

6. Future Developments in the Fishing Industry

Background

One of the purposes of the Fishery Conservation and Management Act of 1976 is to encourage the revitalization of the U.S. fishing industry, particularly through development of now underutilized stocks.

Development of the fishing industry is a complicated subject about which little reliable information has been accumulated in the past. With the stimulus provided by the Act, however, new efforts are being made to determine the needs of the industry and the role of the Federal Government in meeting those needs or aiding the industry in meeting them.

Because several other studies⁸⁵ were already underway dealing with the needs of the fishing industry, the OTA analysis of this subject was limited to a very general look at the industry. It was intended that once surveys mandated by the Eastland Resolution are completed, that information, together with data collected by the General Accounting Office and OTA, should be correlated and analyzed before further study of the industry is undertaken.

In the meantime, there appears to be general agreement among the Eastland group, GAO, and OTA about the status of relationships between the Federal Government and the fishing industry:

- 1) The capability and equipment exists for catching almost any kind of fish. Some of this capability is vested in foreign fishing fleets, but it could be adopted for domestic use if there were incentive to do so. What is needed most is a dependable resource and good markets for the catch. These two factors would cause increased interest in technology transfer and new equipment and would allow industry to generate capital for such investments.

- 2) The Federal Government does not have much dependable information about technology in the fishing industry.
- 3) Fishing technology is very uneven within the industry, ranging from very poor equipment which results in unsuccessful operations to modern, sophisticated equipment which results in highly successful operations—all in use in the same fishery.
- 4) Assessment of fishing equipment and the development of new equipment is difficult without “hands on” experience in the fishing industry.
- 5) Established fishermen and boat operators generally do not favor Government development of new fishing technology.
- 6) The industry generally prefers that the Government limit itself to technology transfer and information services rather than massive financial or research support.

The following discussion of future developments in the fishing industry is based on OTA research on the west coast and in the New England ground fishery. It is divided into three areas which are key to improving the overall picture of domestic fishing:

- 1) stock enhancement (increasing the total amount of product available to the fishermen),
- 2) creation of new markets for fish which are not presently harvested by U.S. fishermen because they are not a saleable product, and
- 3) methods of revitalizing the fishing industry.

Each of these areas is discussed in terms of what will be necessary in order to develop useful programs.

Stock Enhancement

The Fishery Conservation and Management Act of 1976 could be a stimulus for comprehensive stock enhancement programs which would improve many of the U.S. fisheries. For example, the National Marine Fisheries Service (NMFS) has projected that enhancement could result in the ultimate restoration and a 100 percent increase in the catch of U.S. groundfish.⁸⁶

Basically stock enhancement is the use of procedures which will increase the total amount of edible biomass by increasing the number of fish and/or the size of fish in the population.

Stock enhancement is a complex subject, and in spite of erratic periods of intense interest by various private and governmental groups, detailed studies are not numerous. In general, certain fisheries, such as salmon, are better understood in terms of stock enhancement than others. Various reasons can be given for this lack of data, but one major factor is the problem of control and recovery of stock by the government responsible for the enhancement activities. By extending fishery jurisdiction to 200 miles, the United States has taken control over the fisheries which would benefit from enhancement and has assured that US. citizens or permit holders could reap the harvest of stocking programs.

There are a number of commercially important species which could benefit from enhancement programs. Some of these are cod, haddock, yellowtail and blackback flounder, ocean perch, pollock, Gulf shrimp, Pacific salmon, Alaska crab, Atlantic herring, and Pacific pollock.⁸⁷ Enhancement possibilities and the benefits to be gained are different for each. These species were selected somewhat arbitrarily in order to study enhancement possibilities as described in OTA Working

Paper No. 4. The heavy fishing of these species in the past, with the depletion of stocks of some, and the existing well-developed markets for products of these species make them likely targets for enhancement. However, if a comprehensive program were to be undertaken in reality, careful analysis should go into the selection of the species for enhancement and the specific enhancement methods to be used with each species.

The most commonly used methods of enhancement are control of the harvest, recruitment, development of new stocks, habitat management, and aquaculture. The following is a brief description of how each of these methods is used:

- 1) *Control of harvest*: If the amount of biomass removed from the stock is properly regulated, then the maximum sustainable yield can be achieved. However, a depleted stock, such as haddock, might increase in biomass by natural processes if the amount of fishing is decreased. The levels of harvest which allow this natural recovery are not always easily determined and must be evaluated constantly.
- 2) *Recruitment*: to Assist a natural population in attaining a maximal size consistent with the marine ecosystem, additional fish can be added to the stock. Many fish can be reared in hatcheries under man-controlled conditions and then released into the natural environment when they are large enough to survive the predation and environmental hazards encountered by very young fish. Hatchery programs related to Pacific Coast salmon and many freshwater species, such as trout and bass, provide excellent examples of successful recruitment. Unfortunately, many marine species have not yet been reared under hatchery conditions although some attempts have been made.

3) *Development of new stocks:* Utilizing standard breeding and genetic selection techniques, new stocks which have desirable traits, may be developed and introduced into marine waters or into confined waters for aquaculture purposes.

4) *Habitat management and environmental quality:* Some species spend a portion of their life cycle in estuaries, rivers, or near shore environments. Poor water quality can have a detrimental effect on the size of the stock either through a marked increase in mortality or sublethal effects such as stunted growth. Programs of pollution abatement will assist in stock enhancement. In addition, some attempts at habitat manipulation may increase the availability of a suitable habitat for a species, such as artificial reefs or an increase in the level of nutrients by artificial upwelling. These nutrients stimulate the growth of phytoplankton, making more food available.

5) *Aquaculture or mariculture:* Animal husbandry of marine organisms has been extensively tried within the 3-mile limit; however, open-sea mariculture experimentation is now underway. Typically aquacultural techniques are used with organisms that are confined to a specific area for harvesting as opposed to nursery programs where organisms are usually released to natural bodies of water,

Any of these enhancement techniques have implications for data gathering programs because specific information is necessary for carrying out the procedures, beginning with

an understanding of the genetic and functional differences—the different stocks or populations—that exist within one species of fish. Most of the economic, social, and stock assessment information mentioned in the previous section would also be necessary to design and implement enhancement programs which carry out the spirit of Public Law 94-265.

Decisions for improving an existing fishery or developing a new fishery by enhancement techniques would require an intensive and integrated examination of all facets of a fishery: resource assessment, harvest and processing technologies and costs; market potentials; and institutional factors including artificial barriers to trade. But the absence of viable industry for the fishery make it likely that special studies will be necessary to collect data and project economic effects. If the enhancement efforts were successful, these special studies could become the starting point for the continuous monitoring and periodic collection of statistics which will be part of management and conservation programs in established fisheries.

New Markets for Fish

Extended jurisdiction will undoubtedly open new markets for species now caught as well as markets for species not caught by U.S. fishermen at present. It is reasonable to assume that the response to these economic opportunities will be highly varied. Some of the factors influencing acceptance or rejection of these opportunities are similar to those affecting technical innovation. In addition, the responsiveness of fishermen to new markets depends on their ability and willingness to catch new species and to process them in ways that make them saleable. Two questions are paramount:

- 1) Under what conditions will fishermen exploit new species and markets?
- 2) How many fishermen will exploit a set of species under a given set of conditions?

Studying the conditions under which fishermen will exploit new species is simplified by the fact that fishermen now often exploit many different species over the course of the year. At present, it appears that price is one of the primary factors influencing the decision of fishermen to catch various species. That is, they choose the species which will give them the highest revenues relative to costs. If this is generally true, then a change in the economic climate, especially changes in ex-vessel prices, would be one of the key factors influencing the responsiveness of fishermen to exploit new species. In addition to the prices which might be paid for new species, stock assessments and projections of yields from new species are needed in order to determine if the stocks can sustain a market.

In addition, some social information maybe needed to determine the preferences fishermen will have for entering some markets and avoiding others. Their unwillingness to accept certain innovations may limit their ability to enter some markets. This may be true in spite of changes in prices.

In order to study the social, cultural, and economic factors influencing the decision of fishermen to enter certain markets at present, two kinds of studies are needed:

- 1) Data needs to be gathered comparing fishing practices of boats which exploit a wide range of species over the annual cycle with practices of those that do not. Emphasis should be placed on such factors as the prices paid for fish, the catch of various species, the locations where fish are caught, etc. Interviews should be obtained with fishermen concerning their decision to enter a given market (i.e., exploit a given species requiring certain handling and processing procedures), and the social and cultural factors inhibiting them from entering others.
- 2) A set of questionnaires might be administered to a carefully selected sample of fishermen to obtain data on their preferences concerning entry and exit from particular fisheries,
- 3) Information needs to be gathered to identify factors which affect the price paid for fish at the docks, the stability or flexibility of that price, and how the price affects the fisherman's willingness to direct his efforts toward certain species. This information should be supplemented by identification of ways in which prices could be stabilized or otherwise manipulated by Government or industry in order to encourage fishing activity.

This kind of information is of particular importance for fisheries managers. A knowledge of the factors affecting entry and exit into different markets would allow managers to draw up management plans influencing ex-vessel prices paid (e.g., taxes and subsidy) and to manipulate the relative fishing pressure on various species.

Revitalization of Fishing Industry

Presently, the fishing industry may be unable to take advantage of opportunities which could be offered by stock enhancement or new markets because many sectors of the industry are experiencing economic difficulty and are unable to attract capital and labor. Yet, no coherent program has been developed to assist the industry or fishermen,

As noted in the previous section of this report, economic information about the fishing industry is not available in the quality or quantity which is necessary to evaluate problems in any segment of the industry. The status of investment in new harvesting technology and systems, however, has been used as a measure of economic well-being. Many studies of the New England fishing industry conclude that technology is old and inefficient. It is clear that investment in new ships and harvesting technology in New England fisheries was at a low point until passage of the Fishery Conservation and Management Act of 1976 was assured. The Act stimulated new confidence in the future of the fishing industry and at least 20 new boats were ordered for fishing fleets in New Bedford, Mass., and Point Judith, R.I. However, there is concern among some Regional Council members⁸⁸ that investment in U.S. fishing vessels may continue to lag, in part due to the industry's lack of success in getting import duties levied or increased on fish products from countries which subsidize their fishing industry.

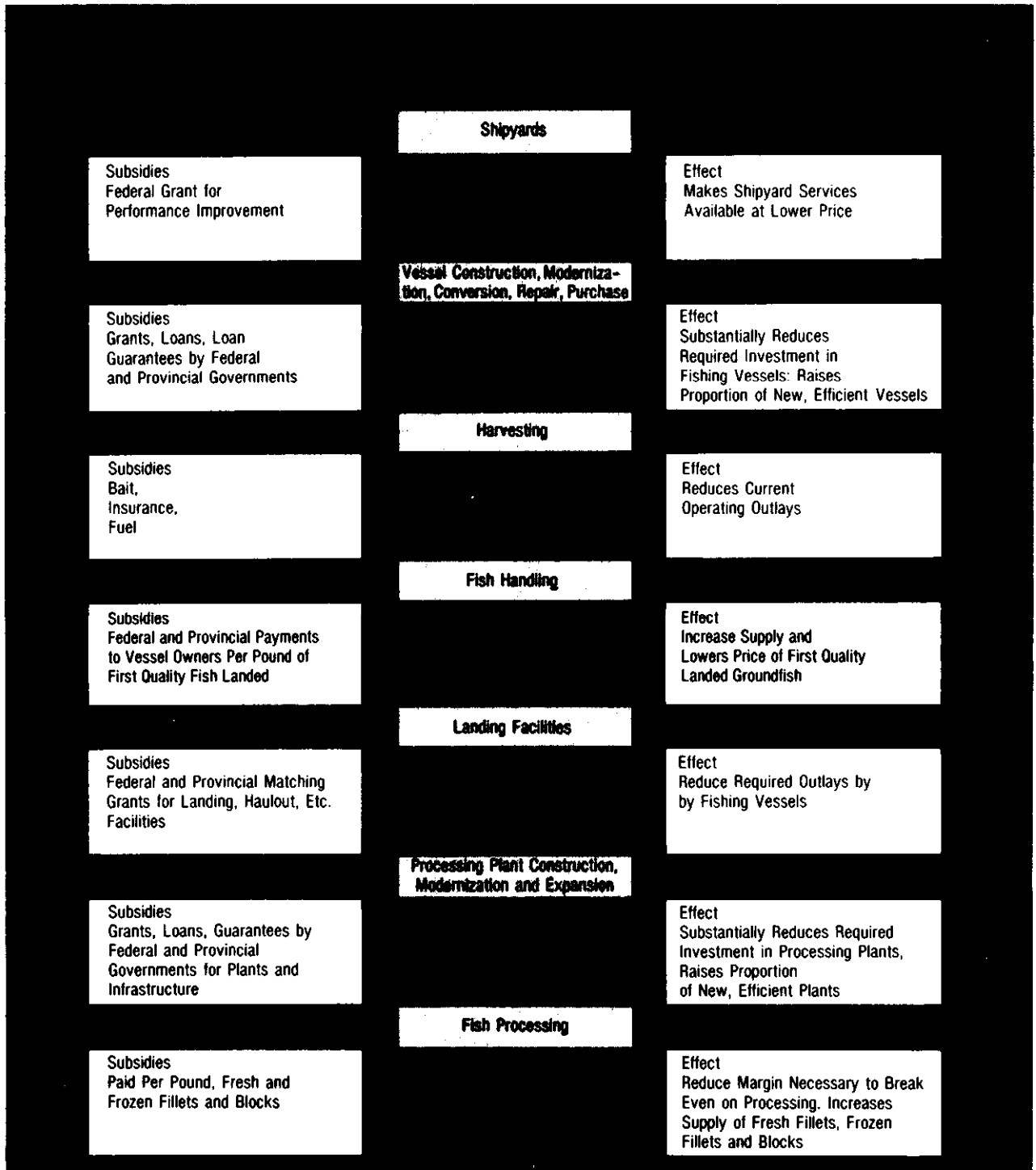
Members of the fishing industry have long contended that the flow of subsidized products into the United States adversely affects the competitive position of the U.S. fishing industry (see figure 24). Imports from Canada are of particular concern because the United

States and Canada share access to many fish stocks. The Canadian Federal and Provincial Governments have traditionally provided grants, bounties, and other forms of direct and indirect subsidies to their groundfish industry and the cumulative effect of these grants and subsidies has been calculated to reach 35 cents (Canadian) a pound for some types of fish products. In 1975, 150 million pounds of major groundfish species which may have benefited from such subsidies were exported from the Atlantic fishery in Canada to the United States.⁸⁹

By law,⁹⁰ the Bureau of Customs may levy a duty on imported products which are produced with the support of a foreign government subsidy or increase an existing duty if there is proof the import is injuring a U.S. industry. Such duties could help protect both the U.S. fishery resources and U.S. investments in fishing vessels. They could also, of course, raise the price of foreign fish products to U.S. consumers and possibly encourage retaliation by foreign governments against some U.S. products.

Under existing practices,⁹¹ the Tariff Affairs section of the Treasury Department considers duties on fish imports on a case-by-case basis as some segment of the U.S. fishing industry requests that a particular duty be levied or increased. Treasury does not routinely monitor duties on fish imports in order to determine their effects; does not initiate action to counterbalance any unfavorable effects; and does not develop the case when a U.S. industry requests some change in a particular duty situation. Therefore, the full burden of proving that changes are needed in duties on imported fish products falls on individual fishermen or firms which initiate action.

This is an extremely difficult task. There are no established criteria for demonstrating that subsidized imports injure U.S. producers, but the fishermen must generally prove that par-



ticular subsidized imports have caused declining production in the United States, unemployment, or decreased markets for U.S. products. Therefore, large corporations with experienced tariff attorneys are frequently successful in winning their cases, and small industries and fishing groups which generally develop their own cases are less successful or are discouraged from making a request,

To date, in spite of the urging of fishermen, no overall review of duties on subsidized fish imports has been made in order to determine how the U.S. fishing industry in general is affected. Such a review would allow investors to assess the competition from foreign products accurately before putting money into vessels or other fishing operations. Some Regional Council members feel that encouraging U.S. interests to invest in the fishing industry is unrealistic and counterproductive until such basic assessments can be made.

In addition, there has been a general decline in some fisheries which has been evident in terms of technology and investment, employment and income, productivity and profit.

To provide some insight into conditions of technology in the fishing industry, OTA informally surveyed fishermen on the west coast about their gear and sources of technical information. The survey consisted of a short questionnaire which was included with other materials distributed by the Eastland Resolution Fisheries Survey group at their west coast meetings. About 100 fishermen from a variety of fisheries responded to the questions.

The survey showed that nearly all crabbers, aquaculturists, and charter-boat operators considered their gear the best available for their operation; a majority of the trollers and seiners were equally confident about the

**Figure 25
Fishermen's Opinions of Their Gear**

Type of Fisherman	% Considering Gear Satisfactory
Aquaculturists	100
Charter Boats	100
Tuna	100
Crabbers	90
Seiners	85
Trollers	70
Swordfish	66
Recreational	60
Groundfish/Bottomfish	50
Gillnetters	33
Trawlers	10

Source: OTA

quality of their gear; and half or slightly more of the tuna, bottom, swordfish, and recreational fishermen were satisfied. Gillnetters and trawlers reported very low levels of satisfaction, indicating that improvement in their gear is badly needed. Figure 25 illustrates responses to the question of whether gear was satisfactory. Several specific types of needed improvements were cited:

- . better nets for groundfish;
- better gillnets;

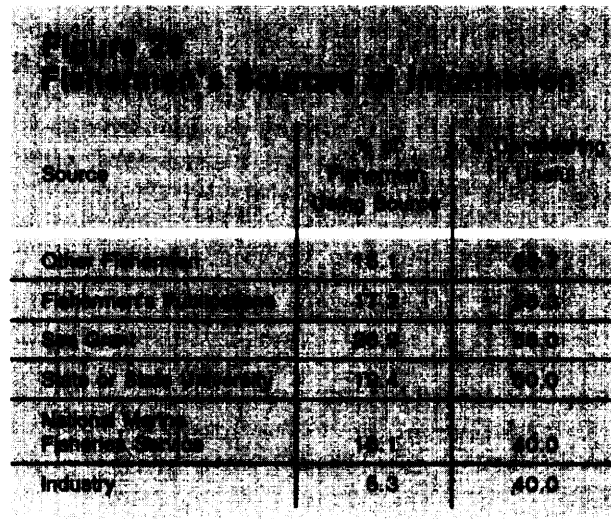
- development of a multipurpose, small scale mid-water trawl; and
- more efficient equipment to freeze, handle, and store fish onboard fishing vessels.

Although more than one-third of the fishermen responding expressed an interest in modernizing equipment and using electronics onboard their vessels, many fishermen emphasized that the job could better be done by private industry than Government.

However, Government assistance was strongly advocated for work in several areas of more public concern, such as:

- habitat improvement;
- location of fish;
- identifying migration patterns of fish;
- improving dissemination of weather and water-surface temperature data to fishermen;
- finding solutions to localized pollution problems;
- stressing the need for conservation; and
- improvement of stock assessment information.

OTA also asked the Pacific fishermen how they presently receive technical information and how useful that information is to them. The major source of information was the Sea Grant program through an information system similar to the Agricultural Extension Service. Other sources of information were individual State programs or State universities and fishermen's publications. Information from these sources reached about two-thirds of those surveyed, but only slightly more than half of the respondents considered the information useful (see figure 26).



Source: OTA

The National Marine Fisheries Service and some industry sources also provide information, but only 40 percent of the respondents found it useful.

A small group of fishermen got their information only from other fishermen, but such information had the highest reliability rating of any of the sources of information mentioned.

Since the Federal Government through NMFS and Sea Grant already has some structure for disseminating information to fishermen, it appears likely that this structure could be expanded and improved to reach a larger segment of the fishing population. It should provide more information from a variety of sources, including trusted segments of the fishing industry itself. Such an information

system could make use of a clearinghouse concept that gathers and distributes data and perhaps daily NOAA radio reports with weather forecasts, water temperature, weekly reports of fish landings, announcements of current research programs, results of research, and information on grants and financial assistance available to fishermen. Such information could be provided with relatively little effort and expense. Other information which would be useful to fishermen, but would require additional research and expense, includes reports on foreign fishing techniques, data on migration patterns of fish, and reports on stock assessment, marketing, distribution, and handling of fish.

The equipment and information needs of the industry will inevitably be debated by the Regional Councils in the course of formulating regulations for the domestic fishery. Gear particularly will come under scrutiny as the councils consider gear restrictions as a means of regulating catch. Such restrictions will limit the efficiency of existing gear and are sure to be challenged by the fishermen. The result may be an increased need for innovations in gear or it may be that councils will be forced to find alternate ways of regulating catch. (For example, a system of fees for illegal bycatch, instead of restrictions on mesh size, may be used, leaving fishermen free to find their own ways of modifying gear or fishing practices so that illegal fish are not taken.)

Since the councils will be deeply involved in this area, they should be charged with studying the needs of the fishing industry in their areas and proposing appropriate actions to the Federal Government. In this way, such proposals are likely to more accurately reflect the thinking of the industry and be compatible with industry desires and fishery management plans. The councils, through NMFS,

should also be charged with sharing with other regions what knowledge they have gained about industry practices and problems, proposed Government actions, and successful or unsuccessful management techniques.

Revitalization of the U.S. fishing industry is the subject of a recent report by the General Accounting Office⁹² and a study by the Eastland Fisheries Survey which will be completed soon. Programs for assisting the industry or removing constraints are being proposed by both groups. But sufficient data about various segments of the fishing industry are not now available for evaluating what revitalization proposals are justified. At least the following questions should be addressed for each industry segment so that Government agencies, fisheries managers, and private industry can determine what programs are needed and what actions are best suited to each group:

- 1) What is the status of the fish product involved, including history and trends of catch, value, prices, market demand, and distribution? What competition with imports exists?
- 2) What is the status of the technology used for harvesting, its efficiency, its productivity, the effect on the resource, and the cost of production?
- 3) What is the status of the labor force and earnings in the fishery?
- 4) What is the normal and possible area of coverage of the fishery? What mobility and flexibility is available to expand or change?

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- 5) What is the **status** of the resource? Is **there** foreign competition for the same resource or another species in the same ecosystem ? Can the resource be enhanced or the yield increased? Are there other underutilized resources available for the same industry?
 - 6) What is the economic condition of the industry? What future changes are likely with assistance programs and would they provide short-term or long-term solutions?

These questions could be tested on specific industry segments and with specific revitalization proposals in order to develop a comprehensive program which addresses national needs most completely.

That job could be undertaken by a committee of representatives from each of the Regional Councils. The council committee could synthesize information on industry needs which has been collected by the Eastland Survey, the General Accounting Office, OTA, and NMFS. The council committee could then identify important information which is still missing, gather that information itself or through contracts, and recommend a specific course of action for Congress to follow if it desires to take legislative action which could encourage growth in the fishing industry. The council committee could also recommend specific changes which could be made administratively by NMFS, NOAA, or other agencies currently responsible for programs which include financial aid, research or information pertinent to the fishing industry.