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NATIONAL FISHERIES PLAN: FISHERIES DEVELOPMENT TASK FOR THE CENTRAL AND WESTERN PACIFIC REGION. Paul J. Struhsaker (Compiler)

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BOTTOMFISHES

Introduction

The bottomfish resources of the central and western Pacific are represented by many families of tropical fishes. Two general categories are considered for the following Task Questionnaire. The reeffish resources (those species occurring in the nearshore and reef environments and usually within diving depths) are dominated by the following families: Holocentridae (squirrelfishes), Serranidae (sea basses), Priacanthidae (bigeyes), Carangidae (jacks), Lutjanidae (snappers), Mullidae (goatfishes), Labridae (wrasses), Scaridae (parrotfishes), Acanthuridae (surgeonfishes), and Scorpaenidae (scorpionfishes). These species are harvested by handlines, traps, spearing, gill-netting, and other methods. The outer-shelf and upper-slope resources are dominated by the Lutjanidae, Serranidae and Carangidae. These species are taken by handlines and, occasionally, traps.

These fishes are taken almost exclusively for local consumption, although some transshipment of catches occurs within regions. These resources are heavily fished in some areas. For example, we have estimated that the near-shore production of these groups may be as much as 400-500 kg/km^2 for the island of Oahu in Hawaii. Further development of these resources in all areas will depend largely upon increased local demand.

I. Resource

A. Except for the Hawaiian Islands, no reliable catch statistics for bottomfishes exist for the central and western Pacific island areas. Presently, about 800 MT of these species are producted in Hawaii. The current product trends are generally steady, with modest increases from year to year for certain species. Estimation of time tables for the full commercialization for most forms is not presently feasible.

B. Further development of these resources would not reduce pressure on other fisheries.

C. Generally quite stable.

D. No foreign competition.

E. Very little is known of the extent of these resources, as is also the case of biological information for their management. Much additional information for all the Pacific areas is desirable.

II. The Technology

A. There are no major obstacles for further development of these resources.

B. Further development would depend on implementation of existing technological methods in the fields of harvesting, catch preservation methods and facilities, and transshipment.

III. Industry Capacity

A. Harvesting capacity.

1. Present harvesting methods and vessels are generally suitable.

2. Established fisheries are suitable.

3. Efficiency is moderate.

4. Little difficulty. This would be an expansion of existing fisheries.

5. Highly variable. Even moderate production increases would attract additional harvesting capability.

6. and 7. Not applicable.

B. Processing Capacity.

1. Most products are sold to the fresh or frozen markets, and further expansion of existing capabilities is all that is required.

2. Adaptation of existing technology would be necessary in the case of developed export market.

IV. Employment

A. Harvesting and processing labor would not be difficult to attract.

B. The usual shore-based employment opportunities compete for harvesting labor.

V. Market Factors

1. Imported frozen fishery products currently compete with local fisheries in Hawaii, American Samoa and Guam.

2. Fresh and frozen whole fish.

3. Market trends for competing items probably will not change dramatically.

4. No major changes anticipated.

VI. Consumer

A. There are long-run potentials for bottomfishes in the following categories:

1. Domestic. Perhaps international in some cases.

2. Retail food chain and white-tablecloth restaurants.

3. Local (each island area) and regional (West Coast).

4. Fresh and frozen.

B. 1. Favorable.

2. No effect.

3. Unfavorable.

4. Favorable.

5. Unfavorable.

6. Unfavorable.

7. Little effect.

8. No effect.

VII. Economic Feasibility

A. Further commercialization of these species would be an expansion of existing fisheries.

B. Further information on the extent of resources in more distant areas is required.

VIII. General

A. Industry level of involvement is high. State involvement consists of modest participation through maintenance of catch statistics and some management regulation enforcement.

B. Increased NMFS activity through a harvesting and infrastructure development plan would be followed almost immediately by increased production.

C. The institutional barrier of the general public's lack of familiarity with most tropical bottomfishes is a deterrent to rapid expansion of these resources. No legal barriers are foreseen.

D. No major environmental constraints. The presence of ciguatera in certain island areas prohibits the utilization of many species there.

E. Conflicts between commercial and sports groups may develop in the long run, but no difficulties are foreseen at present.

F. Substantial commercialization of underutilized species should be underway by 1985.

NERITIC SPECIES

Introduction

There are indications that the "mackerel scad" resources of the Pacific are considerable. These carangid fishes of the genera Selar (= Trachurops) and Decapterus are usually taken by handlines at night or with surround nets when they aggregate inshore during daylight hours. The Hawaiian harvest of this species group during 1973 was about 400 MT, second only to skipjack tuna. Most of this catch comes from the island of Oahu, with lesser amounts from the "outer islands." Production is more or less limited by local demand, and the akule, Selar crumenophthalmus, is now the most important "table fish" in the Hawaiian diet.

Surveys and local knowledge indicate that species of these genera are abundant in other Pacific areas of interest to the United States. Further production would depend upon increased harvesting capacity for local consumption, and product and market development for exportation. An example of what a concerted development program can accomplish is illustrated by the Philippine Islands: a U.N.-sponsored project on improvement of harvesting and catch preservation methods has resulted in an annual production exceeding 350,000 MT there.

I. Resource

A. The present yield is known only for the Hawaiian Islands where the trend is generally upward. Maximum production will probably be obtained sometime in the 1980's. It is difficult to estimate the impact of a development program, but the development of an export market would considerably increase the rate of harvest.

B. Further development of this fishery would not relieve much pressure on existing fisheries.

C. Marked fluctuations in stock sizes have not been noticed.

D. No foreign competition is expected.

E. Virtually no knowledge exists on the status of these stocks in the Pacific area other than for Hawaii.

II. Technology

A. Further development of these resources would depend upon demand for these products in other than the areas of harvest. A two-three year program of market promotion for the frozen product would determine the feasibility of exporting these species.

B. Marketing of these species as kippered or smoked products might increase the demand, both locally and regionally.

2 (Neritic Species)

III. Industry Capacity

A. Harvesting capacity

1. Small and medium-sized vessels take these species by handlining and surround net.

2. Harvesting capacity currently exists. Not much modification required.

3. Methods are fairly efficient.

4. Only moderate difficulty to increase production.

5. A continuation of the present price structure for effort-return would be necessary.

6. and 7. Not applicable.

B. Processing capacity

1. The present processing and handling facilities in the Hawaiian Islands could handle a general increase in production.

2. New handling and processing facilities would need to be developed for an export market.

IV. Employment

A. No problem to attract more harvesting and processing labor.

B. Shore-based employment competes for harvesting labor.

V. Market Factors

1. Imported fishery products currently compete with products of these fisheries.

2. Fresh and frozen. Perhaps dried, smoked or kippered products in the future.

3. Increased product from other fisheries would not have a large effect on the scad fisheries.

4. No major changes expected.

VI. Consumer

A. Long-run potential for:

1. Domestic. Perhaps international in the future.

2. Retail food chain, white-tablecloth restaurants.

3. Local (Pacific Islands); perhaps regional (West Coast) and national.

4. Fresh, frozen, smoked.

B. 1. Favorable.

2. No effect.

3. Unfavorable.

4. No effect.

5. Unfavorable.

6. Favorable.

7. No effect.

8. No effect.

VII. Economic Feasibility

A. No, for further expansion of the fishery.

B. Extent of the resource in areas other than the Hawaiian Islands must be determined. Market acceptance in areas other than Oceania must be determined. The NMFS could undertake this program.

VIII. General

A. High industry involvement in the Hawaiian Islands.

B. One-three years after an NMFS development plan.

C. None for local consumption. Market acceptability for exportation to mainland U.S.

D. No environmental constraints foreseen, except for gross degradation of inshore habitats.

E. None.

F. Very good.

Introduction

DEEPWATER SHRIMP RESOURCES

Recent investigations by the NMFS and the Hawaii Institute of Marine Biology have demonstrated that three deepwater species of shrimp occur in the Hawaiian Islands in quantities sufficient to support commercial fisheries. The one penaeid and two caridean shrimps and their approximate depth ranges are:

Penaeidae

Penaeus marginatus Randall 60-120 fathoms

Pandalidae

Heterocarpus ensifer Milne-Edwards 100-350 fathoms

H. laevigatus Bate 250-400 fathoms

Only data from exploratory fishing data and some informal results of test fishing by commercial fishermen in the Hawaiian area are available for the following account. There is some potential for the Guam area where the Guam Marine Laboratory has undertaken some initial surveys based on the results obtained in the Hawaiian Islands. Perhaps some limited grounds exist in the northern Marianas near Saipan, as indicated by C. & G. S. charts. Otherwise, most of the Trust Territory island areas and American Samoa offer very little area in the depth ranges in which these species occur.

REFERENCES:

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I. RESOURCE

A.

1. Present production is less than 5 metric tons per year of Heterocarpus spp. Estimated MSYs per annum (based on catch rates and estimated amounts of fishable grounds) are as follows.

   P. marginatus 50 metric tons

   H. ensifer 1,000-5,000 metric tons

   H. laevigatus 500-1,000 metric tons

2. The production trend at present consists of a few, small sporadic landings of Heterocarpus.

3. Although there are no current production trends of these species, once exploitation begins production should rise rapidly.

   P. marginatus: 2 years after full-time production.

   Heterocarpus spp. 1980-1985.

4. P. marginatus

   One year after a subsidized commercial production attempt.

   Heterocarpus spp.

   One-two years after a development program. There are indications that a NMFS sponsored development program may not be necessary.

5. These potential fisheries should be commercialized to a considerable extent by 1980.

B. A trap fishery for Heterocarpus would probably attract a few vessels from the small Hawaiian tuna longline fleet.

C. Stability of shrimp stocks unknown, although limited exploratory fishing surveys demonstrate that they are not prone to great fluctuations in abundance.

D. No foreign competition forseen. Most potential grounds within the 12-mile contiguous fishery zone.

E. For all three shrimp species the sustainable production levels are unknown. These should be determined for selected areas as well as basic life-history parameters for management purposes.

II. THE TECHNOLOGY

A. P. marginatus. The only major obstacle to the development of this resource is the lack of a suitable trawler-rigged vessel in the Hawaiian Islands.

Heterocarpus spp. Major problems in the development of these resources are: catch handling and preservation; processing for peeled, deveined, and frozen product; and product marketing.

B. The technology exists to resolve all of the above problems.

III. INDUSTRY CAPACITY

A. Harvest capacity

1. Vessels 35-75 feet in length with deep-water trapping and trawling capabilities are required.
2. Harvesting capabilities are available. However, no suitable trawler presently exists in the Hawaiian area. Some local vessels could be modified for shrimp trapping.
3. These vessels have exhibited their efficiency in other trawl and trap fisheries.
4. Moderate difficulty for small trap vessels: the new fishery must show evidence of higher than average return on the investment.

Difficult for larger trawlers. Most vessels of this type are presently engaged in an attractive return fishery.

5. Small trapping vessels: $50K per annum
   Larger trawling vessels: $125-150K per annum
6. Not applicable.
7. Not applicable.

B. Processing Capacity.

1. For products directly sold to the local markets, handling and processing capabilities currently exist.
2. Processing of H. ensifer for a peeled, deveined, frozen, and export market (to U.S. mainland) would require modification and testing of available processing machinery. A pilot plant would also be desirable to develop optimum handling techniques. Depending upon the extent of the development program, this phase could be completed in 6-24 months at a cost of (shooting from the hip) $50-500K. A portion of this phase should quite probably be conducted by private enterprise.

IV. EMPLOYMENT

A. Harvesting and processing labor forces are available.

B. Most shore-side jobs now strongly compete for harvesting labor. However, sufficient personnel probably could be recruited to a relatively small shrimp fishery. There should be no strong competition for semi-skilled processing labor.

V. MARKET FACTORS

A. Local Market. There should be no problem in supplying the local fresh and fresh-frozen whole shrimp market. Demand for such products is unknown and can only be determined with development of the fisheries.

Processed Shrimp Tails. A quality processed shrimp product should find a ready outlet both locally and on the mainland U.S.

Exportation. Whole frozen and processed tails could possibly compete in the foreign export markets. The products would probably have a long-run potential in the following markets.

1. Domestic and international.
2. Retail food chain, white-table restaurants (who came up with that one?), and institutional markets.
3. Local (Oahu and outer islands) and Regional (U.S. West Coast).
4. Fresh and frozen.

B.

1. Favorable.
2. No effect.
3. Some adverse effect.
4. Favorable
5. Unfavorable.
6. Unfavorable.
7. Little effect
8. No effect.

VI. ECONOMIC FEASIBILITY

A. Considering the present world-wide demand for shrimp products, it would seem that eventual development of these resources is inevitable.

B. Determination of resource bases, approximate production figures, quality of processed products, and market acceptability. These projects should be undertaken by both Industry and the NMFS.

VII. GENERAL

A. Moderate interest on the part of the local fishing industry.

B. Within 1-2 years of intensive NMFS testing and development program.

C. None

D. Serious degradation of the inshore environment would probably adversely affect the survival of young P. Marginatus.

E. None.

F. I figure that by 1985 we could just about have the deepwater shrimp resources of the Hawaiian Islands wiped out!

OCEANIC SPECIES

The development plan for the skipjack tuna resource of the central and western Pacific is covered by the PIDC document. Further production of oceanic species of fishes in this region could be effected by small- and medium-sized vessels working out of insular areas and utilizing improved means of harvest. The NMFS may wish to consider modest developmental programs for the following species. Experience gained from these programs in the Hawaiian Islands could be applied throughout the central and western Pacific.

Yellowfin (and bigeye ?) tuna: There are indications that medium to large yellowfin, and perhaps bigeye, tuna are associated with the outer shelf areas of the Hawaiian Islands in depths of 100-200 m. These are taken occasionally by live-bait boats when they have an adequate supply of bait and skipjack tuna fishing is slow. An experimental program during one summer season consisting of deep-trolling and drift fishing should provide a preliminary assessment of the efficacy of these fishing methods. An increased supply of large tunas would contribute to the local and Hawaiian export market to the U.S. mainland.

The current production of these two species from Hawaiian waters is about 550 metric tons. These methods could possibly result in an increase of 50-100 metric tons.

Albacore: Recent longline experiments near Fiji have demonstrated that large albacore occur at considerable depths in the tropical central Pacific. Catch rates there have ranged up to 3%-5% at depths of 200-400 m. The experimental gear is not considered practical for commercial use at present, however, and new techniques would have to be developed to fish these depths. Personnel at the Honolulu Laboratory have conducted a preliminary design study of deepwater commercial longlining system and feel that it is practical.

The primary constraint on increased albacore production in the Hawaiian Islands is that this species is not desirable for use as sashimi. However, this species commands the highest price of all tunas for canning purposes. With a marked production increase in the central Pacific, canning could be carried out in Hawaii, or the raw material transshipped to the west coast.

Current Hawaiian landings of albacore are only about 15 metric tons. Annual landings of at least 500 metric tons would be desirable for the development of a fishery directed to the canning industry.

Skipjack tuna: Under the current PIDC tuna development plan, the Government of American Samoa will undertake surveys to determine the feasibility of small-craft trolling as an alternate harvesting technique for skipjack tuna. This has already been proven feasible in the Ponape District of the Trust Territory (for local markets), but it is desirable to learn if this fishing method can produce substantial catches that could provide increased production for local markets, transshipment and the Honolulu cannery. Possibly, the Honolulu Laboratory could undertake Hawaiian trolling experiments in conjunction with those being conducted in American Samoa. The advantages would be the presence of a commercial fleet against which the trial landings could be compared and the close procimity of fishing supplies and support facilities.

A small vessel would have to produce about 40 metric tons during the 3-4 month fishing season to be economically feasible.

Mahimahi (dolphinfish; Coryphaena): The bulk of mahimahi landed in the Hawaiian Islands is taken incidentally by commercial and sport fishermen and goes directly to the fresh fish market. Most of the mahimahi utilized in the restaurant trade, however, consists of foreign-caught imports. Quite probably some of the chance could be removed from the incidental catches by the placement of floating objects that would attract mahimahi such as is the practice in the Sea of Japan.

The Honolulu Laboratory plans to undertake an experiment in the aggregation of skipjack tuna schools. The experiment is designed to simultaneously determine the effect on mahimahi schools. A concerted effort in the placement of floating objects by the NMFS and perhaps private individuals could conceivably result in a greatly increased production of mahimahi (and tunas).

OTHER SPECIES GROUPS--TRUST TERRITORY, AMERICAN SAMOA, AND GUAM

The following species groups in the Hawaiian Islands are currently being exploited at nearly maximum levels. The following comments apply to other Pacific areas, particularly the Trust Territory. It is not clear what, if any, roles the NMFS should play in the development of these resources.

Tuna baitfishes: Recent work by several agencies has provided us with a fairly good assessment of the baitfish resource in the Trust Territory. Utilization of these live-bait resources for skipjack tuna fishing is discussed in the PIDC document. Surveys by the Honolulu Laboratory have shown that the sardine Herklotsichthys punctatus occurs in large numbers in the Marshall Islands, but populations of this species are apparently subject to wide fluctuations in abundance. Constraints on the use of this species are: present methods of capture used by U.S. fishermen are relatively ineffective; seasonal abundance and availability are poorly known, as well as basic life-history parameters upon which to base management methods; it is a food species for the Marshallese in some areas.

Recreational fish species: This group is briefly mentioned because it is not covered by the Hawaiian Recreational Fisheries Plan. The potential for development of the deep sea, lagoon, and reef sport fisheries in American Samoa, the Trust Territory, and Guam is well

known. The primary constraint in the development of some of the worlds' finest game fishing (and spearing) areas is the lack of support facilities. Obviously, the provision of these facilities is the role of local government and enterprise. However, it might be desirable for PR purposes for the NMFS to be associated with recreational fisheries development in the western Pacific through one or more small programs (e.g., provision of billfish tags to charter vessels).

Spiny lobsters: Although there are no indications of vast spiny lobster resources in the Trust Territory, the present ridiculously high prices of this commodity indicate that a harvest based on local fishermen selling their catches to a collecting freezer vessel might be feasible. The NMFS could serve as liaison between industry and officials of the Trust Territory and coordinate development efforts. An estimated potential annual harvest of 50-100 metric tons does not seem unreasonable.

THE ARMORHEAD (*PENTACEROS RICHARDSONI*) RESOURCE

Japanese and Russian vessels have been working the armorhead populations that inhabit the banks northwest of Midway for several years now. Production figures are not available, but the resource is extensive. Recent exploratory fishing catches by a Japanese research vessel produced about 480 metric tons during 32 days of fishing. Hauls of up to 17 metric tons per half-hour tow by the Russians have been reported to us.

It would seem that at present this resource would hold little interest for U.S. fishermen. Considering the remoteness of the fishing grounds and that the species is not visually appealing, it would seem that it will be some time before the domestic industry will consider this resource. However, it would be desirable for the NMFS to monitor the status of these stocks during the next decade.

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