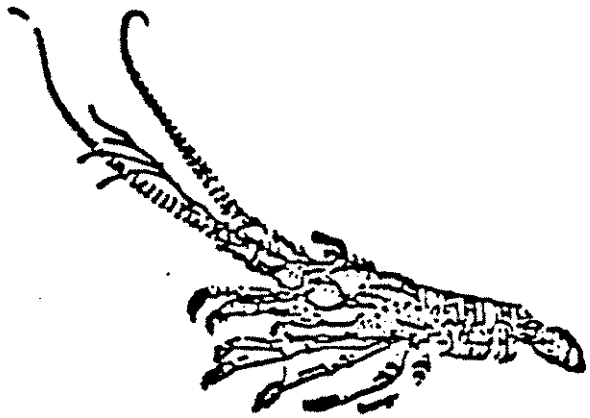
ENVIRONMENTAL IMPACT STATEMENT/FISHERY MANAGEMENT PLAN

AND REGULATORY IMPACT REVIEW

FOR THE

SPINY LOBSTER FISHERY OF PUERTO RICO

AND THE U.S. VIRGIN ISLANDS



CARIBBEAN FISHERY MANAGEMENT COUNCIL

IN COOPERATION WITH

NATIONAL MARINE FISHERIES SERVICE

JULY, 1981

Environmental Impact Statement/Fishery Management Plan and Regulatory Impact Review

Responsible Agencies

Caribbean Fishery Management Council and the National Marine Fisheries Service.

Title of the Proposed Action

Caribbean Spiny Lobster Fishery Management Plan.

Location of the Proposed Action

The marine waters extending from the shores of the Commonwealth of Puerto Rico and the Territory of the Virgin Islands, to the outer limits of the U.S. fishery conservation zone (FCZ).

Contacts for Further Information and Submission of Comments

Caribbean Fishery Management Council

Contact: Omar Munoz-Roure
Executive Director
Suite 1108
Banco de Ponce Building
Hato Rey, Puerto Rico 00918
(Telephone No. 809-753-4926)

National Marine Fisheries Service

Contact:
Regional Director
Duval Building
9450 Koger Blvd.
St. Petersburg, FL 33702
(Telephone No. 813-893-3721)

Type of Statement

Final Environmental Impact Statement/Fishery Management Plan and Regulatory Impact Review.

Abstract of Proposed Action

Implementation of the Spiny Lobster Fishery Management Plan will provide for regulatory controls on size and sex of lobsters to be harvested, gear restrictions, data collection and the establishment of certain sanctuaries. The specification of harvest levels is based on biological, social and economic considerations while maintaining an optimum yield from the resource.

The proposed action includes the following elements for the conservation and management of a multiple year fishery for the spiny lobster (Panulirus argus Latreille):

1. Determinations for the multiple year fishery:
   a) The maximum sustainable yield (MSY) of the fishery (Sec. 4.5.1).
   b) The optimum yield (OY) or harvest level of the fishery (Sec. 6.0).
   c) The expected domestic annual harvest (DAH) from the fishery (Sec. 5.3).
   d) The total allowable level of foreign fishing (TALFF) in the fishery (Sec. 7.0).

2. Management measures:
   a) Size and Sex Restrictions (Sec. 8.2(1.0)).
   b) Data Collection Requirements (Sec. 8.2(3.0)).
   c) Gear Restrictions (Sec. 8.2(4.0)).
   d) Alternative Measures (Sec. 8.2).

3. Establishment of criteria for modification of the management measures (Sec. 8.2).

4. Rationale and impacts of management measures (Sec. 10.2).

5. Relationship to existing laws (Sec. 8.3).

Comments due date:

1981

Summary

The preparation and implementation of the Spiny Lobster Fishery Management Plan is mandated under the Magnuson Fishery Conservation and Management Act.

The proposed action recommends a management regime for controlling the harvest level of spiny lobster on a uniform basis throughout the marine waters off Puerto Rico and the Virgin Islands under domestic control (in the territorial sea and the FCZ), and identifies measures necessary to ensure appropriate implementation. The level of harvest is established as "all the non-berried lobsters in the management area having a carapace length of 3.5 inches or greater that can be harvested on an annual basis". This would allow for an annual catch estimated to be approximately 582,000-830,000 pounds on a continuing basis. The level was established as being optimum from a biological, social, and economic standpoint—and will provide the greatest overall benefit to the nation (see Sections 5 and 6). Domestic fishermen will harvest the allowable catch and therefore no foreign fishing will be allowed (7.0). The level of harvest and other management measures will be evaluated on an annual basis and revised if deemed necessary (8.2, 11.0).

The plan is a multi-year plan with certain revisions intended to be made through the regulatory amendment process (1.0, 8.2, 11.0).

The adoption of uniform management in the fishery will require the cooperation of the Commonwealth of Puerto Rico and the Territory of the Virgin Islands in waters under their respective jurisdictions (8.2). The officials in charge of marine fisheries for Puerto Rico and the Virgin Islands are voting Council members who have approved the plan and both governments have indicated that they are anxious to cooperate.

Purpose and Need

Regulating the harvest of spiny lobsters is needed to halt the progression of overfishing and economic hardship (3.2, 4.6, 5.3, 6.3). Improved statistical data, and a better understanding of the resource through biological and socio-economic research are required to improve management decisions (3.2, 3.4, 3.5, 6.3, 8.2, 8.5, 8.6). In addition, certain management measures are necessary to reduce gear losses, destruction of the habitat, and death and injuries to unharvested immature and adult lobsters (2.0, 8.1).

Alternatives Including the Proposed Action

Four alternatives were considered. Three were considered and rejected. These were no action, more restrictive management, and less restrictive management (8.2, 10.0). The management regime which is proposed centers on a continuing optimum yield concept based on the carapace length of the spiny lobster (5.3, 6.2, 6.3, 10.0). The 3.5-inch carapace length was adopted. Other lengths were considered and rejected (10.0).

Affected Environment

Commercial and recreational fishermen, consumers, non-consumptive recreationists and scientists are all impacted by the proposed action—as is the economy of Puerto Rico and the U.S. Virgin Islands (3.5, 3.6, 3.7). The impact is favorable as a higher yield can be expected on a continuing basis (6.2, 10.0). The biological condition of the stocks and the physical environment is expected to improve (3.2, 4.1, 4.5, 4.6). There is no evidence of interaction between the spiny lobster fishery in the Caribbean and endangered or threatened species or marine mammals. The plan will not affect endangered or threatened species or critical habitat (8.3).

Environmental Consequences

Long-term biological productivity will result from the proposed action, which in turn will promote economic efficiency in the fishery (8.3, 10.0). From available information, the proposed management measures will have no other significant environmental effects on living marine resources other than spiny lobsters. In addition to the social and economic benefits to be derived as a result of the proposed action, the multi-year character of the plan will result in substantial administrative savings by eliminating the need for costly plan amendments. Some energy conservation is likely to result as more efficient fishery methods evolve (6.3). The proposed action is consistent with Coastal Zone Management Programs of Puerto Rico and the U.S. Virgin Islands (8.3).

List and Qualifications of Preparers

Fernando Castillo, Economist, Caribbean Fishery Management Council
James Cato, Economist, University of Florida,
Thomas Costello, Biometrics Specialist, National Marine Fisheries Service
Alan Craig, Socio-biogeographer, Florida Atlantic University
Arthur Dammann, Chief Scientist, Caribbean Fishery Management Council
Gary Davis, Biologist, National Park Service
Donald Erdman, Associate Director, Commercial Fisheries Laboratory, Government of Puerto Rico
Albert Jones, Assistant Director for Fisheries Management, Southeast Fisheries Center, NMFS
Michael Justen, Economist, National Marine Fisheries Service
Paul Leach, Management Systems Specialist, National Marine Fisheries Service
Ignacio Morales, Economist, Caribbean Fishery Management Council
David Olsen, Director, Division of Fish and Wildlife, Government of the Virgin Islands
Fred Prochaska, Economist, University of Florida
Richard Raulerson, Economist, National Marine Fisheries Service
Miguel Rolon, Council Liaison, CODREMAR, Government of Puerto Rico
William Turner, Fisheries Administrator, National Marine Fisheries Service

List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent

Department of Commerce

Department of the Interior

- Bureau of Land Management
- U.S. Fish and Wildlife Service
- National Park Service

Department of State

Department of Transportation

- U.S. Coast Guard

Department of Energy

Environmental Protection Agency

- Region II - New York
- Region IV - Atlanta
- Region VI - Dallas

U.S. Army Corps of Engineers

Puerto Rico and U.S. Virgin Islands Government Agencies

All Fishery Management Councils

Southeastern Fisheries Association

National Fisheries Institute

Sea Grant Advisory Services
Puerto Rico

Puerto Rico and U.S. Virgin Islands Coastal Zone Agencies

Various Spiny Lobster User Groups in Puerto Rico and U.S. Virgin Islands

Virgin Islands Public Libraries

Draft Statement to EPA: (May 23, 1980)

Final Statement to EPA: _____

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PREFACE

This combined Environmental Impact Statement-Fishery Management Plan and Regulatory Impact Review has been prepared in both English and Spanish versions for wide distribution in Puerto Rico and the U.S. Virgin Islands.

A source document which contains Figures, Tables and References with more extensive discussions of various sections is available for inspection in unedited English form at the following locations:*

Caribbean Fishery Management Council Offices:
1108 Banco de Ponce Bldg., Hato Rey, P.R.
206 Federal Building, St. Thomas, V.I.
Marine Resources Development Corporation, Corps of Engineers Bldg.,
400 Fernandez Juncos Ave., Puerta de Tierra, P.R.
Puerto Rico Marine Resources Development Corporation,
Commercial Fisheries Laboratory, Cabo Rojo, P. R.
Proyecto Desarrollo Pesquero de Culebra, Villa Pesquera, Culebra, P.R.
Proyecto Desarrollo Pesquero de Vieques, Barrio Esperanza, Vieques, P.R.
Proyecto Desarrollo Pesquero de Guayama, Sector Pozuelo, Guayama, P.R.
Proyecto Desarrollo Pesquero de Arecibo, Barrio Jarealito, Arecibo, P.R.

Department of Conservation and Cultural Affairs, Government of the V.I.

(1) Division of Fish and Wildlife, Red Hook, St. Thomas
(2) Room 203 Lagoon Street Government Bldg. Frederickstead, St. Croix
(3) Watergut Project Government Building, Christiansted, St. Croix
(4) Public Libraries on all three Islands

V.I. Government Administrators Office, St. John

National Marine Fisheries Service, Office of Resource Conservation and Management, Page Bldg. No. 2, 3300 Whitehaven St., NW, Washington, D. C. 20235

National Marine Fisheries Service, Southeast Regional Office,
9450 Koger Blvd., St. Petersburg, FL 33702

*The costs of translating, printing, and mailing have dictated this approach as have the policies of the Council on Environmental Quality and the U.S. Department of Commerce in attempting to make such documents shorter and more readable by the general public.

1.0 SUMMARY

This plan was developed by the Caribbean Fishery Management Council to establish a management system for the spiny lobster resource within the fishery conservation zone (FCZ) and the territorial seas of the Commonwealth of Puerto Rico and the Territory of the U.S. Virgin Islands. Although three species of spiny lobsters occur in the management area, landings of only the Caribbean spiny lobster (Panulirus argus) are of significance and the management system described is restricted to that species.

Spiny lobsters are an important resource and in 1979 comprised about 8% (797,856 pounds) of the total estimated landings from the inshore fishery (includes all landings except those from the distant water tuna fishery) of these islands. Data indicate an average annual increase in lobster landings of approximately 78,000 pounds in the last 4 years. There were 1,723 licensed fishermen in Puerto Rico and the Virgin Islands in 1979 and the ex-vessel value of their lobster catch was reported as $1,947,940. All of the lobsters are marketed locally; however, supply does not meet the demand and the market relies heavily upon imports.

Although the resource is presently in a reasonably healthy biological condition, the unregulated harvest of small lobsters is leading to overfishing and reductions in catch in some areas. This, coupled with the limited statistical data base necessary for refining management techniques, are the two foremost problems and exist in both the recreational and commercial sectors of the fishery. Other unquantified problems are the loss of immature and adult lobsters in "ghost" traps, the losses incurred by certain other gear and the lack of information on the derivation or origin of recruitment into the stocks.

To address these problems, the Council identified the following management objectives:

1. Provide for biological conditions consistent with the ability to achieve a maximum sustainable yield (MSY);

2. Promote economic efficiency of the commercial fishery;

3. Provide for the social and cultural needs of Puerto Rico and U.S. Virgin Islands citizens;

4. Provide biologic, economic, and social data bases for future management of the resource; and

5. Reduce the loss of the resource which is associated with "ghost" or "drowned" or "lost" traps due to ship traffic, pilfering, thievery, displacement by currents, and other reasons.

Regulations are recommended to restrict harvest by size and sex, establish gear limitations and restrictions, and collect appropriate data. In addition, recommendations are made to the National Park Service to establish a spiny

lobster sanctuary in St. John, U.S. Virgin Islands. These regulations are responsive to the problems identified in the fishery and to the management objectives of the plan.

This is a multi-year plan and certain modifications will be effected through the regulatory amendment process (Sec. 10.3). Criteria for making such modifications are identified in Section 8.2.

Based upon the best scientific information available, the following parameters have been determined for the spiny lobster resource:

Optimum yield (OY) from the fishery has been established as all the "non-berried" lobsters having a carapace length (CL) of 3.5 inches or greater that can be harvested on an annual basis. This amount is presently estimated to range from 582,000 pounds to 830,000 pounds annually. This level of harvest was established as optimum from a biologic, social, and economic standpoint, and will provide the greatest overall benefit to the nation. The U.S. domestic fishery is expected to harvest this entire amount and there is no surplus available for foreign fishing.

2.0 INTRODUCTION AND STATEMENT OR PROBLEMS AND OBJECTIVES

1) Biological and Economic Overfishing

Although spiny lobsters provide the basis of a valuable fishery, biological and economic overfishing exists in some areas around the islands, especially with recent increases in effort and landings; the 1979 landings are the largest on record. However, a severe hurricane season can change this annual picture abruptly. In Puerto Rico the average size of lobsters has declined from 4.0 inches CL in 1957 to 3.68 inches CL in 1979. During this same period, the percentage of lobsters landed having a CL less than 3.5 inches has increased from 19.6 to 40.6. Analysis of these trends shows that the fishermen are catching smaller lobsters in order to sustain recent harvest levels. Catching smaller lobsters results in lower harvest levels. Biological and economic overfishing have caused economic hardships on resource users in other areas as well as biological problems with lobster populations. Biological overfishing occurs when harvesters decrease the spawning stock size to a level where there is sustained reduction in the amount of young fish produced. Economic overfishing occurs when the net economic yield from the fishery is equal to, or less than, zero.

2) Biological, Economic, and Sociological Data Bases

More extensive biological, economic, and sociological data bases are needed to effectively manage the resource. Present data provide only a basis for making preliminary fishery decisions. For example, many landings are not reported.

3) Management Measures and Objectives

Historically, lobsters have been taken incidentally in fish traps and to a smaller extent by free-diving fishermen. In recent years, larger boats, fishing pots specifically designed to catch lobsters, and the use of SCUBA gear by divers have increased. The Governments of the Virgin Islands and Puerto Rico have different management systems that when considered collectively do not solve the problems. Many small and non-reproductive lobsters are being harvested while others are being taken by methods and gear that are detrimental to the population and its habitat (i.e., lost traps and spears). Primary objectives and specific management objectives designed to resolve these problems are described below and in Section 8.

2.1 Objectives for the Management Plan

The primary objective of the plan is to provide a mechanism for attaining OY within the fishery which takes place in the management area. The Magnuson Fishery Conservation and Management Act (MFCMA) sets seven national standards. The national standards with which the plan complies are enumerated below. Specific management objectives are enumerated in Section 8.0 of the plan.

2.1.1. "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery." The plan specifies an OY that is consistent with the MSY. It provides for sanctuaries and acknowledges areas difficult to harvest to their full biological potential. These actions along with other regulatory methods are designed to correct biological overfishing and to maintain an "ecological reserve."

2.1.2. "Conservation and management measures shall be based on the best scientific information available." The plan preparers used all relevant published data and a great deal of unpublished material from local and regional sources.

2.1.3. "To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination." Conclusive data regarding the genetic exchanges between various geographic areas within the range of Panulirus argus are not available. Probable sources of recruitment, coupled with physical and environmental barriers within the geographic range were carefully considered in arriving at the treatment of the stock as set forth in the plan. Establishment of an international coalition will eventually be necessary to effectively manage this migratory species throughout its range.

2.1.4. "Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such

privileges." While the Council recognizes the fact that the local artisanal fisherman can rapidly be displaced by an influx of more sophisticated boats, gears, and fishing methods from other regions, no action has been taken in this plan to allocate such resources among U.S. fishermen. However, as the Council monitors the plan and the development of the fishery it will be prepared to recommend needed adjustments to the Secretary as significant differences from the status quo evolve.

2.1.5. "Conservation and management measures shall, where practicable, promote efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose." None of the management measures make any allocation—economic or otherwise. Moreover restrictions of any kind are deemed to be minimal for the conservation of the resource. They specifically allow for the retention of certain gear and practices that are believed to increase efficiency in harvest.

2.1.6. "Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches." There are virtually no seasonal aspects to the present fishery from the standpoint of effort and/or gear. At present much of the effort is inextricably woven into harvesting shallow-water reef fish. The very nature of the tropical reef environment precludes large biological fluctuations (except for those caused by hurricanes) and the longevity of the resource mitigates against severe annual or seasonal fluctuations except for those caused by hurricanes. The plan recognizes that effort is changing and provides for the establishment of a monitoring system. The plan addresses the question and problem of providing a common management program for the entire area of the Puerto Rican and St. Croix geological platforms. These shelf areas include not only the Commonwealth of Puerto Rico and the Territory of the Virgin Islands but also the entire chain of the British Virgin Islands. The lobster population recognizes none of these political entities nor the limits of territorial seas.

2.1.7. "Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication." The plan has utilized existing federal and local mechanisms for permitting, data acquisition, enforcement, and establishment of sanctuaries, rather than attempt to establish new systems with their concurrent extra costs.

2.2 Operational Definitions of Terms Used: Terms used in this plan for population analysis are described by Ricker (1975).

Maximum sustainable yield (MSY). The MSY from a fishery is the largest average annual catch or yield in terms of weight of fish caught by both commercial and recreational fishermen that can be taken continuously from a stock under existing environmental conditions (50 CFR 602.2(b)(2)).

Domestic annual fishing capacity (DAC). This is the total potential physical capacity of the U.S. fleets, modified by logistic factors. The components of the concept include (a) an inventory of total potential physical capacity, defined in terms of appropriate vessel and gear characteristics (e.g., size,

horsepower, hold capacity and gear design) and (b) logistic factors determining total annual fishing capacity (e.g., variations in vessel and gear performance, trip length between fishing locations and landing points, and weather constraints).

Expected domestic annual harvest (DAH). The domestic annual fishing capacity as modified by factors that determine estimates of what the fleets will harvest (e.g., how fishermen will respond to price changes in the subject species and other species) constitutes DAH.

Optimum yield (OY). OY is the annual level of harvest by commercial and recreational users. OY may be obtained by a plus or minus deviation from MSY for purposes of promoting economic, social, or ecological objectives, where they primarily relate to biological purposes and factors included in the determination of MSY. Where ecological objectives relate to resolving conflicts and accommodating competing users and values, they are included as appropriate with economic and/or social objectives. OY may be set higher than MSY in order to produce a higher yield from other more desirable species in a multispecies fishery or smaller individuals in a single species fishery. It might be set lower than MSY in order to provide larger-sized individuals or a higher average catch per unit effort.

The MFCMA defines "optimum" with respect to the yield from a fishery as the amount of fish "(a) which will provide the greatest overall benefit to the nation, with particular reference to food production and recreational opportunities, and (b) which is prescribed as such on the basis of the maximum sustainable yield from such fishery, as modified by any relevant economic, social, or ecological factor."

Total allowable level of foreign fishing (TALFF). OY minus DAH establishes the surplus available for foreign fishing.

Domestic annual processing capacity (DAPC). The capacity and extent to which U.S. fish processors, on an annual basis, will process that portion of such OY that will be harvested by fishing vessels of the United States (16 U.S.C. 1853).

Biomass. The amount of organisms present in a particular habitat expressed as weight. It may be used to include all living material or, as in this plan, be restricted to a single species.

3.0 DESCRIPTION OF FISHERY

3.1 Areas and Stocks. The plan addresses only the species Panulirus argus where it is limited to the geological shelves of Puerto Rico and the Virgin Islands essentially inside the 100-fathom isobath (Fig. 1). The entire shelf area within U.S. waters contains 2,115 square nautical miles. Of this, 800 sq. nautical miles or 37.8% are in the FCZ and 1,315 or 62.2% are within three miles of the shoreline of Puerto Rico and the Virgin Islands. The total length of the 100-fathom contour inside U.S. waters is 500 nautical miles. Of this, 225 nautical miles or 45% are within three miles of the shoreline and 275 (55%) are

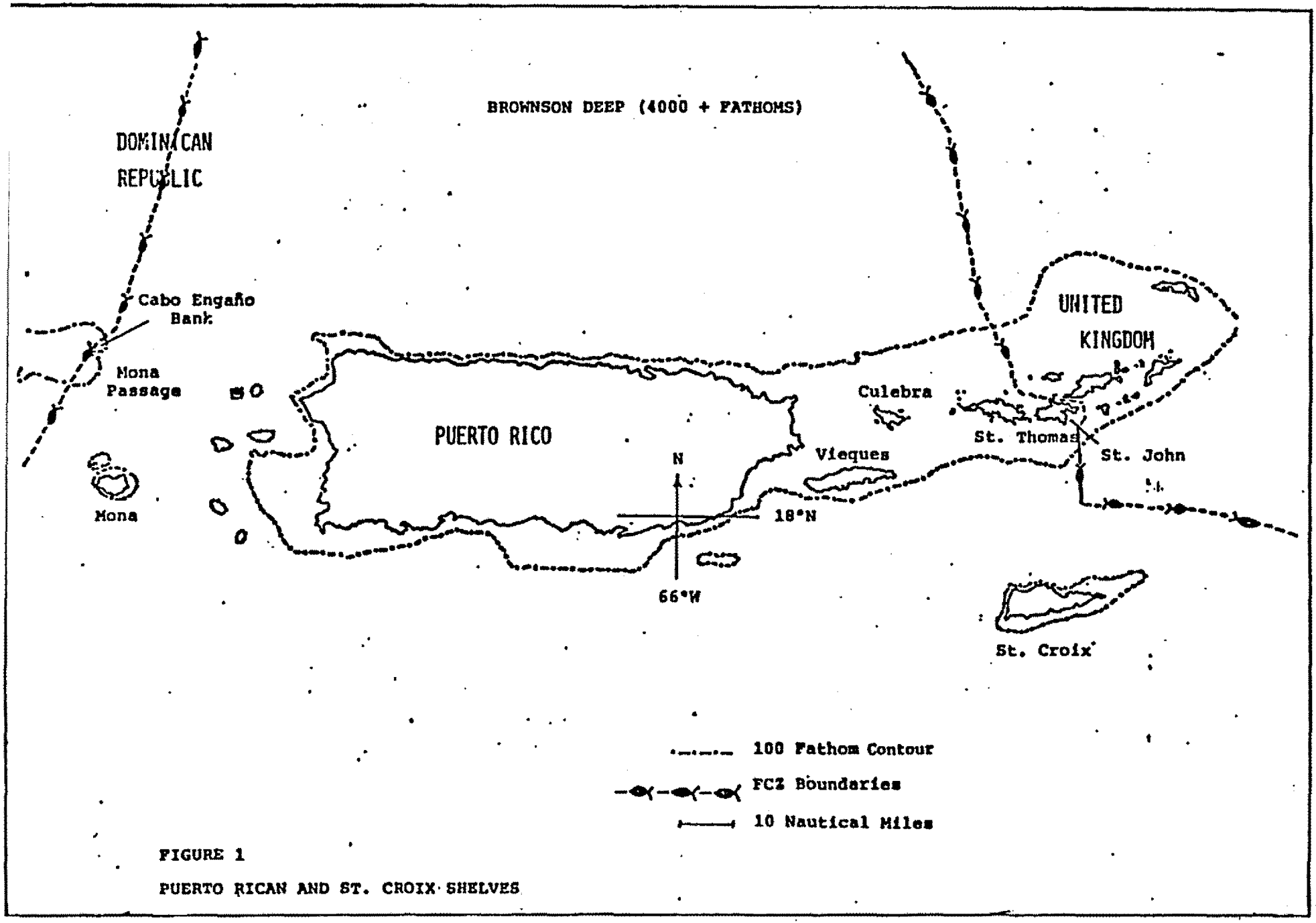

FIGURE 1

PUERTO RICAN AND ST. CROIX SHELVES

within the FCZ. For management purposes three biological assessment areas were considered; (1) Puerto Rico, (2) St. Thomas - St. John, and (3) St. Croix. See 3.3.1, 4.1.1, and Figure 1.

3.2 History of Exploitation

3.2.1. Domestic fishery. This started with the aboriginal Indians and continued at a low level through the colonial period. High market demand during and since World War II has resulted in increased effort and escalating prices. Local catch falls short of local consumption.

3.2.1.1. Description of user groups. The largest user group is the consumer. This includes the local residents of Puerto Rico (3,338,000) and the Virgin Islands (125,000), as well as the increasing number of tourists (Puerto Rico, 1,661,900; Virgin Islands, 1,204,373 in 1979). Other users are commercial fishermen, recreational fishermen, and non-consumptive users, such as observers, photographers, and scientists. Artisanal commercial fishermen are probably low on the economic scale while owners of large commercial and recreational boats are at the higher end (Sec. 3.5).

3.2.1.2 General description of fishery effort. Puerto Rican fisheries have two distinct elements; the local inshore fishery and the distant water tuna fishery. The Virgin Islands fishery is composed of only an inshore element. The boats, gear, and methods are similar in the two inshore fisheries and are predominantly artisanal. Lobsters are generally an incidental catch in the fish pot fishery. Increasing catches are taken by divers and by fishermen with larger boats using lobster pots. Traps are fished adjacent to reefs and have little detrimental effect on corals or other reef habitat.

3.2.1.3 Catch trends. An upward trend in lobster landings has been apparent in recent years. (V.I. 31,100 lbs (1975-1979) and P.R. 33,000 lbs (1971-1979) (rounded number) average annual increase). These estimates include extrapolations from fisherman reports.

Puerto Rico. The 1971 total of all inshore landings was 5,335,000 lbs. Of this total 354,750 lbs were lobster. By 1979 the total landings were 8,718,000 lbs from the inshore fishery. Of this, 618,901 lbs were lobster.

Virgin Islands. In 1975, 1,221,000 lbs were landed from the inshore fishery and 54,560 lbs were lobster. By 1979 the total landings were 1,396,000 lbs, and 178,956 lbs were lobsters. The Virgin Islands began compiling statistics in 1974 and the rate of increase in landings was reported for the first four years of those data.

3.2.1.4 Description of vessels and gears employed. Most of the approximately 2,000 boats in the fishery are small (less than 26 ft.) open and outboard powered. The older style wooden, planked, wineglass-sterned island designs are being replaced by plywood and fiberglass, while sails, oars, and small horsepower engines are giving way to larger engines. There are a very few larger inboard powered boats which fish farther offshore, but the fishery

remains predominantly small boat and artisanal. The most common gear is the "fish pot" (approximately 13,000 units) with the West Indian "arrowhead" or "chevron" being preferred. Some slat-type lobster pots are in evidence and some fish pots are now made of welded iron rather than wooden sticks. There is an unreported recreational- commercial catch by divers who use spears and gaffs (hooks) in Puerto Rico but such gear is unlawful for taking lobsters in the Virgin Islands where hand held snares are used. SCUBA gear is replacing free-diving methods.

3.2.2 Foreign Fishery - Essentially none. A few (only 1 boat was licensed in 1978) small boats from the British Virgin Islands do limited fishing in the FCZ. The boats and gear are similar to those in the U.S. Virgin Islands. Some boats from the Dominican Republic have occasionally fished around Mona Island, mostly for finfish. (See Sec. 3.3.2.)

3.3 History of Management

3.3.1 Management institutions, policies, jurisdictions in the territorial sea. Historically both the Commonwealth and the Territorial Governments have managed their fisheries without regard to the limits of territorial seas. Sixty- four percent of the Puerto Rican shelf area and 57% of the Virgin Islands shelf is inside three miles. Representatives of both Governments have indicated that management in the territorial seas will be compatible with that in the FCZ. In Puerto Rico 30% of landings by weight and number of individual lobsters are estimated to come from within 3 miles. Similar information is not available for the Virgin Islands since local legislation has previously claimed fishery jurisdiction out to 12 miles which would encompass virtually all of the lobster catch. None of the boats in either area, however, have navigational devices capable of determining position and distance from shore. (See Sections 3.1, 4.1.1, and Fig. 1).

Puerto Rico. The Fisheries Act of 1936 prohibits the harvest of egg-bearing females, requires traps to have a self-destruct panel, and prohibits explosives. Each person engaged in commercial fishing and each fishing craft with gear must be registered with the Secretary of Natural Resources. All motorboats are registered beginning July 1 of each year with the Port Authority. Voluntary landing statistics have been collected by the Department of Agriculture. In 1978 legislation transferred this function to the Marine Resources Development Corporation, a branch of the Department of Natural Resources.

Virgin Islands. Act 3330 (1972) protects egg-bearing females, sets a minimum CL of 3 inches (see Fig. 2) a minimum tail length of more than 5 1/2 inches, prohibits spearing, hooks, chemicals, and explosives, prohibits wringing tails at sea, requires a self-destruct panel, and a trap mesh of at least 1 1/4 inches. Commercial fishermen are licensed and all motorboats are registered before July 1 of each year. All gear and buoys must be numbered and color coded. Catch and landings statistics are mandatory. Jurisdiction is under the Department of Conservation and Cultural Affairs.

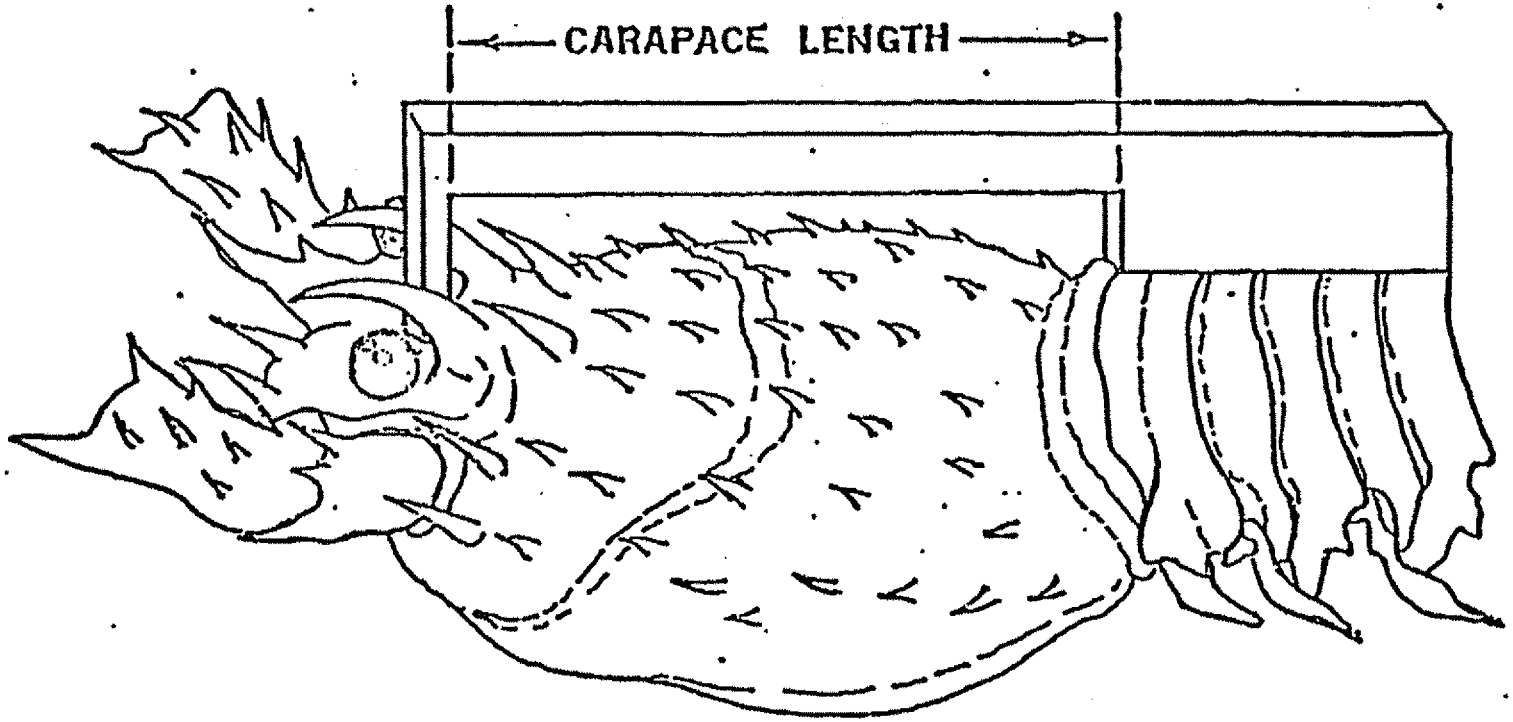

FIGURE 2

METHOD OF MEASURING CARAPACE LENGTH

The U.S. National Park Service controls the waters of the Virgin Islands National Park and Buck Island National Monument. Gear and bag limit restrictions are in effect with new regulations under review. Regular marine patrols are maintained.

3.3.2 Management of foreign fisheries. In June 1977 a reciprocal fishery agreement was signed between the Government of the United States and the Government of the United Kingdom and Northern Ireland that permits existing and historical patterns and level of fishing to continue. Negotiations are underway with the Dominican Republic for a similar arrangement for the Cabo Engaño Bank where the boundary of the FCZ is in question.

3.3.3 Effectiveness of management measures. Puerto Rico has had essentially no enforcement of its measures until very recently but has an effective statistical program. An enforcement staff consisting of over 300 rangers now exists.

Virgin Islands has the mechanism for effective management (an enforcement staff) but the statistical program needs augmentation. The enforcement staff presently consists of about 15 conservation officers but others are being added.

3.4. History of Research. About 1200 technical reports, scientific papers and popular articles concerning spiny lobsters in the Caribbean have been produced in the last 80 years. An extensive bibliography has been published. Most fishery-related research has taken place in the last 20 years. Important questions about larval dispersal, population genetics and fishery recruitment remain unanswered. Complete management is hampered by the lack of this information and by the international, pan-Caribbean nature of the species.

3.5 Socio-Economic Characteristics (3.5.1.1 thru 3.5.6.3)

3.5.1 Output of domestic fishery

3.5.1.1 Value of catch (ex-vessel) Total spiny lobster landings in 1979 had a value of $1,949,379.

Puerto Rico. The 1979 value was $1,516,308.

Virgin Islands. The 1979 value was $433,071.

3.5.1.2 Description and value of wholesale product.

Puerto Rico fishermen often sell directly to consumers but presently there are about 20 private dealers and 17 marketing associations. Estimated ex-vessel prices were 1972-$1.23, 1974-$1.56, 1975-$1.65, and 1979-$2.45 per pound. Supermarket prices (1978) in frozen condition were, whole $5.00 per lb., tails $8.00 per lb. Estimated 1977 values were — dockside $825,000, and retail $1,075,619.

Virgin Islands fishermen traditionally sell directly to the consumer. There are presently only about 6 middlemen in the fishing industry. No published data are available. The fisheries cooperatives of both St. Thomas and St. Croix are inactive. The 1979 price was $2.42 per lb. for whole lobsters.

3.5.1.3 Domestic and export markets. While lobsters are sometimes sold in each direction between Puerto Rico and the Virgin Islands, the local demand is so great, and prices are so high, that there is no export from the region.

Puerto Rico. Total consumption of lobster in 1979 was 1,141,000 lbs. Domestic production accounted for about 619,000 lbs. or 54.2% of the total and was valued at $1,516,308. Imports accounted for the remaining 48.8% of the total.

Virgins Islands. The 1968 total consumption was 181,199 lbs., of which domestic production accounted for 52.1%. Foreign imports accounted for the 47.9% or 86,109 lbs. worth $209,275. In 1979, total domestic consumption was 226,000 lbs. of which domestic production accounted for 79.2%. The remaining 20.8% was imported and valued at $205,455.

3.5.2 Domestic-commercial fleet characteristics

3.5.2.1 Total and average annual gross income of fleet.

Puerto Rico. The total gross income to commercial fishermen from lobsters in 1976 was $729,000 or 24.3% of total gross fisheries income. Total gross income from lobster sales increased to $1,378,461 in 1979. Gross income from lobster landings per boat was $455 or $322 per fisherman in 1974. It increased to $1,285 per boat or $956 per fisherman in 1979. Lobster catches accounted for 31% of gross income of fishermen in 1974 and 53% in 1979. In 1979, 13% of the pot catch in lbs. was lobster.

Virgin Islands. In fiscal year 1978-79 total gross income from lobster was $393,315. Average income from lobster per boat (1979) was $2,658 or $1,400 per licensed fisherman.

3.5.2.2 Investments in vessels and gear.

Whether boats and gear (fish traps) catch finfish or lobsters, the investment is the same. Since very few boats or fishermen allocate their time by species, and are not cross-classified in that way, there is no method of prorating the investment by species.

Puerto Rico. The total investment in the pot fishery was estimated to be $2,888,932 in 1975.

Virgin Islands. The total investment in the pot fishery was estimated to be $2,774,795 in 1975.

3.5.2.3 Annual participation in fishery.

Puerto Rico. The estimated number of boat days was 48,300 and the number of fisherman/days was 96,600 in 1975.

Virgin Islands. The estimated boat-man/days was 49,848 in 1975.

3.5.2.4 Total manpower employed.

Puerto Rico had 1,442 commercial fishermen in 1979.

Virgin Islands had 509 licensed fishermen in 1976 with about 500 licensed helpers, and 846 licensed fishermen in 1977. The number of licensed fishermen dropped to 281 in 1979. There is one helper per licensed fisherman on the average.

3.5.3 Domestic annual processing. Processing is not a regular or normal aspect of the fishery nor is any anticipated. Almost all lobsters are sold alive directly to the user by the fisherman. A few are sold to retailers who in turn sell them alive.

3.5.3.1 Total and average gross income of area processors.

Almost no lobsters are processed except by the restaurant or the consumer in both Puerto Rico and the Virgin Islands.

3.5.3.2 Investment in processing plants and equipment. There are no plants or equipment involved in processing lobsters.

3.5.4 Recreational fishery characteristics. Actual data from landings and effort are not recorded. The catch statistics published in Puerto Rico utilize a figure of 10% for the recreational catch. A study in the Virgin Islands (1978) indicates that the recreational landings fall within the range of 9,500 to 82,000 lbs. (6%-52% of commercial landings). Until more refined statistics are available the plan uses the figure of 10% and recognizes the need for monitoring and better data gathering.

3.5.5 Subsistence fishing characteristics. No true subsistence fishing can be identified.

3.5.6 Area community characteristics.

3.5.6.1 Total population (by relevant demographic characteristics) Official 1980 census figures have not been released.

Puerto Rico. The total population is now 3,338,000 with more than half being urban. The median age is 21.6 years, 98.1% native born with 52,792 foreign born and 43,140 of foreign parents, 106,602 born in the continental United States. The median school years completed are 6.9 but 63,329 are enrolled in higher education. Families with incomes below the poverty level are estimated to number 336,662.

Virgin Islands. The total population is now about 125,000, mostly black and rural. Nearly 50% are less than 21 years old (median age 23). In 1970 there

were 41,140 out of 64,460 who were native born. Many residents are from the British West Indies. Median school years completed are 9.5 with about 600 in college and 34.6% of all persons between 18-24 have completed high school. The mean family income is $9,062, the highest in the Caribbean.

.3.5.6.2 Total employment.

Puerto Rico employed 807,000 persons in 1979.

Virgin Islands employed 40,000 persons in 1979.

3.5.6.3 Total work force.

Puerto Rico had 978,000 persons in 1979.

Virgin Islands had 41,440 persons in 1979.

3.6 Interaction Between and Among User Groups. The impact of any foreign fishery is minimal (See Sections 3.2.2, 3.3.2, and 5.1.2). To date there has been little serious conflict between commercial and recreational lobster fishermen. As more diving occurs this situation may change because some trap fishermen allege that divers open their traps and some non-consumptive users advocate that all harvest be disallowed. On St. Thomas a marine sanctuary is being proposed by the local government to help alleviate a potential problem of this sort in a heavily used area. Non-consumptive and recreational users generally support closure of National Park Service waters while many commercial fishermen want them open.

3.7 Federal and State Revenues Derived From Fishery

Puerto Rico. The money received for motorboat registration, fishing craft registration, fines or other penalties are credited to the Port Authority and the Department of Natural Resources. No totals are available.

Virgin Islands. The money received from motorboat registrations, fishing and hunting licenses, fines and penalties, are deposited in the Fish and Game Fund. The FY 1976 total was $40,000 and in FY 1978 this had fallen to $32,103 because the $5.00 fee for fishing licenses was set aside by the legislature as an aid to fishermen. Licenses are required but free of charge.

4.0 BIOLOGICAL DESCRIPTORS

4.1 Life History Features

4.1.1 Distribution. Adult lobsters are found on coral reefs and rocky substrate from Brazil through the Caribbean and Gulf of Mexico to North Carolina, with an isolated population in Bermuda. Vertical distribution ranges from just below the surface to at least 275 fathoms (1650 feet). Mean standing crops of around 50 lbs. per acre of reef habitat are recorded. In Puerto Rico and the Virgin Islands they are found from the shoreline to the edge of the

shelf. The shelf edge is described as the 100-fathom contour. The sea floor drops precipitously to great depths at this point and there are no data regarding the distribution of lobsters at or below the edge. (See Sections 3.1 and 3.3.1 and Figure 1).

4.1.2 Movement. Three kinds of movement are known (1) migration, (2) nomadism, and (3) homing. During its life cycle stages of (1) larval, (2) post-larval, (3) juvenile, and (4) adult, all three kinds of movement take place. Larvae are pelagic for several months, postlarvae settle out in sponges, under sea urchins, algal mats, rock crevices, etc., and move to grass flats, and mangrove roots as juveniles. The young adults (3 years) move back to the reef. The adults move both alongshore and directly offshore, perhaps seasonally. The need to determine the degree to which pelagic larvae from other areas of the Caribbean contribute to the adult populations in the Virgin Islands and Puerto Rico, as opposed to local recruitment, is recognized as a research need.

4.1.3 Reproduction. The male deposits sperm packets (tar spots) on the underside of the female. She scratches these to release sperm as the eggs are extruded. The fertilized eggs stick to the swimmerets beneath her tail (she is now referred to as "berried") and hatch in about four weeks. Reproduction is year-round but declines in the fall. Most females reach sexual maturity between 80-90 mm. (3.1 inches-3.5 inches) CL, are at peak egg production between 110 mm-125 mm (4.3 inches-5 inches) CL, and produce fewer eggs when larger. Number of eggs ranges from 0.5 million to 1.7 million per spawning. More than one spawning per year has been recorded. There are extended planktonic larval stages. The reproduction of local females coupled with larval transport appears sufficient to support the fishery, at least at its present level.

4.1.4 Food and Feeding. Lobsters are opportunistic predators on mostly sedentary animals such as mollusks, crustaceans, echinoderms, coelenterates, annelids, and sponges.

4.1.5 Growth takes place by shedding the exoskeleton. The most rapid growth occurs up to the critical size of 3.5 inches CL. The rate then slows, partly because of the additional energy requirements of reproductive activities. This forms part of the rationale for a minimum CL of 3.5 inches (Fig. 2) since the growth rate by weight more than doubles when the CL increases from 2.6 inches to 3.5 inches. See Table 5.

4.1.6 Mortality.

The planktonic larvae are eaten by fish. Juveniles and adult spiny lobsters are preyed upon by a variety of fish and invertebrates including groupers, snappers, sharks, skates, turtles, and octopus. They are also subject to disease and injury. The summation of these factors equals natural mortality. Annual natural mortality in the Virgin Islands, in Jamaica, and by inference in Puerto Rico in areas moderately fished is about 40%. Fishing mortality is mortality caused by harvest of the lobster population. Total mortality is the sum of natural mortality and fishing mortality. In some moderately fished areas the total mortality may drop below the natural mortality of an unfished area because

the populations are density dependent. That is, in an unfished area when a virgin stock reaches a high density, predation ordinarily increases and the competition for food is maximized. These factors both increase natural mortality and may place it above total mortality in some moderately fished areas.

4.2 Stock Units. The question of whether or not biologically distinct stocks of Panulirus argus may be identified is not resolved. For purposes of this plan three biological assessment areas (distinguished by their user groups and geography) were assumed; (1) Puerto Rico, (2) St. Thomas - St. John, and (3) St. Croix. A single OY is established. There is nominally one species and the source(s) of recruitment are not verified.

4.3 Catch Effort Data.

Puerto Rico landings data indicate no decline in catch per unit of effort (CPUE).

Virgin Islands landings data indicate an increasing CPUE.

4.4 Other (Habitat)

Puerto Rico. It is estimated that 21.3% of the total Puerto Rican shelf area is lobster habitat (328 sq. mi.) (Sec. 4.5.1).

Virgin Islands. The St. Thomas - St. John shelf has 10% habitat (47.5 sq. mi.), while the St. Croix shelf has 25% (25 sq. mi) (Sec. 4.5.1).

4.5 Current Status of the Stock

4.5.1 Maximum sustainable yield

As stated in previous sections, postlarval spiny lobsters in the management area seem limited to the geological shelves of Puerto Rico and the Virgin Islands essentially inside the 100-fathom isobath. The geographic origin of the stock is in doubt. The larval stages are pelagic and live in the water column for some period of time prior to settling to the bottom. Adult spiny lobster may sometimes migrate considerable distances. Regardless, the spiny lobster populations of the area concerned are relatively stable and can be treated as a unit for management purposes (Sec. 3.1 and 4.2). Because of the similarities of the lobsters endemic to the three areas — (1) Puerto Rico, (2) St. Thomas/St. John and (3) St. Croix — MSY was estimated for each of the areas and then summed to provide an estimate for the entire management area.

MSY and, subsequently OY, DAP, DAH, and TALFF levels are established for the entire management area. Greatest growth, as a measure of optimum economic yield, occurs between 1.6 and 3.5 inches CL. Sexual maturity is achieved by most females between a CL of 3.0 inches and a CL of 3.5 inches (see Sec. 4.1.3). Maximum egg production occurs between CL's of 4.3 inches and 5.0 inches.

Currently the Virgin Islands regulates on the basis of a minimum CL of 3.0 inches, while Puerto Rico does not have a CL requirement. To take advantage of the period of most rapid growth and achieve sustained biological reproduction, a minimum CL of 3.5 inches should be established for the entire shelf area (Secs. 4.1.3 and 4.1.5).

The MSY was estimated by using the virgin stock biomass method described by Gulland which calculates that the MSY of an unexploited stock is taken when that stock is fished to approximately one-half the total stock. (Adequate data for other methods of calculation do not yet exist in this fishery.)

To estimate the virgin stock biomass, shelf areas around Puerto Rico and the U.S. Virgin Islands were divided into 15 zones. Estimates of the probable effective habitat in each zone were made based on geologic, photographic, bathymetric, and ecologic information. Virgin biomass for each zone was estimated from observed lobster densities and effective habitat areas in the Virgin Islands. From this baseline information, the virgin biomass for each of the three larger areas, Puerto Rico, St. Thomas-St. John, and St. Croix was calculated. All of this shelf area with suitable habitat is not easily fishable because of sea conditions, currents, depth, bottom topography, and distance from port as these relate to the boats and gear presently in use.

The estimates of MSY for each area were then calculated by multiplying one half the virgin stock biomass by an appropriate estimate of fishing mortality (.5 instantaneous rate, .39 annual rate). The resulting estimates are given below:

Area	MSY estimate (live weight)
Puerto Rico	610,000 lbs/yr
St. Thomas - St. John	116,900 lbs/yr
St. Croix	102,400 lbs/yr
Total Management Area	829,300 lbs/yr

The above total is rounded to 830,000 lbs/yr which is the estimated MSY.

4.6 Estimate of Future Stock Conditions

Indicators such as the average size of the lobsters (V.I., 4.5 inches CL or 114.3 mm; P.R., 3.68 inches CL or 91.7 mm), the size distribution in the catch, and the CPUE suggest that these stocks (except in limited geographic areas) are in a reasonable healthy state. Nevertheless, in Puerto Rico, the average size of lobsters has declined from 4.0 inches CL in 1957 to 3.68 inches CL in 1979. Also, the percentage of lobsters by number in Puerto Rican landings with a CL of 3.5 inches and below has increased from 19.6 in 1957 to 40.6 in 1979.

Under current management practices this trend is expected to continue and will soon result in stock depletion (Sec. 5.3). In the Virgin Islands where a 3-inch minimum CL regulation is in place, the average size is larger and still increasing (See table 2).

Adoption of the proposed 3.5-inch CL minimum size limit will insure that each lobster can reproduce at least once before being harvested. This should restore the healthy condition of the stock.

5.0 CATCH AND CAPACITY DESCRIPTORS

5.1 Data and Analytical Approaches

The definitions of OY, MSY, DAH, etc., were noted in Section 2.2. The following procedures are used in calculating OY and TALFF.

OY

OY is MSY as modified upwards or downwards for promoting economic, social, or ecological objectives.

TALFF

The portion of the OY which, on an annual basis, will not be harvested by U.S. fishermen and can be made available to foreign fishermen. The TALFF is calculated by subtracting DAH from OY.

5.1.2 Foreign

Under the terms of the reciprocal agreement (Sec. 3.3.2) only one boat from the British Virgin Islands was licensed in 1978 and it is believed that there are no boats from the Dominican Republic which fish for lobsters in the FCZ except perhaps on the outer tip of Cabo Engaño. The United States asserts jurisdiction over the outer tip of Cabo Engaño at the present time. TALFF is addressed in Sec. 7.0.

5.2 Domestic Annual Capacity

The maximum catch capacity was calculated to be 1,274,208 lbs, using a value of 1.2 lbs of lobsters per trap lift, average number of trap lifts per year (80) and lotal number of traps employed (13,273). The CPUE value has been demonstrated for lobster pots and the other values are within existing levels of effort and gear.

The figure of 1.27 million lbs is a minimum estimate and this is larger than the estimate of MSY (see Fig. 3).

5.3 Expected Domestic Annual Harvest

Based upon information contained in Table 2, the percentage of small lobsters in the Puerto Rico landings has increased at an average annual rate of 2% over the past decade under the existing management system (no minimum carapace length). Because of the rapid change in gear and technology since 1975, it is conservatively estimated that this rate has increased to 5%. The Council is presently conducting a long-term survey to obtain more complete information on size-frequency and other bio-economic factors.

The seemingly insatiable demand for lobsters and the accompanying high prices have stimulated the influx of more selective gear (lobster pots) into a fishery that has previously used only fish traps. This innovation has also resulted in larger boats that fish longer strings of lobsters pots. These larger boats are

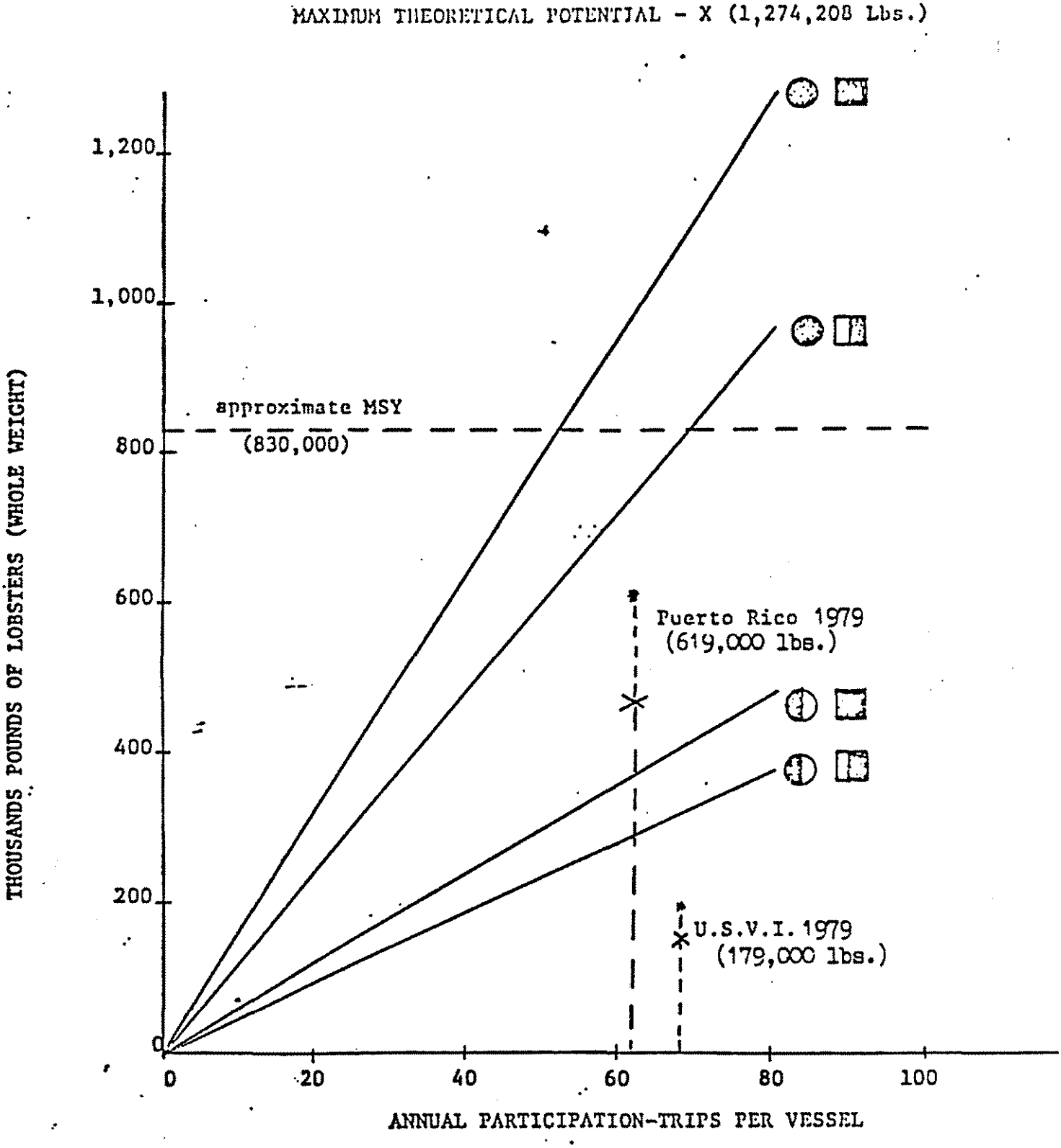

FIGURE 3 CATCH CAPACITY OF FISHING FLEETS USING

$Cc = E\,\bar{w}\ (TN.\ Ln) - i$ and :

$\bar{w}$ = (CPUE in lbs.) TN = Number of traps

= 1.2 = 10,000

= .6 = 8,000

also capable of fishing more of the platform area under a wider range of sea and weather conditions.

If the rate of harvest of small lobsters continues to increase, it will have two detrimental impacts: (1) a shift in population structure resulting in fewer lobsters of reproductive size; and (2) a decrease in the total weight of the landings. Assuming a direct relation between price and weight, a reduction of the value of the fishery over its possible or optimal yield will result.

The expected DAH for the first year (1981) of fishing under the proposed 3.5-inch restriction will be around 582,000 pounds, (See Table 1). However, this amount will increase annually at a rate of around ten percent in the first and second years; seven and five percent respectively in the third and fourth years, 3.8% the fifth year and 1.4% the sixth year, when the landings will stabilize at the MSY level of 830,000 pounds.

These estimated landings contrast sharply with those under the existing management system, in which there will be a consistent annual decrease of three or four percent. In the 10th year the difference between the present management system and the proposed 3.5-inch restriction will be 293,000 additional pounds. In terms of value this will represent a gain of $1,251,000. (Table 1 gives a complete picture of the situation under different carapace length limit options).

6.0 OPTIMUM YIELD CONCEPT

6.1 Optimum Yield

Because of the changing nature of the fishery and the biological considerations outlined in Section 4.0, OY is defined as all the non-berried spiny lobsters in the management area having a CL of 3.5 inches or greater that can be harvested on an annual basis (Sec. 4.1.3). Alternatives to the selection of a 3.5-inch CL are discussed in Section 10.4.

OY is expected to be within the range of 582,000 to 830,000 lbs (Sec. 6.2) and is estimated at 582,000 lbs during the first year of the plan. OY may fluctuate somewhat from year to year as a function of (1) planned rebuilding of the biomass, (2) variability in habitat, and (3) better assessment data. Since OY is all non-berried lobsters with a CL of 3.5 inches or greater that can be harvested on an annual basis, the 830,000 lbs estimate does not represent an upper limit and may be exceeded in any given year without resultant damage to the resource. This size limitation ensures that most lobsters have reproduced at least once before being harvested, and coupled with other proposed measures, should provide an adequate safeguard against biological overfishing, and at the same time provide for optimal use by all user groups.

6.2 Departure from MSY for Biological Reasons

There is no departure of OY from MSY for biological reasons. Present biological and ecological conditions allow the lobster resource to be harvested at the MSY level which is included in the estimated range of OY (Sec. 6.3).

6.3 Departure from MSY for Socio-Economic Reasons

There is no departure of OY from MSY for socio-economic reasons. For all user groups except underwater observers, optimal use of the resource is obtained by harvesting the MSY (which is included in the range of OY). The establishment of closed areas (see Sec. 8.0 and proposed regulations for Virgin Islands National Park waters) will provide virtually unfished stocks and optimal use for underwater observers and researchers. Only a small percentage (10%) of the Virgin Islands landings is made up of lobsters under the 3.5-inch CL minimum. After the first year, DAH is anticipated to rise above the 1981 estimate (582,000 lbs) to 636,000 lbs, and eventually reach the MSY level of 830,000 lbs about the seventh year. The loss of 146,000 pounds the first year and 70,000 lbs the second year will be more than offset with the average gain of 186,000 lbs annually in the following eight years, which represents an average annual increase of $714,000.

6.4 Future MSY's and OY's

Although MSY is based on the best available scientific data, it is only an estimate and may be modified in the future as data become available for the use of production model calculations. In the interest of conservation of the stocks, OY is set equal to the sums of commercial and recreational catches (DAH). Coupled with the proposed management regime, this should safeguard the health of the resource and allow periodic adjustment of OY as appropriate. The value of lobster and its importance to the economies of Puerto Rico and the Virgin Islands, suggest conservative management be employed (Sec. 3.2). The traps most commonly used primarily catch finfish while lobster are caught incidentally. The increased interest in lobster fishing, as evidenced by the entry of substantial numbers of Florida-type traps, must be absorbed. Florida-type traps fish directly for lobster and yield a higher CPUE. Careful monitoring of the introduction of the Florida-style traps by the Council will provide an estimate of their impact on the fishery.

7.0 TOTAL ALLOWABLE LEVEL OF FOREIGN FISHING (TALFF)

As indicated in Sec. 5.1, TALFF = OY - DAH. OY is expected to fluctuate between 582,000 and 830,000 lbs on an annual basis. Domestic fishermen will harvest the total OY annually, and have the capacity to harvest 440,000 lbs above the upper level of OY. Consequently, there is no surplus of spiny lobsters available for foreign fishing.

8.0 MANAGEMENT REGIME

8.1 Management Objectives. The primary objective of this plan for spiny lobster is to achieve OY from the stock without encountering more severe problems of economic or biologic overfishing that occur in some other fisheries. The differences between optimizing and maximizing were thoroughly considered. This primary objective can be achieved by attaining the following specific management objectives:

1. Provide for biological conditions consistent with the capability to eventually achieve MSY. These conditions are:

   a. Maintain a sufficient supply of adult lobsters so that adequate spawning takes place and a sufficient number of recruits are produced to replenish the population.

   b. Prevent the harvest and incidental mortality of small lobsters, which results in less than maximum production and is an inefficient use of this valuable resource.

   c. Evaluate the contribution of closed areas, including the establishment of marine sanctuaries, in achieving MSY.

2. Promote economic efficiency of the commercial fishery by:

   a. Optimizing the total economic return from the spiny lobster resource. Maximizing economic return would require extensive social changes such as limited entry in some form as noted below.

   b. Creating conditions which would allow individual commercial fishermen to derive optimum individual gross income from their use of the resource. Two examples of such conditions are (1) 3.5-inch minimum CL and (2) continued free entry into the fishery rather than a more economically efficient limited entry.

3. Provide for the social and cultural needs of Puerto Rico and U.S. Virgin Islands citizens by:

   a. Continuing both the recreational and commercial utilization of spiny lobsters.

   b. Maintaining fishing as a viable component of community activity.

   c. Providing for the equitable distribution of spiny lobsters among user groups, including the commercial and recreational fishermen and other users such as underwater observers and scientists.

   d. Providing for the increasing future economic demands for spiny lobster as a food commodity.

4. Provide biologic, economic, and social data bases for improved management of the resource. This includes identification of needed scientific research and methods of accomplishing this research, including the collection of management information.

5. Reduce resource loss associated with "ghost" or "drowned" or "lost" traps due to ship traffic, pilfering, thievery, displacement by currents, and other reasons.

8.2 Management Measures. The spiny lobster stock is being heavily utilized. Indicators such as the estimate of MSY, current catch trends, CPUE, the average size of the lobsters in the catch and the distribution of size classes in the population reveal that fishing with no regulations is having an adverse effect on an historically healthy stock.

In spiny lobster fisheries of some other areas, fishing effort has expanded rapidly, and economic or biologic overfishing has resulted except where adequate management has been implemented.

Measures which have been used to regulate spiny lobster fisheries throughout the Caribbean include: minimum size limits; closed areas; closed seasons; protection of egg-bearing lobsters; protection of soft-shell lobsters; gear restrictions; licensing of boats, fishermen, processors, and exporters; and reporting of catch. Each of these types of regulations has been considered for this plan. Management measures proposed by the Council will be implemented in the FCZ and recommended for adoption by the Commonwealth of Puerto Rico and the Territory of the Virgin Islands within those waters under their jurisdiction. Representatives of both governments have indicated their full cooperation.

Since the fishery occurs throughout the year, the fishing year is defined as the calendar year—January 1 through December 31. The calendar year is a convenient time frame from the standpoint of data compilation and analysis, as Puerto Rico and the Virgin Islands presently collect statistics on different fiscal years.

The following proposed management measures are those that best address the objectives of the plan. The rationale for both adopted and rejected management measures is presented in Section 10.0 which constitutes the Regulatory Impact Review.

1.0 Size and Sex Restrictions (to achieve management objectives 1,2,3).

1.1 Make unlawful the retention of any lobster of the species Panulirus argus which has a carapace length of less than 3.5 inches (88.9 mm), except as provided under 1.4.

1.2 Make unlawful the retention of any egg-bearing (gravid or "berried") lobster of the species Panulirus argus, except as provided under 1.5.

1.3 Make unlawful the practice of stripping or otherwise molesting egg-bearing ("berried") spiny lobsters to remove the eggs.

1.4 Allow the retention of small (less than legal size) lobsters, alive, as "attractors" in traps or pots. Undersized lobsters may not be retained aboard the vessel.

1.5 Allow the retention of egg-bearing ("berried") female lobsters in pots or traps until the eggs are shed. Berried females may not be retained aboard the vessel.

1.6 Spiny lobsters are to remain whole after harvest until taken to shore (landed) and while being transported to shore.

2.0 Sanctuaries (Recommendations to National Park Service to achieve management objectives 1, 3, 4).

2.1 Recommend that the taking of lobster of the species Panulirus argus or the possession of any lobsters taken in the waters of the Virgin Islands National Park from a point due north of the west end of Mary Point south west to the Visitors Center in Cruz Bay be prohibited.

2.2 Recommend that lobsters of the species Panulirus argus which are captured as an incidental catch in traps in waters of the Virgin Islands National Park as described above be returned to the water.

3.0 Data Collection (to achieve management objective 4).

3.1 Require the reporting of catch and effort information through the improvement of the existing data collection system.

4.0 Gear Restrictions (to achieve management objectives 1, 2, 3, 5).

4.1 Require a self-destruct panel and/or self-destruct door fastenings on traps and pots.

4.2 Require owner identification and marking of traps, pots, buoys, and boats.

4.3 Prohibit the use of poisons, drugs, or other chemicals for the taking of spiny lobsters.

4.4 Prohibit the use of spears, hooks, explosives, or similar devices for taking of spiny lobsters in marine waters.

4.5 Make unlawful the pulling of another person's legally marked traps or pots without the owners permission, except by authorized enforcement officers.

5.0 Recommendations to the Secretary of Commerce

5.1 It is recommended that the Secretary of Commerce undertake whatever action may be necessary and appropriate to immediately prohibit the importation into the U.S. Virgin Islands and Puerto Rico of undersized (less than 3.5 inches CL) or berried spiny lobsters and of spiny lobster tails of less than 6 ounces total weight.

5.2 It is recommended that the Secretary of Commerce take whatever measures are necessary, in coordination with the pertinent federal agencies and the Commonwealth and Territorial Governments, to define shipping lanes in critical areas off Puerto Rico and the U.S. Virgin Islands to avoid, to the extent possible, conflicts between normal shipping activities and regular commercial fishing operations.

5.3 Considering the close interrelationship and interdependence between the fishery resources in the fishery conservation zones and territorial seas of the Caribbean community of nations, it is strongly recommended that the Secretary of Commerce adopt, in coordination with the U.S. Department of State and the Caribbean Fishery Management Council, a viable plan of action to foster the adoption by the other members of the Caribbean community of nations, fishery conservation and management measures along the lines established in this, and other FMPs, under preparation by the Caribbean Fishery Management Council.

Procedures for Review and Modification

This multi-year plan will be monitored continuously by the Council. It is the Council's intention that necessary changes in the numerical estimates of MSY, OY, DAP, DAH, and TALFF be made by the Secretary after consultation with the Council. The methodologies to be used in modifying the estimates are as follows:

A. Production model statistics as they accummulate are to be coupled with new biological data such as size-frequency (age-class) distribution in the population, or new data which would be applicable to the Gulland Virgin Stock Biomass approach may be used to reassess MSY. MSY will be reassessed at least once every five years.

B. Numerical values of OY, DAH and TALFF will be recalculated annually (e.g., OY (830,000 lbs) minus DAH (830,000 lbs) equals TALFF (0).

C. DAP will be evaluated annually to determine if processing is an integral part of the industry and the portion of OY that will be processed.

The 3.5-inch CL is considered to be the most important management measure contained in this plan. In the event the 3.5-inch CL does not provide for sustained recruitment into the fishery or the anticipated changes in income (as identified in Sec. 10.0), it may be modified through the Regulatory Amendment process. Whenever the monitored landings by weight deviate from the statistically calculated expected landings by an amount greater than the 50% Confidence Interval, the relationship between landings and CL will be analyzed and action taken accordingly. These Confidence Intervals will be recalculated annually following the submission of catch reports by the respective Territorial and Commonwealth governments.

After the relationship between landings and CL has been analyzed, the Secretary may adjust CL downward or upward in equivalents of 0.25-inch after consultation with the Council and after a reasonable opportunity for public consideration has been afforded. Equivalents of 0.25-inch CL were selected because they provide a realistic size adjustment to assess changes in the

fishery, have been analyzed relative to anticipated impacts (Sec. 10.0) and are convenient measures from the standpoint of user groups and enforcement personnel. There are no limitations on the upper or lower adjustment boundaries, but changes will be based on continuous monitoring of impacts on recruitment and income. When the CL is adjusted, the Secretary will also recalculate OY, DAH and TALFF and publish them with the regulations proposing the different CL. After the plan has been operational for 10 years, data should allow the use of an 80% Confidence Interval.

Alternative Management Measures

The Council considered but did not adopt the following measures because they were considered to be unnecessary and inappropriate at this time for reasons stated in Section 10.0.

1. No Action

This management alternative would allow the fishery to continue but would not prevent overfishing with its socio-economic-biologic consequences.

2 More Restrictive Fishery

(a) Closure of more habitats, establishment of seasons.

(b) Limitations on catch, number of traps, traps per boat, number of traps per fisherman, entry, and places of sale.

(c) Prohibitions on: SCUBA and HOOKA harvesting; retention of undersize lobsters in traps; and berried females in traps.

(d) Increase the minimum size limit to 4.0-inch or 4.5-inch CL to maximize egg production by local populations.

(e) Impose a maximum size limit to protect so-called "den guards."

3. Less Restrictive Fishery

The Council felt this alternative was a special case of "No Action." The only less restrictive measures considered were the establishment of a 3.0 and 3.25-inch CL. These alternatives would allow the continued harvest of many immature lobsters and would result in continued reduction in recruitment into the fishery and the present reduced landings by weight.

8.3 Relationship of the Recommended Measures to Existing Applicable Laws and Policies.

The laws respecting the resource and its habitat in territorial seas are discussed in 3.3.1, 3.3.2. Most of the local laws are identical to the regulations proposed in this plan. The minimum size at harvest, the reporting

procedures, and the use of spears and hooks (bicheros) are at variance. The federal laws and policies which were analyzed for possible impact on this plan are:

Submerged Lands Act, 43 USC 1301-1343
Marine Mammal Protection Act, 16 USC 1361-1384
Endangered Species Act of 1973, 16 USC 1531-1543
Coastal Zone Management Act, 16 USC 1451-1464
Marine Protection, Research and Sanctuaries Act, P.L. 92-532
National Environmental Policy Act, 42 USC 4321-4347
Fish and Wildlife Coordination Act, 16 USC 661-667e
Privacy Act, 5 USC 552a, as amended
Freedom of Information Act, 5 USC 552, as amended
Commercial Fisheries Research and Development Act, 16 USC 742c,779-779f
Outer Continental Shelf Lands Act, 43 USC, 1331 et seq.
Executive Order 12291
The Jones Act, 48 USC 749 as amended by P.L. 96-205 Sec. 606

8.3.1 Section 7 Consultation on Endangered Species

The following endangered or threatened marine species are known to occur in the Caribbean FCZ: sei whale (Balaenoptera borealis) Endang.; humpback whale (Megaptera novaeangliae) Endang.; sperm whale (Physeter catodon) Endang.; West Indian manatee (Trichechus manatus) Endang.; Caribbean monk seal (Monachus tropicalis) Endang.; brown pelican (Pelicanus occidentalis) Endang.; green sea turtle (Chelonia mydas) Threat.; hawksbill sea turtle (Eretmochelys imbricata) Endang.; loggerhead sea turtle (Caretta caretta) Threat.; olive ridley sea turtle (Lepidochelys olivacae) Threat.; and leatherback sea turtle (Dermochelys coriacea) Endang. Critical habitat for the last species has been designated at St. Croix, Virgin Islands.

After reviewing available information on these animals and discussing the proposed activities with the National Marine Fisheries Service and the Fish and Wildlife Service, the Council has determined that the management measures in the plan will not affect a listed species or critical habitat.

8.3.2 Coastal Zone Management

This plan has been determined by Puerto Rico and Virgin Islands Coastal Zone Agency officials to be consistent with their approved Coastal Zone Programs.

8.4 Enforcement Requirements (Inspection-Surveillance). Any person or vessel found to be in violation of these regulations may be subject to civil and criminal penalty provisions and forfeiture provisions prescribed in the MFCMA or other applicable Federal or local law. Enforcement patrols and onshore surveillance inspection by state and special agents will encourage compliance.

8.5 Reporting Requirements. Certain foreign fishermen, domestic fishermen, and dealers are required to maintain a current record of information on the spiny lobster fisheries according to State-Federal Agreements proposed by the National Marine Fisheries Service. The Council recommends that the Territorial and Commonwealth Governments adopt a means of collecting uniform data as set forth in the provisions of the proposed State-Federal agreements.

8.6 Cooperative research requirements. Research is required to verify or modify certain conclusions in the plan and to improve the habitat. The Council will encourage such research and request it from the National Marine Fisheries Service and State Governments, as appropriate.

8.6.1 Biological data base needs. Four types of data are needed to manage the fishery:

1. Accurate estimates of total harvest by both recreational and commercial fishermen;

2. Descriptions of the size/age structures and natural mortality of the harvest and available stocks;

3. Accurate estimates of the number (or weight) of the lobsters available for harvest; and

4. Definitive information on recruitment and its source or sources.

The Council is presently conducting a survey which will provide information in response to items 2 and 3. The data collection requirements will provide information in response to item 1, and current research will contribute data responsive to item 4.

8.6.2 Economic and social data base needs. These include production statistics and market information at all levels of the industry as well as improved profiles of user groups.

The National Marine Fisheries Service and the two local governments are presently conducting a cost and earnings study of the fishery. Analysis of these data will provide a basis for the development of criteria to determine the net economic yield from the fishery for individual fishermen and industry as a whole. Analysis of this study will be completed by 1983.

8.7 Permit Requirements. The permit normally and historically issued by local authorities is required for all vessels fishing for lobsters in the FCZ.

8.8 Financing Requirements

8.8.1 Management and enforcement costs. The incremental costs to the National Marine Fisheries Service, U.S. Coast Guard, Caribbean Fishery Management Council, Commonwealth of Puerto Rico, and the Territorial Government of the U.S. Virgin Islands to carry out this plan are approximately $240,000. This figure includes the management, data collection, and enforcement costs (Table 4).

Recognizing the other priorities of the Coast Guard, the limited resources of NMFS, and the absence of any foreign fishing and the proximity of the fisheries to the coast line, the $159,000 identified as enforcement costs for these two agencies should be regarded as maximal. This value represents a directed enforcement thrust, which in reality, probably will not materialize because of the limitations mentioned. Most of the directed enforcement effort would be provided by existing agents in the states and any efforts by the Coast Guard would likely be incidental to other activities. The two NMFS special agents stationed in Puerto Rico and the Virgin Islands may be expected to provide a moderate amount of technical support and assistance to the large and expanding state enforcement staff. Actual enforcement costs, therefore, would be substantially less than the amount identified, and realistically could be considered nil as technical support and training assistance is currently being provided.

8.8.2 Expected state and federal revenues, taxes and fees. No fees from foreign fishing are expected since no foreign fishing occurs. Other sources are unpredicted but would appear to be minimal.

9.0 ENVIRONMENTAL IMPACT STATEMENT. The Environmental Impact Statement (EIS) was prepared in accordance with the most recent regulations issued by the Council on Environmental Quality which implement the National Environmental Policy Act (43 FR., Nov. 29, 1978). The guidelines promote the preparation of concise documents in language that is readable and understandable, and specify the inclusion of material by reference rather than by repetition. In following this approach, all referenced material becomes part of the EIS. In this instance, the entire document is essentially considered an EIS.

10.0 REGULATORY IMPACT REVIEW.

10.1 Introduction. This section addresses impacts of the proposed and alternative management measures listed in Section 8.2 and relates the Council's rationale for proposing certain measures and not proposing the alternatives. The section fulfills the requirements of Executive Order 12291 "Federal Regulation" which established guidelines for promulgating new regulations and reviewing existing regulations. Under these guidelines each agency, to the extent permitted by law, is expected to comply with the following requirements:

(1) Administrative decisions shall be based on adequate information concerning the need for and consequences of proposed government action;

(2) Regulatory action shall not be undertaken unless the potential benefit to society for the regulation outweigh the potential costs to society;

(3) Regulatory objectives shall be chosen to maximize the net benefits to society;

(4) Among alternative approaches to any given regulatory objective, the alternative involving the least net cost to society shall be chosen; and

(5) Agencies shall set regularly priorities with the aim of maximizing the aggregate net benefit to society, taking into account the condition of the particular industries affected by regulations, the condition of the national economy, and other regulatory actions contemplated for the future.

In compliance with Executive Order 12291, the Department of Commerce and the National Oceanic and Atmospheric Administration require the preparation of a Regulatory Impact Review (RIR) for all regulatory actions which either implement a new fishery management plan (FMP) or significantly amend an existing FMP, or may be significant in that they affect important DOC/NOAA policy concerns and are the object of public interest.

The RIR is part of the process of developing and reviewing FMPs and is prepared by the Regional Fishery Management Councils (the Council) with the assistance of the National Marine Fisheries Service (NMFS), as necessary. The RIR provides a comprehensive review of the level and incidence of impact associated with the proposal of final regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve problems. The purpose of the analysis is to ensure that the regulatory agency or Council systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way.

The RIR also will serve as the basis for determining whether the proposed regulations implementing the FMP or amendment are major/non-major under Executive Order 12291, and whether or not the proposed regulations will have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (P.L. 96-354).

Most of the data used to determine economic impact are contained or referenced in the source document (see page 2) and the subsequent annual fishery reports issued by Puerto Rico and the Virgin Islands. Effects of minimum CL were estimated by using a bioeconomic model to compute the monthly landings by weight of alternative sizes of lobsters. Then, average prices were used to compute value of landings. Government cost estimates for implementing this plan were provided by the entities that will incur the costs. Impacts in terms of changes in supply, prices, employment, distribution of income, productivity, international trade, and market structure were estimated where relevant. The problems of the spiny lobster fishery listed in Section 2.0 and the management objectives listed in Section 8.1 are included by reference.

10.2 Proposed Management Measures

Overall Impact. The plan is not expected to have significant adverse impacts on stocks outside the spiny lobster management unit either through predator-prey or incidental catch relationships. The plan is not believed to have any significant adverse impacts on other marine life, water quality, or benthic habitat. The measures in the plan do not cause any changes in red mangrove,

turtle grass, or other juvenile lobster habitat. The plan is expected to have significant positive biological impacts on the spiny lobster stocks in the management unit and significant positive socio-economic impacts on the consumptive and non-consumptive human users of the stocks. No plan-induced adverse effects are expected on the stocks or the resource users.

Rationale for Measure 1.1. The alternative minimum CL of 3.5 inches was selected as biologically and economically representing the optimum critical size from the standpoints of weight gain and reproductive potential. Smaller lobsters are growing rapidly and a large percentage have not reproduced. Larger animals are growing more slowly, in part because energy is being expended on reproduction. Most lobsters with a 3.5-inch CL have spawned at least once. The economic criteria used were (1) change a downward trend in landings into an upward trend by inverting the proportion of small and large lobsters in the landings, (2) maintenance of consumer preference with respect to size (3.5 inches), and (3) maximizing the harvest over a specified time period.

Impact of Measure 1.1 Analysis of the alternatives showed that the 3.5-inch CL provided the most acceptable compromise regarding the maximum harvest, protection of the stocks, and future landings in the fishery. During the first year, the 3.5-inch minimum CL size limit will result in a loss of 146,000 lbs or a 20.1% reduction in landings when compared with the expected landings under the present management system. This reduction in landings represents a loss of $393,000 based on an average 1980/81 price of $2.69 per pound. The impact on the 1723 fishermen represents a loss in income of about $228.00 per fisherman. Very few fishermen, however, are dependent upon lobster catches for their entire income. During the second year the loss will be reduced to 70,000 pounds, equivalent to $200,900 and $117 per fisherman.

Third and subsequent year landings with a 3.5-inch minimum size will range between 14,000 and 343,457 lbs greater than the expected landings under the present management system. Using a discount rate of 10 percent, the present value of the landings indicates that the 3.5-inch alternative provides the greatest benefits when compared with the other alternatives, including no action. This represents a $203,000 annual increase in value or $118 per fisherman, assuming that the number of fishermen is constant.

Results of regression analyses indicate no major change in price trends resulting from the increase in supply. There are no projected employment changes; hence, productivity of individual fishermen should rise. The increased production is expected to be absorbed by the market in Puerto Rico and the Virgin Islands and may lead to a slight reduction in imports. No changes in market structure or income distribution are expected.

The environmental impacts will be that the lobster biomass will be increased, the average size of breeders will increase, number of breeders will increase, and recruitment should also be enhanced by more eggs and lower fishing mortality. The greater availability of spiny lobsters would effect predator-prey relationships (e.g., nurse sharks and groupers as predators and mollusks and other benthic organisms as prey) involving this species. Such effects cannot be quantified but is believed to be minimal within the management area (Sec. 4.0).

Rationale for Measures 1.2, 1.3, 1.4, 1.5, and 1.6. Protection of berried females (1.2) is a measure that is in common use throughout the range of the lobster and is generally regarded by fishermen and the general public as being beneficial. Measure 1.3 is necessary in order to make 1.2 enforceable for all users. This use of "attractors" (1.4) is regarded as useful or essential by many fishermen. Injury and mortality are minimized by not allowing prolonged exposure to sun, wind, and rain water in the open fishing boats and during transfer between traps. Measure 1.5 allows the females to be used as "attractors" and eventually enter the landings while being afforded the same protection as in 1.4. Measure 1.6 is necessary for the enforcement of 1.1.

Impact of Measures 1.2, 1.3, 1.4, 1.5 and 1.6. These measures are expected to have a positive biological and economic impact through an increase in production and hence increase in fisherman income. These measures may result in an increase in the number of lobsters with the environmental impact indicated under measure 1.1 immediately above. In addition, measure 1.6 should guard against competition from imports of lobster with a CL of less than 3.5 inches.

Rationale for Measures 2.1 and 2.2. Published reports of studies in National Park sanctuaries have demonstrated that such areas can, and have, provided protected nurseries, controlled areas for the evaluation of management schemes, reservoirs of reproductive adults for perpetuation of the fishery, large stable populations, integrity of the community structure, and species richness. All these are attributes that are valuable to resource users.

Impact of Measures 2.1 and 2.2. There will be minor supply and income effects from these measures. The current small commercial and recreational catch in the Park sanctuary (2 lobsters per person per day) will be eliminated with a resulting small negative impact on fishermen income or consumption by recreationists. This will be partially offset because the protected lobsters will provide some recruitment by movement of adults and/or larvae to open areas adjacent to the Park. These measures will provide aesthetic benefits to divers and research benefits to scientists and fishery managers, offsetting the slight negative effect on commercial and recreational harvesters.

Rationale for Measure 3.1. This will eventually allow production model statistics to be used as a tool in evaluating the calculation of MSY.

Impact of Measure 3.1. The primary impact will be Government costs (Table 4). The existing data collection system in the U.S. Virgin Islands and Puerto Rico (Sec. 3.3.1) may be utilized except that certain additional information will be requested from certain individuals. This will result in minimal increases in reporting burdens on some fishermen but will result in improved resource management.

Rationale for Measures 4.1, 4.2, 4.3, 4.4, and 4.5. Measure 4.1 allows lobsters and other fishes to escape from lost traps while 4.2 helps to resolve social conflicts, aids law enforcement, and provides data on fishermen mobility and effort. Measure 4.3 is generally believed to be beneficial to marine populations and their habitat. Measure 4.4 reduces mortality and injury to lobsters which would be illegal if landed. Injuries divert energy from growth to repair. Measure 4.5 discourages theft and pilfering of traps and catches.

Impact of Measures 4.1, 4.2, 4.3, 4.4, and 4.5. This group of measures will provide slight positive impacts through resource protection which does not limit usual harvesting practices. For example, lobsters and other fishes caught in "ghost traps" will have better opportunity to escape and enter commercial landings later. Lobsters are most often caught in fish traps for other species, particularly shallow-water reef fishes. Therefore, escapement will also benefit numerous other species. Costs of implementing these measures will be negligible as they are presently required by the Governments of Puerto Rico and the Virgin Islands. Measure 4.5 affords protection to the fishermen and should result in a positive economic impact by reducing loss of traps and catches.

Government cost for proposed management measures. Table 4 lists the incremental Government costs associated with implementation of this plan. The size distribution survey costs have already been incurred and Puerto Rico forecasts no additional costs for data collection and enforcement.

10.3 Alternative Procedures for Modification.

Alternative procedures to selection of the Regulatory Amendment process for plan modification are by Council Amendment and by Notice Action. The Council Amendment would require the same amount of time (250-280 days) as the initial approval and implementation of the plan; whereas, changes can be made through the Regulatory Amendment process in 90-120 days. This savings allows for critical changes to occur on a timely basis and provides a reasonable period for public comment. Although Notice Actions can effect changes within a shorter time frame, the Council determined that this process was less flexible and did not provide sufficient time for evaluation of options and for public review and comment.

10.4 Alternative Management Measures.

10.4.1 No action.

Rationale for no action. All persons with knowledge of the fishery agreed that, in order to prevent serious problems in the next few years, management is necessary. Most recent available data indicate a decline in average CL of lobsters landed in Puerto Rico coupled with a substantial increase in the percentage of lobsters less than 3.5 inches CL in the catch (Sec. 4.6). If unchecked, current practices will result in additional adverse impacts to the resource.

Impact of no action. Since no action results in no new or revised Government regulations, there is no regulatory impact. However, information in the plan indicates a continuing decline in the fishery unless some action is taken.

10.4.2 More restrictive fishery.

Rationale for measures 2(a), 2(b), 2(c), 2(d), and 2(e). On the advice of the Advisory Panel and Scientific and Statistical Committee to the Council and members of the public at open meetings, the Council decided that, while all the rejected options might be reconsidered in the future, the present situation did not warrant their immediate implementation.

Impact of Measures 2(a), 2(b), 2(c), 2(d), and 2(e). The direction and magnitude of economic impacts resulting from measures 2(a), 2(b), 2(c), and 2(e) depends on the current biological state of the fishery. Given the presence of data indicating increasing biological problems at the present time, the impact of these measures should be positive and important depending on the extent of the action taken. These measures should be carefully evaluated for impact in the future as more data become available, particularly if future monitoring indicates greater biological problems. Measure 2(d), involving a CL greater than 3.5 inches was evaluated using the model and procedure described earlier. Both the 4.0-inch and 4.5-inch CL alternatives have a greater negative economic impact the first year than the 3.5-inch CL. The landings are estimated to drop 49 percent and 73 percent respectively. This would represent first year income losses of $958,000 and $1,434,000 or per fisherman losses of $556 and $832 if prices continue the present trend. However, the indicated loss of supply would substantially raise the ex-vessel price. The supply disruption would increase costs to consumers and restaurants and would cause a temporary change in the market structure. The limited supplies would go mainly to restaurants and retail distribution would shrink. Imports would rise, and income would shift from domestic harvesters to harvesters located in other nations. By the end of the third year, the supply and other effects would begin to be reversed as the larger number of small lobsters not caught the first and second year, begin to enter the commercial landings in quantity. The demand for lobsters with a CL greater than 4 inches is significantly less. Government costs for these combined measures would be significantly higher than for the proposed measures because of additional needs for data collection, permitting procedures, and enforcement.

10.4.3 Less restrictive fishery.

Rationale for not choosing less restrictive measures. The administrative record shows that the Council has made a sincere effort to impose only those regulations that will accomplish the objectives. Less restrictive measures will not accomplish the objectives and the landings will not be as great as those under the preferred options.

Impact of less restrictive measures. The long-term economic impact of less restrictive measures would be negative, and not as beneficial as the proposed measures. The only specific less restrictive alternatives formally analyzed for economic impact were the establishment of a 3.0-inch and 3.25-inch CL.

The analysis shows that, although in the first 3 years these alternatives would be more beneficial in terms of landings and income, the difference is more than offset in the following years. For example, in the 6th year the 3.5-inch option gives 33,000 pounds more than the 3.25-inch, and 60,000 pounds more than the 3.0-inch CL options. In terms of income the differences are $118,000 and $213,000 respectively. Less restrictive measures would also result in continued biological damage to the resource from harvesting non-reproductive lobsters. Government costs for the less restrictive management regime would be about the same as Government costs for the proposed measures.

10.4.4 Impact of the 3.5-inch Limit on Small Business.

In Puerto Rico and the U.S. Virgin Islands, around 2,000 fishermen sell a total of two million dollars in lobsters, which represent $1,000 per fisherman. These fishermen do not depend exclusively on lobsters, since they catch and sell other kinds of fish. The same can be said of the few fish dealers (26) and marketing associations (17) operating in Puerto Rico and in the U.S. Virgin Islands.

The definition of "Small Business" states that in the case of agriculture, which includes fisheries, the annual sales may not exceed $1,000,000. According to this definition, all Puerto Rican and Virgin Islands fishermen are classified as "Small Business".

In the case of fish dealers, if they are wholesalers and their sales do not exceed $9.5 million, or if they are retailers and their sales do not exceed $2.0 million, they are also classified as "Small Business". Although no data about the size of fish dealers' operations are available, considering the ex-vessel value of the total catch and the profit margin of wholesalers and retailers, there is no doubt that all fish dealers in Puerto Rico and the U.S. Virgin Islands are in the category of "Small Business".

In the case of Marine Suppliers, the government is the principal supplier of fishing craft materials, for commercial fisheries, and would not be included under the definition of "Small Business".

According to the above analysis, it has been determined that the proposed regulations for the Spiny Lobster fishery will not have a significant economic impact on a substantial number of small entities. The proposed regulations impose a minimal burden regarding recordkeeping requirements, since data reporting will be only required from a small number (a representative sample) of fishermen and these do not necessarily have to keep records of their catch.

10.5 Cost of Development and Implementation

Total Council administrative (salaries, benefits and meetings) and programmatic (contractual) costs for the development of the Caribbean Spiny Lobster plan are estimated at $177,000. An additional $30,000 ($20,000 Region and Center, $10,000 Central Office) expenditures by NMFS were associated with the development of this plan, for a total of $207,000. The $207,000 plan development costs are a one-time cost which must be allocated over the 10-year planning horizon. Allocation of the $207,000, based on a capital recovery factor for 10 years at 10% interest, shows that annual costs would be $33,700. (See footnote on next page).

Plan implementation costs are estimated at $50,000 per year for enforcement and data collection efforts in the Virgin Islands. No new costs will be incurred by Puerto Rico for implementation since these activities are adequate in that area. Recognizing that enforcement activities will be conducted almost exclusively by existing state personnel, no additional costs to the Federal Government are identified for plan implementation.

This is a multi-year plan that contains provisions for effecting changes through regulatory amendment rather than by lengthy plan amendment procedures; therefore, maintainance costs to the Federal Government will be minimal (estimated at $5,000 per year).

The value of the benefit from the CL restriction of 3.5 inches is $2,251,000 (based on a present value analysis using 10 percent) over the 10-year planning horizon (Table 1-A). Allocation of the $2,251,000 using a capital recovery factor for 10 years at 10% interest shows annual benefits to the industry of $366,350.*

Summarizing, the benefits and costs are:

(a) Increased landings to the fishermen valued at $366,350.

(b) Increased costs valued at:

(1) plan development $33,700,

(2) data collection Virgin Islands $40,000,

(3) increased enforcement Virgin Islands $10,000,

(4) plan maintainance costs $5,000.

Total $88,700

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* Capital Recovery Factor is a technique used to find the uniform end of the year payment which can be secured for any time period from any investment.

TABLE 1

Expected Landings and Value of Lobsters in Puerto Rico and U.S. Virgin Islands With Present Management Regime and With Alternative CL Limits

Year	With Present Regulations	With Alternative Carapace Length Limits				
		3.0"	3.25"	3.5"	4.0"	4.5"
Landings (lbs.)						
1980/81	727,704	691,376	639,803	581,618	371,929	194,670
81/82	706,714	709,007	676,914	636,207	460,560	262,569
82/83	684,525	727,186	713,336	698,061	590,977	381,137
83/84	662,936	740,126	747,456	750,187	704,034	490,701
84/85	641,346	751,971	769,266	788,177	797,853	585,668
85/86	623,355	758,851	785,382	818,453	830,000*	672,354
86/87	601,765	765,184	799,638	830,000*	830,000*	749,060
87/88	580,176	770,679	812,102	830,000*	830,000*	817,764
88/89	558,586	775,935	819,596	830,000*	830,000*	830,000*
89/90	536,996	777,303	826,651	830,000*	830,000*	830,000*
Annual Average	632,410	746,764	759,014	759,270	707,535	581,392
Value ($ 000)						
1980/81	1,958	1,860	1,721	1,565	1,000	524
81/82	2,028	2,035	1,943	1,826	1,322	754
82/83	2,081	2,211	2,169	2,122	1,797	1,159
83/84	2,135	2,383	2,407	2,416	2,267	1,580
84/85	2,174	2,549	2,608	2,672	2,705	1,985
85/86	2,225	2,709	2,804	2,922	2,963	2,400
86/87	2,257	2,869	2,999	3,112	3,112	2,809
87/88	2,274	3,021	3,183	3,254	3,254	3,206
88/89	2,290	3,181	3,360	3,403	3,403	3,403
89/90	2,293	3,319	3,530	3,544	3,544	3,544
Annual Average	2,172	2,614	2,672	2,684	2,537	2,136
Present Value 2/	13,158	15,284	13,972	15,409	14,177	11,383

* Landings stabilized at MSY limit.

1/ These calculations are based upon the best available data. However, it must be realized that some fishery-independent factors such as tropical storms or hurricanes can severely affect annual landings.

2/ Based on 10% discount rate over the 10-year period (see Table 1-A).

TABLE 1-A

Value of Lobster Landings in P.R. and U.S. Virgin Islands Including 10% Annual Discount Factor to Account for Future Inflation

(Thousand Dollars)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				10% Annual Discount Rate			
Year	With Present Regime 1/	With 3.5-inch CL Regulations 1/	Gain or loss with 3.5" Reg. (2) - (1)	n	With Present Regime 2/	With 3.5-inch C.L. 3/	Difference (6) - (5)
1980/81	1958	1565	- 393	1	1780	1423	- 357
81/82	2028	1826	- 202	2	1676	1509	- 167
82/83	2081	2122	+ 41	3	1563	1594	+ 31
83/84	2135	2416	+ 281	4	1458	1650	+ 192
84/85	2174	2672	+ 498	5	1350	1659	+ 309
85/86	2225	2922	+ 697	6	1256	1649	+ 393
86/87	2257	3112	+ 855	7	1158	1597	+ 439
87/88	2274	3254	+ 980	8	1061	1518	+ 457
88/89	2290	3403	+ 1113	9	971	1443	+ 472
89/90	2293	3544	+ 1251	10	884	1366	+ 482
Total	21720	26840	+ 5120	-	13157	15408	+2251

1/ See Table 1, page 38.

2/ Column (1) divided by 10^n.

3/ Column (2) " " " .

TABLE 2

SIZE-FREQUENCY DISTRIBUTION SURVEYS OF SPINY LOBSTERS IN PUERTO RICO AND IN THE U.S. VIRGIN ISLANDS

A. Surveys Conducted in Puerto Rico 1956 - 1968 and 1978.

Survey	Year	Number of Lobsters	Average Carapace Length (inches)	Average Weight (pounds)	Percent Below 3.5 inches CL	
					#Lobsters	Pounds
Feliciano, C.	1956-57	1,276 1/	4.0	2.0	19.6	-
Rodriguez, W.	1968	223	3.75	1.71	25.0	-
Caribbean Council	1978-79	9,232	3.68	1.72	40.6	23.7

1/ Samples analyzed from unpublished data available at the Commercial Fisheries Laboratory. Commonwealth of Puerto Rico

B. Surveys Conducted in the U.S. Virgin Islands 1976 - 1978.

Survey	Year	Number of Lobsters	Average Carapace Length (inches)	Average weight (pounds)	Percent Below 3.5 inches CL	
					# Lobsters	Pounds
Scharf, Charles K.	1976 2/	996	4.05	1.98	1.0	-
Caribbean Council:						
St. Thomas, June	1978	146	4.40	2.61	9.6	6.1
St. Croix, July	1978	233	4.60	2.55	.4	.6
Total	-	379				
Weighted Mean			4.52	2.57	4.0	2.7

2/ Unpublished report in the library of Fairleigh Dickinson Univ., West Indies Laboratory on St. Croix.

TABLE 3

PUERTO RICO REPORTED LOBSTER LANDINGS
AND PERCENTAGE DISTRIBUTION AT DIFFERENT SIZE CATEGORIES

Month	Landings 1/ (pounds)	Size Frequency Distribution 2/ (Percent by weight)				
		Below 3.0 inches CL	Below 3.25 inches CL	Below 3.5 inches CL	Below 4.0 inches CL	Below 4.5 inches CL
May 1978	28,085	4.72	9.15	18.25	37.19	62.62
June	27,721	7.69	14.15	22.56	46.03	71.09
July	30,093	13.23	25.27	35.56	57.92	78.26
August	34,177	11.88	24.22	38.08	59.57	79.95
September	41,096	8.33	16.30	25.39	50.20	69.68
October	40,969	4.94	12.99	25.01	56.20	76.90
November	51,671	5.48	15.07	25.25	60.51	78.39
December	53,076	2.30	6.83	16.00	65.46	91.82
January 1979	48,746	4.33	12.41	22.10	58.72	81.78
February	48,149	7.33	17.98	30.10	57.37	77.15
March	47,386	3.68	7.34	11.40	32.43	52.31
April	40,772	20.57	32.39	39.89	56.44	76.84

Sources:

1/ Commercial Fisheries Laboratory - Department of Agriculture, Commonwealth of Puerto Rico.

2/ Caribbean Fishery Management Council- Spiny Lobster Survey - Puerto Rico -May 1978 -April 1979.

TABLE 4

ADDITIONAL GOVERNMENT COSTS OF PROPOSED MEASURES 1/

Entity	Purpose	Amount($)
USCG/NMFS	Enforcement	159,000 2/
U.S. Virgin Islands	Data Collection	40,000
U.S. Virgin Islands	Enforcement	10,000
Total		$209,000

1/ No additional costs are expected to be incurred by the Government of Puerto Rico.

2/ This is an optional value, as most of the enforcement effort will be provided by existing state agents (Sec. 8.8).

Table 5

Age-Length-Weight Relationship of
Spiny Lobster: Puerto Rico 1978/79 1/

Age	Length (Inches)	Weight (Lbs)
Less than 10 months	Less than 1.5	.10
10 - 12 "	1.5 - 1.9	.47
13 - 15 "	2.0 - 2.4	.64
16 - 20 "	2.5 - 2.9	.80
21 - 22 "	3.0 - 3.2	1.07
23 - 25 "	3.25 - 3.4	1.28
26 - 31 "	3.5 - 3.9	1.64
32 - 39 "	4.0 - 4.4	2.24
40 - 48 "	4.5 - 4.9	2.84
5 years	5.0 - 5.4	3.52
6 - 10 years	5.5 - 5.9	4.11

Source: Size Frequency Survey and Von Bertalanffy Equation.

11.0 STATEMENT OF COUNCIL INTENTION TO MONITOR THIS PLAN AFTER APPROVAL BY THE SECRETARY. The Council will, after approval and implementation of this plan by the Secretary, maintain a continuing review of the fishery by:

1. Maintaining a close liason with the Puerto Rican Marine Resources Development Corporation, and the Virgin Islands Department of Conservation and Cultural Affairs.

2. Monitoring and evaluating the data assembled through the State/Federal agreement that gather catch statistics and which incorporate them into the National Marine Fisheries Services Technical and Information Management System, or such other programs as may be established by the National Marine Fisheries Service for monitoring and data processing.

3. Encouraging research by local, national, and international groups that will contribute to the improvement of this fishery management plan.

4. Conducting public hearings at appropriate times and places, regarding the need for change in the plan or its regulations in order to increase its effectiveness.

5. Incorporating changes, whenever possible, through the regulatory amendment process, thereby maintaining the multi-year character of the plan.

12.0 REFERENCES. All references are included in the source document (Preface).

Appendix

This appendix summarizes testimony on the Draft FMP/EIS/RIR at 10 public hearings or submitted by letter to the Caribbean Fishery Management Council and the National Marine Fisheries Service. These letters are included in the appendix. Responses to the comments are also included here. Public hearings were held at the following times and locations:

U.S. Virgin Islands:

June 26, 1980 - St. John, U.S. Virgin Islands

June 27, 1980 - St. Thomas, U.S. Virgin Islands

June 30, 1980 - St. Croix, U.S. Virgin Islands

All of the above hearings started at 7:00 p.m. and adjourned, at or about 10:00 p.m.

Commonwealth of Puerto Rico:

July 1, 1980 - San Juan, Puerto Rico

July 2, 1980 - Fajardo, Puerto Rico

July 3, 1980 - Salinas, Puerto Rico

July 7, 1980 - Arecibo, Puerto Rico

July 8, 1980 - Humacao, Puerto Rico

July 9, 1980 - Cabo Rojo, Puerto Rico

July 11, 1980 - Vieques, Puerto Rico

All of the above hearings started at 3:00 p.m. and adjourned at or about 6:00 p.m.

(1) Comment: There is no need for a lobster management plan.

Response: The rapidly changing nature of the boats and gear being used, the shift in size/age structure of the harvested lobsters and the lack of common management measures between Puerto Rico and the Virgin Islands (or the rest of the Caribbean) indicate to all who are locally involved in the fishery a need for the FMP. Non-reproductive lobsters are being harvested at an increasing rate. This is leading to a continued annual reduction in the average size of harvested animals. This poses the very real threat of increased biological overfishing. At the same time the fishery is being hurt economically by losing the potential weight of larger lobsters. The Plan addresses these problems and their solution will benefit the nation.

(2) Size and Sex Restriction: There were 36 comments which favored these regulatory measures and 31 comments which were opposed to them entirely or in part.

Comments: There is a small species (langostin) of lobster which looks like the spiny lobster and lives in grass beds.

Response: The scientific evidence for a separate small species is lacking and moreover, indicates that the lobsters referred to are juvenile P. argus. It is clear that the comments did not refer to P. guttatus. In any event the FMP only applies to P. argus.

Comment: The minimum carapace length should be 3 inches.

Response: The Florida experience does not support this and under the constantly warmer temperature regimes in the Caribbean, 3" CL lobsters are younger and only a small percentage of them have reached sexual maturity. Part of the period of rapid growth along with the economic accruals is lost. The RIR analysis makes this very clear.

Comment: Prohibition on harvest of small lobsters will have a severe economic impact on Puerto Rican fishermen.

Response: The Council has analyzed this in the Regulatory Impact Review and acknowledges that there will be an economic loss during the first two years after the implementation of the plan. This loss will fall most heavily on the fishermen who are presently harvesting large numbers of small lobsters. However, during the third year after implementation, and in following years, there will be substantial dollar gains and a significantly improved resource base.

Comment: The government should subsidize fishermen during the first year after implementation of the plan.

Response: The federal government has no mechanism for such action (assuming that it might be a valid request) and the local governments are free to act on their own in such a matter. This raises the question of ownership of lobsters before harvest.

Comment: If the intent of the 3.5" CL is to ensure that a lobster "sheds eggs" at least once during its lifetime, why does the restriction apply to males?

Response: There are few data to indicate that the maturation size of males is different from that of females. There are no data on the effects of sex ratios on the lobster population. In the face of a lack of information that indicates that harvesting small males has no deleterious biological effect, it is economically more efficient to allow them to gain the extra weight of a 3 1/2" animal and thus increase the dollar value of the yield per recruit.

Comment: Small lobsters and berried females which are taken in traps should be brought in close to shore and released in "corrales" to spawn and/or grow.

Response: There is very little scientific evidence to indicate that this is biologically feasible and most data indicate that it would probably not succeed. Such a provision would also make enforcement of other regulations virtually impossible because of the presence of these berried and short lobsters on the boats and at the landing sites. The Council has recommended scientific efforts to assess the feasibility of such actions.

Comments: Retention of short and berried females in traps should not be allowed.

Response: The Council recognizes that some mortality is associated with this practice. However, there is no way to keep such lobsters from entering the traps and there is no way to enforce their release. The Council feels that prohibiting their transport on a boat is the best compromise. In addition, many fishermen commented that such attractors are necessary and greatly increase the catch rate. Moreover females which shed their eggs while in the trap are not lost to the fisherman since he can remove them then.

Comment: Reporting catches by fishermen is too much trouble and costs the fisherman money.

Response: Catch reports are essential for management and eventually provide more economic return to the fishermen. Fishermen also use the data to support claims for their losses in the fishery. Fishermen should not expect to utilize public resources as a source of personal income without helping to manage the resource upon which they depend.

Gear Restrictions (All opposing comments were made by Puerto Rican fishermen who use the bichero (gaff). There is documentary scientific evidence the injured lobsters have reduced growth rates and that gaffs produce injured lobsters.

Comment: Self destruct panels are not necessary and will represent additional costs to the fisherman.

Response: There are few hard data on the durability of various trap types under all environmental conditions. Most fishermen support (or demand) this measure. There will be no additional costs since such panels are already required under the laws of both Puerto Rico and the Virgin Islands. Regulations on material types are specific.

Comment: Marking of gear by owners is good but requires constant enforcement.

Response: The Council acknowledges that enforcement itself must be monitored.

Comment: The gaff (bichero, garfio) or hook on the end of a short stick or rod is the only gear used by divers in Puerto Rico. If prohibited, commercial fishing divers will be forced to quit.

Response: Gaffs (hooks, bicheros) injure many small lobsters and berried females which cannot then be harvested. Most injured animals probably die and if they do not, data show that their growth is markedly slowed because available energy goes to healing the wound.

Virgin Islands' law prohibits these instruments and fishermen there claim that the snare is far more efficient anyway. The Council feels that Puerto Rican fishermen can learn to use snares rather than bicheros.

There were no complaints about eliminating spears.

The following responses address the written comments received on the DEIS/FMP:

1. Federal enforcement costs identified in the DEIS/FMP are considered optimal and recognize that the possibility of obtaining additional resources to support that effort are remote. The plan also recognizes that the Coast Guard has higher priorites than fisheries management and that any enforcement by that agency would be incidental rather than directed. The plan acknowledges that Puerto Rico has an enforcement staff of over 300 rangers and the Virgin Islands has a small but expanding enforcement staff which collectively should be adequate for effective enforcement of this FMP. Therefore, Federal costs associated with enforcement will be substantially less than the $159,000 stated in the plan. Only NMFS uses the term "special agents".

2. Copies of the DEIS/FMP were forwarded to EPA, Region II and their comments are included in this Appendix.

3. Both of the Natural Resource Agencies of the Governments of Puerto Rico and the Virgin Islands have endorsed the adoption and implementation of FMP's developed by the Council.

4. Incremental Federal costs of $240,000 associated with enforcement and data collection activities is considered an overestimate because:

   1. practically all of the enforcement activity will be effected by existing state staff;

   2. data will be collected essentially under the existing statistical program in Puerto Rico, and additional data needs will be provided under a State/Federal agreement; and

   3. the size distribution survey has already been completed.

   Therefore, Federal costs associated with these activities will be substantially less than those identified in the DEIS/FMP. The final document will reflect these changes.

5. Negotiations are currently underway with NPS to effect such a sanctuary in Virgin Islands National Park waters. Taking of lobsters from Park waters would be prohibited.

6. Extension of Puerto Rico's jurisdiction to 9 nautical miles would place considerably more of resource in state waters and further reduce Federal enforcement responsibilities. The plan, however, is responsive to MFCMA in that the proposed regulatory regime is for the management of the stock throughout its range—from the coastline to offshore. At this time, however, it has not been determined if the extension of the jurisdiction "over resources beneath the sea floor" includes living marine resources.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

1980 JUL 14 PM 1:44

JUL 08 1980

RECEIVED
LO-2

Mr. Omar Munoz-Roure
Executive Director
Caribbean Fishery Management Council
Suite 1108, Banco de Ponce Building
Hato Rey, Puerto Rico 00918

Dear Mr. Munoz-Roure:

We have reviewed the draft environmental impact statement (EIS) and fishery management plans for the spiny lobster fishery of Puerto Rico and the Virgin Islands, and are in agreement with the proposed action to establish regulatory controls on the harvest of this species. Our only comment is to note that the EIS includes an estimate of $240,000 for the incremental cost of this program, a figure that does not appear sufficient both to enforce the fishery restrictions embodied in the plan, as well as to gather an adequate data base with which to measure program effectiveness. Accordingly, we suggest that these two critical aspects of program implementation be examined in greater detail in the final EIS. 1, 4

Based on the above and in accordance with EPA procedures, we have rated this EIS LO-2, indicating our lack of objections to the management plan (LO) and our request for additional information on program implementation (2).

Thank you for the opportunity to review this document. Two copies of the final EIS are requested

Sincerely yours,

Anne N. Miller

Anne Norton Miller, Director
Office of Federal Activities

cc: Bruce R. Barrett
U.S. Department of Commerce

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS: (G-OLE-4/31
U.S. COAST GUARD
WASHINGTON, DC 20593
PHONE: (202) 755-1155

•16475

JUL 21 1980

Mr. Omar Munoz-Roure
Executive Director
Caribbean Fishery Management Council
Suite 1108, Banco de Ponce Building
Hato Rey, Puerto Rico 00918

RECEIVED
1980 JUL 28 AM 10

Dear Mr. Munoz-Roure:

The Draft Environmental Impact Statement/Fishery Management Plan (DEIS/FMP) for the Spiny Lobster Fishery off Puerto Rico and the U.S. Virgin Islands has been reviewed. The Coast Guard agrees with the management measures outlined in the FMP and believes they will form a readily enforceable management regime.

In Section 8.3, page 25 the effect of P.L. 96-205 of March 12, 1980 has not been considered. Section 606 of this new law amends the Act of March 2, 1917 ("Jones Act"), as amended (48 USC 749), to give Puerto Rico a maritime jurisdiction seaward to three marine leagues (9 nautical miles) vice three nautical miles. This extended jurisdiction covers almost the entire area of the proposed fishery (inside 100 fathoms) off the coast of Puerto Rico. This situation is similar to the extension of marine jurisdiction to three leagues held by the states of Texas and Florida. Ambiguities between these extended state jurisdictions and the FCMA have been rectified, in part, through memoranda of understanding. 6

It is noted that in Section 8.8.1, page 26, and Table 4 on page 30, the DEIS/ FMP addresses costs of Coast Guard enforcement. While the source of this data is unknown, it is suspected that it is based on information which does not take into account the increased cost of fuel within the last few years, and the administrative overhead of enforcement. Further, it must be considered as preliminary data only, since it was generated prior to knowing the extent of the regulations. The level of Coast Guard enforcement effort estimated as necessary to enforce all FMP's within the Caribbean area within the next two years, is 150 aircraft-hours and 120 cutter-days on patrol per year. The effect of Puerto Rico's extended jurisdiction has not been evaluated in the estimate. 1, 1

The opportunity to comment on this DEIS/FMP is greatly appreciated. If you have further questions regarding this matter, please feel free to contact LT Bill CHAPPELL of my staff at (292) 755-1155, commercial or FTS.

Sincerely,

L. N. SCHOWENGERDT, Jr.,
Commander, U. S. Coast Guard
Assistant Chief, Operational Law
Enforcement Division
By direction of the Commandant

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (dpl)
Seventh Coast Guard District
51 S.W. 1st Avenue
Miami, Fla. 33130
Phone: (305) 350-5502

2 July 1980

Mr. Omar Munoz-Roure, Executive Director
Caribbean Fishery Management Council
Suite 1108, Banco de Ponce Building
Hato Rey, PR 00918

Dear Sir:

In response to the U. S. Department of Commerce letter of 22 May 1980, a review of the "Draft Environmental Impact Statement/Fishery Management Plan and Regulatory Analysis for the Spiny Lobster Fishery of Puerto Rico and the U. S. Virgin Islands", was made. The following comments are provided:

a. Page 25, paragraph 8.4, Enforcement Requirements (Inspection-Surveillance) - The statement "Regular Coast Guard patrols and onshore surveillance inspection by special agents will encourage compliance", is unclear. Regular Coast Guard patrols in the management area can be expected to be irregular and intermittent, not dedicated to fishery enforcement and inspection. It is doubtful that irregular patrols contribute to effective enforcement. It should be clearly established that these patrols are not vessel boardings or inspections, but patrol vessel transits. The statement "onshore surveillance inspection by special agents" is unclear. Who will perform this surveillance - the Coast Guard or National Marine Fishery Service?

This section should be expanded to include a discussion of the specific responsibilities and authority for management of the proposed fishery. It is suggested that the National Oceanic and Atmospheric Administration (NOAA) develop a memorandum of understanding (MOU) with the Coast Guard setting forth the specific responsibilities and reimbursement of costs of each party for management and enforcement of the fishery management program. Coordination in developing this memorandum should be conducted at the Headquarters level.

(dpl)
2 July 1980

b. Page 26, paragraph 8.8.1, Management and Enforcement Costs. In light of current economic conditions and budget limitations, the discussion of costs should be deferred until the (MOU) suggested in paragraph (a), above is developed.

c. Page 30, Table 4, Additional Government Costs of Proposed Measures. Again, the discussion of costs should be deferred until the (MOU) is developed.

Thank you for the opportunity to review this document.

Sincerely,

M. J. BARBOUR
Commander, U. S. Coast Guard
District Planning Officer
By direction of the Commander
Seventh Coast Guard District

Copy: DOT, SEC REP, Reg II
COMDT (G-WS-1)
COMDT (G-OLE-4)

United States Department of the Interior
FISH AND WILDLIFE SERVICE
15 NORTH LAURA STREET
JACKSONVILLE, FLORIDA 32202

July 17, 1980

RECEIVED
1980 JUL 22 PM 1:44

Mr. Omar Munoz-Roure
Executive Director
Caribbean Fishery Management Council
Suite 1108, Banco de Ponce Building
Hato Roy, Puerto Rico 00918

Dear Mr. Munoz-Roure:

This is in response to your request of February 21, 1979, to review the Spiny Lobster Fishery Management Plan for Puerto Rico and U.S. Virgin Islands relative to potential impacts on the brown pelican and West Indian manatee (Log No. 4-1-79-I-89).

After carefully reviewing the Draft Environmental Impact Statement (DEIS) and other correspondence relating to this Plan, we concur with your determination that the management measures proposed would not affect the brown pelican or West Indian manatee. (DEIS, Section 8.3.1.). As indicated in your October 29, 1979 letter, "manatee migration routes seldom occur in lobster pot fishing areas which are generally found farther offshore." In addition few, if any, lobster pots are set in manatee feeding areas that are usually located in water less than 2 fathoms and near shore. Up to the present time, there is no evidence available from Puerto Rico to indicate that manatees become entangled in lobster pots or trap marker lines.

This does not constitute a Biological Opinion; however, it satifies the requirements of the Act and no further action on your part is required. If significant changes are made in the Fishery Management Plan or if data becomes available to show that a potential conflict may exist between the lobster pot fishery and threatened and endangered species, then consultation should be reinitiated.

We appreciate your interest and concern in protecting threatened and endangered species.

Sincerely yours,

Donald J. Hankla

Donald J. Hankla
Area Manager

United States Department of the Interior

OFFICE OF THE SECRETARY

Southeast Region / Suite 1412 / Atlanta, Ga. 30303
Richard B. Russell Federal Building
75 Spring Street, S. W.

July 11, 1980

RECEIVED
1980 JUL 21 PM 3:44

ER-80/554

Mr. Omar Munoz-Roure, Executive Director
Caribbean Fishery Management Council
Suite 1108, Banco de Ponce Building
Hato Rey, Puerto Rico 00918

Dear Mr. Munoz-Roure:

The following comments concern the Draft Environmental Impact Statement/Fishery Management Plan and Regulatory Analysis for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands.

General Comments

The document appears to be complete, and we agree that it is time for some method of control over the sport and commercial harvest of the spiny lobster. The incidence of taking especially small lobster (less than 3.5 inch carapace length) is very high in Puerto Rico. Any method to control the taking of small lobster should improve the present conditions.

Presently, there are two major problems facing the implementation of this fishery management plan. One is the difficulty of gathering reliable statistics on the actual sport and commercial catches. The other is the enforcement of any adopted regulations. It is believed that the present Ranger Corps of the Puerto Rico Department of Natural Resources could handle the increased activity of enforcement, provided the restrictions on lobster harvest are made part of Commonwealth law. The Department of Conservation and Cultural Affairs rangers in the U.S. Virgin Islands are adequately enforcing the territorial lobster harvest regulations.

Data on the lobster fishery in Puerto Rico and the Virgin Islands is incomplete. A method must be devised to get good statistics on both commercial and recreational catches. It is believed that the sport taking of lobster accounts for a highly significant part of the total catch.

Specific Comments

4 Page 21, paragraph 8.1.4 - Broadening the data base should be a top priority. The spiny lobster fishery in Puerto Rico is poorly understood and thus poorly regulated. An improvement in biological and economic data will provide a better understanding of the fishery as it presently exists.

1 Page 22, paragraph 8.1.5 - The concept of reducing the losses of traps as outlined is good; however, the methodology is a bit more difficult. Presently, there are not enough enforcement personnel and equipment available to provide significant relief to the pilferage and thievery problem.

4 Page 22, paragraph 8.2 - The statement that the spiny lobster fishery has not been overfished appears incongruous in light of the fact that the maximum sustained yield is estimated and the gathering and reporting of statistics are incomplete. A strong effort must be made to improve catch data.

5 Page 23, paragraph 2.0 - A provision should be included to designate lobster sanctuaries should they be defined by research. Possibly these sanctuaries could be closed to the sport/commercial taking of lobster during periods of high reproductive activity.

1 Page 25, paragraph 8.4 - We believe this section should be expanded to take into account the present enforcement capabilities of Commonwealth, Territory, and Federal enforcement agents, and their areas of responsibility. Presently, there are only four Federal agents for Puerto Rico and the Virgin Islands. These agents are already hard pressed to handle their everyday duties. It would be impossible for them to enforce new regulations.

Sincerely yours,

James H. Lee

James H. Lee
Regional Environmental Officer

United States Department of the Interior

NATIONAL PARK SERVICE
Virgin Islands National Park
Box 7789 - St. Thomas, V. I. 00801

IN REPLY REFER TO:
N1423

July 10, 1980

RECEIVED

Mr. Omar Munoz-Roure, Executive Director
Caribbean Fishery Management Council
Suite 1108, Banco de Ponce Building
Hato Rey, Puerto Rico 00918

Dear Mr. Munoz-Roure:

Members of my staff reviewed the Draft EIS/Plan/Regulations (1980) for the Spiny Lobster Fishery in the PR/VI area. This letter constitutes our comments on the draft. Some specifics:

1. We believe that - a) minimum size of 3.5 inches (carapace length), b) no gravid lobsters allowed, c) no molesting of gravid lobsters, d) allow baiting with trapped undersized lobsters, e) allow retention of trapped gravid lobsters until eggs are shed, and f) require that lobsters be kept intact while on or below the water surface - are all good regulations.

2. The proposed sanctuary on the North Shore of Virgin Islands National Park will require much study on the part of the National Park Service. As the Virgin Islands Government shares jurisdiction with the NPS over these waters, and are developing a sanctuaries program, perhaps the proposal might be best directed at them.

3. The data collection procedures look adequate. Careful handling of public relations would be important in this instance.

4. All gear restrictions seem to be appropriate.

The 1978 Draft Plan was also reviewed. The biological and economic data contained therein generally supports the present proposal.

Our Regional Office in Atlanta has no comments on the draft. We anticipate the participation of our legal professionals there should the sanctuary proposal receive further consideration. Much weight will also be given to the opinions of NPS biologist, such as Gary Davis, who are familiar with the Spiny Lobster.

I appreciate this opportunity to comment on these proposals.

Sincerely yours,

Joe R. Miller

cc:
Mr. Bruce R. Barrett
Office of Environmental Affairs
Washington, D. C. 20230

COMMONWEALTH OF PUERTO RICO / OFFICE OF THE GOVERNOR

Environmental Quality Board

[illegible] MANAGEMENT COUNCIL

1980 JUL 16 PM 12:01

No: OSA 362/80

July 7, 1980

Mr. Omar Muñoz Roure
Executive Director
Caribbean Fishery
Management Council
Suite 1108
Banco de Ponce Bldg.
Hato Rey, Puerto Rico 00918

Re: Fishery Management Plan and Draft EIS for the Spiny Lobster Fishery of P. R.

Dear Mr. Muñoz Roure:

After studying the Fishery Management Plan EIS for the Spiny Lobster Fishery of Puerto Rico, we wish to issue the following comments:

1. A copy of the Plan/Draft EIS should be sent to the Environmental Protection Agency Region II Offices (26 Federal Plaza, New York, N.Y. 10007) since this is the EPA Region covering New York, New Jersey, Puerto Rico and the Virgin Islands. 2

2. The Environmental Quality Board is in favor of the size and sex restrictions and gear restrictions incorporated into the new FMP. We note that the Plan would prohibit spearfishing for lobster, a practice which has still not been outlawed in Puerto Rican territorial waters. We think that spearfishermen may account for much more than the 10% of the commercial catch (in Puerto Rico) presently estimated by the Caribbean Fishery Management Council. We endorse the proposed prohibition on spearfishing for lobster. This fishing technique does not allow verification of size or sex of the animal before it is killed.

   We also note the requirement for a self-destruct panel on fish traps. Although this requirement is part of Puerto Rico's Fishing Law, it apparently has seldom been enforced, as most traps now in use seem to be uniformly made of steel rod and chicken wire mesh.

3. Finally, we wish to note that there are no provisions for enforcement in the Regulation. Who will monitor compliance with the Regulation once it is adopted? We think it is essential that the plan be endorsed and incorpored into the Fishing Law of Puerto Rico (Ley de Pesca Núm. 83 of May 13, 1936, as amended) as soon as possible, so that local regulatory agencies (the Department of Natural Resources and CODREMAR) can monitor compliance.

Cordially yours,

Pedro A. Gelabert
Chairman

THE VIRGIN ISLANDS OF THE UNITED STATES
OFFICE OF THE GOVERNOR
CHARLOTTE AMALIE, ST. THOMAS 00801

July 7, 1980

Mr. Omar Munoz-Roure
Executive Director
Caribbean Fishery Management Council
Suite 1108 Banco de Ponce Building
Hato Rey, Puerto Rico 00918

Dear Mr. Munoz-Roure:

Governor Juan Luis has instructed me to acknowledge receipt of your letter dated June 10, 1980 transmitting two copies of the Draft Environmental Impact Statement/ Fishery Management Plan and Regulatory Analysis for the Spiny Lobster fishery of Puerto Rico and the U. S. Virgin Islands.

The report contains very valuable information not only about fishing for the lobsters, but also about the lobsters themselves. To the lay person it is a valuable reference and we appreciate your thoughtfulness in sending us these copies.

Sincerely,

Calvin Wheatley
Assistant to the Governor

Estado Libre Asociado de Puerto Rico
Gobierno Municipal
Oficina del Alcalde
Culebra, P. R.

PONENCIA: CONSEJO DE PESCA DEL CARIBE

Desde que el pescador culebrense y otros pescadores puertorriqueños hacen más de cincuenta años tuvieron reconocimiento de la importancia de la langosta como parte de la alimentación de un pueblo, creció en ellos la preocupación de la conservación de la especie. Ellos crearon sus propios controles para proteger la producción de la langosta en estado grávido con procedimientos tales como: devolver al mar las que tenían huevos a punto de soltarlos, se preservaban en viveros especiales hasta que depositaban todos los huevos.

Uno de los factores negativos ha sido la ignorancia de personas que desconocen los hábitos de la langosta en la época de su reproducción y en otras ocasiones el número de ellas que quedan atrapadas en las trampas perdidas. Son las razones de mayor peso en el desbalance señalado en la region y que con esta nueva modalidad restrictiva se pretende sostener ese desbalance.

En la constante demanda de crustáceos, la langosta es la de mayor demanda por el público y su precio es el estímulo que atrae al pescadór a inclinarse más hacia la pesca de langostas que de otros tipos de pesca lo que está constantemente reflejando un mayor número de capturas y un desbalance continuo en la materia prima. La pérdida de empleos ha hecho crecer la matrícula de pescadores que ingresan a las Asociaciones de Pescadores y con las ayudas que se le ofrecen hacen de esto una profesión y se constituye en un medio de vida permanente para él y sus familiares y en múltiples ocasiones indirectamente el producto de ésta profesión se constituye en punto de apoyo para el desarrollo comercial y de atracción turística para aquellas áreas cercanas a la operación del puerto pesquero o de la asociación pesquera.

Compoarto la intención del Consejo del Caribe de establecer mediante Ley mecanismos que tiendan a proteger la especie para mantener su balance en el Caribe especialmente en la zona nuestra o de Puerto Rico, pero que la forma o Ley restrictiva no esté basada solo en las estadísticas ya publicadas por la prensa del país que solo señala como razón la cantidad capturada y que aparentemente la cantidad tiende a impresionar y desalentar a los pescadores que viven de esta industria a que vayan buscando otro modus vivendi.

Tanto los gobiernos locales, como el Gobierno del Estado Libre Asociado de Puerto Rico, han planificado en torno a la pesca en las aguas de Puerto Rico; como ejemplo podemos señalar el Plano Regulador y uso de terrenos preparado por la Junta de Planificación para la isla de Culebra donde se hace incapié en la creación de programas de maricultura y de otras formas para salvaguardar la especie en este caso la protección de la langosta en estado grávido. Han habido

peticiones para que se establezcan programas federales para el estudio de la conservación de la langosta en areas señaladas para su desarrollo natural , de establecer medios de incentivos al pescador para que bregue con mayor delidadeza con las langostas con huevos, que las puedan proteger en una forma más segura hasta llegar a los santuarios y que estos programas envuelvan personal permanente y profesional que mantengan un control constante estadístico y práctico de los proyectos que se establezcan hasta determinar la capacidad productiva de cada proyecto ya sean individuales o en forma colectiva. Que los programas a desarrollarse ya sean estos de mariculture o de índole de estudios a traves del laboratorio envuelva además tipos de adiestramiento y conferencias a todo el personal que bregue con las langostas, sean estos pescadores, centros de venta y distribución, al mismo cliente y hasta grupos de jóvenes que se -interesen por los programas de protección.

La demanda mayor de la langosta que se captura fluctua entre 3 libras y 5 libras por lo que creemos que de no existir una profunda razón para restringir la captura de langosta de 3½ libras, debe darse una mayor explicación de las razones por lo que no se pueda reducir el tamaño de las mismas y que el consejo recomiende a su organizmo central incluir programas ya planificados por los gobiernos locales y el extatal que envuelva el desarrollo para el incremento de la producción de la langosta y otras especias marinas.

Todos los puertos pesqueros estamos de acuerdo con los planes de protección que se discuten porque sirven para mantener el balance de la vida marina especialmente qquel que contribuye a convertirse en parte de la nutrición de un pueblo, pero tambien sostenemos proyectos para capitalizar a traves del uso de ellos el sostener como medios de vida parte de ese pueblo que vive de ese medio mediante la pesca y nos preocupa tambien el desarrollo de todo tipo de tecnología marina moderna que tienda a aumentar la capacidad en el desarrollo de la materia prima en este caso la langosta.

Compartimos la preocupación del Consejo en proteger nuestros recursos marinos, y nos complace estar envueltos en los mecanismos señalados en esta vista, pero a la vez sea de alta preocupación.

Asociación Pescadores de Maunabo
Bo. Emajaguas - Sector Playa, Apartado 627, Maunabo, Puerto Rico 00707

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11 de julio de 1980

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Sr. Omar Muñoz- Roure
Executive Director
Caribbean

Estimado señor Muñoz:

A continuación le someto la reacción y alternativas a las restricciones que el consejo de administración Pesquera del Caribe propone con relación a la pesca de la langosta "Panulirus Argus" que los pescadores de la Asociacion de Pescadores de Maunabo entienden que les afectan.

Restricciones de tamaño y sexo

1. Recomendamos que la medida debe ser de 3.0 pulgadas en adelante.

Esto lo hemos determinado asi debido que en nuestra área el porciento de langosta de 3.0 hasta 3.5 es bastante elevado. En una prueba hecha en el proyecto en tres pescas diferentes se determinó un 38%. Además la experiencia nos indica que en estas medida ya la langosta se ha reproducido.

Favorecemos todas las demás restricciones sometidas por el consejo con relación al tamaño y sexo.

Restricciones en las artes

1. Se debe permitir el uso de bicheros. Esto es un anzuelo al final de un pedazo de metal, que es utilizado por los buzos. Entendemos que se puede permitir porque:

   a. El buzo puede determinar qué langosta puede pescar dentro de las limitaciones de ley.

   b. Hay muchos pescadores que no tienen dinero suficiente para comprar marerial para construir nasas y utilizan este tipo de arte como su único equipo de trabajo. El impacto economico en estos pescadores seria mucho mayor al estado actual.

   c. El daño hecho a la langosta es mínimo, ya que el buzo puede determinar qué langosta capturar y el promedio que se quedan heridas sin capturar, según la experiencia manifestada, es mínimo.

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2. Se debe incluir bien claro en la ley, si se llegara aprobar y adoptar por el gobierno de P.R., el tipo de material autodestructible a utilizarse en las puertas de las nasas.

Observaciones Generales

1. Se debe dar una orientación y educación a todos los pescadores a través de radio, televisión, periódicos persona a personas y de otras formas y con no menos de un año, de manera que ya los pescadores vayan haciendo los arreglos correspondientes.

2. Se debe evaluar el impacto socio-económico de esta reglamentación periódicamente para determinar su efecto (esto es una vez puesto en función).

Felicitamos al consejo por la gran tarea que están llevando a cabo en beneficio de la pesca en general y nos ponemos a la orden cuando determinen que le podemos ayudar en algo.

Cordialmente,

Julio Sánchez.
Presidente

Comments from: Mr. Pipino Montalvo
Barrio Guaniquilla, Cabo Rojo

Sábado 12 de julio de

(Reglamentación de la Langosta)
"La idea es buena, siempre y cuando"

Honorable Consejo, siempre hay una primera vez para llevar algo a la práctica, ésta serían sus planes para reglamentar la pesca de la langosta. Por mi experiencia como pescador de nasas, creo no deben dejar dentro de la nasa langostas con huevos o las gatas pequeñas; pues éstas serían víctimas del mero, la chema, el congre, el peje puerco y sobre todo el pulpo el cual es el peor de todos.

—¿Quiénes van a ser los pescadores más perjudicados con esta medida de 3.5 pulgadas?

Los pescadores que pescan en las costas, o sea los que echan sus nasas cerca de la orilla o en los barrancos como se dice entre los pescadores.

—¿Por qué van a ser más perjudicados estos pescadores que pescan la langosta en áreas más cercanas a la orilla?

Porque de diez langostas capturadas alrededor de ocho no dan la medida de las 3.5 pulgadas.

Esa mi opinión personal, por experiencias propias.

—¿Pagaría el Gobierno la mitad de el valor en dinero de las langostas capturadas y devueltas al mar de nuevo?

Se cree muy difícil por el pasaje y otras razones.

—¿Permitiría el gobierno que cada pescador en conjunto o individual fabrique su propio corral en alambre de nasa para depositar las langostas menores de 3.5"

Estando que lo del Gobierno es la reproducción y no el cautiverio hasta lograr las medidas, aunque la idea sería que crecieran y se reprodujeran

—¿Se han hecho estudios donde está la langosta en corrales o criaderos y se reproduzca?

Ya se le podría asegurar, pero se puede tratar de hacer el estudio. Pues hay gente que ha logrado hacer criaderos de camarón de tierra, logrando gran producción y que la bomba suelte los huevos y no hay animales que mate o se coman esos huevos.

—¿Se podría hacer lo mismo con la langosta

Vamos a probar. "De el estudio y a la práctica."

Tengo una revista donde hay ilustraciones de "Granjas de Peces en el Japón." Estos logran grandes producciones de deberían hacer lo mismo con la langosta. "Esa es mi idea." ¿Cuál es la de ustedes los del Consejo de Administración? Pregunta al Con