marine environment is allocated among competing uses to assure fisheries a proper place in the pattern of use according to their contribution to the national welfare under conditions of efficient management.

The report which follows will describe the state of the U.S. fisheries, 1970-71, cover present organization of the National Marine Fisheries Service, the tools it has to accomplish the tasks assigned, the significant activities during 1970 and 1971 of the NMFS and its predecessor organization, the Bureau of Commercial Fisheries, and list the publications which have resulted from its functions during the period.

STATE OF THE FISHERIES

During the 1970-71 period commercial fisheries continued as a dynamic force in the U.S. economy. Both landings and the value to fishermen and vessel owners made substantial gains, and 1971 totals revealed that the dollar value of the year's catch (\$643 million) was the highest in the history of U.S. fisheries. The increased monetary value was due largely to the high dockside prices that prevailed in 1971. That figure represented a \$116 million, 5 percent increase over the 1970 total, far greater on a percentage basis than the 1 percent increase in volume caught (5 billion pounds in 1971, 4.88 billion in 1970).

Unfortunately, however, the impressive financial gain in 1971 was not divided evenly among all segments of the industry. On the *increase* were catches of shrimp, menhaden, bonito, Pacific cod, croaker, sea trout,

bluefin and skipjack tuna, and king crabs; on the *decrease* were landings of anchovies, haddock, halibut, Pacific ocean perch, salmon (pink, red, and silver), swordfish, yellowfin tuna, whiting, surf clams, and Dungeness crabs. Some of the 1971 declines were particularly distressing to certain members of the fishing industry whose catches in 1970 had reached record highs. In this category were fisheries for California anchovies, Dungeness crabs, salmon, surf clams, and yellowfin tuna.

The picture was bright for most U.S. processors of fishery products, with substantial increases recorded in almost all categories in 1971. A record total of \$1.85 billion was earned from products manufactured from both domestic and imported raw materials, representing a gain of 7 percent over the previous year. The 1971 canned pack of human and animal food—46.3 million standard cases valued at \$763.5 million—represented an increase of \$1.7 million. Greater than ever before were the 1971 packs of tuna, pet food, and clam chowder; increases also were seen in the production of canned alewives, mackerel, Maine sardines, and oysters. Production of fish sticks and portions was a record-breaking 337.4 million pounds valued at \$179.6 million, and substantial gains were realized among producers of breaded shrimp and industrial fishery products.

Cold-storage holdings in 1971 fluctuated from 338 million pounds at the end of September to 302 million at year's end, compared with the 1970 figure of 306 million pounds. 1971 imports of edible fishery products declined in quantity by 6 percent from the previous year, but rose in value by 7 percent, while U.S. exports increased by 22 percent in quantity (172 million pounds) and 21 percent in value (\$114 million).

Per capita consumption of edible fishery products dropped from 11.8 pounds in 1970 to 11.2 pounds in 1971 even though there was a 1 percent increase in landings of fish and shellfish. The reason for the apparent contradiction is that while landings of inedible fish increased, edible fish landings and imports declined.

ADMINISTRATION

Organization

The year 1971 was one during which NMFS underwent major changes in organization. These changes responded in part to long-standing criticisms of the organization of NMFS's predecessor agency, the Bureau of Commercial Fisheries, and in part to NMFS's new role as an element of NOAA and its new responsibilities to marine recreational anglers.

This restructuring of NMFS represents the consensus of those in NOAA and NMFS who are most concerned. It reflects a basic change in philosophy and a response to that change in terms of organizational structure.

The major aspects of the new organization are these:

- 1) The primary functions of NMFS have been assigned among three areas, those concerned with Resource Research, Resource Utilization, and Resource Management. Each is headed by an Associate Director.
- 2) There has been created a small number of fishery research Centers by combining the administrative and program functions of similar biological laboratories.
- 3) The Centers concerned more with oceanic programs, national in nature, report to the Associate Director for Resource Research rather than to a Regional Director.
- 4) The Centers and Laboratories concerned chiefly with inshore programs, local in nature, report to the Regional Director concerned.
- 5) Integrated into this system are the marine game fish laboratories, which came to NMFS from the Bureau of Sport Fisheries and Wildlife when NOAA was established.
- 6) The fishery products technological laboratories have been placed under the Associate Director for Resource Utilization.
- 7) Finally, the basic regional structure, with the Regional Directors continuing as the key NMFS representatives in their geographical areas of responsibility, has been retained. The Directors of Centers who report administratively to the Central Office also serve as senior scientific advisors to the Regional Directors.

The principal elements of the old system and the new are outlined in Figures 1, 2, and 3.

A major criticism of the old system was that there were too many small laboratories, some without sufficient budget or staff to operate effectively as independent units. Another criticism was that the essentially regional approach to, and control of, research programs made development and implementation of national programs a monumental job. The Center concept responds to the first criticism, and the national control of some of the Centers to the second.

There are four major fisheries research Centers concerned primarily with high-seas research carried out as part of nationwide programs designed to solve problems of a national or international nature. The lead laboratories of these centers are located in Seattle, Wash.; La Jolla, Calif.; Miami, Fla.; and Woods Hole, Mass. These Centers, and the Atlantic Estuarine Fisheries Center at Beaufort, N.C., report to the Associate Director for Resource Research.

Two Centers, with headquarters in the NMFS laboratories in Galveston, Tex., and Sandy Hook, N.J., and two Laboratories, at Tiburon, Calif., and Auke Bay, Alaska, are concerned chiefly with inshore and estuarine research and with programs and problems that tend to be regional in nature. These report to the Regional Directors.

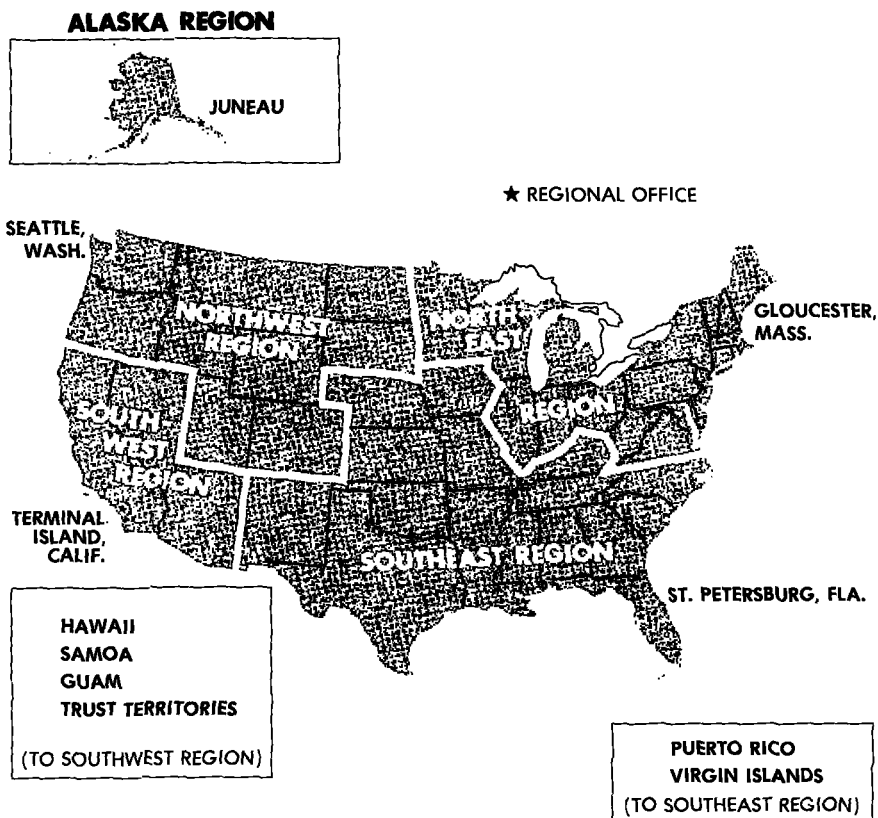


FIGURE 1.—Regions of the National Marine Fisheries Service.

The principal officials of NMFS on December 31, 1971, are shown in Table 1.

Budget

*The impact on NMFS of President Nixon's Reorganization Plan No. 4 of 1970, which created NOAA, becomes apparent through a comparison of the appropriations for fiscal year 1971 for the former Bureau of Commercial Fisheries with the appropriations for fiscal year 1972 to NOAA for NMFS. These appropriations are included in the activity titled "Ocean Fisheries and Living Resources."

The appropriations for fiscal year 1971 reflected an overall reduction in funding level of \$7.5 million from the prior fiscal year. Most of this was because of a reduction for construction and fishing vessels subsidies; however, it did include a reduction of \$1.5 million in on-going research and several programs. In contrast, the appropriations for fiscal year 1972 provided program increases of \$3.4 million and \$100,000 for additional

costs of construction of the laboratory at Panama City, Florida, for an appropriation of \$47.7 million.

Increases for fiscal year 1972 were as follows:

<i>Program</i>	<i>Amts. in \$1,000</i>
Marine Resources Monitoring, Assessment and Prediction	\$ 953
State-Federal Fisheries Management	608
Enforcement and Surveillance	291
Sport Fisheries (including construction)	619
Contamination and Environmental Quality	983
Research and Translations—Special Foreign Currency	<u>-15</u>
Total	\$3,439

<i>Comparative Summary</i>			
<i>Activity</i>	<i>FY 1971</i>	<i>Change</i>	<i>FY 1972</i>
	<i>(In Thousands of Dollars)</i>		
<i>Resources and Environment</i>	26,858	3,299	30,157
Programs financed with these funds include surveys of living marine resources and their environment, the development and implementation of management policy, and related enforcement and surveillance functions. Also included are programs designed to develop the knowledge necessary to understand the biological characteristics and requirements of fish, shellfish, and other living marine resources, their relationship to the physical environment, and the consequences of changes in the physical environment, primarily for the purpose of conservation and management of fishery stocks whether for commercial or sport fishing purposes. Other programs include research on marine contaminants and the procurement of equipment and facilities.			
<i>Public Service</i>	2,971	0	2,971
The public service activities include the collection and dissemination of fishery statistics and market news information, economic analyses, consumer education, and marketing activities.			
<i>Development, Test, and Evaluation</i>	4,880	140	5,020
These programs include the development of specialized equipment necessary to assess living marine resources, the development of technology for fish harvesting and processing, the production of fish protein concentrate, and other food product technology.			
<i>Financial Assistance</i>	214	0	214
Programs financed with these funds cover in part the costs of administering the mortgage insurance program and the vessel construction subsidy program.			
<i>Grants in Aid</i>	6,420	0	6,420
Grants in aid are provided on a cost-sharing basis to States and Territories for commercial fisheries research and development (P.L. 88-309), and for research on the control of jellyfish (P.L. 89-720) and to States and other non-Federal cooperators for the cost of projects to conserve, develop, and enhance the anadromous fishery resources of the U.S. (P.L. 89-304). Grants may also be made, with or without cost-sharing, to the commercial fishing			

NATIONAL MARINE FISHERIES SERVICE

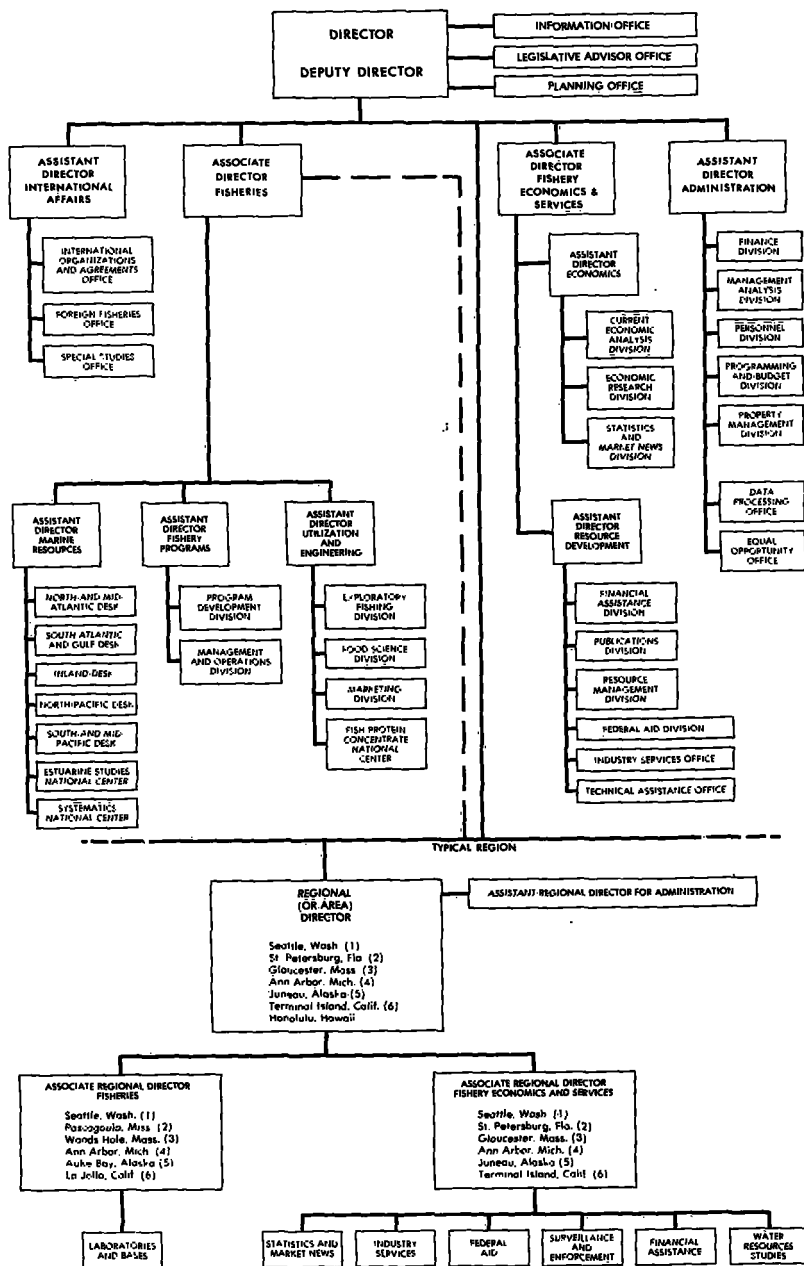


FIGURE 2.—Organization structure of the Bureau of Commercial Fisheries.

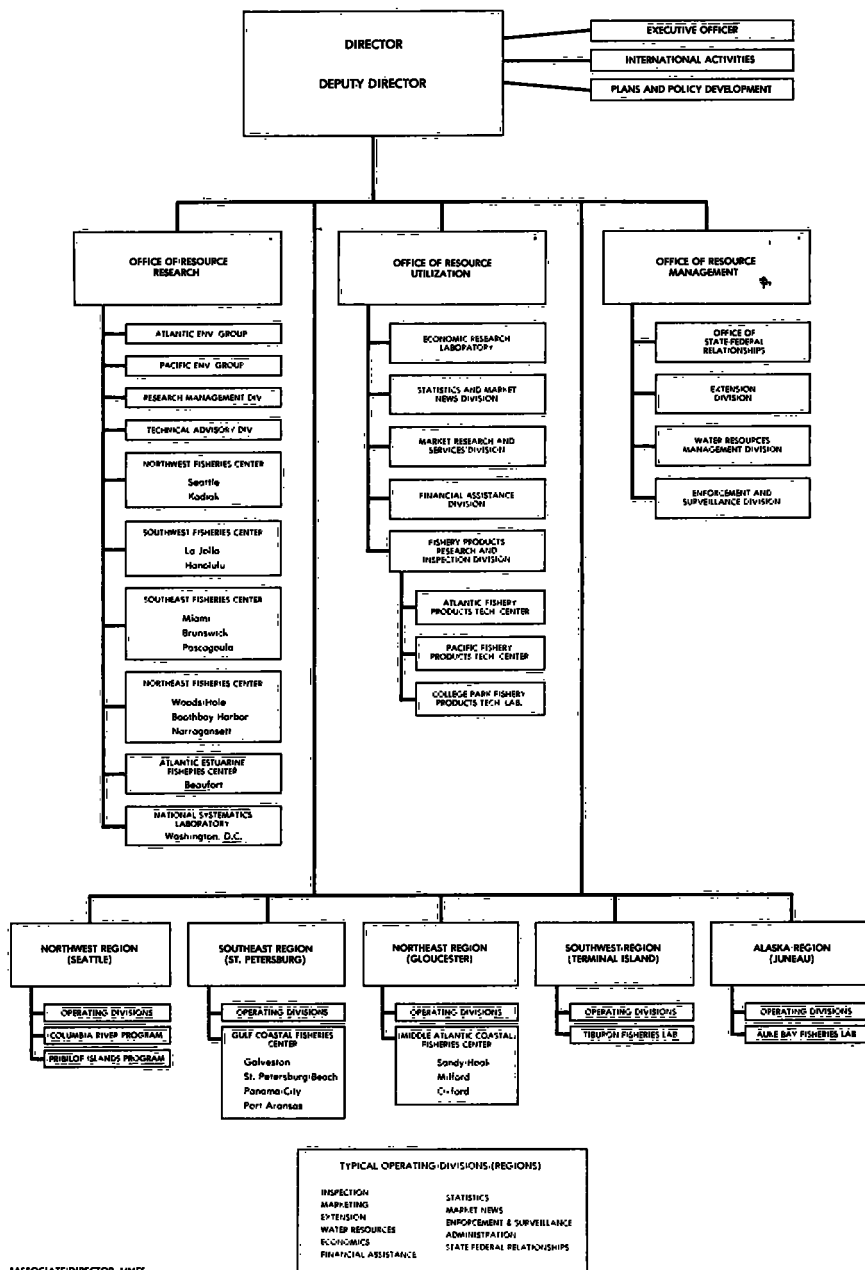


FIGURE 3.—Organization structure of the National Marine Fisheries Service.

Table 1.—Principal Officials of the National Marine Fisheries Service, December 31, 1971.

Director	Philip M. Roedel
Deputy Director	Robert W. Schoning
Assistant to the Director for Sport Fisheries	John S. Gottschalk
Assistant to the Director for Special Projects	Dr. Steven E. Schanes
Special Assistant to the Director	John L. Baxter
Marine Fisheries Review	Edward F. Edelsberg
Scientific Publications Staff	Thomas A. Manar
Executive Officer	C. Doyle Innis
Chief, International Activities Staff	Robert C. Wilson
Chief, Plans and Policy Development Staff	Nelson J. Norem (Acting)
Associate Director for Resource Research	Dr. William F. Royce
Deputy Associate Director	Vacant
Director, Northwest Fisheries Center	Dr. Dayton L. Alverson
Director, Southeast Fisheries Center	H. R. Bullis, Jr.
Director, Northeast Fisheries Center	Dr. Robert L. Edwards
Director, Southwest Fisheries Center	Dr. Brian J. Rothschild
Director, Atlantic Estuarine Fisheries Center	Dr. Theodore R. Rice
Director, National Systematics Laboratory	Dr. Daniel M. Cohen
Chief, Technical Advisory Div.	Dr. Joseph W. Angelovic
Chief, Research Management Div.	Dr. Robert R. Kifer
Associate Director for Resource Utilization	Joseph W. Slavin
Deputy Associate Director	Dr. H. M. Hutchings (Acting)
Director, Economic Research Laboratory	Dr. Frederick W. Bell
Chief, Statistics and Market News Division	Dr. Hoyt A. Wheeland
Chief, Market Research and Services Division	Morton M. Miller
Chief, Financial Assistance Division	James F. Murdock
Chief, Fishery Products Research and Inspection Division	Roland A. Finch
Director, Pacific Fishery Products Technology Center	Dr. Maynard A. Steinberg
Director, Atlantic Fishery Products Technology Center	Louis J. Ronsivalli
Director, College Park Fishery Products Technology Lab.	Dr. George M. Knobl, Jr.
Associate Director for Resource Management	Dr. Robert F. Hutton
Deputy Associate Director	Walter Kirkness

Chief, Office of State-Federal Relationships	Takashi Miyahara
Chief, Extension Division	J. David Almand
Chief, Water Resources Management Division	H. William Newman
Chief, Enforcement and Surveillance Division	Raymond L. Fritz
Director, Northwest Region	Donald R. Johnson
Deputy Director	John B. Glude
Director, Columbia River Fisheries Development Program	Fred C. Cleaver
Director, Pribilof Islands Program	William L. Peck
Director, Southeast Region	Jack W. Gehringer
Deputy Director	Harold B. Allen
Director, Gulf Coastal Fisheries Center	Dr. A. K. Sparks (Acting)
Director, Northeast Region	Russell T. Norris
Deputy Director	William G. Gordon
Director, Middle Atlantic Coastal Fisheries Center	Dr. C. J. Sindermann (Acting)
Director, Southwest Region	Gerald V. Howard
Deputy Director	Floyd S. Anders, Jr.
Director, Tiburon Fisheries Laboratory	Richard S. Shomura
Director, Alaska Region	Harry L. Rietze
Deputy Director	Robert W. McVey
Director, Auke Bay Fisheries Laboratory	Dr. William A. Smoker
Public Affairs Officer*	John A. Guinan
Legislative Advisor*	Kip Robinson
Staff Attorney*	Herbert L. Blatt

*NOAA personnel on Detached Service with NMFS

industry in cases where there is a fishery failure due to a resource disaster arising from natural or undetermined causes, or to prevent such a resource disaster (P.L. 88-309).

<i>Administration of the Pribilof Islands</i>	2,879	0	2,879
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Programs are for management of the fur seal herd, community services to the natives of the islands, construction and maintenance of buildings, roads, and facilities, and maintenance and operation of a supply vessel.

<i>Fishermen's Protective Fund</i>	60	1	61
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These funds, together with fees collected from vessel owners, provide for payment to vessel owners and crews to compensate for certain financial losses sustained as a result of fishing vessels being seized by foreign countries.

TOTALS	\$44,282	\$3,440	\$47,722
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Note: Supplemental appropriations for the cost of salary increases subsequently raised the NMFS appropriations for FY 1972 to a total of \$49,083 thousand.

Vessels

During calendar years 1970 and 1971, NMFS operated 35 research vessels ranging in length from 28 to 222 feet. Some of the larger of these are equipped to conduct specialized fishery and oceanography studies anywhere in the world ocean. The vessels are:

Vessel	Length (feet)	Year Built	Home Port
<i>Pribilof</i>	222	1953	Seattle, Wash.
<i>Miller Freeman</i>	214	1967	Seattle, Wash.
<i>Albatross IV</i>	187	1962	Woods Hole, Mass.
<i>George B. Kelez</i>	176	1944	Seattle, Wash.
<i>David Starr Jordan</i>	171	1965	La Jolla, Calif.
<i>Oregon II</i>	171	1967	Pascagoula, Miss.
<i>Townsend Cromwell</i>	158	1963	Honolulu, Hawaii
<i>Delaware II</i>	156	1968	Gloucester, Mass. (deact. 1970)
<i>Undaunted</i>	143	1944	Miami, Fla. (loaned out 1970)
<i>Charles H. Gilbert</i>	123	1952	Honolulu, Hawaii (deact. 1970)
<i>Dolphin</i>	107	1953	Sandy Hook, N. J.
<i>Oregon</i>	100	1950	Kodiak, Alaska (Trans. to Ak. FY 1970)
<i>John N. Cobb</i>	93	1950	Seattle, Wash.
<i>Murre II</i>	86	1943	Juneau, Alaska
<i>George M. Bowers</i>	73	1956	Brunswick, Ga.
<i>Challenger</i>	65	1961	Sandy Hook, N. J.
<i>Cripple Creek</i>	65		Kodiak, Alaska (acquired about 4/71)
<i>Rorqual</i>	65	1941	Boothbay Harbor, Me.
<i>Kaho</i>	65	1961	Saugatuck, Mich. (BSF&W FY 71)
<i>Cisco</i>	59	1950	Saugatuck, Mich. (BSF&W FY 71)
<i>Siscowet</i>	51	1946	Ashland, Wis. (BSF&W FY 71)
<i>Shang Wheeler</i>	50	1951	Milford, Conn.
<i>Alosa</i>	48	1941	Oxford, Md.
<i>Point of Marsh</i> (J-3486)	48		Beaufort, N.C.
<i>Hiodon</i>	46	1965	Mobridge, S.D. (BSF&W FY 71)
<i>Musky II</i>	45	1960	Sandusky, Ohio (BSF&W FY 71)
<i>Kingfish</i>	43	1954	St. Petersburg Beach, Fla.
<i>Rachel Carson</i>	43	1967	Panama City, Fla.
<i>Tommy Box</i>	42		Galveston, Tex.
<i>Martha E. (Xiphias)</i>	42		Sandy Hook, N.J.
<i>Phalarope II</i>	40	1932	Boothbay Harbor, Me.
<i>Sockeye</i>	40	1946	King Salmon, Alaska
<i>Sablefish</i>	38	1949	Kasitsna Bay, Alaska (sold 1971)
<i>Blueback</i>	38		Woods Hole, Mass.
<i>Redfish</i>	28		Galveston, Tex.

Marine Game Fish Activities

Transfer of the Marine Game Fish Research Program of the Bureau of Sport Fisheries and Wildlife to NMFS represented the only basic addition

to the structure of NMFS brought about by the creation of NOAA. The Marine Game Fish Research Program historically had dealt with studies of the problems of the marine game fisheries and their habitats but in an agency with little orientation toward the sea.

Reorganization Plan No. 4 reflected the recommendations of a number of governmental reorganization studies which had been carried on in recent years, particularly those of the Commission on Marine Science, Engineering and Resources, which urged that this program, along with most of the others dealing with oceanic and atmospheric subjects, be put in a new ocean-oriented agency. This policy reflects the fundamental concept that only through the grouping of the ocean-oriented activities of the Government in a single strong organization capable of bringing to bear a wide variety of talents, equipment, and constituency support on marine resource development problems could the Federal Government make essential progress.

The Marine Game Fish Research Program began as the outgrowth of the enactment of the Fish and Wildlife Act of 1956. Subsequently, Congress enacted the Migratory Marine Game Fish Act of 1959 which directed the Secretary of the Interior to carry out a broad program of research into the problems affecting the health and future of the Nation's saltwater game fish populations and the interests of the anglers who depend upon these populations for their recreation.

As an indication of the way in which ocean angling has evolved, the number of saltwater anglers increased from about 4 million in 1959 to 9.4 million in 1970. The rate of increase in numbers of marine anglers continues substantially above that for most other participant sports.

Activities originally visualized for the Game Fish Research Program included studies to determine population size and the effects of harvest and exploitation. While the more important commercial species had been studied sufficiently to understand the characteristics of their life histories, this was true of few of the sport species. Thus, studies of life histories of game fish was another point of principal focus. Naturally it was recognized that no animal, whether sport or commercial, can exist without a healthy environment. Consequently, environmental studies were put into the program early, together with studies to attempt to develop methods for habitat management. Lastly, it was recognized that problems relating to allocation of scarce species and determinations of the extent to which a particular species might be harvested depended upon getting accurate information as to size and composition of the catch. While reasonably accurate commercial fishery statistics were available, there were no feasible means of getting comparable sport fish statistics except at great cost. Therefore, plans were made to try to develop a suitable sampling system to collect such statistics in a way which would permit relatively small samples to be expanded into total catch figures with reasonable accuracy.

The original facilities were located at Sandy Hook, N.J., where the first laboratory was established in 1961 in the former Army hospital at Fort Hancock. The second laboratory was established later in the same year at the former U.S. Navy net depot at Tiburon on San Francisco Bay in California. The third laboratory was erected on Narragansett Bay, adjacent to the University of Rhode Island marine complex, in 1966. Simultaneously plans were developed for two laboratories to be built on the Gulf of Mexico. One at Panama City, Fla., was begun in 1966 and completed in 1972. The other, at Port Aransas, Tex., designed to handle problems of the Western Gulf, was to have been completed in 1972.

These facilities, programs, and scientific and support personnel were transferred by Reorganization Plan No. 4 to become an integral part of NMFS. It was obvious that only by developing a program which could take advantage of the total scientific capabilities of NMFS could the full effectiveness of this organization be brought to bear on the many current and pressing marine fishery resource problems needing solutions. Therefore, general plans were made to develop marine fishery programs that would be related to all of the major program entities of NMFS and which would ultimately result in the placement of sport fishery programs in most of the laboratories operated by NMFS. From the time of the effective date of Reorganization Plan No. 4 through fiscal year 1972, a general reorganization has taken effect which has resulted in a regrouping of projects as well as facilities so that the programs are now carried out from an array of national fisheries centers strategically located on each of our coasts.

Environmental and fisheries survey programs in the research category are of significance to most marine resources. They serve all kinds of fish and marine resources. The research program that relates to problems of specific sport fish has retained its basic identity in broad categories of research under headings of population dynamics, stock identification, life histories, and environmental modification. All of the studies now being carried out are being approached from an ecological viewpoint so that while a project may deal primarily with a sport fish species or group of species its findings may be of significance for a related commercial fishery.

The game fish statistics program which involved the preparation of the 1970 saltwater angling survey was transferred from the Resource Research group to the Resource Utilization group and is being handled by the staff of statisticians in the Division of Fishery Statistics. In addition to the saltwater angling survey which has been carried out every five years since 1955, a broad program of collection of statistics on a more frequent basis is under intensive study with the expectation that it will be put into partial operation in fiscal year 1973.

Prior to the establishment of NMFS and NOAA any extension work which was directed toward making the results of research studies available to the general public had to be carried out primarily by the staffs of the

marine laboratories themselves. This was an undesirable diversion of highly skilled research talent which is now avoided by having this work placed in the Extension Program (see section on Resource Management) being supported by NOAA through both NMFS and the Sea Grant Program. Thus, once again, trained specialists are available to develop appropriate extension programs.

The details of the work being carried out in marine game fish research, collection of statistics, and in extension work will be found in those parts of this report dealing with those specific activities.

International Activities Staff

During 1971, part of the functions of the International Affairs unit of NMFS were converted into a staff function at NOAA headquarters. A research, support, and advisory staff was retained within NMFS, including the Office of Foreign Fisheries, and renamed the International Activities Staff.

The International Activities Staff provides advice and policy recommendations to the Director on international fisheries problems. It studies the impact of foreign and international fisheries developments on the achievement of NMFS objectives and prepares background reports for use in the formulation of fisheries policies, in the conduct of negotiations, and in connection with NMFS participation in the activities of international organizations concerned with fisheries.

The number of foreign fishing vessels operating off the U.S. coast and in major fishing areas continues to increase. The International Activities Staff obtains information on developments in foreign high seas fishing operations which may affect the U.S. fishing industry and analyzes and reports on foreign fishing activities off the U.S. coasts to provide an overview of the range of these fisheries for use in formulating international fisheries policies. Profile reports on the fisheries of foreign countries are developed for various purposes, chiefly use at the Law of the Sea Conference.

The International Activities Staff also services four Regional Fisheries Attachés stationed in Tokyo, Copenhagen, Mexico City, and Abidjan and supervises the CERP fishery reporting program of the Department of State to obtain current technical, economic, and political information on fisheries from U.S. overseas posts in more than 120 countries. Trade leads, trade agreements affecting fisheries, prices, and stocks are among the other aspects regularly reported to keep the Government, the fishing industry, and the public informed and thereby enable the U.S. fishing industry to cope more effectively with competition from foreign fishing industries.

The Translation Program within the Staff examines and screens foreign

scientific publications, arranges for their translation, and serves as a national clearinghouse for such translations.

International Fishery Treaties and Agreements

NMFS continued its objective to implement U.S. international policy by helping to protect both coastal and distant water fishery resources of interest to U.S. fishermen. The regulatory or management obligations of the Service are presently concerned with implementing regulations to carry out eight treaty obligations of the United States with respect to harvesting halibut, salmon, and fur seals in the North Pacific; hake, haddock, cod, and flounder in the Northwest Atlantic; yellowfin tuna in the Tropical Pacific; and whales generally. Various employees of the Service have been appointed by the President to serve as Commissioners on several of the eight international fishery commissions established for specific fisheries or specific areas of fishing concerning these treaties.

The Service has responsibility for conducting all scientific investigations needed to support U.S. participation in the International Commission for the Northwest Atlantic Fisheries (ICNAF), the International Commission for the Conservation of Atlantic Tuna (ICCAT), the International North Pacific Fisheries Commission (INPFC), the North Pacific Fur Seal Commission (NPFSC), and the International Whaling Commission (IWC). The United States is also party to nine bilateral fishery agreements adapted to more specialized management problems. The Service performs research in support of many of these.

During 1970 the United States renegotiated two bilateral executive agreements with Japan. The U.S.-Japan agreement on the Contiguous Fishery Zone initiated on May 9, 1967, after passage of Public Law 89-658 establishing a nine-mile exclusive fishery zone, was renegotiated in November 1970 and extended to December 1972. The agreement allows certain traditional Japanese fisheries to continue inside the U.S. exclusive fishery zone during specific periods. It also places certain restrictions on Japanese fishing on the high seas outside the fishery zone to prevent gear conflicts and to allow U.S. fisheries the opportunity to fish in areas usually fished by them. The U.S.-Japan agreement on the king and tanner crab fisheries of the Eastern Bering Sea initiated on November 25, 1964, was renegotiated in November 1970 and extended for a two-year period. The principal change in 1970 was that Japan's quota of king crab was reduced by 56 percent, from 85,000 cases to 37,500. Japan's quota on tanner crab was reduced from 18.2 million crabs to 14.6 million.

In 1970, the United States and Poland extended their one-year agreement on mid-Atlantic fisheries which was initially signed on June 12, 1969. The agreement prohibits large vessels, such as those used by Poland, from fishing during January 1 through April 15 in a long belt from Rhode Island

to Virginia in waters of the 50-100 fathom zone where winter concentrations of bottomfish are found. The agreement also requires Poland to refrain from conducting specialized fisheries in all instances for scup, flounder, red hake, silver hake, menhaden, river herring, and black sea bass in the mid-Atlantic Bight, and to limit its incidental mid-Atlantic catch of those species to a total of 1,300 metric tons, of which not more than one-third may be of any one species.

On April 24, 1970, Canada and the United States signed a 2-year agreement extending reciprocal fishing privileges in the 3-12 mile fishery zone off both the east and west coasts of the two countries south of 63°N. latitude. The agreement covers species involving commercial fisheries affecting both countries. However, fishing for any species of clam, lobster, herring, scallop, or shrimp in the reciprocal fishing area of the other country is not permitted. Salmon trolling by the Canadians will be permitted in the 3-12 mile limit of the United States only along the coast of Washington State; similarly, U.S. salmon trollers will be permitted to fish within such limits along the Canadian shore only off Vancouver Island.

During February 1971, the United States renegotiated three bilateral agreements with the Soviet Union: the Agreement on Gear Conflict (Kodiak Gear Agreement) originally signed on December 14, 1964; the Agreement on King and Tanner Crab Fisheries of the Eastern Bering Sea initiated on February 5, 1965; and the Agreement on the Contiguous Fishery Zone originally signed on February 13, 1967.

The Kodiak Gear Agreement provides that mobile gear such as that used by the Soviets will not be deployed in six areas around Kodiak Island for specific periods when U.S. king crab fishermen fish extensively with fixed crab gear. In 1971, the six areas were modified to include only the waters seaward of the 12-mile fisheries zone and closed periods for three of the six areas were increased by 3½ months. This will provide additional protection for the growing U.S. tanner crab fishery and for many of the shrimp grounds fished by Kodiak fishermen. The principal feature in the current U.S.-Soviet King and Tanner Crab Agreement is that the Soviet harvest of king crabs was reduced by 56 percent to 23,000 cases. The Soviet tanner crab quota was reduced by 12.5 percent to 35,000 cases of tanner crab. The U.S.-Soviet Contiguous Fisheries Zone Agreement places certain restrictions on the high seas Soviet fisheries beyond the contiguous zone so as to protect fishery resources of particular importance to the United States and to prevent gear conflicts with U.S. fishermen. In return, limited access by Soviet fishery vessels to certain U.S. ports and to the U.S. contiguous zone is facilitated under the Agreement.

Plans and Policy Development Staff

During 1971 it became evident that the Director of NMFS needed an organization in his immediate office to assist him in regard to program

relationships within NMFS and with NOAA. Consequently, a Plans and Policy Development Staff was authorized as of July 1, 1971.

The Plans and Policy Development Staff advises the Director on those activities of the NMFS involving planning, program coordination, and budget management. The Staff provides guidance on current trends and needs of the future in developing missions, goals, objectives, and policies and in so doing provides coordination within NOAA and with other agencies of Government and public and private organizations. It conducts and/or coordinates special analytical studies as the basis for alternative solutions to problems for the decision-making process.

The Staff advises on the design, development, and use of management and data information systems and the evaluation of the effectiveness of NMFS management, programs, and activities. It coordinates the formulation, justification and presentation of the NMFS program budget, including the development of program papers, the annual budget estimates, and the justifications for appropriations. It provides staff assistance to the Directorate in executing the budget, including preparation of apportionments, allotment advices, and control schedules, and processes requests for supplemental appropriations and reprogramming actions. It performs analyses monthly on the rate of progress in carrying out authorized programs and recommends changes, as necessary, to achieve best utilization of funds and manpower or to meet urgent unforeseen requirements.

Congressional Affairs and Legislation

That portion of the Office of Congressional and Legislative Affairs (NOAA) which is detached for service with NMFS is responsible for formulating and conducting work related to the legislative program of NMFS and the relationships of that Service with members of the Congress. The legislative program is complex and diversified in nature in that NMFS must deal with numerous legislative proposals and programs relating to or affecting the United States commercial fishing industry, the sportsmen interested in the marine recreational fishery, and the living natural resources utilized by both.

The detachment has responsibility for the preparation, coordination, and implementation of the NMFS legislative program and maintains liaison with the Office of Congressional and Legislative Affairs (NOAA), and with the General Counsel's office in the Department of Commerce in order to accomplish review and coordination of reports on specific legislative proposals and to assure proper response to a variety of Congressional requests for information and assistance. Additional functions of the office are to prepare testimony for hearings; attend hearings; review and correct transcripts of hearings as necessary; analyze Federal statutes bearing on NMFS programs, indicating the extent of impact on NMFS functions and

general procedures; and provide general consultative and advisory services on legislative and related matters.

During the 1st Session of the 92nd Congress, several new Federal laws were enacted which involved to some degree new program or new administrative responsibilities for NMFS. These include an amendment to the Northwest Atlantic Fisheries Act of 1950, as amended, P.L. 92-87, 85 Stat. 310, August 7, 1971; the establishment of the National Advisory Committee on the Oceans and Atmosphere, P.L. 92-125, 85 Stat. 344, August 16, 1971; the Alaska Native Claims Settlement Act, P.L. 92-203, 85 Stat. 688, December 18, 1971; and an amendment to the Fishermen's Protective Act of 1971, P.L. 92-219, 85 Stat. 786, December 23, 1971. Those items developed by NMFS which are left unresolved at the close of the 92nd Congress will be resubmitted for consideration during the 93rd Congress.

Public Affairs

The Public Affairs activities of the National Marine Fisheries Service are a function of the Public Affairs Officer and his staff, assigned to NOAA Headquarters but detailed to NMFS by the NOAA Public Affairs Office.

The Public Affairs Officer is responsible for liaison between NMFS and NOAA in all public affairs activities. He functions as a member of the staff of the NMFS Director and has close contact with the three Associate Directors and their Division Chiefs, as well as the NMFS Regional and Center Directors. The Public Affairs Officer is responsible for the preparation and clearance of the Director's speeches.

The Public Affairs Office handles national news releases, feature stories, interviews with representatives of the media, and inquiries from the press, radio and TV, trade papers, and the general public. The Public Affairs Office also maintains liaison with NMFS Regional Offices and fishery centers.

Marine Fisheries Advisory Committee

The Marine Fisheries Advisory Committee (MAFAC) was established February 17, 1971 by the Secretary of Commerce under provisions of Reorganization Plan No. 4 of 1970 and Executive Order 11007, Section 3b Act of July 1, 1954 (15 U.S.C. 713—3 (c)). MAFAC members are appointed by the Secretary and advise him on matters pertinent to the Department of Commerce's responsibilities for marine fisheries resources.

The Committee held two meetings in Washington D.C.: May 24-25 and September 22-23, 1971.

Membership of the Committee on December 31, 1971 was:

Chairman: Dr. Robert M. White, Administrator
National Oceanic and Atmospheric
Administration

Mr. D. Otis Beasley
Attorney at Law
500 Solar Building
Washington, D.C. 20036

Dr. Clarence P. Idyll
Food and Agriculture Organization
of the United Nations
Via delle Terme di Caracalla
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Mr. William S. Brewster
United Shoe & Machinery Corp.
Federal Street
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Professor John D. Isaacs, III
Scripps Institution of
Oceanography
La Jolla, Calif. 92037

Dr. L. Eugene Cronin
Natural Resources Institute
University of Maryland
College Park, Md. 20740

Mr. Harold E. Lokken
Fishing Vessel Owners
Association, Inc.
Pier 59, Foot of Pike Street
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Dr. James A. Crutchfield, Jr.
Department of Economics
University of Washington
Seattle, Wash. 98105

Mr. Henry Lyman
Salt-Water Sportsman
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Mr. Jacob J. Dykstra
Point Judith Fishermen's
Cooperative Association
Point Judith, R.I. 02882

Mr. John A. Mehos
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Mr. William A. Nungesser, President
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300 Homer Street
New Orleans, La. 70114

Mr. Ray H. Full
Kishman Fish Company
573 River Street
Vermilion, Ohio 44089

Mr. John M. Olin
Olin Mathieson Chemical Corp.
7701 Forsyth Boulevard
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Mr. William B. Hannum, Jr.
Sea Farms, Inc.
813 Caroline Street
Key West, Fla. 33040

Mr. John J. Royal
Fishermen's Union
Local 33, International Longshoremen
& Warehousemen's Union
San Pedro, Calif. 90733

Mr. Allen W. Haynie
Haynie Products, Inc.
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Mr. William G. Saletic
Seiners Association
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Seattle, Wash. 98107

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Chicago, Ill. 60612

Mr. Everett H. Tichon
Tichon Fish and Fillet
Corporation
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New Bedford, Mass. 02742

Mr. Henry J. Shakespeare
Shakespeare Company
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Mr. Lowell A. Wakefield
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Port Wakefield, Ak. 99550

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Westgate-California Corp.
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San Diego, Calif. 92112

Mr. Theodore S. Williams
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Mr. A. Burks Summers
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Bethesda, Md. 20014

Mr. W. Horace Witherspoon, Jr.
4645 Fairfield Drive
Corona del Mar, Calif. 92625

Mr. Robert M. Thorstenson
Petersburg Fisheries
P.O. Box 747
Petersburg, Ak. 99833

Executive Secretary: John L. Baxter
National Marine Fisheries Service

RESOURCE RESEARCH

The Office of the Associate Director for Resource Research is responsible for the development and implementation of research programs to produce the data and knowledge necessary for management, protection, and wise use of the Nation's living marine resources. In this capacity, this Office is responsible for directing the Marine Monitoring Assessment and Prediction Program (MARMAP) and research at seven Centers: Southeast Fisheries Center; Southwest Fisheries Center; Northeast Fisheries Center; Northwest Fisheries Center; Atlantic Estuarine Fisheries Center; Gulf Coastal Fisheries Center; and Middle Atlantic Coastal Fisheries Center; and three laboratories located at Tiburon, California; Auke Bay, Alaska; and Washington, D. C.

Resource Research of the National Marine Fisheries Service includes:
1) Collection and documentation of scientific data for the purpose of al-

locating and protecting access to living marine resources for U.S. citizens.

- 2) Assessment and characterization of the raw material potential and fundamental properties of fishery resources.
- 3) Undertaking biological surveys and studies for monitoring, assessing, and predicting the abundance and availability of living marine resources.
- 4) Development of monitoring, sampling, assessment, and analytical methods, techniques and equipment.
- 5) Collection and assimilation of information to provide for the protection and improvement of the quality and abundance of living resources in both natural and controlled environments.

The National MARMAP Program launched in 1970 provides for the collection of biological and environmental information by standardized methods on the Continental Shelf and oceanic areas off the United States. Analysis of data from comprehensive long-range MARMAP surveys will provide urgently needed information on the extent and future outlook of various fish stocks and insight on factors affecting their well-being. Accomplishments to date include selection of a standardized plankton sampling gear and techniques, developing plankton sorting and taxonomy capabilities at our research Centers, and establishing extensive regional data collection systems.

A resume of the missions of the various field installations and their activities by geographical area during the reporting period is provided below.

Southwest

Southwest Fisheries Center

The Southwest Fisheries Center, La Jolla, Calif., is responsible for studies leading to the conservation of our pelagic natural resources in the California Current and the eastern tropical, central, and western Pacific Ocean. These studies include research and management whose aim is predicting the size of the resources and the rational utilization of fisheries in the area. The Center conducts fishery management research in support of the U.S. position in fishery commissions and for bilateral and multilateral fishery negotiations in this region, in cooperation with the Regional Director, NMFS Southwest Region. The Center comprises two laboratories, the La Jolla Laboratory, adjacent to the Scripps Institution of Oceanography, and the Honolulu Laboratory, near the University of Hawaii; NMFS staff at both laboratories maintain close research contact with their colleagues at these institutions.

The Southwest Fisheries Center operates a high seas research vessel in

the eastern Pacific from northern California to below the Equator. Operating out of Honolulu are two high seas research vessels which sail the tropical and subtropical central Pacific on oceanography and fishery cruises.

Major emphasis at the La Jolla Laboratory is on environmental studies designed towards the general objective of tactical and strategic fishery prediction, an objective which now has a reasonable probability of success, because of recent technological advances in environmental monitoring and prediction. Research at the La Jolla Laboratory stresses four major investigations: Stock Biology, Resource Surveys and Monitoring, Ecological Investigations, and Experimental Biology, with some effort also on Aquaculture.

The Honolulu Laboratory, located centrally in the Pacific, provides a base from which to study high seas tropical pelagic fishery resources in mid-ocean. Principal effort is devoted to the assessment of commercial and game fish stocks, chiefly tunas, and to investigations of the relation of fishes to the tropical oceanic and island environment. Because of its location and the capability of holding large tropical pelagic fishes at this laboratory, a major effort is applied to studying the sensory and physiological reactions of tunas to their environment.

Significant accomplishments by the Southwest Fisheries Center include:

- 1) The successful spawning of the northern anchovy in the laboratory, the first time any important commercial pelagic fish has been induced to spawn under artificial conditions.
- 2) Evaluation of various techniques to reduce mortality of porpoises taken accidentally in tuna fishing operations.
- 3) Acquisition of new knowledge on the population structure and dynamics of certain fish and whale stocks to provide data to national and international agencies concerned with their management and protection.
- 4) Development of techniques for the rapid counting and aerial measurement of fish schools by using sonars.
- 5) Quantified description of the development and nature of fish larval feeding behavior and mechanisms for use in studying survival of larval fish in various oceanic conditions.

Tiburon Fisheries Laboratory

The Tiburon, Calif., coastal laboratory is the headquarters for research on coastal marine, shellfish, and anadromous fisheries in the Southwest Region. The mission of the laboratory is to obtain information on the migration, availability, growth rate, and population size of various coastal sport and commercial fish and shellfish. In addition, studies are undertaken

to measure the effects man's disturbance of the environment has on marine life. Results of such studies provide the basis for management measures to establish fishing regulations and for regulating actions that will have an adverse affect on the environment.

Significant accomplishments include assistance to the State of California in developing new commercial fisheries for sea urchins and basking sharks, and progress toward completion of a comprehensive angler's guide for sport fishermen.

Northwest

Northwest Fisheries Center

Headquarters of the Northwest Fisheries Center in Seattle is a multibuilding complex located near the University of Washington on land bordering Portage Bay, Lake Union. The main buildings consist of a 16,000 square foot office/laboratory with connecting walk-ways to a 72,000 square foot office/laboratory. Three offshore research vessels and several small vessels comprise the Center's fleet.

Work at the Center involves research on salmon in the high seas of the North Pacific in fulfillment of U.S. obligations under the International North Pacific Fisheries Convention. Research on groundfish is undertaken to determine the status of stocks, potential yields, maximum sustainable yields of exploited stocks, and methods of forecasting abundance and availability. Such knowledge provides the basis for international agreements for the conservation of these resources. Center scientists also assess the effects of industrial and multipurpose water resource developments on fishery resources and develop ways to counteract adverse effects; determine the suitability of raising coho salmon in marine waters for market and for enhancing sport fishing; assess measures to be undertaken for conservation and wise management of the Northern fur seal resource; and develop more efficient and economical fishing and sampling gear.

Included in the Northwest Center are eight outlying laboratories and field stations. The mission of the Kodiak, Alaska laboratory, which is located in renovated buildings formerly part of the Kodiak Naval Station, involves assessment of marine fish and shellfish populations in the offshore waters of Alaska. The Marine Mammal Management and Monitoring Laboratory is housed at the Seattle Naval Support Activity at Sand Point. Functions of this laboratory include research to provide the scientific information needed to formulate management decisions toward achieving the maximum sustainable yield of the Northern fur seal.

At the Aquaculture Research Station at Manchester, Washington, research is carried out on various aspects (nutrition, stock selection, thermal control, etc.) of salmon rearing in saltwater.

The Research Station at Mukilteo, Washington, serves as a base for studies on effects of thermal and chemical stresses on fish in Puget Sound.

At the Environmental Laboratory at Prescott, Oregon, located on a barge moored in the Columbia River, environmental research is conducted on the Columbia River in the vicinity of Prescott.

At the Hammond, Oregon Biological Field Station research is aimed at determining the effects of changing environmental conditions on economically important fish and shellfish in the Columbia River estuary.

The Fisheries-Engineering Research Laboratory at North Bonneville, Wash., is housed in space owned by the U.S. Army Corps of Engineers. The primary mission is to provide information on performance and behavior of upstream migrating salmon and steelhead in fishway situations.

The Pasco, Wash., Biological Field Station studies the effects of dams on the survival of juvenile salmonids migrating seaward.

Major accomplishments of the Northwest Fisheries Center include:

- 1) Coho salmon were successfully reared in saltwater floating pens. This shows great promise as a commercially economical venture and as a means for supplementing the supply of salmon for the Puget Sound sport fishery.
- 2) The general condition of major species of fish in the North Pacific was obtained by resource assessment cruises and analyses of data of foreign fishing fleets. Such information provides the basis for international negotiations as to measures required to conserve the various fish stocks.
- 3) Research on the Columbia River revealed that construction of the Lower Monumental and Little Goose Dams on the Snake River reduced survival of downstream migrating salmon by over 50 percent. Various means to alleviate such losses are under study.
- 4) Inexpensive lightweight fish traps for fishing in deep water were developed and found to be effective. Their usage was adopted by the commercial fishery.

Auke Bay, Alaska, Fisheries Laboratory

The Auke Bay Laboratory is headquarters for coastal research from southeast Alaska to the Bering Sea. Satellite to the laboratory are field stations at Little Port Walter in southeast Alaska, King Salmon in the Bristol Bay area, and Kasitsna Bay in Cook Inlet. Three small research vessels are assigned to the laboratory.

Research at the Auke Bay Laboratory is organized into four major programs: Experimental Biology, Stock Biology, Resource Survey and Monitoring, and Ecology.

The Experimental Biology Program involves studies of the basic biology

of salmon and their environmental requirements for the purpose of improving natural production from existing salmon stocks, and enhancing production of salmon by aquaculture methods.

The Stock Biology Program is directed toward determining natural mortality, fishing mortality, recruitment, biomass, and growth of important demersal fishes, salmon, crabs and shrimp.

The Resource Survey and Monitoring Program involves assessing the seasonal and annual fluctuations in abundance and distribution of important marine species.

The Ecology Program provides the information base, through field and laboratory research, for recommendations to prevent or alleviate damages to coastal fisheries by petroleum, timber, and water resource developments and by nuclear testing.

A few of the significant accomplishments were:

- 1) In cooperation with the Alaska Department of Fish and Game, the size and species composition of shrimp stocks in Kachemak Bay, Alaska was determined and a basis was developed for setting an annual quota to be harvested.
- 2) NMFS scientists surveyed the marine environment prior to and after the detonation of a nuclear device at Amchitka Island and discovered no significant damage to the fauna or marine environment.
- 3) An examination of freshwater and marine fish for DDT, PCB's, and mercury revealed the contaminants were widely distributed through Alaska fishes but mostly at low levels of concentration.
- 4) Methods to enhance salmon production were employed at Saska Creek, southeast Alaska, and it appears these methods were responsible for the largest pink salmon run since 1941 and a record run of coho salmon.

Northeast

Northeast Fisheries Center

The mission of the Northeast Fisheries Center is to conduct research on the distribution and abundance of the major species of fish and shellfish which occur off the coast of the New England and Middle Atlantic States and investigate the factors which affect their abundance. Recommendations are made for the implementation of various management measures, particularly control of the harvest, which will lead to the conservation and preservation of these stocks.

Headquarters of the Northeast Fisheries Center is Woods Hole, Mass.,

site of the first U.S. Government fishery research laboratory (1871). In addition to the Laboratory, there is a public aquarium which is visited by about 250,000 people during the 10-12 weeks it is open each summer. Other laboratories of the Center are located at Boothbay Harbor, Me., and Narragansett, R.I. All have running seawater systems and are equipped to maintain and study living marine animals. An offshore research vessel is based at Woods Hole and smaller vessels at the other laboratories.

Research at the Woods Hole Center is oriented around four major programs: Resource Survey, Ecology, Fishery Management Biology, and Technology.

Principal objectives of resource surveys are to monitor changes in the distribution and abundance of fishes (including all major groundfish stocks) in relation to fishing effort and environmental factors, and to provide recruitment predictions for priority stocks such as haddock, cod, yellow-tail flounder, and red and silver hake.

Ecological studies emphasize both field and laboratory experiments to improve our knowledge of the ecology of marine fishes, with emphasis on those of importance to sport fishermen.

The Fishery Management Biology Program seeks to determine yield levels that various Northwest Atlantic stocks can sustain at their present level of abundance. In addition, the program considers the effects of all fishing on the total fish biomass. The recommendations are made to national and international agencies having management responsibilities.

Objectives of the Technology Program include the development of effective, efficient and calibrated gear for sampling fish, shellfish, plankton and for collecting general oceanographic and biological data.

Accomplishments of the Northeast Fisheries Center include:

- 1) Semi-annual surveys were conducted of groundfish stocks from Cape Hatteras to Nova Scotia in collaboration with Canada and the USSR to provide current information on the condition of fish stocks in this area.
- 2) The condition of the Georges Bank and southern New England yellowtail flounder and Georges Bank haddock stocks was analyzed and decreased quotas acceptable to the International Commission for Northwest Atlantic Fisheries were recommended.
- 3) A fairly definite separation was determined between offshore and inshore populations of lobsters from studies of the parasitology, size composition, sex ratios, and movements of tagged lobsters. This will have an important bearing on lobster management.
- 4) An international tagging program was completed which resulted in a description of the migration routes of the blue sharks.
- 5) An automatic data logging system was developed for recording 22 operational, meteorological, and hydrographic measures for use aboard research vessels.

Middle Atlantic Coastal Fisheries Center

The Middle Atlantic Coastal Fisheries Center, with headquarters at Sandy Hook, N.J., is engaged in an integrated, cooperative, multidiscipline research program on the biology and ecology of living marine coastal organisms, with primary emphasis in the zoogeographic area known as the Middle Atlantic Bight. This program is being carried out in cooperation with other interested Federal, State, and municipal agencies and with local academic and non-profit research institutions.

The Center is the focal point for the Sandy Hook, N.J., Marine Laboratory, the Oxford, Md., Biological Laboratory, the Milford, Conn., Biological Laboratory, and the former Ann Arbor, Mich., Technological Laboratory (now based at Milford). A modern 158-foot stern-trawler is based at Sandy Hook and four small motor vessels operate out of the three facilities.

The Center is organized around five major research programs: Ecosystem, Resource Assessment, Experimental Biology, Pathology, and Aquaculture.

The Ecosystem Program involves studies of physiological responses of marine animals to toxins and organic wastes, zoogeographic distribution of benthic populations, evolution and succession of reef structures, and surveys and analyses of the effects of man-made environmental changes on abundance and distribution of marine organisms. A major immediate responsibility is the aforementioned Mid-Atlantic Bight area, where such man-made changes are most profound. Important aspects of the Ecosystem Program concern environmental chemistry and microbiology. This work, located principally at the Milford facility, is concerned primarily with determining the level of chemical contaminants in marine resources and food chain organisms, and in the environment of marine animals. It also is concerned with the distribution of microorganisms (bacteria, viruses, fungi and algae) in marine inshore animals.

The Resource Assessment Program includes studies of the life history, distribution, migration, physiology, and behavior of coastal marine species of the Middle Atlantic Bight and adjacent waters; subpopulation studies using immunogenetic and biochemical techniques; statistical and geographical inventories; atlases of marine sportfish of the Atlantic; and larval fish distribution, abundance, and physiology.

The Experimental Biology Program concerns the genetic manipulation of selected mariculture species and the effects of environmental factors, natural and man-made, on growth, development, behavior, and survival of marine fish and shellfish.

The Pathology Program involves research on pathogens which affect living marine resources, role of environmental conditions on the incidence

of diseases, and development of effective methods for controlling diseases in cultured marine animals.

Aquaculture Program activities presently involve planning research and development measures to establish a model aquaculture system, with special emphasis on molluscan and crustacean species.

A few of the significant accomplishments during 1970-1971 include:

- 1) The collection and analyses of several thousand organism and sediment samples for heavy metals and other toxic materials. Results of the survey show a correlation between the distribution of benthic organisms and the distribution of heavy metals and coliform bacteria.
- 2) Fin rot disease in fish was found to be caused by several pathogenic bacteria, incidence of which seems to be related to pollution of the environment.
- 3) An 18-month study of zooplankton, bottom fauna, and fish surrounding Davids Island in Long Island Sound was completed. This work provides data on the fauna of the area prior to the proposed construction of a nuclear power plant.
- 4) Identification and characterization of parasitic amoebae and bacteria from certain fish and shellfish.

Systematics Laboratory

The NMFS Systematics Laboratory is located in the U.S. National Museum, Washington, D. C. The mission of the laboratory is to conduct taxonomic studies of marine life to produce classifications which are necessary to organize biological information and to stabilize the names of animals. Research at the laboratory is organized around three major activities: 1) classification of groups of animals that are of particular commercial or ecological importance, e.g., shrimps, sharks, mollusks; 2) studies of the fauna of particular geographical regions; and 3) studies of the fauna from particular ecological regions.

Major research accomplishments include the completion of 11 research papers on taxonomy of tropical American shrimps, sharks and north Atlantic fishes plus a summary paper on distribution of fishes in the Indian Ocean.

Southeast

Southeast Fisheries Center

The Southeast Fisheries Center, Miami, Florida, specializes in offshore oceanic fisheries research in an area extending from Cape Hatteras, N.C., to the Tropical South Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico. There are four laboratories and two research vessels carrying out the Center's programs within these confines. The Biological Laboratory,

collocated with the Center in Miami, is responsible for research in the fields of Resource Assessment, Ecosystems, Oceanography, and Fishery Biology. Programs relating to assessing, monitoring, and predicting the distribution and abundance of living marine resources, the effects of the environment on their survival and growth, plus an assessment of the U.S. fishing effort in relation to fisheries potential form the basis for the work of this laboratory.

Aiding in research in defining the fishery resources of the South Atlantic and Caribbean are scientists and technicians based at the Biological Laboratory, Brunswick, Ga. Center responsibilities in the area of exploratory fishing and assessing the conditions of the calico scallop resource are assigned to this laboratory.

Scientists based at the Biological Laboratory, Pascagoula, Miss., are involved in assessing and defining the pelagic groundfish and shellfish resource of the Gulf of Mexico and in developing new gear and sampling techniques.

The Center's Fishery Engineering Program is headquartered at NASA's Mississippi Test Facility, Bay St. Louis, Miss. Scientists working on this program test and develop new technological advances for application by NMFS researchers and representatives of the fishing industry.

Accomplishments of the Southeast Fisheries Center include:

- 1) Completion of an atlas on the distribution of tunas and billfishes in the Atlantic Ocean plus studies on food habits of tunas and migratory patterns of the marlins.
- 2) Successful testing of a low light level image intensifier system to locate fish schools at night by detecting the bioluminescent halo that surrounds them.
- 3) Assessing the abundance and location of stocks of offshore hake, royal red shrimp, red crab, calico scallops, and rock shrimp as an aid to the commercial fishing industry.
- 4) Completing a study of surface winds off the west coast of Africa to help tuna fishermen in predicting areas and seasons suitable for purse seine fishing.

Gulf Coastal Fisheries Center

The Gulf Coastal Fisheries Center with headquarters located at the Biological Laboratory, Galveston, Tex., is made up of four laboratories located on the periphery of the Gulf of Mexico. One of these laboratories is under construction at Port Aransas, Tex. Four small inshore vessels are assigned to these laboratories.

Activities of the Galveston headquarters laboratory include the development of economically feasible technology for reproducing and rearing

commercially important or potentially important marine organisms under controlled conditions and the evaluation of permits submitted to the U.S. Army Corps of Engineers involving construction in Gulf coastal areas. Research at the St. Petersburg Laboratory was directed toward defining the effects of natural and man-made changes on the estuarine environment and aquatic life and toward developing guidelines for utilization and enhancement of living marine resources. At the Panama City Laboratory studies were made of the life histories, behavior and physiology, and population dynamics of marine species with special emphasis on the billfishes.

Important accomplishments of the Center include:

- 1) Determination of optimum culturing techniques for larval shrimp and diatoms used as shrimp food.
- 2) Assessment of freshwater requirements of marine fishery resources in coastal Louisiana and south Florida.
- 3) Documentation of the rate that fish re-colonize newly constructed canals.
- 4) Compilation of data to obtain a better understanding of billfish stocks of the northeastern Gulf of Mexico.

Atlantic Estuarine Fisheries Center

The mission of the Atlantic Estuarine Fisheries Center at Beaufort, N.C., includes studies of the life histories of marine animals and plants, their relationships to each other and to the environment, their resource potential, the effects of man on their abundance, and methods for their scientific culture.

Research at the Center is organized around four major investigations with vessel support provided by a 47-foot coastal research vessel.

Ecosystem Investigations at the Beaufort Center are supported jointly with the U.S. Atomic Energy Commission and include studies of ecosystem structure and function in the coastal plain salt marsh estuaries typical of the mid-Atlantic and South Atlantic regions of the United States, in order to evaluate the effect of man's activities on this ecosystem type. Included in this very broad goal are: assessing the species structure and biomass composition of the ecosystem; and determining the major pathways and rates that contaminants of human origin, especially heavy metals, radionuclides, and pesticides, move within the ecosystem. Information from these studies is used to develop mathematical models to predict distribution and effects of radionuclides; to evaluate the importance of individual species to total ecosystem function; and in turn to estimate the

ecosystem requirements, including environmental quality, for the production of individual species.

Fishery Biology Investigations primarily are directed toward research on artificial reefs. The research goals include: 1) description of reef fish communities and of the life history of reef fishes, 2) the mechanism whereby artificial reefs attract or increase populations of fish and forage organisms, 3) the effects of reefs on catch per unit of angler effort, 4) the best materials for constructing productive reefs, 5) the most effective methods for building reefs, and 6) the manner in which organisms use reefs.

Experimental Biology Investigations seek to define the interactions of environmental stress and man's environmental modifications on the physiology and biochemistry of estuarine organisms. Studies deal with the interactions of salinity, temperature, radiation, suspended matter, and nutrition on respiration, osmoregulation, growth, and survival of estuarine fishes and invertebrates.

Resource Assessment Investigations concern mainly the Atlantic and Gulf menhaden resources. These are the largest fisheries in the United States by volume and menhaden rank uppermost in forage for other commercial and recreational fishes. The objectives of the program are to explain the causes of fluctuations in resource abundance and to predict response of populations to the fishery and to changes in the environment.

Work underway includes: 1) sampling the commercial landings from Massachusetts to Texas for vital statistics on population size, age composition, growth, survival, and geographic distribution, 2) measuring the juvenile menhaden abundance in estuarine nurseries to estimate the size of the incoming year class, 3) determining the recruitment and migrations by tagging, and 4) constructing predictive models for maximum sustained yield of both Atlantic and Gulf menhaden.

Significant accomplishments of the Center include:

- 1) Completion of analysis of four years' tagging of more than one million Atlantic menhaden which showed the resource is composed of one stock of migrating fish. Analysis of two years' of tagging Gulf menhaden showed that populations east and west of the Mississippi River may constitute separate stocks. Such information is vital to develop comprehensive multi-State and perhaps Federal management regulations.
- 2) Development of mathematical models that indicated a large proportion of total marine productivity is required to support exploited fish populations.
- 3) Completion of analysis of fish populations on 26 artificial reef sites along the Atlantic coast to show improved angling at these sites for bottom fishes with no change in fishing success for pelagic fishes.
- 4) Documentation of techniques and materials to use for artificial fishing reefs.

RESOURCE UTILIZATION

The Office of Resource Utilization plans and manages: 1) economic and marketing research; 2) the collection, analysis, compilation, and dissemination of fishery statistics and market news information; 3) administration of fishing industry assistance by providing money for loans, mortgage and loan insurance, and subsidies; 4) microbiological, chemical, and technological research to enhance the quality and utilization of fishery resources; 5) a voluntary national program of inspection and certification of fishery products; 6) programs to improve marketing practices and to alleviate extraordinary short-term supply-demand imbalances; and 7) national research programs in fishery products technology. The Office consists of five Divisions. These are the Economic Research Laboratory, the Statistics and Market News Division, the Fishery Products Research and Inspection Division, the Financial Assistance Division, and the Market Research and Services Division. Under the direction of the Fishery Products Research and Inspection Division are the Atlantic Fishery Products Technology Center, Gloucester, Mass.; the Pacific Fishery Products Technology Center, Seattle, Wash.; the Kodiak Fishery Products Technology Laboratory, Kodiak, Alaska; and the College Park Fishery Products Technology Laboratory, College Park, Md.

Economic Research Laboratory

The mission of the Economic Research Laboratory is to provide economic analyses to help overcome problems and obstacles facing the fishing industry (such as the common property nature of the resource, pollution, insurance problems) and help evaluate present and future Service programs for the managers.

Laboratory activities during 1970 and 1971 included: 1) analysis of the economic impact of changes in management policy in selected U.S. fisheries on the fishing labor force; 2) studying the economics of vessel and labor productivity in selected U.S. and foreign fisheries; 3) surveying and evaluating laws and regulations affecting selected U.S. fisheries; 4) evaluation of the socioeconomic impact of various fishery management schemes; 5) analysis of the marine sport-commercial fisheries conflict and the development of a bibliography on the economic analysis of sport fisheries; 6) estimation of capitalization in U.S. fisheries; 7) development of financial information to assist the fishing industry; 8) development of information on the economics of contaminants and pollution abatement; 9) economic evaluation of fishery byproduct utilization; 10) estimating the parameters of U.S. and world supply and demand relationships for major fishery products; 11) providing economic information for Government policy evaluation and formulation for ongoing and proposed Government actions and programs; 12) development of theoretical economic and interdisci-

plinary models necessary for the accomplishment of the Laboratory's functions.

Financial Assistance

The Division of Financial Assistance administered five programs to aid the commercial fishing industry during calendar years 1970-1971. These were: 1) the Fisheries Loan Fund program; 2) the Fishing Vessel Mortgage and Loan Insurance program; 3) the Fishing Vessel Construction Differential Subsidy program; 4) the Fishermen's Protective Fund program; and 5) the Capital Construction Fund program.

The Fisheries Loan Fund program provides financial assistance to fishermen who traditionally cannot effectively compete for credit. Direct loans are made available to qualified applicants for the purchase of vessels and gear, and for maintenance and repair. About 100 loans a year were granted in 1970-71 totalling about \$2,000,000 per year. About 400 cases a year were serviced with an accumulated total debt of over \$8,600,000.

The Fishing Vessel Mortgage and Loan Insurance program is available to those qualified in order to stimulate financial assistance to fishermen from conventional lenders by having the Government guarantee repayment of the debts incurred. This program covers new and reconstructed vessels. About 50 new cases a year were processed covering an insured amount of about \$4,000,000 each year. About 175 cases a year were serviced covering a total guarantee of over \$17,000,000.

The Fishing Vessel Construction Differential Subsidy program provides a subsidy to offset the high cost of domestic construction and reconstruction of fishing vessels in order to aid United States fishermen to compete more effectively in the marketplace. However, in accordance with the provisions of the act creating this program, no applications for the construction of a fishing vessel have been accepted after June 30, 1972.

The Fishermen's Protective Act program allows fishermen to enter into a guarantee agreement with the Government with payment of a prescribed fee whereby the government will insure their vessels against loss when a vessel is seized by a foreign government because of jurisdictional and fishing rights claimed by that government which the United States does not recognize. In order to free the vessel to continue fishing, the fines and fees imposed by the foreign government are paid through the State Department. NMFS pays compensation for damage, confiscation, fish spoilage, and partial payment for loss of gross income. About 200 guarantees are issued each year. Claims were about \$250,000 for 1970 and 1971 and about half of that amount will be paid by fees collected.

The Capital Construction Fund program allows fishermen to deposit certain amounts from their fishing activities into a fund created by agreement with the Secretary of Commerce. No tax is paid on the amounts

deposited, thereby allowing an amount for later vessel acquisition or reconstruction to be acquired at a faster than normal rate. The object of the program is to help replace our aging fishing fleet. About 150 agreements are now in effect even though the program is in its early stages. Deposits into the Fund for 1970 were about \$2,500,000.

Mailing addresses of the Division's field offices are:

6116 Arcade Building
Seattle, Washington 98101

144 First Avenue South
St. Petersburg, Florida 33701

State Fish Pier
Gloucester, Massachusetts 01930

300 South Ferry Street
Terminal Island, California 90731

2570 Dole Street
Honolulu, Hawaii 96812

P.O. Box 1668
Juneau, Alaska 99801

In the Northeast Region, 52 loan applications totaling \$1,079,281 were received in 1970-71. Of these, 33 loans were approved for a total of \$708,841. Eighteen new vessels were constructed; seven used vessels were purchased; four vessels were repowered; and four vessels were refinanced. Several of the loans included the purchase of equipment and gear.

In the Southeast Region during calendar year 1970, 23 loan applications totaling \$709,895 were received and 14 for \$477,690 were approved. During calendar year 1971, 39 applications totaling \$877,044 were received and 14 for \$364,800 were approved.

Under the fishing vessel mortgage and loan insurance program, during 1970, 18 applications totaling \$1,294,407 were received and 15 for \$1,101,402 were approved. The 15 approvals amounted to about \$1,465,000 in new construction costs. During 1971, 28 applications totaling \$2,188,865 were received and 25 for \$2,020,865 were approved. The 25 approvals amounted to about \$2,915,000 in new construction costs.

In the Southwest Region in 1970, 21 loan applications for a total of \$575,199 were received. Of these, 13 for a total of \$382,499 were approved.

During 1971, 27 loan applications were received for a total of \$846,107. Most individuals applying were interested in purchasing newer vessels of larger carrying capacity. Of these, 12 were approved for \$409,955, with several pending.

Statistics And Market News

The Statistics and Market News Division collects statistics on the quantity and value of landings of commercial fish and shellfish by species, region, and type of gear; the production of processed fishery products; imports and exports of fishery products; employment on fishing craft and in wholesale and fish processing establishments; per capita consumption of fishery products; and the number of fishing craft and gear operating in the fisheries. These data are collected by the statistical field offices and are published in monthly, quarterly, and annual reports. They are used for policy formulation, decision making, and research programs in both Government and private industry.

The Division also collects, publishes, and stores current market information on the commercial fishing, processing, and distribution industries. The Division operates seven Market News offices located in major fishery marketing centers of the United States. They compile daily information on prices, landings, imports, and holdings of fishery products and other general market information. This information is disseminated three times a week to industry, Government, and to the general public.

The Division collects statistics on the marine sport fisheries, such as the quantity of fish caught and the amount of fishing effort by species and by region.

The Division works closely with the States, other Federal agencies, regional commissions, and trade organizations in collecting data and in evaluating its programs.

In calendar years 1970 and 1971, greater emphasis was placed upon State-Federal cooperation in data collection and publication. For example, monthly landings data continued to be published in cooperation with each of 19 States. Alaska's Department of Fish and Game now provides on magnetic tape most of the data needed for that State. State assistance was sought in obtaining information on fish catches by distance from shore. The Division also provided data in various forms to State agencies. In 1971, copies of punched card files containing catch statistics for Maryland and Virginia for the years 1966-69 were provided to the Virginia Institute of Marine Science. Various data were provided universities doing research, trade organizations such as the National Fisheries Institute, and regional commissions such as the Atlantic States Marine Fisheries Commission. The Division also provided data to international organizations such as the Food and Agriculture Organization of the United Nations and the Organization for Economic Cooperation and Development.

Plans were formulated in 1971 for two new sections in the Division—one to study current collection techniques and publications (Statistical Proce-

dures Program), and one to plan the collection of marine sport fish statistics (Marine Sport Fish Statistics Program).

The Division directed its attention in calendar years 1970-71 to improving its operations through shortening the time required to get publications in the hands of users. Efforts were begun to explore more efficient and accurate methods of collecting statistics, and to determine types of fishery statistics that users need. An operations research analyst was hired and contracts were issued for a study of data collection methods and a survey of fishery statistics users. In addition, a contract was issued for a Response Bias Study/Pilot Household Survey to determine methods for obtaining responses from household interviewees that contain a minimum amount of bias and to obtain information usable for the efficient design of a nationwide survey.

In the Northeast Region, the Statistics and Market News Division continued to collect and report daily, monthly, quarterly, and annually all pertinent statistical and market data to record developments in the region's fishery industry. A series of monthly and annual statistical publications in seven of the 10 coastal States in the region were issued under cooperative agreements with the individual States. Daily Market News Reports were prepared and released from offices at Chicago, Ill.; Boston, Mass.; New York, N.Y.; and Hampton, Va. A continuing biological sampling program was carried out in New England ports to support and assist the Northeast Fisheries Center to assess the region's fisheries. This included sampling of selected trips at shore installations and aboard commercial fishing vessels on the high seas.

During calendar year 1971 the region's statistical and market news activities were consolidated into the Statistics and Market News Division. A consolidation of activities took place in the States of New Jersey, Pennsylvania, Delaware, Maryland, and Virginia. Consolidation was also effected in Boston. The "port pool," in cooperation with the Northeast Fisheries Center, is working well and these activities were extended into the Middle Atlantic and Chesapeake States. The State landings data and bulletins which had been collected and produced manually (it took up to 45-50 days to collect the necessary statistics) have been modernized. Collection time in the States of Maine, Massachusetts, Rhode Island, New Jersey, and Virginia is now accomplished within 20 days after the end of the reporting period because the systems used in these States have been fully automated and processed with ADP.

Preliminary plans were made to automate and speed-up collection of statistics in Maryland and New York. Plans were also formulated to modernize and update the region's five Market News offices in an effort to streamline operations in order to better meet the demands of Government and industry for current data on the fishing industry.

Market Research And Services

The present Market Research and Services Division evolved from the October 1971 reorganization that combined the Marketing Services Division with the Divisions of Current Economic Analysis and Economic Services.

During 1970 and 1971, the activities of the Divisions mentioned included planning, coordinating, and evaluating activities to improve marketing practices and alleviate supply-demand imbalances; developing markets for underutilized fishery products; developing and expanding foreign markets; conducting home economics research; and developing educational materials. The Division also prepared and published situation and outlook reports on shellfish, food fish, and industrial fishery products; conducted research studies on transportation problems; provided specific technical services and continuing analysis and monitoring of the development and operation of fishery cooperatives; conducted studies and made analyses on freight rates and tariff negotiations; maintained liaison with the Economic Development Administration and other Government agencies; provided industry and Service personnel with current status reports of the fisheries under the President's Stabilization Program.

Based on program requirements, the National Marketing Services Office in Chicago developed and disseminated educational materials, including food editor press releases, filmstrips, slide presentations, publications and other materials needed to better inform consumers, encourage consumption and improve marketing practices. It coordinated publicity activities with other State, Federal, and private educational organizations to maximize benefits to the fishing industry.

A major activity during 1971 was the program to restore consumer confidence in fishery products as a result of adverse publicity regarding contaminants in fish and shellfish.

Some of the other activities of the Division were carried on through the Education and Market Development Program which was designed, among other things, to provide information on handling, purchasing, and quality control to the food traders (retailers, distributors, and shippers) and to volume feeding institutions (schools, hospitals, restaurants, and cafeterias).

Under the foreign trade program, foreign markets for U.S. fishery products were developed and expanded by introducing and promoting them through international food trade fairs, trade center shows, and overseas in-store promotions. Information was also developed on current trends and conditions of foreign markets for industry use.

The marketing functions during 1970 and 1971 were performed by Washington Office staff and field-based personnel. Marketing coordinators for field operations were located in Gloucester, Mass.; St. Peters-

burg, Fla.; Seattle, Wash.; and Terminal Island, Calif. In addition, marketing specialists and/or home economists were located in New York, N.Y.; Baltimore, Md.; Chicago, Ill.; College Park, Md.; Atlanta, Ga.; Pascagoula, Miss.; Dallas, Tex.; Little Rock, Ark.; San Francisco, Calif.; and St. Paul, Minn.

During 1970 and 1971, *Food Fish Situation and Outlook*, *Shellfish Situation and Outlook*, and *Industrial Fishery Products Situation and Outlook* reports were issued on a quarterly basis. These reports contained information on current economic conditions and statistical analyses for the major food finfish, shellfish, and industrial products industries.

In the Northeast Region there are five field offices conducting market research and services activities: Gloucester, Mass. (also Regional headquarters for the program); New York, N.Y.; Baltimore, Md.; Chicago, Ill.; and St. Paul, Minn.

The following are examples of the types of activities that were carried on during the calendar years 1970 and 1971:

An educational campaign was conducted to restore consumer confidence in fishery products when publicity on contaminants adversely affected consumer attitudes toward wholesome fish. Personnel gave dozens of lectures and cookery demonstrations for mass feeder groups, academic groups, and employees of public and private agencies who work with the general public. Also, general seafood nutrition information was disseminated to the general public. Efforts were accelerated to educate the public on the nutritional value and utility of underutilized species. The reason for the accelerated program is a growing shortage of species now in common use. Seafood merchandising clinics were conducted for retail chains.

A study was made to find out the acceptability of various oyster, ocean quahog, and squid products to food industry operators and to determine the potential of these underutilized species.

In the Southeast Region, field marketing offices are located in: Atlanta, Ga.; Dallas, Tex.; Little Rock, Ark.; Pascagoula, Miss.; and St. Petersburg, Fla. The marketing and home economics staff is responsible for conducting marketing activities in the 17 states comprising the Southwest Region of the National Marine Fisheries Service.

During 1970-71, the media devoted an extraordinary amount of attention to the effects of pesticides and mercury and other heavy metals on fish and fishery products. To counteract some of this adverse publicity, the marketing staff mounted an intensive and extensive consumer education program to restore consumer confidence in fishery products. This included extensive personal appearances on television, providing newspaper food editors with factual information about seafoods, and extensive distribution of video tapes and films to television as well as spot announcements to over 2,800 radio stations throughout the region.

Assistance was provided industry in its efforts to develop markets for

many underutilized species including rock shrimp, catfish, mullet, spanish mackerel, calico scallops, pond-cultured salmon, snow crab, whiting, rainbow trout, king mackerel, and croaker.

The marketing efforts in the Southeast Region were closely coordinated with the fishery marketing staffs of the States of Texas, Florida, North Carolina, and Maryland; and various allied food trade groups.

In the Southwest Region, activities of special interest for 1970-71 included efforts to correct a supply-demand imbalance in Dungeness crab, consumer education in relation to the mercury problem, and promotion of underutilized species. Interest in aquaculture, particularly catfish farming, increased and many requests for information on the subject were filled. Material on catfish farming was presented to trade association meetings.

As part of the ongoing program in fishery education and market development, over 50 demonstrations to a total audience of about 3,500 were conducted—there were appearances on about 140 radio or television programs; about 100,000 educational leaflets were distributed.

Fishery Products Research And Inspection

Objectives of the Fishery Products Research and Inspection Division are to provide direct assistance to the fishing industry in solving technological problems, and provide the public with needed technical information on the nutritional value, composition, and the proper and safe handling and preservation of sport and commercial fishery products in the home.

The Division's research program is divided into six categories, each representing areas of activity responding to needs of the fisheries and the consumer:

- 1) **Utilization Technology**—The development of new technology in order to utilize underdeveloped species so as to replace those species in short supply because of limitations on present stocks and a changing environment; and the improvement of present seafood processing techniques to reduce losses, and to improve quality and consistency to the consumer.
- 2) **Marine Contaminants**—The measurement and monitoring of contaminants such as heavy metals, pesticides, PCB's, and radionuclides in fishery resources and products, and the study of their chemical form, removal, and significance in the diet.
- 3) **Process-Induced Hazards**—The study of toxins which can develop in fishery products under some conditions of processing, and the precautions needed to control their formation.
- 4) **Pollution Abatement**—The study of problems arising in disposal of wastes from various fishery processes and the potential recovery of by-products from those wastes.
- 5) **Quality, Composition, and Nutrition**—The study of the unique and

immensely varied composition of fish and fishery products and their significance as components of human and animal diets.

- 6) Inspection Systems—The development of standards and inspection techniques to help ensure a consistent supply of safe, high quality fishery products to the consumer.

The Division in 1971 operated three major laboratory complexes. Their numerous activities are coordinated through the Washington, D. C., central office. Each of the laboratories contributes to the overall research program. The College Park Laboratory, Md., is the technology and research focal point and its activities support the Gloucester, Mass., laboratory and the Seattle-Kodiak laboratories in handling regional fisheries problems.

Prior to October 1970, the Division of Fishery Products Research and Inspection, then the Branch of Food Science, advised the Director through the Assistant Director for Utilization. Work was conducted in six laboratories which were responsible to Regional Directors, and at the National Center for Fish Protein Concentrate, College Park. When NMFS was incorporated into NOAA, the Pioneer Research Laboratory at Seattle and the Ann Arbor Laboratory (which was moved to Milford) ceased to be part of the Division. As part of a subsequent reorganization in June 1971, the present Division was established and given direct responsibility for the remaining laboratories, with the exception of that at Pascagoula, Miss.

The College Park Fishery Products Technology Laboratory, College Park, Md., is our largest laboratory and is divided into three major sections: Engineering with pilot-plant capabilities; Food Research, with animal rooms, and facilities for study of food chemistry, with test kitchens and microbiological laboratories; and Chemistry, including atomic absorption and gas-liquid chromatograph equipment.

The major research programs concern contaminants (Chemistry); quality, composition, and nutrition (Food Research); and utilization technology (Engineering).

In the area of chemistry, a major program has been established to assess the problem of contaminants in fishery products. The analytical chemistry group at the Laboratory also provides support for other research programs, especially in the area of nutrition and processing technology.

Recently, a trace element survey was completed of over 35 fish and fishery products. Elements analyzed included mercury, cadmium, lead, chromium, and arsenic.

The Laboratory is the center for applied nutritional research within NMFS. The program is divided into three main areas: human nutrition, animal nutrition, and microbiology. In human nutrition, work deals mainly with the quantity, quality, and utilization of nutrients in FPC and other fishery products for human consumption.

Reports have been published showing the availability and utilization of fluoride by both animals and humans.

Fact sheets have been prepared which provide the nutritional properties of many commonly used fish.

In animal nutrition, research studies have mainly dealt with industrial fishery products, such as fish meal, fish oil, fish solubles, and other fishery by-products. Extensive information has been obtained and published on the chemical and nutritional characteristics of these products.

In microbiology, studies are being conducted on the effect of processing fishery products on microbial contamination.

In the area of utilization technology (engineering), extensive research has been conducted by food technologists and engineers on processes for preparing Fish Protein Concentrate (FPC). FPC is an inexpensive, stable, wholesome product of high nutritive value, hygienically prepared from fish, in which protein and other nutrient materials are more concentrated than they were in the fresh fish. As presently produced, FPC is essentially an odorless and tasteless food supplement which does not create any perceptible physical change to most products to which it is added.

A brief history of the FPC project follows: The results of basic work on solvent extraction of fish in 1970 culminated in the construction and operation in 1971 of the Experiment and Demonstration Plant in Aberdeen, Wash. This technological expertise is now being applied to new approaches for converting fish into products with different characteristics for human consumption.

The overall objective of the FPC research program at the time of its inception in 1961 was to develop the technology to implement the manufacture and use of FPC as a major deterrent against global protein malnutrition and to provide a potential economic stimulus to the American fishing industry through the more effective utilization of our fishing resources.

An international survey indicated a large amount of activity and interest in FPC by government, academic, and private industrial institutions of some countries, with only modest financial support. Although various groups were working actively on the development of an acceptable and economically feasible FPC process, there was no coordination of effort and little or no sharing of advances and discoveries among the researchers.

A basic principle of the program was that it would not place the Government in competition with private industry in the production of FPC. Its only purpose was to provide a foundation of the scientific and technological information on FPC that could be used by private industry as a basis for investment in the production and marketing of FPC.

The FPC program's start with basic research was followed by the successful development of wholesome and nutritious FPC in the laboratory using an isopropyl alcohol (IPA) extraction process, subsequent approval of FPC from whole fish by the Food and Drug Administration,

and passage of the law authorizing an experiment and demonstration plant.

In 1970 the construction of an experimental development plant began at Aberdeen, Wash., at a site donated by the Grays Harbor Port Authority. Ocean Harvesters, Inc. was contracted for design, construction, and operation of the plant. Operation and experimental production using Puget Sound hake began in March 1971. Hake evaluations were completed in late 1970 and plant conversion started in order to begin processing menhaden and fatty fish.

The FPC project is but one of NMFS's numerous activities in the fishing industry. Current programs are under constant evaluation to assure effective coordination and direction of university, industrial, State, and Federal research to benefit the fisheries and the public.

The Pacific Fishery Products Technology Center at Seattle emphasized development of methods to increase the value of fish and help broaden the uses to which they can be put. This work included research into new, highly efficient systems for separating edible meat from inedible portions and resulted in demonstrations to industry of the valuable properties of stabilized minced fish when incorporated into processed food products.

The versatility of uses for fish products was broadened further by developmental studies of procedures for preparing concentrated fish proteins by aqueous procedures that permit the fractionation of fish muscle proteins into components having unique qualities and values. Work on these fractions was extended to include development of procedures that aid in the retention of such functional properties as oil emulsification, whippability, and water absorption. A novel method was developed for the preparation of FPC by a procedure that removes the bulk of the lipids by water washing. This process is now covered by a patent.

Studies on the improvement of quality of landed fish through better refrigeration methods showed that the saturation of cold sea water with carbon dioxide was markedly effective in retarding the growth of spoilage bacteria. This work required an unusual extension of our activities into metallurgy in that the preservation medium of carbon dioxide and brine was found to be extremely corrosive of all metals tested except titanium.

The fabrication of heat exchangers of this metal was found to be economical and practical. Analytical chemists were deeply involved in determining the mercury, DDT, and PCB content of fish and shellfish and industrial fishery products. Developmental studies were begun on methods for the reduction of mercury in fish muscle.

In a cooperative study with the Atomic Energy Commission, work was initiated and moved forward rapidly on the relationship of viruses in *Clostridium botulinum* to the ability of these microbial organisms to produce toxins.

In anticipation of the industrial development of aquaculture, studies were begun on improved methods for slaughtering fish to improve their

appearance, quality, and shelf life.

The Kodiak Fishery Products Technology Laboratory's activities center around the northern shrimp and crab industries. A consolidation of the Ketchikan with the Kodiak Laboratory put our efforts closer to the user group.

Research focuses on holding, processing, and improving the quality of the finished product.

The development of refrigerated sea water and CO₂ systems coupled with innovations in separating trash fish from shrimp when unloading the catch have increased returns.

An extensive in-plant project on pretreating pink shrimp before machine-peeling was successfully completed in 1970, yielding a better quality canned product in color, flavor, and texture. The shrimp prepared by the precooking method were so fresh that proteins were still soluble and caused a gel to form in the can, necessitating a change in the method of adding salt.

Food chemistry studies on carotenoid pigments in shrimp were conducted as carotenoids inhibit oxidation of shellfish oils and decrease adverse flavor changes. Color was established as an important chemical and consumer index of quality.

Technique development includes studies on holding the resource prior to processing. Crab mortalities, especially for snow (Tanner) crabs, are quite severe at times. Research was conducted on the various parameters of live-holding to reduce this serious economic loss to fishermen and processors. Poor water quality aggravates mortalities. The need for clean-up treatment of processing was realized and a cooperative program with the Technology Center at Seattle was initiated.

Contracts were issued to investigate and develop new extraction processes to use on shellfish wastes. The processes could yield three by-products from existing shellfish processing wastes: protein concentrate, calcium chloride brine, and chitin.

The Atlantic Fishery Products Technology Center at Gloucester, Mass., has a well-equipped laboratory and general-use plant facilities for studying fishery handling and processing. A Marine Products Development Irradiator, complete with cobalt-60 source, conveyor systems, refrigeration rooms, and dosimetry laboratory, is used in developing the radiation-preservation of fish at sea, an area the Laboratory pioneered.

The shellfish program is the Laboratory's largest; it covers every aspect of processing and handling of shellfish. Its activities, however, are directed to the blue crab industry. Research on the blue crab includes studies to: 1) increase yield of meat, 2) arrive at practical freezing and sterilization processes, 3) develop more efficient methods for picking the meat, and 4) show the feasibility of utilizing red, Jonah, and rock crabs. In addition,

studies are conducted to use microwave energy to gape raw oysters and other bivalves and to thaw or temper frozen blocks of fish or shellfish. Work is also presently underway to encourage the utilization of squid and ocean quahogs.

Seafood processing techniques are developed and tested to maximize resource utilization through creating by-products from processing wastes and increasing the quality of the product and extending its shelf life.

A program for protein recovery investigates methods for recovering any of the edible marine protein that is normally lost to conventional processing and harvesting techniques or not normally used at all.

Presently mechanical meat/bone separators are used for recovering meat from fish frames that are normally a low-value by-product of the filleting operation. By this process, large amounts of fish meat can be added to protein supply of the population, and the value of the available resource is increased without increasing the fishing effort. Mechanical meat/bone separation also has application in recovering protein from fish that are normally discarded at sea as "trash" fish.

A new rapid vacuum method has been developed for eviscerating fish which reduces initial bacterial levels, and hygiene studies are developing a pressure method for preserving fish which may be applied to other perishable foods. Tests measuring botulism in pasteurized foods and determination of the bacterial permeability of plastic films lead to methodology for predicting shelf life of refrigerated fish. Insulated, leakproof shipping containers were designed for transporting fish over long distances.

The program for developing standards by which fish and fishery products are judged for grades of quality by the inspectors of the U.S. Department of Commerce has been continued. This program also formulates specifications for Federal and State purchasing officials and contributes to the development of international food standards.

As a final step in most of the research undertakings, each development is given appropriate tests under actual conditions. This provides a realistic evaluation of the work and provides industry an opportunity to assess the performance of any new technology.

Staff members are active in academic communities and are often guest lecturers. Involvement includes cooperative research with Federal and State agencies and industry. About five student trainees from a local university participate in a Work/Study Program, and are involved in support tasks for the Laboratory's research programs.

The Division programs have changed substantially over the last few years, reflecting its changing role in NMFS and external changes affecting the fishing industry. Problems of contaminants and waste disposal have been prominent recently and are sure to continue for some time. However, in coming years new technological problems and challenges will continue

to face the U.S. fishing industry, and the work of the division will continue to provide a scientific and technical basis for helping to maintain the health of the industry and the welfare of the consumer.

Fishery Products Inspection and Certification Programs

The objectives of the Fishery Products Inspection activities are 1) to protect consumers by assuring that the public health aspects of fishery products and processing plants under voluntary inspection meet necessary sanitary and safety requirements; and 2) to establish fishery products standards and inspect these products for compliance so that consumers may purchase identifiable consistent quality products. The major subprograms are:

- 1) Standardization and quality control of fishery products.
- 2) Inspection, grading, and certification of fish processing plants and products.

The standardization and quality control program is both national and international in scope and is directed to fishery products as well as processing plants and vessels. Under this program, we develop national voluntary standards of quality, condition, and grade. In the area of international standards we actively participate as part of the U.S. delegation in the development of Codex product standards and advisory codes of hygienic and technological practice for fishery products. Presently 17 fishery products have been standardized—two of these were completed in 1970. Three more product standards are under development.

The standards development unit is located in Gloucester, Mass., and is part of the Gloucester Technology Center.

The voluntary fishery products inspection service is operated on a user-fee basis. The purpose and continuing effort of the program is to provide an impartial, national inspection and certification service of processing plants and all types of processed fishery products—fresh, frozen, canned, and cured. The program is based on the application of official U.S. Standards and specifications as well as minimum sanitary and operating requirements. When fishery products are produced in a plant under inspection and meet all necessary requirements the products are eligible for certification and to bear official Grade A and/or other inspection marks on their respective labels. These marks indicate to consumers that the products were produced under good sanitary conditions, have good flavor and odor, as well as rating high in other important quality factors that apply to the particular product. Thus, the consumer is able to buy with confidence and can expect to receive products in accordance with the desired quality level she desires.

The inspection and certification programs in 1971 were staffed with 64

inspectors, supervisors, and clerical personnel throughout the United States—stationed at 40 processing plants, 15 lot inspection stations, and various other offices. About 340 million pounds of fishery products were inspected and certified annually during 1970-71. This amount constitutes about 27 percent of the annual United States production of processed fishery products. Present users of inspected fishery products in addition to the general public are industry, institutional mass feeders in the field of Federal, State, and local government purchasing, and restaurants. Specifically some who buy inspected fishery products are purchasing agents for Veterans Administration hospitals, military non-appropriated fund activities, State institutions, county and city institutions, school lunch programs, and major restaurant chains.

In order to streamline in-plant inspection, an inspection aid program was initiated in January 1970. This allowed for plant quality control personnel to be assigned under the supervision of a Federal inspector in order to assist him in providing adequate service to plants.

In October 1970 the inspection and certification programs in the Bureau of Commercial Fisheries, U.S. Department of the Interior, were transferred to the U.S. Department of Commerce as part of NOAA. As a result, many changes took place in these programs. For example, fees for laboratory analysis were established, sanitation requirements were spelled out in more detail, and the continuous inspection concept was dropped. Each plant now is evaluated and supplied with the amount of inspection effort necessary for that plant. New forms and certificates were printed and plants under contract were required to sign new contracts in order to reflect the amount of inspection effort needed. New official identification marks were designed and became effective March 10, 1971.

In the Northeast Region, inspection activities included the sampling of chubs in Lake Michigan for DDT and PCB to see if these materials appeared in amounts exceeding the tolerances established by the U.S. Food and Drug Administration (FDA). Also, samples of fish blocks made from various species and received from several countries were taken from inspected plants and tested for mercury. The tests revealed that mercury in the samples analyzed was far below the FDA tolerance of 0.5 part per million.

RESOURCE MANAGEMENT

The major function of the Office of Resource Management is planning, development, management, and evaluation of programs to improve State and Federal management of fisheries resources and their environments. This Office also has a unique responsibility for the care and welfare of some 630 Aleut residents of the Pribilof Islands, Alaska. In carrying out its

function, the Office of Resource Management works in close cooperation with a number of other agencies. These include the Environmental Protection Administration; U.S. Coast Guard; Office of Sea Grant; Corps of Engineers; Bureau of Sport Fisheries and Wildlife; fisheries agencies of the 50 States and Puerto Rico, the Virgin Islands, Guam, and American Samoa; the Atlantic States Marine Fisheries Commission, Gulf States Marine Fisheries Commission; the Council on Governments; and a number of prominent conservation organizations such as the Sport Fishing Institute, Wildlife Federation, and the Wildlife Society.

The present Office of Resource Management was created on July 1, 1971. For two years prior to this date it functioned as the Office of Management and Services and contained seven divisions. In 1971, the Divisions of Marketing, Fisheries Products Technology, Fisheries Products Inspection, and Financial Assistance were transferred to the Office of Resource Utilization. The Office of Resource Management was restructured to include a new Division of Water Resources Management, the Division of Extension, Division of Enforcement and Surveillance, and a new Office of State-Federal Relationships. Staff support is also provided to the Pribilof Islands management program and the Columbia River Fisheries Development Program, both of which are administered by the Regional Office at Seattle, Washington.

The Office of Resource Management is a mixture of old and new NMFS programs. The management of the Pribilof Islands fur seal has been a responsibility of NMFS and its predecessor agencies since 1910. Thus, it is the oldest continuous NMFS program and one of the most successful, since this management effort has increased the population from the very low level of about 200,000 at the turn of the century to the now estimated number of over 1.2 million. Conversely, the State-Federal Fisheries Management Program (Office of State-Federal Relationships) and Extension are among the very new programs, both started during the period of this report.

State-Federal Relationships

NOAA Circular 71-91, effective October 31, 1971, transferred the functions and staffing of the Division of Federal Aid to a new Office of State-Federal Relationships. The functions of the new organization are carried out under two programs, Grant-in-Aid for Fisheries Research and Development (formerly the Division of Federal Aid) and State-Federal Fisheries Management.

Grant-in-Aid for Fisheries Research and Development

The Grant-in-Aid for Fisheries Research and Development is au-

thorized under three basic Acts. Financial assistance for research and development of the Nation's commercial fisheries is provided under the Commercial Fisheries Research and Development Act, P.L. 88-309, as amended; for conservation, development, and enhancement of the anadromous fisheries resources and fish of the Great Lakes that ascend streams to spawn under the Anadromous Fish Conservation Act, P.L. 89-304, as amended; and for controlling jellyfish and other such pests in our coastal waters under the Jellyfish Control Act, P.L. 89-720, as amended. All 50 States, American Samoa, Guam, Puerto Rico, and the Virgin Islands are participating in the program under one or more of the authorizations. In 1970 and 1971, \$12,149,800 (\$6,175,000 in 1970 and \$5,974,800 in 1971) were made available to the States and others. During this period 190 new projects at an estimated cost of \$21 million were initiated, and 238 projects at an estimated cost of \$25 million were completed. The Federal share of project cost is about 67 percent. Outstanding jobs were produced in the areas of fisheries research, environmental improvement, aquaculture, fisheries products technology, and others that will make a significant contribution to the enhancement and development of the Nation's fisheries resources. Some of the highlights of the program activities were construction of research laboratories in Puerto Rico, Maine, and Washington and the acquisition of research boats in New Hampshire and American Samoa at an estimated cost of more than \$1 million that will greatly increase the States' and others' research capabilities. A salmon hatchery was constructed on the Soleduck River in Washington at a cost of \$1.7 million that has a potential annual production of about 125,000 pounds of young salmon. Two fish screens installed in California at a cost of about \$200,000 will assist in maintaining salmon and steelhead trout runs for sport fishing and greatly increase the annual commercial catch in the ocean. Significant advancements were made in the techniques of cage rearing of catfish and trout and mass culture of shellfish that are rapidly expanding in commercial fisheries operations and will help increase supplies of fish and shellfish to meet demands of the increasing population. Four resource disasters involving the Gulf oyster fishery, commercial trout rearing, New England haddock fishery, and coastal blue crab fishery were alleviated at a cost of more than \$500,000. Encouraging advances were made towards limited control of jellyfish in recreational areas and towards development of protective creams and vaccines to protect swimmers from the sting of these animals. In carrying out project activities about 300 State scientists were continuously employed to work on fisheries problems resulting in 71 reports published in scientific journals or for partial fulfillment for the requirement of college degrees. These publications are cited in the National Marine Fisheries Service Federal Aid Program Activities 1971, available from the Service's Regional or Central Offices.

State-Federal Fisheries Management

During the past two years, NMFS has made substantial efforts to define the priority areas of concern affecting living marine resources that influence decisions as to appropriate program emphasis. In this regard, it is clearly evident that high priority must be placed on more rational systems for managing fisheries resources. Simply stated, there is a need for management systems based on rational plans rather than as a matter of expediency. Finally, it is recognized that fisheries management is too great a task for the States or the Federal Government to do alone within their particular jurisdictions.

In recognition of the critical need for State and Federal cooperation, a new State-Federal Fisheries Management Program was formally established in 1971.

The goal of the program is to establish a coordinated State-Federal program designed to improve the management of fish resources so as to achieve the appropriate allocation of these resources among competing users and provide the legal-institutional environment for the development of a viable commercial fishing industry and maximum recreational opportunities.

The harvesting segment of the commercial fishing industry has generally been in continual economic difficulty over the past two decades. The fleets in certain of our important fisheries have deteriorated to the extent that the vessels can no longer be considered as efficient, seaworthy, fishing units. Symptoms of the existing situation in many parts of this industry have been low returns to labor and/or capital, and thus, old vessels and old crewmen to operate them.

Subsidies, technical assistance, and other direct aid programs that attack only the symptoms and not the basic problems will not be successful in upgrading the industry. Rather, it is necessary to solve the basic problems associated with generally free international and domestic entry into any fishery and obscure, ambiguous fisheries jurisdiction.

The overall objectives of the program, in cooperation with the States, are to:

- 1) Strengthen cooperation between the States and the Federal Government, and provide the legal-institutional arrangements so that fisheries management systems can be standardized for a given fishery or group of related fisheries in a region.
- 2) Create rational systems of management for more effective conservation and efficient utilization of fisheries resources, and achieve appropriate allocation of these resources among competing users.
- 3) Improve communications with all commercial and recreational industry groups involved in the fisheries, and seek better understanding and support of and assistance in the management systems.

- 4) Strengthen the multidiscipline approach to utilizing the scientific data base developed by the various biological, technological, social science, and legal programs of the State and Federal Government Fisheries agencies as inputs to fisheries management policies while at the same time providing feedback as to priority data and analysis needs.

Simultaneously with the development of domestic management plans, international fishing activities off our shores must be stabilized. We anticipate that by achieving better domestic control our international posture will be strengthened. Thus, questions of access by foreign fishermen to fisheries more than 12 miles off the U.S. coast will receive much greater attention as a consequence of the full implementation of the State-Federal program. With an effective domestic management plan, international control of those fisheries exploited by foreign fleets will be possible in ways heretofore unrealized.

Funds were reprogrammed in 1970 to intensify economic studies of selected commercial fisheries. The first appropriation of funds was obtained in 1971, which permitted initial staffing in the Washington Office and the five Regional Offices. Funds were also made available for initial grants to States for development and implementation of demonstration management projects.

Other highlights in 1971 included meetings with State officials from all coastal States to explain the philosophy and objectives of the program. The response by the States has been generally favorable. Efforts also continued on the development of legislation designed to fully implement the program both in State waters and on the high seas.

Extension

The Division of Extension was formally established in the National Marine Fisheries Service in October 1970. Activities of this Division are designed to foster understanding and practical use of knowledge and technical expertise relevant to living marine resources. This involves development and prosecution of a comprehensive extension effort at the National, Regional, State and local levels which include appropriate feedback mechanisms to identify real problems and implement practical solutions.

Activities in 1970 and 1971 were largely devoted to studying on-going NMFS and NOAA extension activities and planning how a more systematic program could be developed and implemented. As a result, the NMFS Extension Program began to take shape in the fall of 1971.

The staff and operating budget for the NMFS Fisheries Extension Program was increased from \$40,000 and two positions in 1970 to seven professional positions and \$281,100 in 1971.

A Program Development Plan (PDP) for the Extension Program was

initiated. This PDP will serve as a guide to the orderly growth and development of the Extension Program. It will outline components of the program; set forth roles and relationships with certain other NMFS offices and NOAA and other Commerce agencies; and establish responsibilities of various NMFS officials to the program.

A comprehensive program concerning the development and use of extension publications, visual aids, and mass media was being developed and partially implemented in 1971. Three separate user-oriented publications series were in the process of being developed.

Standardized procedures for producing, cataloging, and distributing slide sets and other visual materials were also being developed. This is a cooperative activity with the NOAA Office of Administrative Services and the NOAA Office of Public Affairs.

A National Advisory Meeting Program (NAMP) was developed and implemented in late 1971 to provide a planned and organized program to expand demonstrations, workshops, townhall, industry, and other non-scientific meetings where NMFS research, technology and/or other information is being presented to expedite two-way communication with users. It includes an annual plan and evaluation of activities; quarterly reports of accomplishment; and in-service training in support of the program. The program became operational, on a limited basis, in November 1971.

One pilot State program was implemented in 1971 in Maryland. This program involves the Maryland Fish and Wildlife Administration, Maryland Marine Extension Advisory Council, Shellfish Institute of North America, NMFS, and certain other cooperators in developing and implementing extension activities directed to the Maryland seafood industry with initial emphasis at the watermen level.

Activities were underway to develop a course of action for the Extension Program in working with marine sport fishing users. This effort is proceeding concurrent with the development of the total NMFS Marine Sport Fishing Research and Development Program.

Three activities were begun in support of the Extension Program. These support activities included:

- 1) The development of a directory of marine extension workers in cooperation with the Office of Sea Grant;
- 2) The development of a NMFS Subject Matter Index to identify NMFS expertise and capabilities, by Region; and
- 3) The initiation of activities to develop Cooperative Agreements and working relationships with certain NMFS program divisions and outside agencies such as the Office of Sea Grant, the Commerce Department's Office of Business Services, and the Agriculture Department's Extension Service. The purpose of these activities is to develop partnerships for broadening the mobilization of national effort to expedite an effective communication and knowledge transfer

system between those who have knowledge and those who need it. A Cooperative Agreement with the Office of Business Services was completed during 1971. This Agreement provides for field cooperation between OBS and NMFS in projects concerning the fishing industry.

Enforcement And Surveillance

The enforcement and surveillance program develops, promulgates, and enforces domestic fisheries regulations required under the authority of 15 international fisheries agreements to which the United States is a contracting party; enforces observance by foreign fishing vessels of the contiguous fisheries zone and territorial waters; and provides intelligence on foreign fishing fleets off the United States needed for enforcement and for negotiations regarding foreign fishing. The program is largely planned and conducted in cooperation with the Coast Guard, the Coast Guard providing aerial and surface patrols and the NMFS providing agents with fisheries expertise.

Surveillance

Surveillance of foreign fishing is conducted primarily in waters off Alaska, the Pacific Northwest, California, Puerto Rico, and the Atlantic Coast from Georges Bank to Cape Hatteras. Although some surveillance is carried out primarily to obtain information on the foreign fleets, including estimates of the catches, most surveillance seeks to ensure that territorial waters and the contiguous fisheries zone are respected and that the provisions of the international agreements are observed by the foreign fleets. The rising pressure on valuable fishery resources adjacent to the United States has led to new conservation measures designed to protect those resources. Fishery management agents logged 300,000 air miles in 1970, increased their total to 375,000 miles in 1971. In addition, in 1971, agents logged 746 man-days at sea on Coast Guard vessel patrols, which is an increase of 300 man-days over 1970.

In addition, information derived from surveillance is used in the formulation of the U.S. international fishery policy. Not only does this information allow the United States to follow the innovations and trends in foreign fishing vessels and gear, but it helps through estimates of catches and fleet movement to determine when discussions leading to agreements should be sought and provides information needed in the negotiations.

Enforcement

Enforcement of domestic fisheries regulations adopted under authority of international agreement is carried out through a combination of air and

sea patrols and dockside landing inspections. Enforcement of haddock and yellowtail flounder regulations constitutes a large share of the program in the New England area. Also, an extensive program is required for the regulatory area for the eastern Pacific yellowfin tuna which stretches from mid-California to mid-Chile and extends 1,500 miles seaward.

As a result of our air and sea patrols seven foreign vessels were arrested during 1970 for violation of the contiguous zone with a total fine of \$190,000. In 1971, six foreign vessels were arrested, resulting in a total fine of \$245,300. In addition to the foreign violations, seven U.S. tuna vessels were seized in 1970, and penalties amounting to \$258,787, were assessed while six vessels were seized in 1971 for violation of U.S. tuna regulations. The amount of penalties for the 1971 violations remains unsettled.

Inter-Agency Cooperation

In response to the increasing number of foreign vessels off our coasts and complicated agreements and regulations, plans have been developed and submitted to the Coast Guard that project our needs for aircraft and vessel time. In addition, the Air National Guard has agreed to provide limited aircraft time during its over-water training. This will also increase our capability to protect those marine resources under various conservation measures.

Northwest Region

The surveillance of the foreign fishing off the Pacific Northwest coast, as well as the enforcement of U.S. fisheries laws and regulations, is the responsibility of the Enforcement and Surveillance Division. In addition to the Fisheries Management agents working out of the Seattle headquarters, one agent is stationed at Bellingham, Wash. and one at Astoria, Oreg.

During 1970-71, these agents carried out extensive joint aerial and surface patrols in cooperation with the U.S. Coast Guard. Biweekly aerial patrols originate from the Coast Guard Air Station at Port Angeles, Wash. and, during the summer months, these patrols, which cover the Oregon and Washington coasts, are augmented by helicopter flights from Coos Bay, Oreg.

Surface patrols originating at Port Angeles and Astoria, Oreg., supply extensive coverage of the same general area with frequency based on the amount of foreign fishing pressure. These patrols, which logged a total of 220,000 miles, resulted in the apprehension of 18 vessels for violation of U.S. fishery laws.

Also contributing to the Division's effort is a communications system, via radio, with the USSR fleet. This innovative practice has been instrumental in reducing the number of gear losses and conflicts as well as aiding general surveillance activities.

Southwest Region

The Enforcement and Surveillance Office for this area is located in Terminal Island, Calif. The major responsibility is to enforce conservation measures adopted by the Inter-American Tropical Tuna Commission regarding U.S. regulations for yellowfin tuna.

In 1970, the Inter-American Tropical Tuna Commission adopted an annual quota of 120,000 short tons. The open season was closed on March 23, 1970, based on the current catch and projected catch rate. The 1971 annual quota was again set at 120,000 short tons and the open season closed several weeks later, April 9. It was felt that the large amount of skipjack tuna, caught during the open season for yellowfin tuna, caused the season to remain open for this long a period. It was expected that the season would close much sooner.

In 1970, Fisheries Management agents, in cooperation with the U.S. Coast Guard, made nine flights in the regulatory area and on cruises covering a total of 38,000 miles. As a result of these flights, six violations by U.S. tuna vessels were observed, resulting in out-of-court settlements of \$232,667.

In 1971, three flights were made covering some 9,000 miles. Two tuna vessels were found in violation and settled for \$49,161.

One of the flights made was with an aircraft from the NOAA Research Flight Facility, Miami, Fla. Unfortunately, weather conditions over the regulatory area were extremely poor which limited the flight and the operation was curtailed.

In addition, several amendments were made to the yellowfin tuna regulations that required additional reporting by vessels fishing outside the regulatory area and provided port inspection for vessels wishing to fish inside or outside the regulatory area during the closed season.

Alaska Region

The Office of Enforcement and Surveillance has its headquarters in Juneau, with one field office located at Kodiak. Fisheries Management agents working out of these two offices have the responsibility of enforcing U.S. fisheries laws and regulations, as well as maintaining a continuous surveillance of the foreign fishing effort off Alaska—an area that includes over 50 percent of the total U.S. coastline.

Throughout 1970-71, intensive joint aerial and surface patrols were carried out in cooperation with the U.S. Coast Guard. Aerial patrols were conducted by HU-16E (Grumman Albatross) aircraft from the Coast Guard Air Station on Annette Island and by C-130H (Lockheed Hercules) aircraft from the Coast Guard Air Station on Kodiak Island. Surface patrols were conducted by the Coast Guard Cutters *Confidence*, *Storis*,

Citrus, Clover, Ironwood, Bittersweet, Balsam, and by additional cutters assigned to Alaska fisheries patrol on a rotational basis.

These patrols, which logged a total of 580,000 miles, observed 8,798 foreign vessels, accounted for 150 foreign vessel boardings, including 13 seizures for violation of U.S. fisheries laws which resulted in fines totaling \$385,000 for over 50 violations of international agreements which were observed, documented, and brought to the attention of the offending country for appropriate action.

In addition, through the Division's surveillance efforts, a serious threat posed to the Alaskan salmon fishery by a South Korean salmon fleet was eliminated.

Northeast Region

The Office of Enforcement and Surveillance has its headquarters in Gloucester, Mass., and Portland, Me. The Fisheries Management agents are responsible for enforcing the U.S. regulations drawn pursuant to ICNAF recommendations ratified by all member countries. United States regulations cover the Northwest Atlantic along the east Greenland coast to Long Island, N.Y.

In carrying out this responsibility, the Fisheries Management agents conducted 9,750 dockside inspections of the more than 650 United States trawlers landing in the various New England ports and 41 at-sea inspections carried out in the course of 51 sea patrols in cooperation with the U.S. Coast Guard.

Close surveillance is kept on the haddock and yellowtail flounder fisheries as they are under annual landing quotas. Under the haddock quota provisions, it was required that the season close when 80 percent of the total quota had been landed; consequently, the season was closed in October 1970. After that date, only haddock taken incidental to other fisheries could be landed. During 1971, the haddock season was closed in November.

The three areas closed for uninterrupted haddock spawning were jointly patrolled by the U.S. and Canada. During 1970, there were no serious violations; however, in 1971, there were 41.

On January 7, 1971, yellowtail flounder was put under ICNAF quota regulations. This fishery, at industry request, is operated under a quarterly apportionment of the annual quota. Quarterly quotas were met, and the season closed on March 5, and again on June 4, 1971.

The U.S./USSR and the U.S./Poland Middle Atlantic Agreements were renegotiated for two and one-year extensions respectively. This office provided considerable amounts of material for the two meetings.

An exchange of Fisheries Enforcement Officers of the U.S. and Poland was conducted in August 1970. During this visit in Gloucester, Mass., both

sides drafted a voluntary inspection scheme for use in the Middle Atlantic. This scheme was essentially the same as that adopted later under ICNAF.

In August 1971, an amendment to the North Atlantic Fisheries Act provided the authority to implement the ICNAF International Inspection Scheme where U.S. inspectors may board foreign fishing vessels on the high seas to check compliance with fisheries regulations. During 1971, 23 foreign vessels were boarded for inspection; no violations were observed.

The Division of Enforcement and Surveillance enforces the provisions of the U.S./Canada Reciprocal Fishing Privileges Agreement signed in April 1970. This agreement allows continuance of fisheries established prior to the establishing of exclusive fishing zones.

Foreign fishing effort along the east coast of the United States is kept under surveillance by this office. With the cooperation of the U.S. Coast Guard, flights on several occasions on a weekly basis cover the area from southern Nova Scotia, Canada, to Cape Hatteras, N.C. A total of 198 flights was made during 1970 and 1971, for about 1,400 hours of flying time. Information gathered on these flights is now processed for ADP at the Northeast Fishery Center. This permits quick retrieval of information for use in fisheries negotiations or specific needs in any number of categories.

During 1970 and 1971, a total of 124 violations of the regulations was found; some were resolved by note of warning, and others were processed in the form of a complaint to the U.S. Attorney requesting prosecution of the violators.

Southeast Region

In August 1970, the Southeast Region initiated a study to determine the extent of foreign fishing in our areas of responsibility. As a result of this study, the need for enforcement and surveillance was clearly demonstrated and a division office was officially established at the regional office in July 1971.

Communications were established with appropriate Coast Guard commands, other government agencies, and State conservation departments, to coordinate surveillance and enforcement operations and to receive sighting reports of foreign fishing vessels. Surveillance patrols in cooperation with the Coast Guard were begun in areas of the Gulf of Mexico and a voluntary sighting report program in cooperation with selected commercial and sport fishing vessel operators was initiated.

In 1971, a total of 678 individual foreign fishing or fishing support vessels were sighted in areas adjacent to the southeastern United States (including the Caribbean Sea). Of these vessels, approximately 250 fished off the southern mid-Atlantic States and 150 off the Gulf States. The remainder were observed in transit or were fishing in the Caribbean Sea or in the Gulf adjacent to Mexico. The total annual foreign catch off the southeastern

United States was estimated at 100 million pounds with an ex-vessel value of \$7 million. Sea herring, Atlantic mackerel, and tuna were taken in the Atlantic and snapper, grouper, shrimp, and tuna in the Gulf.

Of primary importance was the documentation of the operations of modern Spanish- and French-built Cuban shrimp trawlers off Florida and Texas, increased Japanese longline tuna fishing south of the Mississippi River Delta, and the level of Mexican shrimp fishing off Texas. Also documented were Soviet fishing operations off Mexico on the Campeche Bank and on the Trinidad Shelf.

During 1971, eight Cuban vessels were seized for fishing in the U.S. contiguous fishery zone in the vicinity of the Dry Tortugas. Four Lambda handline vessels were arrested in February and four small boats operating from Lambda vessels were arrested in May. Fines totaled \$33,500.

Pribilof Islands Administration

The Pribilof Islands, consisting of St. Paul, St. George, Walrus, and Otter Islands, and Sea Lion Rock, are located in the eastern part of the Bering Sea about 250 miles north of the Aleutian Chain and 300 miles west of the Alaska mainland. Only the islands of St. Paul and St. George have a human population.

The Pribilof Islands are the major breeding grounds for the northern fur seal (*Callorhinus ursinus*). This valuable marine mammal resource forms the basis for the main industry of the Pribilof Islands and involves an almost complete Federal responsibility for the research, management, and harvest, as well as the responsibility for the well-being of a group of Aleut people residing on the islands of St. Paul and St. George. NMFS has the responsibility for these resources through terms of the Fur Seal Act of 1966 (80 Stat. 1091). Activities on the Pribilof Islands during 1970-1971 concerned the Aleut community, management of the fur seal industry, and methods of harvesting fur seals.

During the last two decades the Community of St. Paul has taken an ever-increasing responsibility for the administration of its affairs. By late summer 1967 the St. Paul Community had taken over all retail outlets on St. Paul, including the previously federally owned and operated store. In addition, the Community now manages the local hotel, leases a post office, owns and operates two motor vehicles for community services, is responsible for police and fire protection, maintains the community repair shop, manages the recreation hall, and carries on other community activities. One of the main purposes of the Fur Seal Act of 1966 was to develop self-sufficiency and local self-government among the natives of the Pribilof Islands. Among the first steps to be taken by the residents of St. Paul to meet the requirements of the Act was the establishment of a municipal corporation under the laws of the State of Alaska. The Community had been encouraged to incorporate and on December 2, 1970, it petitioned the

State of Alaska for incorporation as a City of the 4th Class. An election was held at St. Paul on June 21, 1971, with a favorable vote for incorporation and the enactment of a 3 percent sales tax. The State of Alaska certified the election on June 29, 1971. By electing to incorporate as a fourth-class city, the Aleut Community of St. Paul Island became eligible to receive the first of a series of transitional grants to assist it in providing adequate municipal services which ultimately will lead to a determination of viability and opportunity for conveyance of homes and other real and personal properties.

The U.S. Public Health Service supplies health and hospital services to the residents of St. Paul and St. George Islands. The State of Alaska administers the elementary schools on the islands through an agreement with NMFS, providing for reimbursement of operating costs under a formula based on the number of pupils enrolled and the average cost per pupil in the State rural school system. Through special financial arrangements with the State of Alaska, a new elementary school is now under construction on St. Paul Island. Completion is scheduled for September 1973.

The fur seal industry provides most of the employment for local residents. During the 1970 season 42,179 sealskins were taken in the commercial harvest on St. Paul and St. George Islands. In 1971 the total commercial harvest for both islands was 31,824 sealskins.

Methods for harvesting fur seals continued to receive much attention during 1970-1971. Since 1965 various animal protection groups have been extremely critical of the program. Much of their criticism developed over the killing practices of the Canadian and Norwegian sealers in the Gulf of St. Lawrence relating to the harp seal and hood seal harvests by these nations. Through misinformation, much of the attention given to the Canadian harvests was directed to the management program on the Pribilof Islands.

In 1968, a task force was sent to the Pribilof Islands to review the fur seal harvest and to experiment with various methods of killing. Again in 1969 and 1970, detailed studies directed towards alternative methods were conducted by the Virginia Mason Research Foundation. No suitable alternatives were found. In 1971, the Secretary of Commerce appointed six eminent veterinarians recommended by the American Veterinary Medical Association to again review the harvesting methods and develop recommendations on methods to improve the harvest. This group concluded that the present method of clubbing and exanguination was not inhumane and constituted the best method now available. This group recommended continuing research and in 1971 a contract was developed with Battelle Columbus Laboratories to again research suitable and acceptable alternatives. The results of this research were to have been available by late 1972.

Maurice Stans, then Secretary of Commerce, visited the Pribilof Islands

during July 1971 to observe sealing operations. This was the first visit by a Commerce Secretary in the history of the islands.

A suit was brought against the Department of Commerce by animal protectionists in an effort to stop the 1971 sealing operations. The Department's request for dismissal was granted in the Federal District Court for the District of Columbia.

Water Resources Management

The calendar year 1970 was one of major change. It saw a major shift in the role and mission of water resources management in the National Marine Fisheries Service. To understand these changes it is necessary to bear in mind the current twofold mission and role:

- 1) To conserve, protect, and enhance the living marine and estuarine resources, anadromous fishes, and inland commercial fisheries under a variety of statutes (particularly the Fish and Wildlife Coordination Act of 1958, the National Environmental Policy Act of 1969, and the Fish and Wildlife Act of 1956) relative to federally constructed or licensed water resources projects and those projects constructed under Federal permit or with Federal funding. This is done by consolidating NMFS expertise and applying it to direct, systematic participation in environmental decision-making in cooperation with other Federal as well as State Agencies involved in water resources planning and development.
- 2) To carry out the Columbia River Basin Development Program under the authority of the "so-called" Columbia River Basin Fishery Development Act to restore the anadromous fish runs of the Columbia River system which have been impeded and disrupted by construction of dams and other engineering works.

At the beginning of 1970, the water resources management function throughout most of the country tended to be a supportive function emphasizing the review of Federal water projects and coordination of the review reports with the Bureau of Sport Fisheries and Wildlife in the Fish and Wildlife Service. Exceptions were: 1) Alaska, where the Bureau of Commercial Fisheries had the predominant role in river basin studies with a generalized requirement for Bureau of Sport Fisheries and Wildlife review of the final report to the planning and development agency; and 2) in the Columbia River Basin, where the Bureau of Commercial Fisheries had the responsibility for all river basin studies, fishery activities and preparation of draft reports on fishery aspects for transmittal to the Bureau of Sport Fisheries and Wildlife. On July 1, 1970, River Basin Studies functions in Alaska were transferred to the Bureau of Sport Fisheries and Wildlife on order of the Commissioner, Fish and Wildlife Service. The Alaska Region of BCF retained a one-man office to provide commercial fisheries data for

Fish and Wildlife reports. With this exception, water resources management operations during the balance of calendar 1970 continued essentially as they had prior to the formation of NOAA under the terms of an informal "status quo" arrangement between the Bureau of Sport Fisheries and Wildlife and NMFS.

As a result of these 1970 changes, major emphasis was given in 1971 to development of the water resources role in the new NOAA/NMFS framework along with initial implementation of this role. The new NMFS water resources function now provided for a direct participation in the environmental decision-making process of water resource planners and developers under appropriate legislative requirements to conserve and enhance marine, estuarine, and anadromous resources and their environment. Considerable progress was made in coordinating programs and utilizing expertise in coastal and estuarine laboratories to analyze the effects of water development projects upon these resources and respond to their sponsors.

Activities of the Division of Water Resources Management were carried out in all five National Marine Fisheries Service Regions during 1970-1971.

Alaska Region

After the July 1970 transfer of River Basin Studies functions from the Bureau of Commercial Fisheries to the Bureau of Sport Fisheries and Wildlife, the Alaska Region was left with only one man, the Water Resources Coordinator. However, contacts with other State and Federal agencies in Alaska continued, as did those programs of the Auke Bay Fisheries Laboratory directed towards environmental problems. During the latter part of 1970, interest in Alaska was focused on the proposed trans-Alaska pipeline and marine terminal facilities. Although the Department of Interior retained jurisdiction over the trans-Alaska pipeline investigations pursuant to Reorganization Plan No. 4, research in Port Valdez by the Auke Bay Laboratory was continued with funds transferred from the Department of Interior.

Early in 1971, review of the draft Environmental Impact Statement on the trans-Alaska pipeline again dominated the Water Resources Management program, and the Water Resources Coordinator was assigned as a NOAA representative to the Interior Department Task Force to write the final Environmental Impact Statement. In the meantime, the normal workload such as review of Corps of Engineers permits, comments, draft Environmental Impact Statements, and review of Bureau of Sport Fisheries and Wildlife/RBS reports could be given only limited attention, or were assigned to Auke Bay Laboratory staff members temporarily detailed to Water Resources Management Division. Some projects, such as the Corps of Engineers Flood Control Project near Fairbanks, were left

completely in the hands of the Bureau of Sport Fisheries and Wildlife, with the understanding that NMFS be kept advised of new developments in project planning as they occurred.

In the fall of 1971, a staff member from the Auke Bay Laboratory was assigned to Water Resource Management to assist with the workload which had continued since the Bureau of Commercial Fisheries had moved into NOAA. Requests from other agencies for review and comments on their proposed permits and other project activities were screened and only those deemed to have the greatest potential for significant adverse effects on marine, estuarine, or anadromous fishery resources were given attention. By the end of the year much of the work on the preparation of the sections of the final Environmental Impact Statement dealing with the marine aspects of the proposed trans-Alaska pipeline project had been completed.

Northwest Region

Water Resources Management activities in this Region are carried out by the Columbia River Fisheries Program Office and are described in the section of the report for that office.

Southwest Region

The highlight of the Water Resources Management Program in the Southwest Region was the establishment of a formal Regional organization. Prior to this time much of the water resources activities had been handled by personnel from the Northwest Region's Columbia River Fisheries Program Office at Portland. The Southwest Region also became involved in water resources activities in Hawaii. Major activities in calendar years 1970-1971 included participation with the Alaska Region in reviewing an environmental impact statement relative to the trans-Alaska pipeline and serving as a member of the Ocean Environmental Task Group of the California State Water Resources Board Power Plant Siting Committee. This Task Group is involved in problems concerning siting of thermonuclear generating plants along the coast of California.

Southeast Region

During 1970 and 1971, the Southeast Region evaluated and/or furnished comments on some 1,500 federally-planned or federally-licensed water development projects in its area of responsibility, which encompasses 18 States, Puerto Rico, and the Virgin Islands.

Under provisions of the National Environmental Protection Act, this Region reviewed and commented directly to the Central Office as to the adequacy of approximately 65 Environmental Impact Statements in considering fishery values in their plans, most of which concerned proposed

power plants and Federal projects. Beginning July 1, 1971, a new program was started which required Corps of Engineer permits for any discharge of pollutants into waterways. More than 900 applications have been received from the 14 Corps of Engineer District Offices situated within this Region. For nearly three years the Region has participated in the Louisiana Coastal Studies and chaired the Commercial Fishery Unit. These studies are an interagency effort, spearheaded by the New Orleans District, U.S. Army Corps of Engineers, to determine the fresh water needs of the area's fish and wildlife resources. Other participants are the Louisiana Wildlife and Fisheries Commission, Bureau of Sport Fisheries and Wildlife, and the Coastal Studies Institute of Louisiana State University.

The Southeast Region became involved in oil spills and oil platform fires. In anticipation of a formalized response to such events, two observers were sent to the Coast Guard on-scene headquarters of a fire to provide fishery information and to report to NMFS on potential damage to fishery resources.

The Central Office was furnished daily situation reports on the 2½ month Shell Oil Company platform fire off Louisiana.

Public relations activities included supplying pertinent information on the conservation of aquatic resources to teachers and students working on ecological projects. There was participation in meeting with such groups as the Tampa Bay Regional Planning Council, Save Our Bays Committee, Florida Wildlife Federation and Florida Power Corporation (Crystal River Nuclear Generating Plant and Anclote Plant), and attendance at Pinellas and Hillsborough County Commission hearings on dredge and fill application. The conservation films "Estuarine Heritage" and "Crisis on the Coast" were shown 27 times.

Northeast Region

In the Northeast Region water resource activities in 1970-71 included serving on 11 committees that were relatively specific in their orientation of objectives. Technical Assistance Committees concerned with specific power plants are examples of this type of involvement. The Division of Water Resources Management devoted 10 percent of its time to work of this nature. The Division was involved with more broadly-based activities, such as special or comprehensive studies (under the Water Resources Council) including ten major studies, such as the Great Lake Basin Framework Study and the Long Island Sound Study. This in turn necessitated serving on 23 task groups, coordinating committees and similar groups. The Division was also concerned with applications for permits to work in navigable waters, for example, or for permits to discharge wastes under provisions of the Refuse Act of 1899. Critical review of Environmental Impact Statements also became a significant activity during 1971.

The Regional Water Resources Management Staff was also concerned with the preparation of special reports, such as A Contingency Plan for Spills of Oil and Other Hazardous Materials, which sets forth the manner in which Regional programs will respond in the event of an oil spill within the Region. This plan includes the Northeast Fisheries Center, a prime source of expertise on effects of oil and other hazardous materials on living marine resources.

Columbia River Fisheries Program Office

The activities of the Columbia River Fisheries Program Office are directed toward two major objectives—that of maintaining or improving environmental conditions for the runs of salmon and steelhead trout in the Pacific Northwest Region, and that of supplementing production of these fish in the Columbia River Basin through artificial propagation.

Environmental Planning And Development

The protection of adequate environment for fishery resources through planning and development has become critically important to both the sport and commercial fisheries. This program consists of three major features: 1) Water Resource Studies; 2) Comprehensive Planning; and 3) Design of Fish Protection Facilities. Water Resource Studies are undertaken to determine the effects of various water-use projects on fish and their environment and to develop means of preserving, and, where possible, enhancing the fishery resource. Closely related to this function is that of comprehensive planning with other agencies for the use of rivers and estuaries. Fish Facility Design is concerned with the functional design of facilities at specific projects for the protection of fish, particularly those required for safe passage of anadromous fish.

The Environmental Planning and Development Staff participated substantially in the development of three comprehensive river basin studies involving a large number of Federal and State agencies. These studies included: 1) The Willamette Basin Comprehensive Study of Water and Related Land Resources, 2) The Columbia-North Pacific Region Comprehensive Framework Study of Water and Related Lands; and 3) The Comprehensive Study of Water and Related Land Resources of Puget Sound and Adjacent Waters.

In cooperation with technicians from State fishery agencies, NMFS specialists provided the Corps of Engineers with expertise in the planning of major revisions for the fish passage facilities at Bonneville Dam on the Columbia River. These modifications were made necessary by the proposal to raise the forebay level at this dam. The staff continued to play the major role in the design of fish passage facilities at dams on the Connecticut River and reviewed plans and provided design criteria for fish passage at

projects in Alaska. Leadership was provided in the design and planning of major screening projects in California. There was participation with State Fishery agencies in a periodic inspection program of fish facilities at Corps of Engineers and Public Utility Districts dams on the Columbia and Snake Rivers.

The National Environmental Policy Act of 1969 has required increased consideration of the effects of water related projects on fish and fisheries. Channels have been established which allow NMFS to comment in a meaningful manner. Advice was provided to construction or licensing agencies for nearly all of the water development proposals of importance to fish for which environmental impact statements are required. Useful input has also been possible where waste discharge permits or permits to dredge or fill are issued by the Federal Government. NMFS comments in conjunction with those of other agencies often provided a basis for alterations in plans to minimize damage, or at times improve environmental circumstances.

Columbia Fisheries Development Program

In 1970 and 1971, the salmon runs of the Columbia River continued their favorable response to the NMFS-sponsored program to restore and enhance the anadromous fish runs badly damaged by massive water development projects. This program is a cooperative effort planned and executed jointly with the State conservation agencies of Idaho, Oregon, and Washington.

The returns from young fish released in previous years were good. Catches of coho salmon were excellent, particularly in the ocean. The Oregon troll catch of 10.1 million pounds in 1971 was a new record. The catch off Washington was also above average with good landings at all ocean ports. Preliminary estimates place the 1971 sport catch of coho salmon well over 300,000 fish for the ocean area near the mouth of the Columbia River. The coho are mainly from Columbia River hatcheries. The sport fishery for steelhead in the lower part of the Columbia River Basin was also excellent. The fish caught were mainly of hatchery origin.

Hatchery propagation of spring chinook continued to show promise with a record run of over 9,000 fish returning to the Wind River in Washington in 1971. This race of salmon was introduced to this tributary by hatchery planting and accommodated for upstream passage by laddering impassable falls near the mouth. Apart from the hatchery program, new runs of salmon and steelhead were also being developed on the Willamette River with the completion of the construction in 1971 of fish ladders over the falls at Oregon City, Oregon. During 1971 over 100,000 salmon and steelhead were counted through the new fishways. This is a record run for this tributary of the Columbia River.

Operation by contract with State agencies of 88 fish ladders and over 500 screens to protect young fish was continued.

PUBLICATIONS

NMFS staff members publish their work both in series of publications bearing the NMFS imprimatur and in scholarly journals and technical publications. A list, arranged by author, of these publications in calendar years 1970 and 1971 comprises 1,068 titles.

The series issued directly under the auspices of NMFS in calendar years 1970 and 1971 were:

Commercial Fisheries Abstracts

Issued monthly, *Commercial Fisheries Abstracts* has appeared since 1948. In calendar year 1970 the 12 numbers contained 387 pages; in calendar year 1971 the 12 numbers contained 384 pages. The series was distributed free in calendar years 1970-71.

Commercial Fisheries Review

In calendar year 1970, *Commercial Fisheries Review* had 12 numbers (816 pages); in calendar year 1971 it had 12 numbers (620 pages). The publication is available from the Superintendent of Documents.

Current Fisheries Statistics

These publications are issued monthly, quarterly, or annually by States, regions, or larger areas. In calendar year 1970, 300 (2,078 pages) were issued; in calendar year 1971, 368 (2,450 pages) were issued.

Data Report

The *Data Reports* appear in microfiche form. They are available as microfiches or as hard copies from the U.S. Department of Commerce, National Technical Information Service. Prices vary according to length. In calendar year 1970, 10 *Data Reports* (2,307 pages; 39 microfiches) were issued; in calendar year 1971, 19 *Data Reports* (2,169 pages; 44 microfiches) were issued.

Fishery Bulletin

This publication, which originated in 1881, late in 1971 was authorized by the Office of Management and Budget to be issued as a periodical (appearing quarterly). Also it was decided to place the publication, previously distributed free, on sale with the Superintendent of Documents. Beginning with Volume 70, Number 1, in January, 1972, the subscription price was to be \$4.50 a year.

In calendar year 1970, 13 papers (264 pages) appeared in Volume 68, Numbers 2 and 3 (the bound numbers are dated 1971). In calendar year 1971, 2 papers (52 pages) appeared in Volume 68, Number 3. In 1971, the

practice of issuing separates prior to publication of the bound number ceased. All four numbers of Volume 69 were issued in calendar year 1971. They contained 69 papers and an index (896 pages).

Fishery Facts

This series was established in 1971. No numbers were issued in that year, however.

Fishery Industrial Research

Fishery Industrial Research ceased publication with Volume 6, Number 4, issued in November 1970. In calendar year 1970, it had carried 15 papers (195 pages).

Fishery Leaflet

The *Fishery Leaflet* series ceased publication with the issue of *Fishery Leaflet* 640 in September 1971. In calendar year 1970, 7 *Fishery Leaflets* (103 pages) were issued; in calendar year 1971, 6 *Fishery Leaflets* (46 pages) were issued.

Fishery Market Development Series

This series contains popular educational publications on care, preparation, purchase, and nutrition of fishery products. They are for sale by the Superintendent of Documents. During calendar year 1970, 12 (74 pages) of these were issued; during calendar year 1971, 6 (12 pages) were issued; in addition a chart of marine fishes was issued.

Market News

The several Market News offices issue current statistical information on a daily, monthly, and annual basis. In calendar year 1970, the daily reports numbered 1,669 (5,160 pages); in calendar year 1971, they numbered 1,659 (5,131 pages). In calendar year 1970, the monthly reports numbered 72 (504 pages); in calendar year 1971, they numbered 72 (504 pages). In calendar year 1970, the annual reports numbered 7 (151 pages); in calendar year 1971, they numbered 8 (152 pages).

Miscellaneous Publications

Our Changing Fisheries, edited by Sidney Shapiro, appeared in calendar year 1971. This 534-page book is a compilation of articles describing the background, present state, and future of the U.S. fisheries.

Report of the Bureau of Commercial Fisheries for the Calendar Year 1969 (135 pages) was issued in 1971.

NOAA Technical Memorandum NMFS

This series was established in calendar year 1971. No numbers were issued that year, however.

NOAA Technical Report NMFS CIRC

In July, 1971, the Circular series of NMFS (and formerly of the Bureau of Commercial Fisheries) was incorporated in the NOAA Technical Report series. Sequential numbering in the Circular series was unchanged. At the same time, the publications were put on sale by the Superintendent of Documents. In calendar year 1970, 19 Circulars (942 pages) were issued; in

calendar year 1971, 12 *NOAA Technical Report NMFS CIRC* (or Circulars) (511 pages) were issued.

NOAA Technical Report NMFS SSRF

In July, 1971, the *Special Scientific Report-Fisheries* of NMFS (and formerly of the Bureau of Commercial Fisheries) was incorporated in the NOAA Technical Report series. Sequential numbering in the SSRF series was unchanged. At the same time, the publications were put on sale by the Superintendent of Documents. In calendar year 1970, 28 SSRF's (1,168 pages) were issued; in calendar year 1971, 26 *NOAA Technical Report NMFS SSRF* (or SSRF's) (701 pages) were issued.

Situation and Outlook

There are three types of *Situation and Outlook* reports, in which prices, production, imports, exports, and inventories of fishery products are analyzed. They are *Food Fish Situation and Outlook* (2 numbers, 124 pages in calendar year 1970; 4 numbers, 166 pages in calendar year 1971); *Shellfish Situation and Outlook* (4 numbers, 156 pages in calendar year 1970; 4 numbers, 140 pages in calendar year 1971); and *Industrial Fish Situation and Outlook* (4 numbers, 160 pages in calendar year 1970; 4 numbers, 112 pages in calendar year 1971).

Statistical Digest

These are annual compilations of statistics with detailed tabulations relating to fishery production, manufacture, and commerce. In calendar year 1970, 1 (489 pages) was issued; in calendar year 1971, 1 (578 pages) was issued.

An alphabetical listing of publications (by author) follows. The list does not include *Commercial Fisheries Abstracts*, *Current Fishery Statistics*, *Situation and Outlook* reports, and *Commercial Fisheries Review*, except for a few articles for which the authors' names are given.

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