REPORT TO THE CONGRESS

U.S. Fishing Industry Can Be Strengthened By Developing Underutilized Fish Resources

National Marine Fisheries Service
National Oceanic And Atmospheric Administration
Department Of Commerce

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

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To the President of the Senate and the
Speaker of the House of Representatives

This report presents our conclusions and recommendations on how the Department of Commerce can strengthen the U.S. fishing industry by developing new fisheries from underutilized fish resources. Such development can greatly contribute to the U.S. fishing industry's ability to supply the domestic and foreign demand for fishery products.

Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of Commerce; and the Administrator, National Oceanic and Atmospheric Administration.

Comptroller General
of the United States

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ABBREVIATIONS

GAO	General Accounting Office
NACOA	National Advisory Committee on the Oceans and Atmosphere
NMFS	National Marine Fisheries Service
OMB	Office of Management and Budget

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

U.S. FISHING INDUSTRY CAN BE STRENGTHENED BY DEVELOPING UNDERUTILIZED FISH RESOURCES

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D I G E S T

WHY THE REVIEW WAS MADE

GAO reviewed the National Marine Fisheries Service programs to find out if they were effective in carrying out the national policy of strengthening the commercial fishing industry and, specifically, in increasing the harvests from the seas by developing new or expanded fisheries from underused fish resources.

FINDINGS AND CONCLUSIONS

The United States is one of the largest users of fish products in the world. U.S. consumption of edible fish grew from 4.3 billion pounds in 1961 to 7 billion pounds in 1973, a 62-percent increase.

Also, since 1960, the United States has annually used an average of 6.6 billion pounds of fish for industrial purposes such as fishmeal, fish oil, and fish solubles.

The U.S. fishing industry has not increased its harvests to meet the rising domestic demand for fish. The U.S. catch has changed little over the past two decades. In 1973 U.S. fishermen supplied only 33 percent of the edible fish products used in the United States.

As a result, the United States has had to rely increasingly on imported fish products. In 1973 the United States imported a record $1.6 billion worth of fish products. This represented a considerable adverse effect on the overall U.S. balance-of-payments. (See pp. 3 and 4.)

Although the United States has been able to depend on imports to meet its growing demand for fish and fish products, signs indicate that this may not always be the case because

--the growth rate in edible fish caught worldwide has slowed considerably and

--the growing worldwide affluence is creating strong competition for U.S. buyers which is already driving up prices.

The U.S. fishing industry's inability to supply the rising domestic demand for fish has not been due to a lack of fish resources in the waters adjacent to the United States. Large quantities and varieties of commercially important fish and shellfish inhabit the Continental Shelf areas off the United States.

Scientists have estimated that the waters off the United States could yield fish catches ranging from 40 to 50 billion pounds annually. This renewable resource base is about 4 or 5 times larger than the domestic and foreign catches combined. (See pp. 7 and 8.)

Many individual fish species located in the U.S. coastal waters are not used commercially at all, and many others are currently only partially used. In contrast, most of the well-accepted natural stocks of fish (e.g., haddock, cod, halibut, and salmon) are being fished at near, or in excess of, their sustainable limit of production. (See p. 9.)

Developing the vast underused fish resources into commercially viable fisheries would increase the supply of fish and fish products available to the U.S. consumer and strengthen the economic position of the domestic fishing industry.

Establishing additional fisheries for the U.S. fishing industry would relieve pressure on fully developed fish stocks and increase the domestic catch which would help to reduce the large imbalance in our trade of fish and fish products.

Many barriers have to be overcome before the harvest of underutilized fish species can be converted to a viable commercial fishery. They range from locating fishing grounds and devising methods to catch the fish to introducing products from the new species into the marketplace. Problems in one or more of these areas usually keep a species out of production. (See p. 7.)

Two characteristics unique to the fishing industry, the common property character of the resource and the typical small size of the firm, tend to deter substantial private investment in developing new fisheries. Fish in the ocean are subject to use for the most part by any fisherman. As a result, little incentive exists to invest in developing a new fishery because investors could not expect to capture more than a small portion of the economic benefits generated.

The U.S. fishing industry is composed of two major components, the fishermen and the processors. The fishermen consist, for the most part, of small independent fishing vessel operators, more than 90 percent of whom employ less than five people.

The fish-processing component likewise consists principally of small establishments. The industry's fragmented nature leaves little opportunity for capital accumulation and makes coordination among the operators to develop a new fishery extremely difficult. (See p. 14.)

National Marine Fisheries Service Fishery Development Activities

Various National Marine Fisheries Service activities have helped the fishing industry overcome barriers to developing new or expanded fisheries. For some species, the Service has located new fish resources, developed new harvesting and processing techniques, and performed other steps necessary to develop new fisheries.

In some cases these activities resulted in prosperous new or expanded fisheries. In other cases

efforts to develop underutilized species have not succeeded. (See pp. 15 and 16.)

Service activities have often been directed at overcoming only one or two of the barriers retarding a particular species' development, while other barriers have been overlooked. As a result fisheries either remain underutilized or their use was delayed until the additional barriers were removed. (See p. 16.)

In recent years the Service has spent about $2 million annually, or 4 percent of its annual budget, in fishery development. In addition the Service's organizational structure has not been conducive to carrying out an integrated approach to fishery development.

Responsibility for the major functions involved in a fishery development program is spread among the Service's major components. The result is that each component is free to conduct those fishery development activities which it feels are most necessary, with little coordination with other components. (See pp. 18 and 19.) In addition, the Service has not developed criteria to assure that the individual fish species with the greatest commercial potential are selected for development. (See pp. 21 and 22.)

Since 1963 the Service has recognized the need to increase the U.S. fishing industry s share of our expanding market for fish products but has been slow in establishing comprehensive fishery development programs to assist the fishing industry to increase its catch.

Several attempts have been made to establish comprehensive fishery development programs, but none have left the planning stage. (See p. 22.)

RECOMMENDATIONS

The National Marine Fisheries Service should place more emphasis on assisting the fishing industry to develop the underused fish resources off our coasts into viable commercial fisheries. To capitalize on opportunities available, GAO recommends that the Secretary of Commerce direct the Service to complete the National Fisneries Plan, specifically, that section dealing with fishery development. In particular, the new fisheries plan should

--require planning for fishery development by species or groups of species with similar characteristics in order to identify all barriers to development; and

--establish criteria for determining which underutilized species have the highest potential for development.

GAO also recommends that the Secretary provide for monitoring the implementation of the plan after it has been approved.

By placing increased emphasis on implementing a comprehensive, coordinated fishery development program, the Service will be in a position to provide the fishing industry the information and assistance needed to reduce the extraordinary risks involved in developing new fisheries to acceptable levels.

Developing the vast underutilized fish resources into commercially viable fisheries would increase the supply of fish products available to the U.S. consumer, could help reduce the current large imbalance in our trade of fish and fish products by decreasing our reliance on imports, and could increase opportunities to export fish products attractive to foreign markets.

As additional fisheries are established, they would provide alternatives to those fishermen involved in fisheries where excess harvesting capacity now exists. In addition, such information could serve to establish a sound management program as the new fishery is developed.

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Department agreed with GAO's findings, conclusions, and recommendations.

The Department said the National Fisheries Plan will be completed in July 1975 and that, after it has been approved by the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service will review and consider in detail actions necessary to insure its implementation.

Because previous attempts to establish comprehensive fishery development programs have been unsuccessful, GAO believes responsibility for monitoring the plan's implementation should be placed at the highest practicable departmental level.

Such action will insure the plan's implementation and enhance the development of fishery programs necessary to strengthen the U.S. fishing industry (See p. 30.)

MATTERS FOR CONSIDERATION BY THE CONGRESS

Rehabilitation of the U.S. fishing industry has long been a matter of concern to the Congress. Senate Resolution 222 authorized a National Ocean Policy Study, one purpose of which is to achieve full utilization and conservation of living resources of the oceans.

This report should assist the Congress in considering legislation related to helping the U.S. fishing industry. It should also be useful in connection with establishing the fishery-related policy aspects of the National Ocean Policy Study.

CHAPTER 1

STATUS OF U.S. FISHING INDUSTRY

The declining status of the U.S. fishing industry has become a matter of increasing congressional concern. Over the years, the Congress has repeatedly stressed the need to increase our utilization of fish resources and strengthen the fishing industry.

Historically, U.S. consumers have been increasing their consumption of fish products. This trend is evident not only in the increase in total consumption of fish products, but also in the increase in per capita consumption. However, U.S. fishermen have not increased their catch to keep up with the increasing demand for seafood. As a result the United States has had to rely increasingly on imported fish.

These and other matters concerning the status of the U.S. fishing industry are discussed in the remainder of this chapter. Chapter 2 points out that the static U.S. fish catch has not been due to a lack of fish resources. The total fish resources available in the waters off the coast of the United States are considerably greater than the levels of use by the U.S. fishing industry, but there are many barriers involved in converting an underutilized fish resource into a viable commercial fishery. In chapter 3 we discuss the National Marine Fisheries Service's (NMFS') activities to assist the U.S. fishing industry to overcome the barriers to the development of new fisheries.

CONGRESSIONAL CONCERN

In the Fish and Wildlife Act of 1956, the act that established the Bureau of Commercial Fisheries, Congress recognized that the fish resources of the Nation make a material contribution to our national economy and food supply and that such resources are a living, renewable form of national wealth that is capable of being maintained and greatly increased with proper management. The Congress further declared that the provisions of the act should be administered to stimulate the development of a strong, prosperous, and thriving fishery and fish-processing industry.

In the Marine Resources and Engineering Development Act of 1966, the Congress declared as national policy the need to rehabilitate our commercial fisheries and increase the harvest from the seas. In this act, the Congress stated that, among other objectives, the marine science activities of the United States should contribute to the accelerated development of ocean resources.

More recently, Senate Concurrent Resolution 11, introduced in February 1973 and adopted by both Houses of the Congress, declared that it was the policy of the Congress that our fishing industry be afforded all support necessary to have it strengthened. The resolution set forth congressional intent to take measures to solve the problems and to strengthen and rehabilitate the sagging U.S. fishing industry.

In February 1974, the Senate adopted Senate Resolution 222 authorizing a National Ocean Policy Study. One purpose of the study is to establish policies to achieve the goal of full utilization and conservation of living resources of the oceans and recommending solutions to problems in marine fisheries and their management, rehabilitation of U.S. fisheries, and future international negotiations on fisheries.

CONSUMPTION OF FISH PRODUCTS

The United States is one of the largest users of fish products in the world. Only Japan, China, and the Union of Soviet Socialist Republics consume more fish than the United States. Over 10 billion pounds of edible and industrial species were used in 1973. About 7 billion pounds were edible species, and 3 billion pounds were used for industrial purposes as fishmeal, fish oil, and fish solubles.

Use of edible fish products in 1973 was 62 percent over the 1961 level when the United States consumed about 4.3 billion pounds of edible fish. The 2.7 billion pound increase is attributed to both an increase in per capita consumption and an increase in the U.S. population.

The U.S. demand for fish includes a multitude of species, but is concentrated in a few species. In 1973, canned tuna and shrimp accounted for 35 percent of fish products consumed in the United States and canned salmon and fish sticks and portions (the latter manufactured from frozen blocks of fillets--mostly cod) accounted for an additional 20 percent of U.S. consumption of edible fish products.

SUPPLY OF FISH PRODUCTS

Although demand and consumption have increased steadily, the harvesting segment of the domestic fish industry has not increased its catch of fish to meet the rising domestic demand. Record U.S. landings of edible fish products amounting to 3.3 billion pounds were made in 1950. The catch declined steadily throughout the 1950s. In the 1960s and early 1970s, the catch remained about stable ranging between 2.3 and 2.6 billion pounds. Edible domestic landings in 1973 were 2.3 billion pounds.

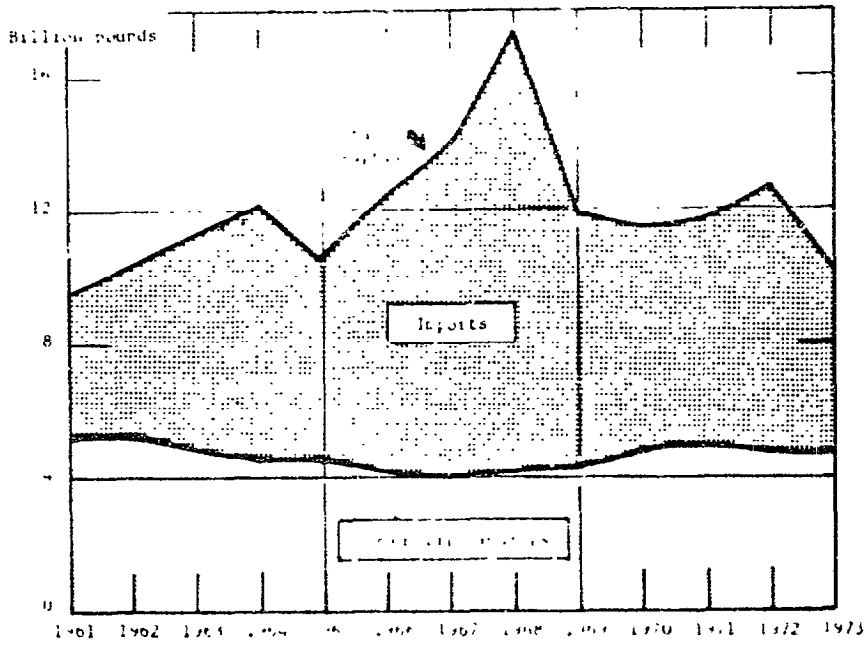
Total U.S. landings of fish (edible and industrial) reached a peak of 5.4 billion pounds in 1962. Total U.S. landings of fish in 1973 were 4.7 billion pounds. (See app. I for additional information on production and consumption trends of fishery products in the United States.)

Although the U.S. catch has remained relatively static during the past decades, other countries have been increasing their catch. The world catch of fish rose from 73 billion pounds in 1958 to 145 billion pounds in 1972. For years the U.S. fishing fleet harvested a catch second only to that of Japan and at one time took more than 12 percent of the world's catch. By 1972 the United States had dropped to sixth place among fishing nations, with 4 percent of the world's total catch.

Imports of fish products

To make up the difference between a stable domestic supply of fish and a rising demand, the United States has relied increasingly on imported fish. Between 1961 and 1973, the portion of the total U.S. market for fish products supplied by imports ranged from a low of 46 percent in 1961

to a high of 76 percent in 1968. In 1973, imports supplied 54 percent of the domestic market. The following graph shows the sources of the U.S. supply of fish products since 1961--commercial landings and imports.



Source: Fisheries Statistics of the United States, 1973
National Marine Fisheries Service

Erratic changes in the supply of imported industrial fish products principally account for the fluctuation in the total supply of fish products. Between 1961 and 1973, industrial fish products supplied by imports has fluctuated between a high of 85 percent in 1968 and a low of 25 percent in 1973. In contrast, the portion of the more commercially valuable edible fish products supplied by imports has risen steadily from 43 percent in 1961 to 67 percent in 1973.

The United States is the largest importer of fish products in the world. The substantial fish imports are of significance to the overall economy of the United States because of their considerable adverse effect on the U.S. balance-of-payments. The fishery balance-of-payments deficit rose rapidly from $730 million in 1968 to a record $1,280 million in 1973. In 1973 imports of fish products cost the United States $1,579 million while exports yielded only $299 million.

Imports of raw fish are highly important in the domestic production of leading fish products consumed in the United States. For many years over half the raw tuna for the U.S. canned tuna has been imported. In 1972, the equivalent of three out of every five cans of tuna on supermarket shelves were processed from imported raw tuna. Regularly, over half the shrimp consumed in the United States is imported. For fish sticks and fish portions 95 percent or more of the raw fish requirement comes from imports.

Although the United States has been able to depend on imports to meet its growing demand for fish products, signs are developing that this may not always be the case. First, the rate of growth in the world catch of edible fish has slowed considerably. The rate of growth is now 1 to 2 percent per year, down from the previous 4 to 6 percent. With the world population increasing at a rate of about 2 percent per year, edible fish production is starting to lag behind the growth in population. Secondly, at the same time the growth in edible fisheries is beginning to slow considerably, the growing affluence around the world--in both developed and developing countries--is creating strong competition for U.S. buyers. Already Japan and some European countries are outbidding U.S. buyers for certain fish products.

NMFS

NMFS is the principal Federal agency responsible for carrying out programs relating to the U.S. fishing industry. NMFS was established as part of the National Oceanic and Atmospheric Administration, Department of Commerce, pursuant to Reorganization Plan No. 4 of 1970. Many of NMFS' responsibilities were carried out by its predecessor agency, the former Bureau of Commercial Fisheries, Department of the Interior, which had been in existence since 1956.

The basic mission of NMFS is to protect and promote the wise and full use of marine fisheries resources. NMFS concerns itself with many aspects of the fisheries, primarily research programs. Basic research programs are designed to better understand living marine resources and the environmental quality essential for their existence. Applied research programs provide information on such matters as the availability of fish resources, the design and testing of

gear to harvest fish resources, and the properties and methods of handling and processing fish. NMFS also performs marketing and economic research. Other major NMFS efforts include the collection and dissemination of fishery statistics, financial assistance programs, and enforcement of Federal and international fishery agreements.

Policies and procedures are established at NMFS headquarters in Washington, D.C. Field units are located throughout the country and consist of five regional offices, five major fishery centers, and three fishery product utilization centers. Numerous small fishery centers and laboratories report through these major components.

As of June 30, 1974, NMFS had 1,734 permanent staff positions--314 at headquarters, 475 at the five regional offices, and 945 at the fisheries centers and other various laboratories around the country. NMFS received appropriations of $52, $50, and $55 million in fiscal years 1972, 1973, and 1974, respectively.

CHAPTER 2

UNDERUTILIZED FISH RESOURCES AND BARRIERS TO THEIR UTILIZATION

The inability of the U.S. fishing industry to increase its fish catch to meet the continually growing demand of U.S. consumers for seafood has not been due to a lack of fish resources in the waters off the coast of the United States. The fish resources available to the U.S. fishing industry are considerably greater than amounts presently harvested by U.S. and foreign fishermen.

Large quantities and varieties of commercially important fish and shellfish inhabit the extensive Continental Shelf areas off the United States. Most of our well-known stocks of fish (e.g., haddock, cod, halibut, and salmon) are being fished by domestic and foreign fishermen at near, or over, their sustainable limit of production, but many other fish species in waters off the U.S. coast are not used commercially at all and many others are only partially used.

Although the underutilized fish resources off the U.S. coast provide a large potential for expanding domestic fisheries, before most of the species can be brought into commercial production, various barriers to their use must be overcome. These barriers range from locating and devising methods to catch the fish to introducing products from the new fish into the marketplace. Furthermore, the structure and capital position of most segments of the U.S. fishing industry tend to preclude private industry from solving all the problems associated with the development of a new fishery.

FISHERY RESOURCES POTENTIAL

Scientists have estimated that the waters over the Continental Shelf off the United States could yield fish

catches ranging from 40 to 50 billion pounds annually.[1] Currently, U.S. fishermen harvest only about one-tenth of the potential available resources while foreign fishermen are estimated to take a larger amount than U.S. fishermen. The renewable fishery resource base off the United States could sustain an estimated production level several times the current level of use by the fishing industry.

Although much remains to be done to fully assess the abundance of specific species of fish which inhabit the waters adjacent to the United States, NMFS has estimated regional catch potentials as shown in the following table.

Region	Total potential catch (Billions of pounds)
New England and Mid-Atlantic	5.3
South Atlantic	9.0
Gulf of Mexico	17.1
Alaska	5.1
California to Washington	3.2
Total	39.7

[1] The Marine Resources Panel of the Commission on Marine Science, Engineering and Resources estimated annual potential yield off U.S. coastal waters at 50 billion pounds. The Conference on the Future of the U.S. Fishing Industry sponsored by the College of Fisheries, University of Washington, estimated annual potential yields to be about 45 billion pounds. A planning document prepared by the NMFS staff, in 1969, estimated annual potential yield to be about 40 billion pounds.

U.S. and foreign fishermen catch a portion of the fish available in each region. The level or rate of catch varies extensively by fish species and regions. The largest resources of underutilized fish and shellfish are in the Gulf of Mexico and along the South Atlantic coast of the United States. Fish species suitable for industrial purposes are particularly large in the Gulf of Mexico and in waters off the California coast. Edible food fish potentials are substantial off the Pacific Northwest, Alaska, New England, and gulf coasts. Also, underutilized shellfish resources exist in the Alaska area, in the Gulf of Mexico, and along the South Atlantic seaboard.

Although many fish species are harvested below their potential, others are more fully utilized and some are fished at rates exceeding their level of maximum sustainable yield.[1] Thus, while some species of the total fish resource base are completely unused, other species have been overfished. Many of the highly demanded and easily caught stocks of fish are harvested near, or in excess of, their sustainable limit of production. This has occurred in the New England varieties such as haddock, ocean perch, sea scallops, lobster, and cod; Middle Atlantic menhaden; Pacific Northwest halibut and salmon; and the Pacific yellowfin tuna and mackerel.

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[1]Maximum sustainable yield is the scientist's term to describe the balance between catching a certain number of fish of a particular species and leaving the necessary number to allow the population to propagate. A harvest that exceeds this amount reduces the capacity of the resource to renew and sustain itself.

Underutilized species with commercial potential

Over the years, NMFS has identified a number of underutilized species which it believed possessed potential for future commercial production. The following table shows some of the major species.

Species	1973 U.S. catch (note a)	Estimated annual yield
	(millions of pounds)	
Pollock	14	3,780
Mackerel	21	1,660
Anchovy	229	2,500
Croaker	23	1,000
Pacific hake	3	1,000
Herring	100	3,500
Skipjack tuna	40	2,000
Clams	100	265
Mullet	33	150
Calico scallops	1	25

[a]In addition foreign fishing fleets are harvesting several of these species.

The estimated annual yields of each of these species are many times greater than the actual U.S. catch and provide an insight into the magnitude of specific underutilized species in the waters off the United States and the potential of these species for expanding U.S. fisheries. For example, NMFS estimates that 3.6 billion pounds of Alaskan pollock could be harvested annually from Alaskan waters. This potential is 1.3 billion pounds greater than the entire 1973

U.S. catch of all species of edible fish. A large amount of Alaskan pollock is presently being taken by foreign fleets, and in 1973, over 100 million pounds of pollock were imported into the United States. NMFS, however, believes pollock still comprises a very large resource for possible harvesting by U.S. fishermen.

DEVELOPING NEW FISHERIES FROM UNDERUTILIZED RESOURCES

The factors involved in developing an underutilized fish species into a viable commercial fishery range from locating fishing grounds and devising methods to catch the species of interest to introducing products from the new species into the marketplace. The factors involved in developing a new fishery are

--resource assessment,

--harvesting technology,

--handling and transportation,

--product development,

--processing technology, and

--marketing and economic analysis.

Major problems with one or more of these factors usually keep a species out of commercial production. Problems retarding the development of an underutilized species can occur in either, or both, the fisherman or processor components of the fishing industry. A brief explanation of each of the factors involved in developing a new fishery follows.

Resource assessment

Assessment of the resource potential provides general information on what fish stocks are available, in what areas, in what quantities, at what times of the year, and an approximation of the maximum sustainable yields available. From such information fishermen can make decisions on the

distribution of capital and opportunities available for investment. NMFS studies show that species such as pollock and mackerel are not harvested in greater quantities because of the lack of specific data on their availability or location.

Harvesting technology, handling, and transportation

Besides knowing where to find the fish, fishermen also need to know the type and quantity of fishing gear that should be used to harvest the resource on a continuing basis. Gear development problems are retarding the development of many species. For example, skipjack tuna exist in very clear water with complex currents. The clear water enhances the chances that the tuna may evade a conventional net, and complex currents hinder the net's sinking rate. Additionally, the movement patterns of skipjack tuna are hard to predict, making it extremely difficult to position a vessel to drop a net.

Some problems occur at both the fishermen and processor levels. For example, mullet and Pacific hake deteriorate rapidly and cannot be stored for extended periods under normal fish storage methods. Accordingly, different storage methods must be developed for use on fishing boats and in processors' facilities.

Product development and processing technology

Product development seeks ways to convert raw material into product forms that would be acceptable in the marketplace. Product development on many underutilized species is especially necessary because of their unfamiliar consistency and taste. Much of the processing and handling of fishery products is labor intensive and thus costly. Processing technology research seeks to reduce costs through the use of sophisticated product-handling techniques. NMFS studies show that product development or processing problems are retarding more extensive use of pollock, herring, croaker, and several other species.

Marketing and economic analysis

Marketing services facilitate the introduction of new species or new products into the marketplace--domestic or foreign. Marketing services can include market research, consumer education, and distribution mechanisms. Underutilized species, such as squid and herring, suffer from marketing problems.

Economic analysis is the basis for decisions throughout the fishery development process involving the evaluation of investment alternatives, the establishment of fishery development priorities, providing cost-benefit studies, and reducing risks on the part of the investor.

BARRIERS FACED BY INDUSTRY IN DEVELOPING NEW FISHERIES

Although abundant underutilized fish resources are available off the U.S. coast, the common property character of the resource and the typical small size of the firm, characteristics unique to the fishing industry, tend to deter substantial private investment to overcome the problems involved in the development of new fisheries. The fundamental technological research necessary to improve existing products or place new products on the market is generally beyond the financial means of individual members of the industry.

Common property aspect of fisheries

Fishery resources in the ocean are considered common property and, therefore, subject to harvest by any U.S. fisherman and often by fishermen from other countries. This differs from other natural resources where legal ownership and control of the resource exists. As a result, extraordinary economic risks exist for parties interested in investing in developing a new fishery because, even if the new fishery succeeds, without ownership or control of the resource the investors could not expect to capture more than a small portion of the economic benefits generated.

For example, a fisherman who invests in locating and developing a successful new fishing ground cannot prevent other fishermen from fishing in the newly discovered fishing ground and sharing in the benefits from his investment.

Composition of U.S. fishing industry

The U.S. fishing industry is a conglomerate of small and large firms. The industry is composed of two major components, the fisherman (also called the producer) and the processor. The fishermen consist, for the most part, of small independent fishing vessel operators, more than 90 percent of whom employ less than five people. Currently, it is estimated that 140,500 full- and part-time fishermen operate about 13,600 vessels of over 5 net tons and 73,000 boats of less than 5 net tons.

The fish-processing component likewise consists principally of small establishments. In 1972, the 1,818 processing plants in the United States employed about 79,000 persons, or an average of about 44 persons per plant. In addition, 1,845 wholesale establishments employed about 12,000 persons.

The National Commission on Productivity, in its report on productivity in the fishing industry, pointed out that the fragmented nature of the industry leaves little opportunity for capital accumulation and makes achieving coordination among the various operators to develop a new fishery extremely difficult. The low amount of capital available to the fishing industry means that, even if a reasonable chance for a fair return did exist, few members of the fishing industry could make the investments necessary to develop a new fishery. One means of accumulating the resources needed is to generate industrywide cooperation toward exploiting underutilized species. But the fragmentation of this industry into very small companies works against this and no mechanism to induce coordination now exists.

CHAPTER 3

NEED FOR INCREASED EMPHASIS BY NMFS ON FISHERY DEVELOPMENT PROGRAMS

Over the years, NMFS has emphasized research and assistance directed toward the management aspects of the developed (popular) fisheries. Only limited efforts have been devoted to developing new fisheries. In some cases, the efforts NMFS devoted to fishery development resulted in new or expanded fisheries, but other NMFS efforts to develop underutilized species have not succeeded.

Several factors have hindered the effectiveness of NMFS fishery development activities. The NMFS' organizational structure is not conducive to managing the comprehensive, coordinated programs needed to develop new fisheries. NMFS has not developed criteria to assure that those individual fish species with the greatest commercial potential are selected for fishery development efforts. Past NMFS attempts to establish comprehensive fishery development programs have not progressed out of the planning stage.

NMFS has begun to take steps to improve its fishery development programs. A national coordinator for fishery development was appointed in October 1973 to act as liaison between headquarters and the field components, and regional directors have been given more responsibility for coordinating fishery development programs within their regions. Several comprehensive projects to develop specific fisheries have been initiated, and NMFS is again preparing a national fisheries plan which includes a section devoted to fishery development.

NMFS FISHERY DEVELOPMENT ACTIVITIES

Various NMFS activities over the years have helped the fishing industry overcome some of the barriers to the development of new or expanded fisheries. NMFS has discovered the location of new fish resources, developed new harvesting and processing techniques, and performed other activities necessary to develop new fisheries. In some

cases, these activities resulted in prosperous new or expanded fisheries.

For example, landings of Northern lobster caught in deep water up to 200 miles off the coast increased dramatically following specific NMFS surveys to locate this resource and NMFS assistance in the design of new pots for harvesting lobster at the greater depths. Previously the lobster fishery had been limited to the relatively shallow water close to shore, with only small amounts taken from deep water. (See app. II for a more complete explanation of NMFS efforts to expand the deep water lobster fishery.)

The increased use of surf clams from the Middle Atlantic States followed a similar pattern. There was concern that the traditional surf clam fishery was being fished at close to its limits and might not be able to continue to meet the demand for this product. At the request of the industry, NMFS conducted explorations resulting in the discovery of abundant beds of surf clams which greatly increased the use of this resource. As with the Northern lobster, NMFS was able to overcome the critical factor holding up the expansion of the surf clam fishery.

Although the offshore lobster and surf clam fisheries developed into viable fisheries, other NMFS efforts to develop underutilized species have not succeeded. Often these efforts were not conducted as part of a comprehensive, coordinated approach to fishery development. As pointed out in chapter 2, an underutilized species can have several barriers which prevent its increased utilization. NMFS activities have often been directed to overcome only one or two of these barriers, while other barriers have been overlooked. The result has been that many fisheries either remain underutilized or their use was delayed until the additional barriers were removed.

For example, NMFS efforts to develop the Pacific coast shrimp fishery demonstrate how success in locating a new fish resource and developing gear to harvest the resource will not necessarily lead to a large new fishery if processing and marketing problems are neglected. Federal and State exploratory cruises beginning in 1950 located many

areas along the Pacific coast with an abundance of shrimp. Six years later, NMFS tested and introduced a more efficient trawl for harvesting the shrimp. Large increases in utilization did not occur, however, because problems with peeling the shell off the shrimp and marketing the final product prevented expansion. Industry solved the first of these problems in 1957 by introducing to the Pacific coast a shrimp peeling machine from the gulf coast. Landings more than doubled in 1958 to 17 million pounds. Although plenty of additional shrimp were still available, landings stabilized at about 19 million pounds during the period 1958 to 1965 because of a lack of additional markets. About 1966, the shrimp industry succeeded in developing new products with new markets. Since then the shrimp industry has expanded but the catch still is considerably less than the estimated potential maximum sustainable yield of 286 million pounds.

The NMFS effort to improve the utilization of sablefish also demonstrates how success in overcoming problems in one phase of a fishery will not necessarily lead to expansion of that fishery if other barriers are not overcome. In 1968, NMFS began the design and testing of a fishpot to harvest sablefish. At that time the harvest was only 4.5 million pounds of an estimated maximum sustainable yield between 66 and 88 million pounds. Development of the fishpot was successfully completed and fisherman acceptance gained. However, recently NMFS has had to discourage use of the fishpot method in fear of creating a situation of oversupply of the fish because a very limited market exists for the products produced from this fish. NMFS marketing personnel have started to develop new markets for sablefish. (See app. III for a more complete explanation of the efforts to develop sablefish.)

FACTORS HINDERING EFFECTIVE FISHERY DEVELOPMENT PROGRAMS

Over the years, the main emphasis of NMFS efforts has been on research and assistance directed toward the management aspects of the developed fisheries. NMFS has not emphasized increasing the catch of underutilized fish resources. NMFS estimated that it currently spends about $2 million annually, or 4 percent of its annual budget, in the area of fishery development.

The lack of emphasis on fishery development work was evident in our review of projects to develop underutilized resources at NMFS field units even in those areas where the largest underutilized fish resources existed. The director of one fisheries center stated only one minor project to develop underutilized resources had been conducted by his center in the past 8 years. A regional director told us he felt that more expertise was needed in the area of fishery development. Officials in another region said only one man in their region was involved in fishery development work. Emphasis in this region was on management, marine mammal protection, environmental protection, marketing news and statistics, and State-Federal cooperative management programs. Development of new fisheries was not emphasized.

One reason for the lack of emphasis has been that before the 1960s, the primary problem of the fishing industry was to sell what it was capable of producing. No need existed to emphasize fishery development. However, as pointed out in chapter 1, this is no longer the case. During the 1960s and into the 1970s, a rapid increase in the demand for seafoods has been experienced in the United States. This fact, together with the static catch of the domestic fishing industry, has resulted in shortages of many species during the past several years.

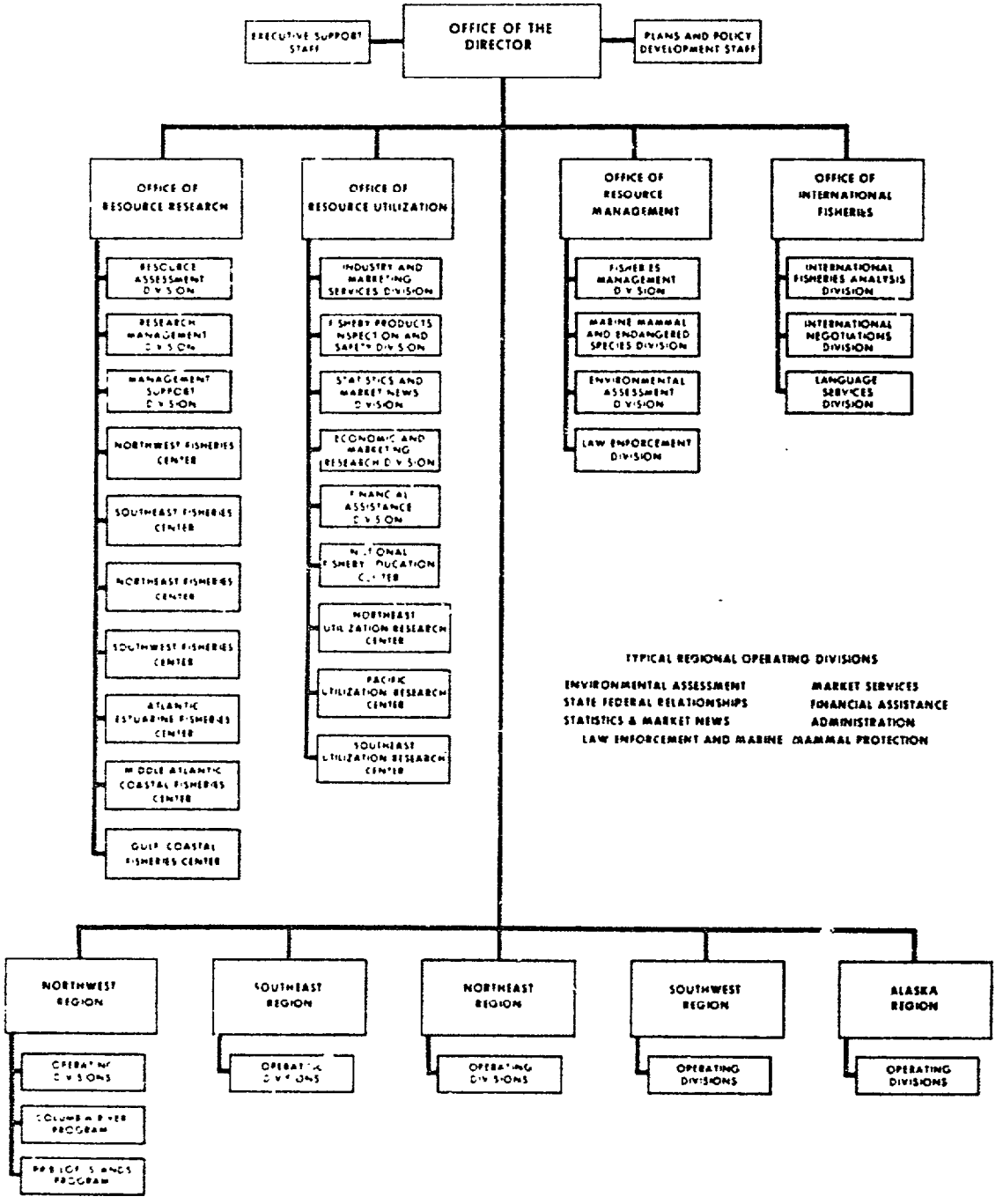
Besides the lack of emphasis on fishery development programs, we identified several factors that have hindered the effectiveness of the fishery development work that NMFS has accomplished. These are discussed below.

NMFS organizational structure not conducive to fishery development activities

The NMFS organizational structure is not conducive to carrying out an integrated approach to fishery development. The NMFS Deputy Associate Director, Office of Resource Utilization, said the NMFS organizational structure actually works against an integrated approach to fishery development. To successfully develop an underutilized fish resource into a viable commercial fishery, all factors retarding that particular species' development must be overcome. Either producing, processing, or marketing problems may be preventing a particular species from being utilized; frequently problems with all three may be involved. Responsibility

for these three areas, however, is spread among the major components of NMFS. Each component operates independently with no formal means of coordinating programs below the director level. Following is the NMFS organization chart in effect during our review in 1974.

NATIONAL MARINE FISHERIES SERVICE
ORGANIZATIONAL STRUCTURE



The fisheries centers, which have a majority of NMFS' personnel, conduct basic research programs and programs designed to better understand living marine resources and the environmental quality essential for their existence. Two activities critical to fishery development efforts that the centers are responsible for are resource assessment and gear design and testing. The centers are under the direction of the Office of Resource Research.

The Office of Resource Utilization directs the activities of the fishery products technology centers which are responsible for developing scientific and technological information on the properties and methods of handling and processing fish. The marketing and economic research programs are also under the direction of the Office of Resource Utilization, but fieldwork on these programs is carried out by the staffs of the regional offices headed by regional directors who report to the NMFS director.

As a result no single organizational component is responsible for all the activities necessary to a fishery development program. Each organizational component has been free to conduct those development activities which it feels are most necessary, with little coordination with other components of NMFS. The Deputy Chief, NMFS Office of Plans and Policy, said that an adequate fishery development program could be conducted informally within the formal organization by proper coordination and communication among organizational components of NMFS. However, our review of fishery development efforts, as demonstrated in the examples described above, indicated that an informal arrangement has not always been an effective means of focusing on the fishery development problems. Furthermore, in some instances officials of various field components seemed unaware of what efforts were being devoted to fishery development, other than the activity of their own organization.

Criteria lacking for selecting fish species for development

For the most part, fishery development programs have been conducted on a judgmental basis. No criteria had been established to assist field personnel in selecting fish species for development. Personnel involved in fishery

development were unable to explain why a particular species was selected. In some instances officials in the same region disagreed on the emphasis which should be given to developing a particular species. Consequently, no assurance existed that the species being worked on were those with the greatest commercial potential.

For example, an official from the Southeast Fisheries Center said that work on red royal shrimp should be discontinued because of its limited abundance. An official at the Pascagoula, Mississippi, laboratory, a component of the Southeast Fisheries Center, however, said that the laboratory was still concentrating its research efforts on red royal shrimp. Also the Fisheries Center was attempting to develop the abundant tilefish resource. But an official in the Southeast Regional Office said that tilefish should receive very low priority because of its high mercury content and because of the harvesting problems associated with the great depths at which it was found.

Attempts to establish comprehensive fishery development programs unsuccessful

NMFS and its predecessor agency, the Bureau of Commercial Fisheries of the Department of the Interior, made various attempts to establish comprehensive fishery development programs, but none of these attempts progressed out of the planning stage. In 1963, a planning effort known as the Trident Plan attempted to establish a national plan for fisheries. The Trident Plan recognized that markets were being lost to imports and that some ocean resources historically fished only by U.S. fishermen were being exploited by other nations. Short- and long-range plans were drawn up to increase the U.S. fishing industries' share of the expanding market. However, the plan did not contain procedures for achieving its objective and was not implemented.

Interest in strengthening fishery development reoccurred several years later following two reports critical of past efforts in this area. The "Report of the Resource Development Committee"--an NMFS report in 1968--examined the factors affecting NMFS capability to undertake resource development programs. Although this report dealt with the resource assessment and extraction aspects of fishery development,

the report concluded that resource development work was not exclusive to any one branch, division, or region of NMFS. The report stated that the barriers to developing a fishery must all be examined simultaneously to successfully bring the resource into commercial development.

The congressionally authorized Commission on Marine Science, Engineering and Resources--referred to as the Stratton Commission--in its 1969 report found that in a 7-year period beginning in 1960, the NMFS budget had more than doubled, while during the same period no increase occurred in the U.S. fish landings. The Commission concluded that NMFS had built a relatively strong research capacity in the area of resource management and this fact, together with the greater sense of public urgency with conservation of overexploited species as compared to the more mundane task of developing new ones, had led to a strong tradition of stressing the management aspect of Federal concern with the fisheries. The Commission stated that implementation of a management system would not develop profitable U.S. fishing operations on the abundant underutilized stocks off the U.S. coasts. The Commission recommended that:

> "Research, development, and management efforts of the U.S. Government should be directed toward improvement of the competitive position of U.S. fishermen, with particular emphasis on increasing production by U.S. flag vessels from latent resources adjacent to our own coasts."

In June 1969--5 months after the Stratton Commission report was issued--an internal NMFS planning document was prepared called "An Accelerated Program for the Development and Management of Important Aquatic Resources in and Adjacent to the United States." This document outlined the extent of the fishery resource base off the U.S. coasts and the problems inhibiting the growth of U.S. fisheries and their ability to compete against foreign competition for domestic markets. Programs for both developed and underutilized fisheries were proposed.

The planning document was submitted to the Office of Management and Budget (OMB) for approval. OMB objected to it because the proposed programs included did not appear to

nave been subjected to the process of systematic analysis. Alternative methods of meeting program objectives had not been systematically compared in terms of their costs, who pays for them, and their benefits and the group benefited. OMB also pointed out that the administration was in the midst of a policy review for all marine activities and, until it was completed, a new program for commercial fisheries would be inappropriate.

Also in 1969 after the Stratton Commission report was issued, NMFS began assembling a "Joint Master Plan for Commercial Fisheries." The Master Plan provided a national objective of increasing our use of underutilized species and called for a systematic approach to their development. This plan proposed that fisheries be examined on an individual basis, and a checklist was provided covering many of the barriers which might have to be identified and overcome. Priorities for potential species to be developed would be established on a national basis instead of having projects initiated at the regional level. Cooperation with State and industry officials was also an integral part of this plan.

Neither the Master Plan nor the approach it proposed for improving our utilization of fish resources was implemented. NMFS headquarters officials stated that the Master Plan was discarded when a new NMFS director was appointed before the plan was completed.

PRESENT EFFORTS TO IMPROVE FISHERY DEVELOPMENT PROGRAMS

NMFS is beginning to place more emphasis on fishery development and has taken some steps to correct several of the shortcomings noted in this report. A National Coordinator for Fishery Development was authorized in October 1973 to act as liaison between headquarters and the field components. The position is intended to make sure that regional plans and programs are being developed and operated properly and that they are addressing and considering all the steps involved with developing a particular fishery. The National Coordinator will not actually set the priorities or approve fishery development programs, but will advise the Director on proposals that are submitted by the regions. The National Coordinator for Fishery Development had not been in office

long enough at the time we finished our work for us to evaluate how successful this approach at coordination has been.

In June 1974, NMFS made the regional directors responsible for coordinating fishery development programs within their regions. It will be their responsibility to get the programs underway and do the necessary planning and prepare budget requests for funds to carry out the programs. The reorganization does not, however, give the regional directors complete control over these activities, but provides a means whereby the regional directors can comment on projects proposed by the fisheries centers' directors.

NMFS has also initiated several comprehensive projects to develop specific fisheries. The approach used on these projects is similar to that proposed by the abandoned Master Plan. They are cooperative projects involving industry, State, and Federal agencies. Care has been taken to see that all potential barriers to development are researched and problems identified. Individuals with a variety of disciplines have been involved in these projects.

The largest of these is the New England Fishery Development Program. The specific objective of the program is to develop at least a $1 million industry within 3 years for squid, red and jonah crabs, and discards of mixed species. These three fisheries are considered to have the best immediate potential for development. The program was planned with industry cooperation and is guided by a task force composed of industry, State, and Federal Government representatives. The program intends to develop and demonstrate the technical and economic feasibility of harvesting, processing, and marketing these species. (See app. IV.)

Another project is the Pacific Island Development Commission program to establish a skipjack tuna fishery in the Pacific. Previous attempts, as far back as 1948, have been made to develop this fishery, but have failed due to problems in obtaining bait or in designing nets which would work effectively in clear water. An NMFS official expressed optimism for the project this time, because industry is more deeply involved.

In addition NMFS is once again in the process of preparing a national fisheries plan. This effort is in response to the reports of the National Advisory Committee on the Oceans and Atmosphere (NACOA). The 1973 NACOA report expressed concern that:

> "The predicament of the U.S. commercial fisheries remains acute. The trend which saw the U.S.-supplied share of the fishery products the Nation consumes drop in less than twenty years from about 70 percent in 1955 to about 35 percent in 1972 shows no sign of being reversed. If this continues, the pursuit, in the United States, of this ancient calling could be weakened beyond recovery."

The report recommended that the Secretaries of Commerce and the Interior develop a plan for the use of national fisheries resources.

One of the five sections of the National Fisheries Plan being developed is devoted to fishery development. This section describes the role of the Federal Government as catalytic, "providing the information, technical assistance, financial incentive, leadership and coordination necessary 'to make it happen.'" Officials in NMFS generally agreed with this view and pointed out that the Government should encourage the investment of capital and cooperation of other people involved in the system.

This plan stresses the need for a multidiscipline approach, involving the coordination of NMFS activities with those of State and industry officials. The plan admits to relying on approaches outlined by previous plans that were never implemented. NMFS officials expressed confidence that the present plan would succeed because industry and Government interest in improving our use of living marine resources has increased.

CHAPTER 4

CONCLUSIONS, RECOMMENDATIONS, AND AGENCY ACTIONS

CONCLUSIONS

The inability of the U.S. fishing industry to increase domestic production is not due to a lack of fishery resources in the waters off the United States. While the harvest of many of the traditional (popular) species has reached or exceeded the maximum sustainable catch, other species have been used very little or not at all. We believe the development of underutilized species off our coasts into commercially viable fisheries can contribute significantly to the ability of the U.S. fishing industry to supply the domestic and foreign demand for fishery products.

Characteristics unique to the fishing industry limit the ability of the fishing industry to solve the problems involved in developing new fisheries. Without Government programs to reduce the risk of investing in the development of new fisheries, we believe that progress in developing many of our underutilized fish resources will remain slow.

NMFS has recognized the need to increase the U.S. fishing industry's share of our expanding market for fish products, but it has been slow to establish comprehensive fishery development programs to assist the fishing industry to increase its catch. For the most part, attempts that NMFS has made in the past to establish comprehensive fishery development programs have not progressed out of the planning stage.

NMFS has emphasized the management aspects of fisheries while limiting its involvement in fishery development activities. The limited amount of work done often has not resulted in starting new fisheries because the activities have not been coordinated to insure that all problems preventing development of a specific species had been solved. Coordination of fishery development activities within NMFS is hampered by the organizational structure where responsibility for the major functions involved

in fishery development is spread among the principal organizational components of NMFS. In addition, NMFS has not developed criteria to assure that the fish species with the greatest commercial potential are selected for fishery development efforts.

Recent planning efforts begun by NMFS to improve its ability to develop underutilized fish resources are steps in the right direction. But NMFS must make a strong commitment to implementing these plans, if they are to be more successful than past efforts.

RECOMMENDATIONS

The NMFS should place more emphasis on assisting the fishing industry to develop the underused fish resources off our coasts into viable commercial fisheries. To capitalize on opportunities available, we recommend that the Secretary of Commerce direct NMFS to complete the national fisheries plan, specifically, that section dealing with fishery development. In particular, the new fisheries plan should

--require planning for fishery development by species or groups of species with similar characteristics in order to identify all barriers to development and

--establish criteria for determining which underutilized species have the highest potential for development.

We also recommend that the Secretary provide for monitoring the implementation of the plan after it has been approved.

By placing increased emphasis on implementing a comprehensive, coordinated fishery development program, the Service will be in a position to provide the fishing industry with the information and assistance needed to reduce the extraordinary risks involved in developing new fisheries to acceptable levels.

The development of the vast underutilized fish resources into commercially viable fisheries would increase the supply of fish products available to the U.S. consumer,

could help reduce the current large imbalance in our trade of fish products by decreasing our reliance on imports, and could increase opportunities to export fish products attractive to foreign markets.

As additional fisheries are established, they would provide alternatives to those fishermen involved in fisheries where excess harvesting capacity now exists. In addition, such information can serve as a basis for establishing a sound management program as the new fishery is developed.

AGENCY ACTIONS

The Department of Commerce

--agreed with our findings, conclusions, and recommendations,

--stated that the report accurately reflected the status of the U.S. fishing industry and the past and current emphasis on fisheries development activities, and

--said th the report adequately explained the resources available off U.S. coasts, the actions required to develop these resources, and the barriers which have hindered their development in the past.

The Department agreed with our recommendation that NMFS be directed to complete the National Fisheries Plan, specifically, that section dealing with fishery development. The Department said that the plan is scheduled for completion in July 1975, that fisheries models were being developed which identify the barriers hindering the development of species in the past, and that criteria were being drafted which will aid in the selection of the species for inclusion in the plan.

The Department stated that once the National Fisheries Plan is approved by the Administrator of the National Oceanic and Atmospheric Administration, NMFS will review and consider in detail what actions are needed to insure

the plan's implementation and that a schedule of implementation and monitoring will be established, but did not state who would have the responsibility for this. As pointed out in the report, previous efforts by NMFS to establish comprehensive fishery development programs have been unsuccessful because the plans developed had not been implemented. We believe that responsibility should be placed at the highest practicable departmental level to insure that the approved plan is implemented and is monitored from time to time. In our opinion, placing responsibility at this level would enhance the development of fishery programs necessary to strengthen the U.S. fishing industry.

CHAPTER 5

SCOPE OF REVIEW

Our review concentrated on NMFS programs and activities to increase our Nation's use of underutilized fishery resources in the waters off our coasts. Other means of making the United States self-sufficient in the production of fish product --such as aquaculture, fish habitat construction, or upgrading of presently caught "industrial species" to direct human consumption--were not covered.

We reviewed literature on past and current fishery development activities, world and national catch statistics, the extent of fish resources off our coasts, and problems preventing our use of underutilized fish resources. We also examined legislation indicating congressional interest in U.S. fisheries, NMFS policies and objectives pertaining to fishery development, and the organizational structure of the agency. Interviews were conducted with NMFS personnel involved in market development, economic analysis, design of harvesting gear, product technology, home economics, biology, resource assessment, and program administration. Interviews were also conducted with representatives of the fishing industry to see how NMFS fishery development activities had affected them and what additional steps they thought could be taken to increase our catch of underutilized species.

Our review was performed in all five NMFS regional offices, the four main fisheries centers, and two out of the three product technology laboratories, in addition to a number of small research laboratories, and the NMFS headquarters in Washington, D.C. We visited NMFS' installations at Miami and St. Petersburg, Florida; Pascagoula, Mississippi; New Orleans, Louisiana; Washington, D.C.; Gloucester and Woods Hole, Massachusetts; La Jolla and Los Angeles, California; Seattle, Washington; Astoria, Oregon; and Juneau and Kodiak, Alaska. Representatives from the fishing industry were interviewed in many of these locations.

PRODUCTION AND CONSUMPTION TRENDS OF FISHERY PRODUCTS

IN THE UNITED STATES, SELECTED YEARS, 1950-73

	1950	1955	1960	1965	1970	1973
Population, millions	150.8	163.0	178.1	191.6	201.7	208.1
Edible fish:						
Domestic catch, million pounds	3,307.0	2,579.0	2,498.0	2,586.0	2,537.0	2,328.0
Imports, million pounds	1,128.0	1,332.0	1,766.0	2,576.0	3,676.0	4,709.0
Total, million pounds	4,435.0	3,911.0	4,264.0	5,162.0	6,213.0	7,037.0
Per capita use, pounds	11.8	10.5	10.3	10.8	11.8	12.6
Industrial fish:						
Domestic catch, million pounds	1,594.0	2,230.0	2,444.0	2,190.0	2,380.0	2,404.0
Imports, million pounds	639.0	980.0	1,515.0	3,182.0	2,881.0	[a]811.0
Total, million pounds	2,233.0	3,210.0	3,959.0	5,372.0	5,261.0	3,215.0
Per capita use, pounds	14.9	19.8	22.2	28.0	26.1	15.4
Domestic catch, million pounds	4,901.0	4,809.0	4,942.0	4,776.0	4,917.0	4,732.0
Imports, million pounds	1,767.0	2,312.0	3,281.0	5,758.0	6,557.0	5,520.0
Total, million pounds	6,668.0	7,121.0	8,223.0	10,534.0	11,474.0	10,252.0
Per capita use, pounds	44.4	43.9	46.1	54.9	56.9	49.3

[a]The drop in imports was caused principally by the disappearance of the Peruvian Anchovetta.

APPENDIX I

APPENDIX II

NMFS EFFORTS TO DEVELOP

AN OFFSHORE AMERICAN LOBSTER FISHERY

The American lobster ranges from Labrador to North Carolina with catches being most abundant in the rocky coastal zone from the Gulf of Saint Lawrence in Canada to southern New England. Most are caught in inshore traps at depths from a few fathoms to about 30 fathoms (1 fathom equals 6 feet). These inshore trap catches have averaged over 20 million pounds yearly.

Catches of lobster, incidental to trawling for finfish, however, have been made since the early 1950s in offshore waters. These offshore lobsters are distributed from Browns Bank and the southeastern corner of Georges Bank to Cape Hatteras, on the Continental Slope and Shelf off southern New England, and along the Continental Shelf of the Middle Atlantic States. These lobsters are generally concentrated at depths of 50 to 250 fathoms at distances ranging from 60 to 200 miles from shore.

Prompted by lobster catches taken in the early 1950s by a Woods Hole Oceanographic Institute general survey boat along the Continental Shelf, and the incidental catches by finfish trawlers, NMFS decided to explore for offshore lobsters. In 1957 and 1958, NMFS surveyed offshore areas with trawlers and mapped out a range of commercial concentrations of lobsters, demonstrating that offshore trawling for lobsters could be worthwhile. After the surveys, in 1960, the trawl catch went to about 1.8 million pounds valued at $568,000 and increased during many of the succeeding years reaching about 7 million pounds valued at $6.8 million in 1970. Trawl-caught lobsters subsequently declined sharply concurrent with introduction of traps to the fishery.

Fishing industry representatives stated that the NMFS surveys located the best offshore concentrations of lobsters, and they credited NMFS with beginning the development of the offshore fishery. They stated that NMFS promulgated the results of its survey work by various means, including market news reports, fishing industry journals and magazines, published papers, and seminars. One industry representative noted also that the fishing industry participated in the

survey efforts by the loan of boats, gear, and personnel and, therefore, it was in a position to know, in a general way, survey results as they happened.

NMFS began experimenting with various designs of steel lobster traps in 1967. The purpose was to find an alternative to trawl fishing, which results in mutilated and dead lobsters due to the abrasive action of the net dragging on the bottom. Metal traps can be used in rough and untrawlable bottom areas and are stable in ocean currents.

NMFS conducted limited exploratory fishing to determine if areas capable of supporting commercial fishing operations existed. Positive results were obtained including avoiding the mutilation and death of lobsters. NMFS encouraged the use of steel traps for the offshore lobster fishery and permitted a fishing industry executive to accompany an experimental cruise. NMFS terminated its metal trap experimenting about 1969 when industry began experimenting with various designs.

Landings of offshore lobsters caught with traps were about 1.5 million pounds in 1970, valued at about $1.5 million. In 1971 this increased to 3.7 million pounds valued at $4 million. Preliminary statistics from NMFS, which are not expected to change significantly, show 1972 trap landings of 7.3 million pounds valued at about $9.5 million. During this period, offshore trawl landings have decreased, but total offshore landings have increased.

NMFS officials believe that portions of the inshore lobster stock are now overexploited and that increased lobster harvesting would be achieved mainly from the offshore lobster areas. An NMFS document indicated offshore landings could be increased to about 20 million pounds annually. An industry representative stated he believed that the offshore lobster is being overfished and becoming depleted. However, other industry representatives and a university fisheries specialist stated that the future of the fishery is good provided proper management of the resource is undertaken.

NMFS EFFORTS TO DEVELOP

A SABLEFISH FISHERY

Sablefish, also known as Black Cod, range along the entire U.S. Pacific coast, including Alaska. The maximum sustainable yield of this resource from the eastern North Pacific Ocean and Bering Sea is estimated between 66 and 88 million pounds. The average catch per year from 1960 through 1969 was 7.3 million pounds. Canada and Japan also harvest sablefish, but only in 1961 through 1963 had the combined catch of all three countries approached the estimated maximum sustainable yield.

Sablefish is high in oil content. This characteristic makes sablefish desirable as a source of smoked fish, and approximately 95 percent of the end product of sablefish for human consumption is in this form. Sablefish is also used fresh or salted as a human food, and has an industrial use as animal food. During the 1960s the smoked sablefish experienced a decline in its market share to the more popular smoked salmon.

Vessels engaged in the sablefish fishery historically employed two types of gear, the bottom set-line (longline) and the trawl (net). Approximately 70 percent of the catch was taken by longlines in 1966, and this method commanded a higher value per pound than for fish caught by trawls. The set-line sablefish fishing has been looked on as a "convenience" fishery for halibut fishermen who use similar gear, with both species taken on the same fishing grounds. Previously, sablefish was the primary species caught between closures of the halibut fishery, but incidental catches of halibut supplemented the income from sablefish. Incidental landing of halibut is no longer allowed, and fishing effort for sablefish has declined.

NMFS efforts to design a pot fishery for sablefish began about 1968 to assist the halibut industry. NMFS quickly determined, however, that sablefish could be trapped more successfully than halibut. A pot fishery for sablefish offered several advantages over the longline fishery:

--The pots are very species specific, catching mainly sablefish. This protects the stock of other fish, particularly halibut.

--The fish are protected by the pots from predators, such as sharks, which often eat fish caught on set-lines.

--The fish remain alive until brought aboard. This makes a better product and provides a means for obtaining live samples for tagging.

Although it was established that sablefish could be captured by traps, two improvements were required before the fishery became attractive. First, the pots were put down on a longline instead of individually. This reduced retrieval time, since the pots could continue being retrieved while those on deck were being emptied. By putting a float on each end of the longline, the chance of gear losses was also reduced. Second, design changes were made so the pot would be collapsible. This permits a boat to carry more pots per trip and thus increase its fishing effort.

Acceptance of this fishing method has been intermittent. The entire sablefish industry was hurt in 1971 by the "mercury scare." Recovery has been gradual ever since. By July 1973, 33 boats were reported in or ready to enter the pot fishery. In March 1974, the entire Monterey, California, sablefish fleet was reported to have converted to use of pots.

The potential of the fishery is not yet ready to be realized, however, because there is a very limited market in the United States for smoked sablefish. This market is not able to absorb large increases in sablefish landings. The regional coordinator of the NMFS Marketing Services Division in Seattle told us that work was being done to develop new markets and products for the fish, and a South American market appeared to be promising.

NEW ENGLAND FISHERIES DEVELOPMENT PROGRAM

The New England fishing industry had been in a continuing decline due to excessive fishing pressure on traditional species and other problems. NMFS reported that in 1950, total landings of fish and shellfish in New England ports were over a billion pounds, contrasted to 524 million pounds in 1973. In 1950, 5,927 fishermen were employed on vessels of 5 net tons or more fishing out of New England ports; this was reduced to 4,349 by 1960 and to 3,236 in 1970. The number of 5 net tons or more fishing vessels declined from 847 in 1955 to 686 in 1970.

In 1973, NMFS initiated the New England Fisheries Development Program to revitalize the New England fishing industry. The immediate objective of the program was to develop and demonstrate within 3 years the technical and economic feasibility of harvesting, processing, and marketing red and jonah crab, squid, and the species usually discarded by fishermen. The program is expected to develop these species into fisheries with sales of $3 million. These species were chosen because it was believed they could be caught by New England vessels with minimum modification to gear and that development obstacles could be overcome with the limited resources available.

The New England Program funding consists of three elements: direct program funds, other NMFS support, and State-industry contributions. The total estimated funding needs, as of March 1974, follow.

	FY 1974	FY 1975	FY 1976
Direct program funds	$ 400,000	$ 400,000	$ 620,000
Other NMFS support (note a)	546,000	532,000	401,000
State-industry contributions (note b)	350,000	500,000	325,000
Totals	$1,296,000	$1,432,000	$1,346,000

[a]Research, biology; resource assessment; processing technology; gear development; product development; marketing; and statistics, domestic and international.

[b]Vessel time, use of processing facilities, demonstration fishing, marketing and transportation, samples, and access to vessels for research data.

The principal departure from traditional methods in coordinating this program is the use of direct input from industry in combination with NMFS activities in accomplishing mutually agreed on objectives. The NMFS Deputy Director emphasized the need for industry to be fully involved in the New England Program from the beginning and to be given full approval authority during its progress.

A task force, composed of six industry members, three State fishery officials, and one NMFS official, was formed to guide and direct the program. The function of the task force is to jointly design a fisheries development plan for New England. The role of the State and Federal representatives is to provide guidance and counsel, while the industry members are to provide program direction.

Implementation of the program is the responsibility of an NMFS Fisheries Administrator who was designated as the full-time program director. NMFS units working on the program under his direction include the Northeast Fisheries Center, the Atlantic Fisheries Products Technology Center, and the Northeast Region Market Research and Services Division. The Fisheries Center has gathered and analyzed red crab data, provided an estimate of the maximum sustainable yield of the species, and plotted locations where the species could be found. The Center has also been providing technical personnel for red crab tagging survey cruises and for chartered squid fishing demonstration curises. It is also assisting by refining stock assessments.

The Atlantic Fishery Products Technology Center is studying and testing processing and product development for species of interest to the New England Program. These efforts include: processing dogfish and red crab; holding, handling, and processing mixed discarded species; storing, handling, and product development of squid; and preparing test food products.

The Regional Market Research and Services Division has surveyed fishing and food industry representatives concerning their interest in underutilized species, distributed product samples of underutilized species products to industry users, and exhibited red crab products at an industrial show. Food distributors, institutional feeders, and

grocery chains have been asked by the Division to evaluate jonah crab, red crab, and squid products. The Division has awarded a contract for a study on Western European markets for the New England fishery products.

State participation, in addition to representation on the task force, includes an agreement with Rhode Island for reciprocal use of red crab catch data for scientific purposes. Rhode Island has provided red crab data from its past efforts and has donated personnel time. Maine and Massachusetts have also provided information and assistance.

Future support of New England Program squid research has been coordinated with the University of Rhode Island Sea Grant Program. Services of a research assistant and a small amount of operating funds will be provided. Coordination activities also include discussions with Cornell University concerning its dogfish-processing program.

A primary vehicle of the New England Program efforts appears to be its contractual relationships with universities and others. Of the $376,000 obligated by the program in fiscal year 1974, about $113,000 was for research and demonstration contracts with States and universities, $109,000 for boat charters, and $15,000 for equipment rental or purchase. An industry representative stated that the National Oceanographic and Atmospheric Administration fishing research vessels Delaware II and Albatross IV could provide additional resource survey effort, but have not been used for this purpose to the extent of their capability. He said industry cannot perform this function because of financial limitations and because industry is not sufficiently unified.

Industry representatives expressed their overall satisfaction with the New England Program and the species selected for development. One representative stated the program will provide needed flexibility to the industry, but cautioned that species management should be a part of any development program.

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Administration
Washington, D.C. 20230

February 27, 1975

Mr. Victor L. Lowe
Director
General Government Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Lowe:

This is in reply to your letter of January 29, 1975 requesting comments on the draft report entitled "Opportunities to Strengthen the U. S. Fishing Industry by Developing New Fisheries from Under-utilized Fish Resources."

We have reviewed the attached comments of the Administrator, National Oceanic and Atmospheric Administration and believe they are responsive to the matters discussed in the report.

Sincerely yours,

Guy W. Chamberlin, Jr.
Acting Assistant Secretary
for Administration

Attachment

GAO note: Page references in this appendix may not refer to the final report.

APPENDIX V

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, Md. 20852

Date FEB 2 7 1975

Reply to Attn. of: Ax21/JMA

To Director, Office of Audits
Department of Commerce

From Robert M. White
Administrator

Subject Department Comments on GAO Draft Report

In accordance with Administrative Order 213-1, transmitted herewith is the National Oceanic and Atmospheric Administration's Statement of Comments on the U. S. General Accounting Office's Draft Report to the Congress of the United States on the Opportunities to Strengthen the U. S. Fishing Industry by Developing New Fisheries from Underutilized Fish Resources, NOAA, January 29, 1975.

Please note that the original letter from the General Accounting Office, dated January 29, 1975, is also attached for your use in preparing the Secretary's response to Director, General Government Division, Victor L. Lowe.

Attachments

Comments of

National Oceanic and Atmospheric Administration

Department of Commerce

on

Draft GAO Report

entitled

"Opportunities to Strengthen the U. S. Fishing Industry by Developing New Fisheries from Underutilized Fish Resources"

dated

January 29, 1975

APPENDIX V

COMMERCE DEPARTMENT COMMENTS ON GAO DRAFT REPORT
ON OPPORTUNITIES TO STRENGTHEN THE U.S. FISHING INDUSTRY
BY DEVELOPING NEW FISHERIES FROM UNDERUTILIZED FISH RESOURCES

Introduction

The Department is pleased that GAO recognizes the importance of fisheries development in assisting the domestic industry by increasing the utilization of fishery resources. Fisheries development represents an effort of different disciplines usually including resource assessment, physical and chemical sciences, technology, marketing, consumer and economic studies and appropriate financial incentives aimed at developing specific resources not being fully or economically utilized. The program is integrated with fishery management so as to provide viable options for traditionally overfished stocks. Necessary ingredients for fishery development include fundamental information on the resource and on potential processing and marketing opportunities. Feasibility studies and specific development projects involving cooperative efforts with industry and Federal and State Governments, coupled with followup financial incentives, enable the private sector to fully capitalize on research and development findings. The GAO findings on the importance of fishery development have particular significance in policies relating to extended jurisdiction and strengthening of the U.S. domestic fishing industry.

We consider the report to be well written. It accurately reflects in Chapter I the status of the U.S. fishing industry. Chapter II adequately explains the resources available off our coasts, the actions required in developing these resources and the principal barriers which have hindered

their development in the past. We believe Chapter III is an accurate reflection of the emphasis NMFS has placed on fisheries development activities in the past as well as its current emphasis.

Nearly two years ago we saw the need to increase our emphasis in fisheries development activities. Our first formal effort in a joint venture with industry, States and universities was the New England Fisheries Development Program, which started on July 1, 1973. The principal reason for choosing New England was that the fishing industry in that area was in the most need of assistance. We did not embark upon similar projects in all regions because: (1) we wished to evaluate the joint/venture concept for a year to determine if it was the best approach; and (2) reprogrammed monies were only sufficient for one region; new monies were not available for FY 74, FY 75 or FY 76.

A second project was launched on July 1, 1974. It is concerned with developing the skipjack tuna resource in the central, western, and southern Pacific Ocean.

An informal industry/government committee has been formed in the Pacific Northwest to begin joint planning for the development of Alaska groundfish.

[illegible] economic feasibility study has been completed on the crooker resource. Products destined for export markets may be available by the end of this year.

NMFS regional directors have been placed in charge of the various projects. Their responsibilities are to coordinate all regional activities and monitor the day-to-day progress. A National Coordinator in Washington [illegible]

monitors all progress and keeps the Washington staffs informed on progress and problems encountered in the regional programs.

Discussion of the GAO Recommendations

1. Secretary of Commerce direct NMFS to complete the National Fisheries Plan, specifically that section dealing with fishery development.

The National Fisheries Plan being prepared by NMFS is scheduled for completion in July 1975. One of the eleven issues that will be discussed in the Plan pertains to fisheries development. As backup documentation for the Plan, fisheries models are being developed which identify the barriers which have hindered development of species in the past. Criteria are presently being drafted which will aid in the selection of the species which will be included in the plan.

2. Secretary of Commerce provide for monitoring the implementation of the plan after it has been approved.

Upon approval by the Administrator of NOAA, NMFS will review and consider in detail what implementation actions are needed to ensure that the NMFS portion of the Plan is implemented. A schedule of implementation and monitoring of these activities will be established.

GAO note: Comments pertaining to draft report material not pertinent to the final report have been omitted.

APPENDIX VI

PRINCIPAL OFFICIALS OF

THE DEPARTMENT OF COMMERCE RESPONSIBLE FOR

THE ADMINISTRATION OF ACTIVITIES DISCUSSED IN

THIS REPORT

	Tenure of office	
	From	To
SECRETARY OF COMMERCE:		
John K. Tabor (acting)	Mar. 1975	Present
Frederick B. Dent	Jan. 1973	Mar. 1975
Peter G. Peterson	Feb. 1972	Jan. 1973
ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION:		
Robert M. White	Feb. 1971	Present
DIRECTOR, NATIONAL MARINE FISHERIES SERVICE:		
Robert W. Schoning	July 1973	Present
Robert W. Schoning (acting)	May 1973	July 1973
Philip M. Roedel	Oct. 1970	May 1973