

Appendix I; Excerpt From A Marine Fisheries Program  
for the Nation  
U.S. Dept. of Commerce, July 1976

TO MEET PROJECTED CONSUMER DEMANDS

Recommendation 5: Ensure the availability to the U.S. consumer of supplies of wholesome fishery products from U.S. sources sufficient to provide for projected increases in consumption.

- 5.1 Increase U.S. commercial landings by 2.3 billion pounds by 1985 to provide for the projected increases in U.S. consumption.
- 5.2 Encourage the development of public and private aquaculture for selected species of fish and shellfish.
- 5.3 Assure the wholesomeness and identity of fishery products to U.S. consumers through a comprehensive program of inspection of U.S. and foreign production facilities and supplies.
- 5.1 Increase U.S. commercial landings by 2.3 billion pounds by 1985 to provide for the projected increases in U.S. consumption.

This recommendation addresses the sources of supply which are now or can be made available to meet future increases in U.S. consumption. It identifies the actions designed to make available (fish stocks sufficient) to enable U.S. harvesters to increase landings by 2.3 billion pounds in the next ten years. It makes the following assumptions: In the near future with the extension of U.S. fisheries jurisdiction the United States will be given the responsibility for conservation and management of stocks out to 200 miles from shore. It will manage its fisheries resources to ensure their full conservation and provide exclusive or preferential treatment for U.S. fishermen. Other recommendations of the National Plan relating to management, development, recreation and environment will be implemented.

It does not take into account the significant contribution made to the food supply through marine recreational fishing, since consumption statistics now available are based on the commercial supply. It should, however, be noted that, according to saltwater angling surveys, recreational fishermen land an amount of fish equal approximately to 7-1/2 pounds annually for each person in the United States. It is likely that much of this fish is eaten and so adds to the overall food supply.

To match the potential U.S. supply and demand the following factors are considered: the present sources of supply of fish and fishery products to U.S. consumers; the projected increased U.S. needs for food and recreation; and the potential U.S. catches of fish in U.S. waters and in distant-water fisheries of interest to U.S. fishermen. Based on the foregoing, the potential sources which could contribute to future U.S. needs are reviewed. Table 4 at the end of this section summarizes these factors.

## How Much More Fish Will The United States Need In 1985?

Synergy, Inc., projected an increase in the annual U.S. consumption of fishery products from 1973 to 1985 of 2.3 billion pounds on a round weight basis. This single target was broken down into "market classes" of fishery products, classes of products having a similar identity, within each of which an interchange of products can be accomplished fairly readily.

This is necessary because there is a spectrum of demand. The consumer of a premium product such as lobster is unlikely to be satisfied with fish sticks. Another consumer may seek products of lower value because these are all he can afford. Future increases in consumption must therefore be considered not only in total but also in terms of market classes. The Synergy study provides forecasts of consumption of edible fishery products in eleven such classes.

Table 4 lists the major market classes. It shows U.S. consumption for each in 1973 from U.S. landings and imports, and projected increases for food and recreation by 1985. In a number of cases estimates for the increases in recreational needs are not available, but it is assumed that they will be significant in amount.

## How Can The Increases Be Supplied From U.S. landings?

It has been noted that increased supplies of fish and fishery products can come from several sources. Consideration of these must take into account the need for measures to retain as much as possible of present supplies while developing new opportunities. The potential sources are:

1. Harvesting part of all of the stocks now caught off the United States by foreign fishermen.
2. Developing fisheries and markets for species now underutilized.
3. Restoring depleted stocks.
4. Developing commercial and public aquaculture.
5. Developing and expanding international arrangements outside the 200-mile zone to assure continued opportunities for U.S. fishermen on the high seas and, where possible, in other countries' jurisdictions.

Development of these potential sources is the subject of recommendations elsewhere in this plan and such sources will be dealt with here only as they represent possible contributions to future needs.

The first objective of Recommendation 5.1 is to hold imports at the present level and to meet future U.S. demands from domestic sources. It is not suggested that there be no increases in imports of any fishery product, but rather that overall imports be held to no more than the present level. In some cases, notably those of tuna, shrimp, and lobster, it may not be possible to increase U.S. landings to the extent required. In other cases, further efforts may be needed to offset potential decreases in present supplies.

Table 4 shows by market class the U.S. catches inside and outside the 200-mile zone and the foreign catch within 200 miles of the U.S. coasts. An estimate of the aggregated MSY is given for each class. It is recognized that MSYs are in many cases only approximate estimates and that fisheries are subject to considerable annual variations. MSYs of different species are not always additive due to interactions and, furthermore, other considerations enter into regulating the catch in any fishery. However, they are used here since they provide the only available estimate of biological resources limitation. Finally, the table shows the potential sources referred to earlier for projected increases by market classes.

The following brief summaries by market classes indicate the general potential of U.S. fisheries to contribute to our future needs. Also considered are some of the problems that may be encountered in increasing supplies from these sources for food and recreational uses. It is important to reemphasize that the proposals for increased catches go hand-in-hand with the need for adequate management plans to ensure the continued conservation of the fish stocks, and that they keep in mind the increasing demands of recreational fishing.

### Groundfish

The estimated increase needed by 1985 is 1.42 billion pounds including 340 million pounds for recreational purposes. By eliminating all or a portion of foreign fishing and by developing underutilized species, ample resources are available to meet the projected increases. Some species such as cod, haddock, and certain flatfishes could provide 250 million pounds to the premium groundfish market following stock restoration. Other major potential sources are Alaska pollock and flatfish (4.7 billion pounds); North Pacific groundfish (350 million pounds); and Gulf of Mexico groundfish (1.1 billion pounds).

### Halibut

The estimated increase needed by 1985 is 40 million pounds. Because most of the halibut caught incidentally by foreign and domestic trawls are below the optimum size, the MSY--even under an efficient management regime--will be less than previously attained by the North American setline fishery. With efficient management of trawl fisheries and the expected benefits from present management of the setline fishery, a 40 million pound increase is anticipated but the restoration is not likely to be completed by 1985. Approximately half of this amount will be caught by U.S. fishermen, the remainder supplied through imports, mainly from Canada.

### Tuna

The estimated increase needed by 1985 is 370 million pounds, assuming that present supplies also remain available. This increase includes 30 million pounds for recreational purposes. The U.S. catch in 1973 was 515 million pounds; imports were 1.5 times this. Although the catch has increased, the U.S. share of the yellowfin caught in the Eastern Pacific has declined from 90 percent in 1966 to 68 percent in 1974, due to increased fishing efforts by other nations, and is projected to decline further. The outcome of the

Law of the Sea Conference or other negotiations and the implementation of any resulting agreements are uncertain. The chances of increasing present catches in this area are not high and losses are possible.

The biggest opportunity to expand tuna landings is in improving knowledge of skipjack tuna resources in the Pacific, Atlantic, and Indian Oceans and in developing means of locating and harvesting these resources. A potential catch of over 2 billion pounds annually has been estimated. Expansion of efforts such as those now being made under the Pacific Tuna Development Program should help to develop a U.S. fishery for these resources which could realize at least a part of future needs. The present Pacific Island Development Program is aiming to increase catches by 200 million pounds as a first step. It also is estimated that increases in landings of Pacific albacore of 30 million pounds may be possible.

### Salmon

The estimated increase needed by 1985 is 90 million pounds, including 30 million pounds for recreational purposes.

Salmon stocks are currently under scientific management which generally maintains such stocks at MSY levels. These levels have fallen due to habitat degradation, mainly by dams and logging, but levels could be raised by expanded management actions such as stream improvement and stock manipulation, plus expanded public hatchery production and increased production by private aquaculture. Such actions could increase publicly generated salmon supplies by 30 million pounds and those from private aquaculture by 60 million pounds annually. These increases would require major investments.

### Scallops

The estimated increase needed by 1985 is 13 million pounds. Resources presently available to U.S. fishermen are sufficient to provide for projected increase if mechanical shucking of calico scallops can be perfected and the distribution and abundance of this resource can be monitored. Restoration of the Northwest Atlantic sea scallop resource through proper management would also contribute to the expected increase in consumption.

### Shrimp

The estimated increase in demand by 1985 is 245 million pounds. In 1973, the U.S. catch was 392 million pounds while imports totaled 203 million pounds. An estimated 40 million pounds now landed by U.S. fleets in other countries probably will be caught by foreign vessels in 1985 if some long term accommodation is not reached.

The estimated unfished shrimp resources off the United States amount to 277 million pounds, but much of this is small, lower-value pandalid shrimp which would not automatically satisfy the demand for the larger penaeid shrimp. Increased aquaculture offers a prospect of 15 million pounds of marine shrimp and 10 million pounds of freshwater shrimp by 1985 if the

technology and economic production systems can be developed rapidly. These sources alone will not meet future demand and imports of shrimp will need to be increased.

### Lobster

The projected increase needed by 1985 is 40 million pounds. Inshore lobster resources are probably being overexploited. Offshore lobster stocks have declined from virgin condition, but the extent of decline is not yet clearly documented. The development of a technically and economically feasible culture system which would produce substantial poundage by 1985 has a low probability. Only small increases in imports are likely. Although the future increases might be met, in part, by imports of Northern and spiny lobsters, increases in supplies will not be sufficient to meet the projected consumption level.

### Crabs

The estimated market increase needed by 1985 is 10 million pounds. The 1973 U.S. catch was 292 million pounds of all crabs. Foreign catches off the U.S. in 1973 totaled 70 million pounds. The estimated MSY for all species is 515 million pounds, leaving a maximum potential increase of 220 million pounds annually when the U.S. jurisdictional limits are increased to 200 miles. High cost is now the limiting factor and more efficient processing is needed to lower costs and increase yield. As costs are reduced, markets can be expanded.

### Clams

The projected increase needed by 1985 is 40 million pounds annually. The estimated MSY is 250 million pounds. Present landing provide 106 million pounds. However, most of the traditional stocks which can be legally taken are fully utilized. Large quantities of clams are presently unavailable along the middle and north Atlantic coasts because they are in polluted waters. Large stocks of clams along the shorelines in Alaska are not being utilized because of paralytic shellfish poisoning (PSP), and others on the continental shelf off Alaska have never been utilized because of difficult logistics and uncertain economics. Private aquaculture might add 7 million pounds by 1985, given research on culture systems, quality control, and favorable zoning decisions. U.S. supplies exist in abundance to meet needs if certain actions are taken.

### Oysters

With a concerted distribution and marketing effort by industry to make high quality oysters readily available throughout the United States, it is projected that future consumption could increase by 20 million pounds.

Production from wild stocks could be increased somewhat in the Atlantic and the Gulf. However, by adapting private aquaculture methods used in other countries, U.S. oyster production could be increased by 80 million pounds of meats by 1985. Major needs are information on genetic improvement of stocks

and disease control, development of economical culture systems, improved product forms and markets, and availability of space for oyster culture in clean environments.

#### Miscellaneous Species

The ten market classes previously discussed cover the most popular species. There are, however, species used in smaller amounts which collectively account for about a fifth of present U.S. consumption. The estimated increase in these other species needed by 1985 is 400 million pounds. Present foreign catch in U.S. coastal waters of species other than in the ten market classes is over 2 billion pounds annually, while the United States landed a total of 533 million pounds in 1973.

Aggregate MSY estimates vary greatly, but the total is at least two or three times more than the present catch. Ample stocks exist to meet projected increases, but they include species which are not in great demand because of a wide range of technological or marketing problems which vary from species to species. Progress is being made in solving these problems but efforts will have to be substantially accelerated.

#### Fish Meal and Fish Oil

The United States produced 585 million pounds of fish meal in 1973, of which 65 percent came from menhaden. Tuna and mackerel scraps accounted for 15 percent, herring for 1 percent, and a mixture of other species 18 percent. Imports in 1973 totaled 678 million pounds, primarily in anchoveta meal. The Synergy forecast indicating an increase in consumption of fish meal of 669 million pounds by 1985 is probably high due to changes in utilization patterns occurring since 1973.

It is believed that menhaden are harvested at MSY. To boost production, alternative resources will have to be used. The currently regulated California anchovy fishery appears to be the most promising unutilized resource to serve as the base for expanded fish meal production. Current MSY estimates of the virgin anchovy stock range from 1.5 to 5.3 billion pounds. With a 20-percent yield factor for fish meal, this fishery could provide from 30 million to 1.1 billion pounds of meal, enough to cover the anticipated increase in demand.

The major constraint in commercial development of the California anchovy resource is the interest of the recreational groups in anchovy as a bait fish and as food for game fish. Significant increases in domestic fish meal production may be possible if adequate biological information is developed to demonstrate that larger harvests will not impair the ecology upon which recreational species depend.

The United States produced 225 million pounds of fish oil in 1973, of which 200 million pounds came from menhaden. Almost all of this was exported. Since oil is a byproduct of fish meal production, increased production of oil is linked to the expansion of fish meal production.

## Conclusions

Fisheries resources available and potentially available to the Nation are estimated to be sufficient, not only to meet the Nation's own projected annual increase of 2.3 billion pounds by 1985, but also to support the future growth of exports of seafood products.

Such assurances are predicated, however, on certain assumptions. One is that U.S. fishermen will be taking a larger proportion of the fish presently harvested by foreign fleets off U.S. coasts. Another is that the United States will be developing its fishing for species currently underutilized. Increased landings of groundfish, scallops, crabs, and miscellaneous species will alone account for 1.8 billion pounds.

Potentials for additional increases lie on the directions of aquaculture and restoration of depleted stocks, but in each instance the prospects for success are related to the success in working out hard questions ranging from the ecological to the economic. Meanwhile, aquaculture seems capable of meeting the predicted increases in demand for salmon (90 million pounds) and oysters (20 million pounds) and portions of the necessary increases in shrimp (25 million pounds) and clams (7 million pounds).

In summary, essential resources exist and are available for catching or cultivation in the coming decade. The catching and the cultivation depend upon the strength of the determination to make them national objectives and the zeal and resources with which the associated problems are attacked and solved.

### 5.2 Encourage the development of public and private aquaculture for selected species of fish and shellfish.

Aquaculture includes any means of artificially increasing the yield of aquatic species through culture and husbandry, from public salmon hatcheries to private oyster, catfish, or shrimp farms in marine, estuarine or fresh water environments.

In the United States, public aquaculture of salmon began a century ago and about one-quarter of the Nation's salmon originate in hatcheries. Private aquaculture produces 40 percent of U.S. oysters, half of the catfish and crawfish, and nearly all of the trout for a total of 143 million pounds. This is about 3 percent of U.S. landings or 1.4 percent of U.S. total consumption of fishery products.

It was noted in the previous recommendation that landings of some highly preferred species of fish and shellfish have reached the maximum sustainable yield level. Also unless extensive environmental improvement occurs, future increases of oysters and clams cannot be obtained from natural stocks.

Attention should be turned to aquaculture as a means of extending production of species such as salmon, oysters, penaeid shrimp, American lobster, clams and scallops. In other cases lower-cost products could be made available by

TABLE 4: Present and Estimated Potential Supply of Edible Fishery Products in the United States (million pounds round weight)

	Groundfish	Halibut	Tuna	Salmon	<sup>1/</sup> Scallops	Shrimp	Lobsters	Crabs	<sup>1/</sup> Oysters	<sup>1/</sup> Clams	Misc. Species
<u>Consumption - 1973</u>											
U.S. landings	404	24	515	213	9	372	40	292	49 <sup>2/</sup>	106	533
Imports	1660	17	906	22	20	385	165	19	14	4	1560
Total	2064	41	1421	235	29	757	205	311	63	110	2094
<u>Projected increase by 1985</u>											
Food	1080	40	340	60	13	245	40	10	20	40	400
Recreation	340	<u>3/</u>	30	30	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	
Total	1420	40	370	90	13	245	40	10	20	40	400
<u>Production - 1973</u>											
U.S. Catch											
Within 200 miles	404	24	45	213	9	355	35	292	49	106	419
Outside 200 miles	0	0	470	0	0	37	5	0	0	0	59
Foreign catch within 200 miles off U.S. (1973)	5850	0	0	0	9	95	0	70	0	0	2050
Estimated MSY within 200 miles off U.S. <sup>4/</sup>	7550	80	2000 <sup>5/</sup>	300	36	600	40	515	130	250	13000
<u>Sources for U.S. increase by 1985</u>											
(1) Displace Foreign Fishing	1420	0	0	0	0	0	0	0	0	0	400
(2) Underutilized Species		0	370	0	13	50	0	10	0	25	
(3) Restore Resource	0	20	0	0	0	0	0	0	5	10	
(4) Aquaculture	0	0	0	90	0	25	0	0	15	5	
(5) Imports	0	20	0	0	0	170	5	0	0	0	
(6) Not Attainable	0	0	0	0	0	0	35	0	0	0	

<sup>1/</sup> Meat Weight

<sup>2/</sup> Includes 20 from Aquaculture

<sup>3/</sup> No figure available

<sup>4/</sup> It is recognized that in some cases downward adjustments might be needed to take interactions and safety factors into account.

<sup>5/</sup> MSY of Kingjack in Pacific and Indian Oceans