

Fisheries Development in New England—A Perspective

W. F. RATHJEN

INTRODUCTION

Since 1973, interest and activity in "fisheries development" has accelerated rapidly both at the regional level throughout the United States and internationally. The reasons for this are multiple and complex. Fisheries Development activities are correspondingly broad and involve a variety of disciplines culminating in utilization. Some of the primary factors influencing use of latent or underdeveloped resources (by U.S. interests) include:

- 1) Availability of traditional resources reduced.
- 2) Economic inability to take advantage of available technology (harvesting, handling, processing).
- 3) Competition in the marketplace with imported fisheries products and innovative foods replacing "traditional" products.

Recognizing the points indicated as basic, it is evident that they all reflect transitory situations and presumably corrections will develop as political and social adjustments are evolved. Some real possibilities exist, however, in smoothing transitions through coordinated efforts—this area is the focus of fisheries development.

This coordination was formalized in New England in 1973 by the establishment of the "New England Fisheries Development Program" (Rathjen, 1974). The activities conducted under it, some of the results, and the possibilities for future emphasis, are the focus of this review.

SCOPE AND ORGANIZATION OF EFFORT

The primary direction of the initial program was derived by an assimilation of existing information and interpretations by industry, academic, and

State and Federal fisheries participants. The original concept involved the following primary ingredients: 1) Industry input and review of direction. 2) Contributions from existing entities throughout the fisheries spectrum to include, but not be limited to: Existing NMFS, State, and Sea Grant program activities, particularly resource assessment, harvesting and processing technology, and marketing.

Several important criteria were used to assist in the selection of candidate species, including availability, markets, and industry interest.

Availability

Due to the severe depletion and continuing competition for many "traditional stocks" (i.e., haddock, flatfish, ocean perch, and lobster), primary effort was to be devoted toward species either completely under utilized, such as red crab (*Geryon quinque-dens*) or with probable slack between the stocks available (sustainable yield) and the actual use such as the squids. A third classification included species heavily exploited by foreign fishermen but only of marginal interest to U.S. fishermen (herring, mackerel, and trawl discards collectively called mixed species).

Markets

All candidate species were considered in terms of their ultimate marketability and value either in domestic markets real or projected or for the possibility of export.

Industry Interest

As industry participation in the selection process was viewed as the most important factor, this category was weighed heavily. In particular, adaptability of existing harvest and

processing techniques as well as marketing links were considered.

After careful consideration of the above factors, three primary groups were considered: Squids (long-finned squid, *Loligo pealei*; short-finned squid, *Illex illecebrosus*); Offshore-crabs (red crab, *Geryon quinque-dens*; Jonah crab, *Cancer borealis*; rock crab, *Cancer irroratus*); mixed species—trawl fish discards (whiting, *Merluccius bilinearis*; red hake, *Urophycis chuss*; ocean pout, *Macrozoarces americanus*; herring, *Clupea harengus* and mackerel, *Scomber scombrus*, Figure 1; and others).

WHAT'S BEEN DONE

Squids

Harvesting

Harvesting experiments have been sponsored by the program using a number of techniques which have included development of high opening bottom trawls, demonstration fishing, with bottom trawls, two boat trawls, and experimental light attraction. Some of these experiments are reviewed in another article in this issue (Taber, 1977).

Holding

In conjunction with some of the harvest experiments, controlled studies of preservation techniques have been underway. These have included holding in ice with varying ratios, holding in chilled seawater, and freezing tests. Although testing and experimentation is still incomplete, preliminary findings indicate that holding in ice for 5 days or longer is practical and that the use of chilled seawater is very attractive for preservation of fresh squid.



Warren F. Rathjen is Program Manager, New England Fisheries Development Program, National Marine Fisheries Service, NOAA, 14 Elm Street, Gloucester, MA 01930.

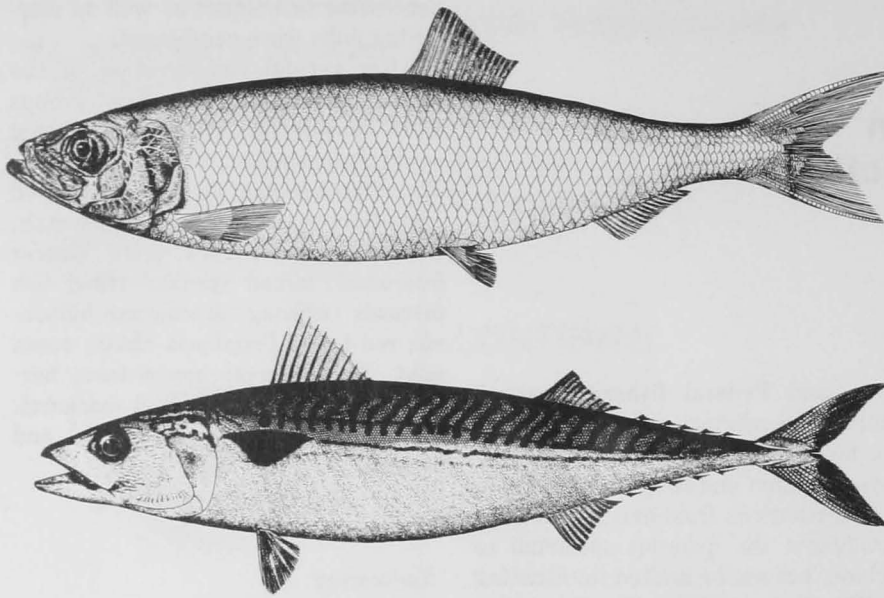


Figure 1.—The herring (above) has long been of interest to U.S. fishermen and has gained new significance during recent years. Export markets in Europe are becoming increasingly attractive to U.S. processors. The mackerel (below) has supported variable interest in U.S. fisheries effort in the past. This resource is currently abundant and with suitable market opportunities could again support a substantial fishery.

Processing

A number of starts have been made which have directed research to mechanically sorting and processing of squid, which is producing cleaned mantles, strips, or rings. These are of interest to some domestic users. Basic research on the potential of squid as a canned product has also been contracted for.

Marketing

It is evident that many opportunities for export of squid exist, particularly in southern Europe and the Far East. Potential use of squid in domestic markets is somewhat less certain. In the case of the former, market studies and preliminary contacts have been established throughout western Europe. Domestic markets have been addressed somewhat superficially through the development and distribution of consumer materials like recipe books (Fig. 2) and posters. This has been supplemented by media presentations which include squid and other underutilized species. More recently a carefully planned study designed to establish a market posture has been started. There is some reason to project that markets for up to 25,000

tons may be a realistic goal within the next 5 years.

The Resource

Demonstration fishing was conducted to measure the density, size, and sex composition of red crab stocks. A limited tagging program was carried out to develop a sensitivity to local movements and frequency of moulting. Measurements of commercial catches were made and the industry was supported with technical input in early efforts to maintain crabs alive aboard vessels. The resource base was examined in a number of dimensions by NMFS research biologists. Coordinated surveys of existing fishery intelligence were conducted on Jonah and rock crabs. These included the crabs from western Maine to the Connecticut border.

Processing

A number of meat extraction processes have been conducted experimentally for red, rock, and Jonah crabs. Adaptation of roller extraction equipment developed for Alaskan species has been successfully demonstrated and adapted to limited commercial operations in New Bedford and Gloucester, Mass. (Fig. 3).

Roller extraction of meat from rock and Jonah crabs is also proceeding ex-

perimentally. Some program supported studies on the three crab species have also been conducted on storage life, packaging, cooking, and development of product forms.

Marketing

The experience accrued by NMFS processing technologists has been cooperatively demonstrated in industrial processing applications at more than three locations in New England (and beyond). As a result, there are currently several operations producing a variety of products from the three target crab species. These products include whole cooked crab, cocktail claws, mechanically processed meat, canned products, and specialized products. To a substantial degree, the future for these products will probably be determined during the next several years. The ability to compete with blue crab, king crab, and other species is being tested in the crucible of the marketplace.

Mixed Species

This category is the most complex of the objective groupings. In spite of the challenges, it offers the greatest potential to the industry. Some aspects of our orientation are included here.

The Resource

In terms of volume, the most outstanding species included are whiting, red hake, mackerel, and herring, any

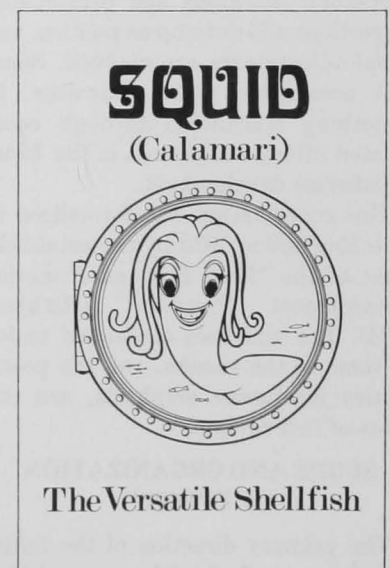


Figure 2.—The squid recipe booklet, one of several promotional aids used to encourage domestic interest in the utilization of squid.

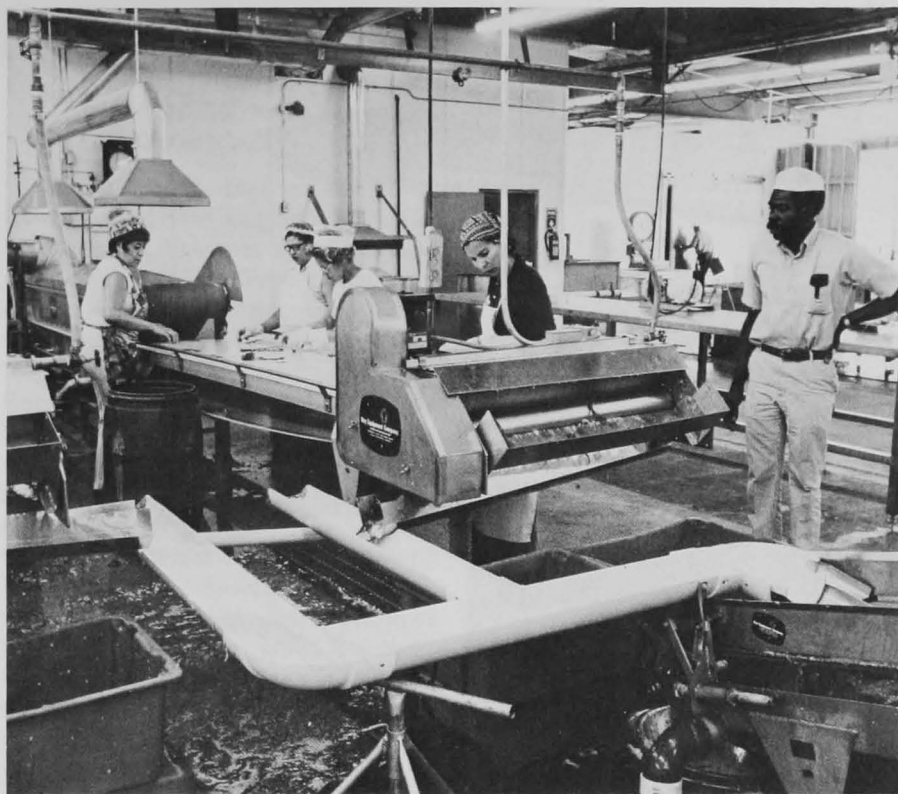


Figure 3.—An NMFS processing specialist oversees the adaptation of mechanical meat separation equipment at a red crab processing facility in New Bedford, Massachusetts.

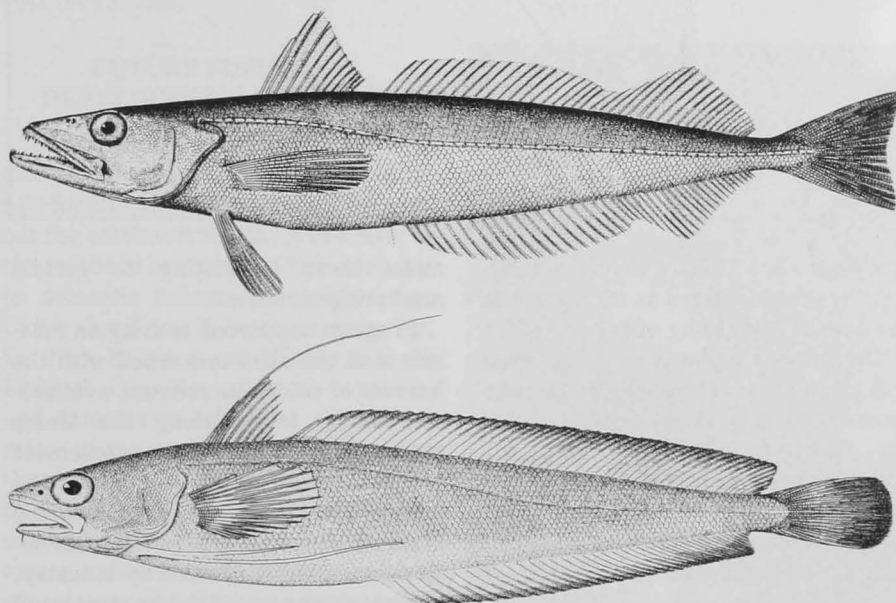


Figure 4.—Two species of hakes, silver (above), and red (below), are expected to be under-exploited by U.S. fishermen. The silver hake, sometimes known as whiting, has supported moderate to large volume seasonal fisheries for the past 20 years. This species is attractive to world and domestic markets. The red hake is abundant and can support greater effort by domestic fishermen. Products and marketability are unanswered questions.

of which in a given year might be available in considerable tonnage. As a result of foreign pressure, the condition of herring and mackerel stocks is questionable for at least the period

through 1977. The supplies available to the U.S. fisherman are probably adequate for some moderate expansion assuming some effort is directed into offshore areas. Although there is only

marginal interest (at this time) in mackerel, the resource has been under heavy exploitation by foreigners during recent years.

Whiting and red hake stocks (Fig. 4) appear to be in comparatively good condition according to biological surveys. Other species are also included under this heading, all of which have varying levels of availability and market interest. Some of these (Fig. 5) are ocean pout, skates, greyfish (dogfish), goosefish, and butterfish.

Handling at Sea

It was early recognized that one of the major problems in attempting exploitation of these species was handling large volumes with comparatively small crews and minimum expense. During 1974 and 1975, experiments were conducted with two separate situations, one for mixed-trawl discards out of Galilee, R.I., and one for herring in Gulf of Maine waters out of Gloucester, Massachusetts. Both tests employed seawater and ice or chilled seawater (CSW) as a coolant. The herring experiment has led to adaptation of the technique by a commercial operation (Fig. 6).

As part of the handling experiment, the problem of offloading large volumes of fish has been included in objectives. A pneumatic system was leased and demonstrated through the Program. Experiments were coordinated with the CSW holding tests mentioned. As a result of the demonstrations, several units of the equipment demonstrated have been acquired and are now employed by New England processors.

One of the links in the holding-unloading-preprocessing which remains to be demonstrated is sorting the "mixed" species into categories by size and variety. Prototype equipment to accomplish this is now being tested.

All of the elements indicated, namely holding, unloading, and sorting will be further evaluated and refined as industrial opportunities become available.

Processing

Once these large volumes of essentially low value fish become available in the processing plants, they are the objects of a growing technological ability for automated sorting processing. Mendelsohn et al. (1977) describes one

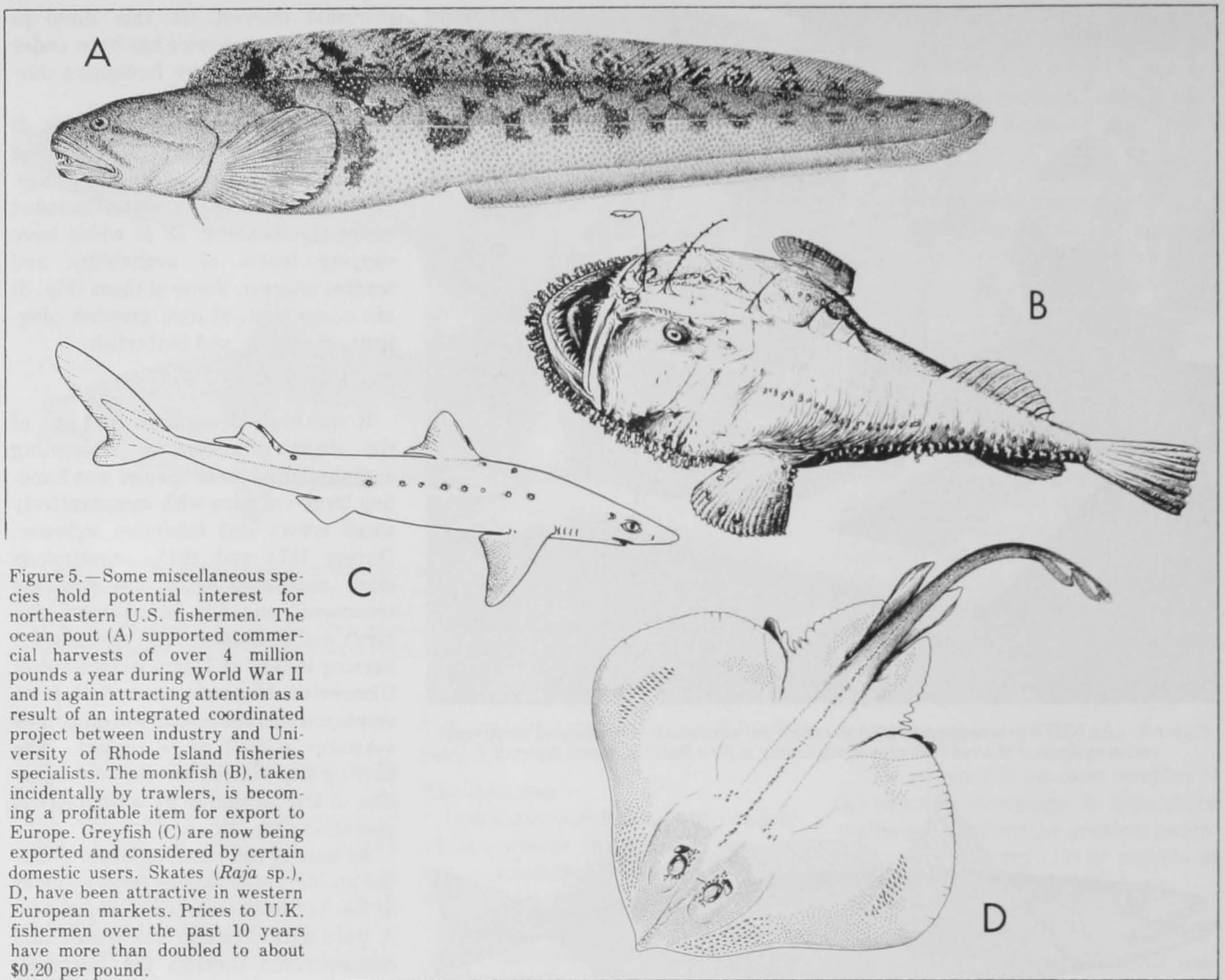


Figure 5.—Some miscellaneous species hold potential interest for northeastern U.S. fishermen. The ocean pout (A) supported commercial harvests of over 4 million pounds a year during World War II and is again attracting attention as a result of an integrated coordinated project between industry and University of Rhode Island fisheries specialists. The monkfish (B), taken incidentally by trawlers, is becoming a profitable item for export to Europe. Greyfish (C) are now being exported and considered by certain domestic users. Skates (*Raja* sp.), D, have been attractive in western European markets. Prices to U.K. fishermen over the past 10 years have more than doubled to about \$0.20 per pound.

start supported by the program. Ultimate uses include the potential as a minced product, frozen fillets for export, and potential use as canned products.

Marketing

During the life of the program, substantial effort has gone forward under the general category of marketing mixed species. These efforts have included a survey of potential markets in western Europe for whiting, skates, and dogfish. Market demonstrations to evaluate the potential for domestic marketing of fresh and frozen herring fillets were undertaken in 1976. Consumer reactions were also sought relative to a "minced/salt-fish" product made from fish now discarded. Participation in overseas promotional efforts and continuing development of overseas market contacts is ongoing (Mc-

Avoy and Earl, 1977). Product development is going forward as an adjunct to the overall marketing effort.

The future emphasis in these areas will attempt to be responsive to reactions experienced. It is anticipated that the flow of fishery products will undergo some redirection during the next decade in response to changes in resources availability, political adjustments, and population growth.

Other Shellfish

Late in 1975, two new species areas were added to the list of objectives under the New England Fisheries Development Program. The blue mussel (*Mytilus edulis*) and ocean quahog (*Arctica islandica*) attracted program input. Although these activities are only recently underway, reduced or inadequate supplies of traditional species

make these interesting to certain marketing situations.

Program supported activity on mussels is at this time concerned with the harvest of wild blue mussels available at subtidal levels along the Maine coast. This project will supplement complementary experiments by the marine fisheries extension arm of the State of Maine as well as other developments being conducted by industry. Ultimately the use of this resource will depend on market development now underway.

Ocean quahogs (Fig. 7) are now being considered by industry as a possible replacement species for declining stocks of surf clams. The variations in yield, color, and other characteristics are being examined objectively through the development program. Ocean quahogs are also being considered as replacement for certain processed clam

products, particularly chowders and blended products.

ADDITIONAL TECHNOLOGICAL SUPPORT

Further modification in the objectives of the New England Fisheries Development Program activities took place during 1976. Through Congressional action, supplementary funds were made available for accelerated "technology transfer" in southern New England fisheries. These funds are being used to demonstrate harvesting and processing techniques established and proven in other parts of the world and considered as practical for application in the fisheries of the northeastern United States. Examples of work undertaken include the introduction of bottom pair trawling, trawl research, feasibility demonstration of Danish seining, and marketing and processing projects. Other activities include support of research on stabilization of minced fish and related research, use of clam processing wastes, and increased efficiency in crustacean harvest techniques.

FUTURE FISHERIES DEVELOPMENT ACTIVITIES

With the advent of extended jurisdiction, we are anticipating a broader role for fisheries development throughout the northeast region. A new look at the resource base that will be available to domestic fishermen is called for. Close coordination between industry, the New England and Middle Atlantic Fishery Councils, resource experts, and industry is called for. There are many unanswered questions, perhaps the most significant of which will relate to the interplay between available resource base, allotments to foreign fishermen, interest by U.S. producers and processors, and ability to enter international markets. In the long run, domestic market opportunities will also



Figure 6.—An insulated container is lowered into a herring carrier vessel. The use of chilled seawater (CSW) has extended the period that herring can be held from less than 12 hours to over 36 hours. This has opened the potential for harvesting herring stocks from a wider geographic range than before.



Figure 7.—Ocean quahogs, an abundant resource of only marginal interest, now have the opportunity to form the basis of a rapidly expanded fishing effort. This species is a prime candidate to supply large market voids created by lessened availability of the surf clam. It is probable that the ocean quahog may be considered as a basic component of chowders and other blended clam products.

be important considerations as the flow of fisheries products adjusts to the available resources.

To meet these challenges, planning is proceeding to accommodate fisheries development activities throughout the northeast area. Most probable target areas will include an expansion of activities already started under the New England Fisheries Development Program, particularly on the squids, herring and mackerels, silver and red hakes, and ocean quahogs. Some attention will also be directed to better use of surplus freshwater fisheries resources. More involvement is expected in marketing and financial assistance (fleet improvement) to help the domestic industry accommodate the changing demands for products.

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