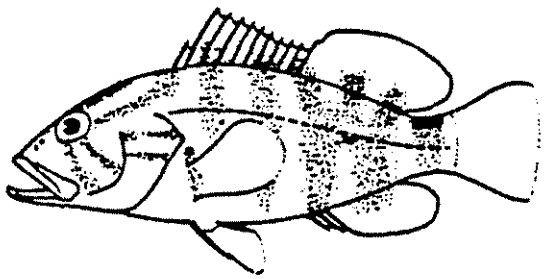
FISHERY MANAGEMENT PLAN, FINAL ENVIRONMENTAL IMPACT STATEMENT, AND DRAFT REGULATORY IMPACT REVIEW, FOR THE SHALLOW-WATER REEFFISH FISHERY OF PUERTO RICO AND THE U.S. VIRGIN ISLANDS

FEBRUARY, 1985

Prepared by the
Caribbean Fishery Management Council

In Cooperation with
National Marine Fisheries Service



ERRATA

	Page	Changes
1.	XVI	Add: "Dr. Herb Kumpf, Fishery Biologist" to "Task Team for FMP"
2.	13	Delete: Last "and" of last sentence in 8.1.1
3.	14	Substitute "S" for "s" in "spanish hogfish"; underline "rufus" after Bodianus...
4.	15	Add: "s" to "represent" in last sentence of 8.1.12
5.	16	Add: "Ostraciidae" after "Boxfishes" in 8.1.14
6.	29	Sentence before table should read: "In Puerto Rico, the most important, in terms of landings, shallow-water reeffish species decreased in catch per trap per year as shown below."
7.	67	Delete: "...Mona, Monito, and..." in 11.1.1.

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1.0 INTRODUCTION

This document presents a combined Fishery Management Plan (FMP) for the Shallow-Water Reeffish Fishery of the Caribbean Region, Draft Regulatory Impact Review (RIR) of the economic consequences of the proposed management measures, and Final Environmental Impact Statement (FEIS) describing the possible effects on the environment of implementing the FMP. The table of contents for the RIR and EIS elements are provided separately to aid in referencing corresponding sections of the FMP. Certain baseline data used in the preparation and evaluation of the various stock assessments and survey results summarized in Appendix I are available for inspection at Council headquarters.

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1.1 Definitions of Terms

1.1.1 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(2))

1.1.2 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).

1.1.3 Expected Domestic Annual Harvest (DAH): The domestic annual fishing capacity as modified by such 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.

1.1.4 Optimum Yield (OY): The Magnuson Fishery Conservation and Management Act (MFCMA) defined "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." OY may be set higher than MSY in order to produce a higher yield from other more desirable species in a multispecies fishery. It might be set lower than MSY in order to provide larger-sized individuals or a higher average catch per unit of effort.

1.1.5 Total Allowance Level of Foreign Fishing (TALFF): OY minus DAH establishes the surplus available for foreign fishing.

1.1.6 Domestic Annual Processing (DAP): The capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States.

1.1.7 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 FMP, be restricted to a group of species.

2.0 SUMMARY

This FMP was prepared by the Caribbean Fishery Management Council to establish a management system for the shallow-water reeffish resources within the fishery conservation zone (FCZ) and the "state waters" of the Commonwealth of Puerto Rico and the Territory of the U.S. Virgin Islands, from the shoreline to the edge of the insular platform. Of some 350 species of shallow-water reeffish in the Caribbean, about 180 are landed and used in quantity throughout the region and collectively comprise the most important fishery in the islands. The FMP's management unit includes the 64 most commonly landed species (distributed among 14 families) which compose the bulk of the catch from Puerto Rico and the U.S. Virgin Islands.

The assemblage of species is utilized by approximately 2,000 commercial fishermen who use traps, hook and line, nets, seines and spears to harvest the catch. Additionally, there are more than 12,000 recreational boats which may be used for fishing in the same waters. The occupants of these boats fish mainly with hook and line or spears. Conflicts such as trap poaching have been detected within the commercial sector of the fishery.

It is exceedingly difficult to estimate accurately the total potential fishery yield of shallow-tropical-coralline environments and as a result many such fisheries throughout the world have been overexploited both biologically and economically. The FMP attempts to deal with this problem and mitigate adverse conditions in the fishery.

Unpublished data for the years 1979 through 1982 obtained from the Corporation for the Development of the Marine, Lacustrine and Fluvial Resources of Puerto Rico (CODREMAR) show a decline in landings as well as catch per trap. Confronted with the graphs shown in Appendix I, the fishermen interviewed at the fact-finding meetings (see Section 10.1), corroborated that the overall decline in the fishery landings is a reality in both Puerto Rico and the U.S. Virgin Islands.

The reeffish resource is of considerable value to the fishermen and citizens of Puerto Rico and the U.S. Virgin Islands. It satisfies social customs and life styles, provides employment, income, recreation, and protein. Total recreational and commercial shallow-water reeffish landings in 1982 were estimated at 7.5 million lbs., with a commercial value of $8.7 million.

The objectives of this FMP are stated in Section 7.0. Table 1 summarizes the problems, objectives, and the remedial measures proposed.

Table 1

SYNOPSIS OF PROBLEMS, OBJECTIVES, AND REMEDIAL MEASURES

PROBLEM	OBJECTIVE	REMEDIAL MEASURES
1. Insufficiency of data needed for long-range management	1. Obtain the necessary data for management and monitoring	1. Gather catch/effort and length/frequency data as well as any pertinent information about these resources through improvement of the state federal agreements and/or Council's own data gathering program (if needed) for species-groups addressed in this FMP. 2. Support research related to stock assessment problems. 3. Recommendations to the Secretary regarding international management.
2. Declining stocks	2. Reverse the declining trends in the resource. a) Restore and maintain adult stocks at levels that ensure adequate spawning and recruitment to replenish the populations. b) Prevent the harvest of individuals of species of high value (e.g. snappers, groupers and others) which are less than the optimum size.	1. Establish a 1 1/4" mesh (in the smallest dimension) for fish traps. 2. Require a self-destruct panel in fish traps. 3. Prohibit the use of poisons, drugs, other chemicals and explosives. 4. Recommend that the local governments prohibit the hauling of seines onto beaches. 5. Establish minimum sizes and/or closed seasons for Nassau grouper, yellowtail snapper and other high-value species (see Sections 10.0, 11.0, and 12.0).

3. Severe conflicts among harvesters of the resource (i.e. trap poaching, etc.)	3. Reduce the opportunity for conflicts among harvesters of the resource.	1. Require owner identification and marking of gear and boat. 2. Prohibit the hauling of another persons' traps without written permission of the owner.
4. The stocks of many, if not most, of the species in the unit range across state and international boundaries.	4. Promote compatible, if not uniform, management of the pan-Caribbean species in the unit.	1. Recommendations to the Secretary to formulate a viable plan of action for cooperation among the states and nations for managing the common resource.
5. Ciguatera is a public health problem, as well as a utilization and marketing problem.	5. Help solve the ciguatera problem.	1. Support the on-going cooperative research program which is attempting to find answers to causes and treatment of ciguatera, and the development of testing methods for ciguatera.

3.0 REGULATORY IMPACT REVIEW (RIR)

This integrated document contains all elements of the FMP, RIR and EIS. To aid the reviewer, a table of contents for the RIR elements is provided separately, referencing sections of the FMP.

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Statement of Problems and Issues	6.0	7
Analysis of Benefits and Costs (Consequences of the Proposal)	10.0	48
Rationale for Choosing the Proposed Regulatory Action	10.0	48
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4.0 ENVIRONMENTAL IMPACT STATEMENT

( ) Draft (X) Final

Responsible Agencies

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Name of Action: (X) Administrative ( ) Legislative

Abstract:

The proposed action is to adopt and implement a fishery management plan for the shallow-water reeffish fishery within the area of authority of the Caribbean Fishery Management Council around Puerto Rico and the U.S. Virgin Islands. The objectives of the FMP are to: 1) obtain the necessary data for management and monitoring; 2) reverse the declining trends (i.e. decrease in landings and catch per unit of effort (CPUE) in the resource; 3) reduce conflicts among harvesters of the resource; 4) promote compatible, if not uniform, management of the pan-Caribbean species in the unit, and 5) help solve the ciguatera problem.

The following measures are proposed to accomplish the objectives: 1) establish 1 1/4" minimum mesh size for fish traps; 2) require a self-destruct panel and/or self-destruct door fastening on fish traps; 3) require owner identification and marking of gear and boats; 4) prohibit the hauling or tampering with another person's traps without owner's written permission; 5) prohibit the use of poisons, drugs, other chemicals, and explosives for fishing; 6) establish a minimum size for high value species such as yellowtail snapper and Nassau grouper; 7) establish a closed season for Nassau grouper; 8) improve the data collection system for this fishery; 9) recommend that the Government of Puerto Rico close a section of the island of Culebra to all fishing on an experimental basis to assess the

closed areas as a management strategy; 10) recommend that the pertinent authorities cooperate with the National Park Service (NPS) in the U.S.V.I. in establishing fishery-research projects to assess stocks inside and outside the NPS system; 11) recommend that the local governments prohibit taking the haul or beach seines onto the beach, except those short seines used for shrimp; 12) recommend that the pertinent authorities fund and support research to help solve the vexing and dangerous problem of ciguatera and; 13) recommend that the local governments adopt and implement the management measures proposed in this FMP within their fishery jurisdiction in order to manage the species through their entire range.

Comments Requested By:

ENVIRONMENTAL IMPACT STATEMENT

This integrated document contains all elements of the FMP, RIR and EIS. To aid the reviewer, a table of contents for the EIS elements is provided separately, referencing corresponding sections of the FMP.

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List of Preparers

The FMP, RIR and EIS were prepared by the Caribbean Fishery Management Council (CFMC) with principal input from members of the Council staff, NMFS and NOAA, as listed below:

Caribbean Council Staff

Name		Area of contribution to FMP preparation
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Name	Area of contribution to FMP preparation
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George C. Miller Fishery Biologist	Biological and ecological aspects of the fishes
David Olsen Fishery Biologist	Management measures analysis in relation to USVI fisheries
Fred Prochaska Economist	Economic analysis of the management measures
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Luis Rivas Ichthyologist	Biology, taxonomy, and ecology of the fishes

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 Shallow-Water Reeffish User Groups in Puerto Rico and U.S. Virgin Islands

Puerto Rico and Virgin Islands Public Libraries

NOAA National Ocean Service (Office of Ocean and Coastal Resource Management Sanctuary Program Office)

Sport Fishing Institute

Center for Environmental Education

Draft Statement to EPA: June 1, 1984

Final Statement to EPA:

5.0 THE FISHERY MANAGEMENT UNIT

The fishery occurs in the shallow water (40 fathoms-240 feet-or less) of the insular shelf, that is, from inshore to the shelf's edge (see Fig. 1). The edge of the platform is precipitous and sometimes falls from 10 fathoms to several hundred fathoms in a boat length. For this reason nautical charts indicate the 100-fathom contour as the edge of the shelf although it may be virtually superimposed upon the 40- and 50-fathom contours. The entire shelf area within U.S. waters contains 2,115 square nautical miles. The total length of the 100-fathom contour inside U.S. waters is 500 nautical miles. U.S. waters are here distinguished from British waters which cover part of the geological platform. The U.S. Virgin Islands has management authority over fisheries out to three nautical miles while Puerto Rico has similar authority out to nine nautical miles.

The FMP manages shallow-water reeffish resources throughout the fishery conservation zone (FCZ). Although, by law, Council authority is restricted to the FCZ, written agreements by the governments of Puerto Rico and the U.S. Virgin Islands (Appendix II) will extend the proposed management system into waters under their respective jurisdictions thereby providing for uniform management of shallow-water reeffish resources throughout the range of the fishery to the extent possible. This arrangement is essential to the effective management of these resources since most of the management area is within state waters. Separate production for state and federal waters, is not available because management authority for Puerto Rico was only recently extended to nine nautical miles.

Beyond the shelf area, the character of the fishery changes dramatically into what is classified as the deep-water reeffish unit. The deep-water unit is, for the most part, characterized by different species associations than those that occur in the shallow-water unit. Of more than 350 species of reeffish inhabiting the nearby waters, some 180 species enter the fishery in quantity. Of these, only those primarily in the shallow-water reef complex are considered. The 64 species, which compose the bulk of the catch, are included in the management unit (see Table 2).

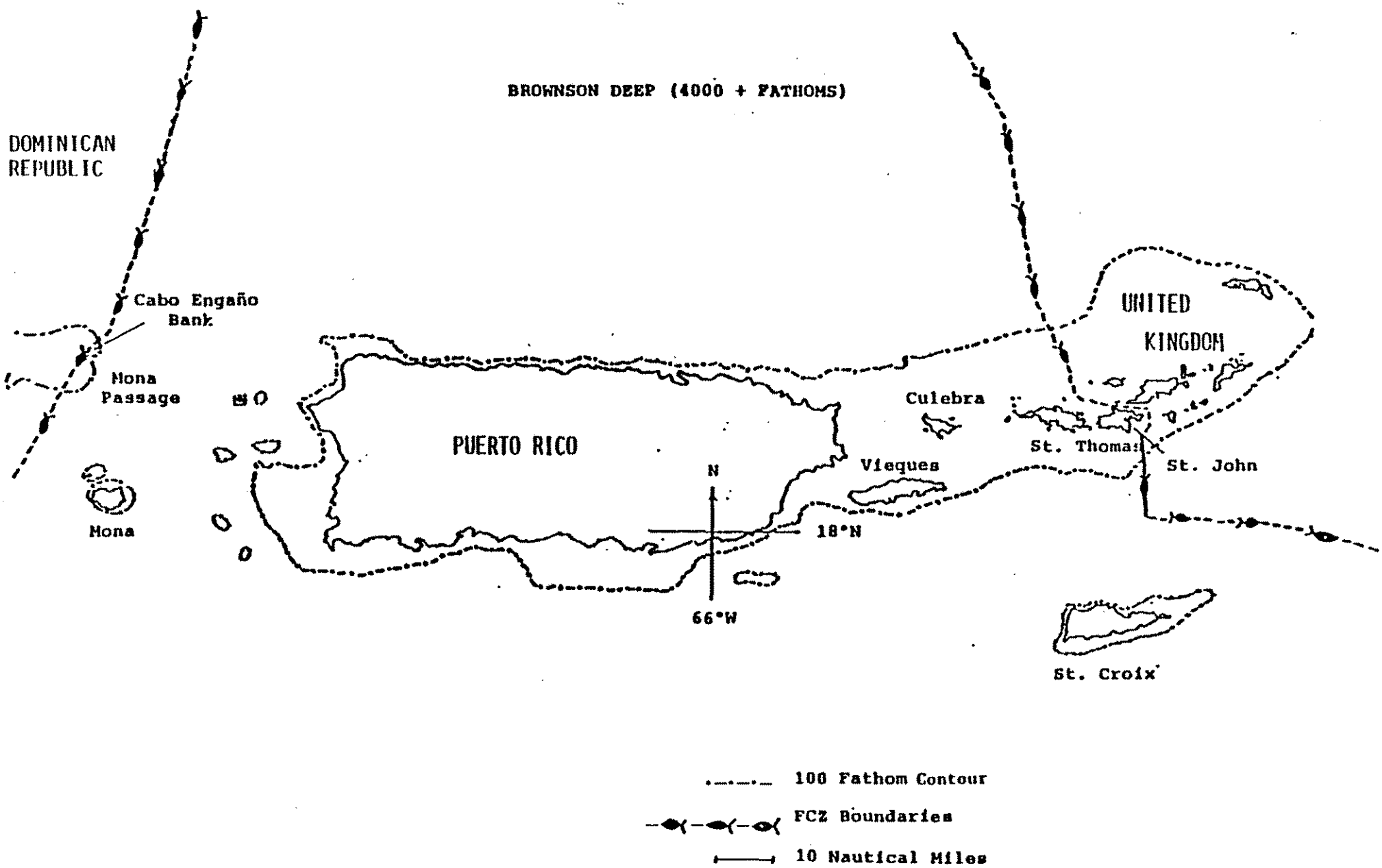


FIGURE 1

PUERTO RICAN AND ST. CROIX SHELVES

Table 2. Commercial shallow-water reeffish species of Puerto Rico and the U.S. Virgin Islands included in the management unit

Family	Common Name	Common Specific Name	Spanish Name *	Genus and Species
Holocentridae	Squirrelfishes	Squirrelfish	Gallo, candil	*Holocentrus ascensionis*
		Longspine squirrelfish	Candilero	*Holocentrus rufus*
Serranidae	Groupers	Rock hind	Cabra mora	*Epinephelus adscensionis*
		Graysby	Mantequilla	*Epinephelus cruentatus*
		Coney	Mantequilla	*Epinephelus fulvus*
		Red hind	Mero cherna	*Epinephelus guttatus*
		Jewfish	Mero grande	*Epinephelus itajara*
		Nassau grouper	Cherna	*Epinephelus striatus*
		Yellowfin grouper	Mero pinto, Guajil	*Mycteroperca venenosa*
Carangidae	Jacks	Yellow jack	Guaymen amarillo	*Caranx bartholomaei*
		Blue runner	Cojinua	*Caranx crysos*
		Horse-eye jack	Jurel ojon	*Caranx latus*
		Black jack	Jurel negron	*Caranx lugubris*
		Bar jack	Cojinua	*Caranx ruber*

*From Erdman, 1983 and FAO, 1978

Family	Common Name	Common Specific Name	Spanish Name *	Genus and Species
Lutjanidae	Snappers	Mutton snapper	Sama	Lutjanus analis
		Schoolmaster	Pargo amarillo	Lutjanus apodus
		Mangrove snapper	Pargo prieto	Lutjanus griseus
		Dog snapper	Pargo colorado	Lutjanus jocu
		Mahogany snapper	Rayado de yerba	Lutjanus mahogani
		Lane snapper	Rayado	Lutjanus synagris
		Yellowtail snapper	Colirrubia	Ocyurus chrysurus
Haemulidae	Grunts	Margate	Viuda	Haemulon album
		Tomtate	Mulita, Mula	Haemulon aurolineatum
		French grunt	Condenado	Haemulon flavolineatum
		White grunt	Cachicata	Haemulon plumieri
		Bluestriped grunt	Ronco amarillo	Haemulon sciurus
Sparidae	Porgies	Sea bream	Chopa	Archosargus rhomboidalis
		Jolthead porgy	Bajonado	Calamus bajonado
		Sheepshead porgy	Pluma	Calamus penna
		Pluma	Pluma	Calamus pennatula

*From Erdman, 1983 and FAO, 1978

Family	Common Name	Common Specific Name	Spanish Name *	Genus and Species
Mullidae	Goatfishes	Yellow goatfish	Salmonete amarillo	Mulloidichthys martinicus
		Spotted goatfish	Salmonete colorado	Pseudupeneus maculatus
Chaetodontidae	Butterflyfishes	Foureye butterflyfish	Mariposa	Chaetodon capistratus
		Spotfin butterflyfish	Mariposa	Chaetodon ocellatus
		Banded butterflyfish	Mariposa	Chaetodon striatus
Pomacantidae	Angelfishes	Queen angelfish	Isabelita	Holacanthus ciliaris
		Rock beauty	Isabelita medioluto	Holacanthus tricolor
		Gray angelfish	Cachama blanca	Pomacanthus arcuatus
		French angelfish	Cachama negra	Pomacanthus paru
Labridae	Wrasses	Spanish hogfish	Loro capitán	Bodianus rufus
		Puddingwife	Capitán de piedras	Halichoeres radiatus
		Pearly razorfish	Doncella cuchilla	Hemipteronotus novacula
		Hogfish	Capitán	Lachnolaimus maximus
Scaridae	Parrotfishes	Midnight parrotfish	Judio	Scarus coelestinus
		Blue parrotfish	Brindao	Scarus coeruleus
		Striped parrotfish	Loro	Scarus croicensis

*From Erdman, 1983 and FAO, 1978

Family	Common Name	Common Specific Name	Spanish Name *	Genus and Species
		Rainbow parrotfish	Guacamayo	Scarus guacamaia
		Princess parrotfish	Loro	Scarus taeniopterus
		Queen parrotfish	Loro	Scarus vetula
		Redband parrotfish	Loro	Sparisoma aurofrenatum
		Redtail parrotfish	Loro	Sparisoma chrysopterum
		Stoplight parrotfish	Chaporra	Sparisoma viride
Acanthuridae	Surgeonfishes	Ocean surgeonfish	Medico	Acanthurus bahianus
		Doctorfish	Medico	Acanthurus chirurgus
		Blue tang	Medico	Acanthurus coeruleus
Balistidae	Leatherjackets	Queen triggerfish	Puerco	Balistes vetula
		Ocean triggerfish	Turco	Canthidermis sufflamen
		Black durgon	Japonesa	Melichthys niger
		Sargassum triggerfish	Puerquito	Xanthichthys ringens
Ostraciidae	Boxfishes	Spotted trunkfish	Chapin	Lactophrys bicaudalis
		Honeycomb cowfish	Chapin	Lactophrys polygonia
		Scrawled cowfish	Chapin	Lactophrys quadricornis
		Trunkfish	Chapin	Lactophrys trigonus
		Smooth trunkfish	Chapin	Lactophrys triqueter

*From Erdman, 1983 and FAO, 1978

The relative position of some of the most commonly landed species and species-groups by weight, in 1980, is shown below:

Species/Species-Group	Family	Percent of Total Shallow-Water Reeffish Catch in Puerto Rico	Percent of Total Finfish Landings	
			P.R.	USVI
1. Grunts	Haemulidae	22.1	12.92	0.47
2. Groupers	Serranidae	22.6	13.23	13.91
3. Goatfishes	Mullidae	10.9	6.38	0.99
4. Parrotfishes	Scaridae	8.0	4.71	5.83
5. Lane snapper	Lutjanidae	8.8	5.13	0.03
6. Yellowtail snapper	Lutjanidae	6.5	3.80	2.89
7. Triggerfishes	Balistidae	5.0	2.94	29.68
8. Squirrelfishes	Holocentridae	1.5	0.89	4.84
9. Porgies	Sparidae	3.9	2.30	0.00
10. Mutton snapper	Lutjanidae	3.2	1.87	0.13
11. Other snappers	Lutjanidae	3.0	1.73	1.04
12. Hogfish	Labridae	2.3	1.35	1.06
13. Trunkfishes	Ostraciidae	2.2	1.27	0.08
TOTAL	-	100.0	58.52	60.95

A discussion of the biology of the unit, its stock structure and the habitat is found in Section 8.0.

6.0 STATEMENT OF PROBLEMS AND ISSUES

The previously listed 64 shallow-water reeffish species compose approximately 60 percent of the total finfish landings of the entire area, from the shoreline out to where the insular platform drops abruptly from about 40 fathoms to great depths. Approximately 2,000 commercial fishermen using fish traps, hook and line, nets, seines, and spears, participate in the fishery. Also, there are around 12,000 recreational boats that may participate in the fishery (see Section 8.5).

6.1 Biologic and Economic Overfishing

A major problem in managing the fisheries of the world's shallow-insular-tropical-coralline platforms is the difficulty of estimating maximum sustainable yields. A detailed discussion of MSY is found in Section 9.0. Small platforms surrounding islands of high human population density are usually overexploited. Puerto Rico and the Virgin Islands rank among the highest population densities in the world.

Traditionally the relatively unproductive tropical shelf has supported a small-scale artisanal fishery . In recent years newer boats that accommodate larger amounts of more efficient gear are entering the fishery. Also, larger boats that used to fish offshore now fish closer to shore in shallow water because of the high cost of fuel. This poses the potential for biologic and economic overfishing with the resultant socio-economic and biological problems that accompany these situations. Moreover, because of currently depressed economic conditions, many additional individuals have entered the fishery, either on a part-time or full-time basis, because of a lack of other income. Density on the fishing grounds has now reached 6 fishermen/sq. mile. Under normal conditions this equates to three fishing boats in each square mile. In Puerto Rico average catch per trap per year in the shallow-water reeffish fishery has declined each successive year from a high of 321 lbs. in 1976 to 138 pounds in 1980. This represents a 57 percent decline. Landings data also show a downward trend in the last three years for Puerto Rico (see Appendix I). This was corroborated by the fishermen interviewed in the fact-finding meetings when they expressed their points of view regarding pressing problems they confront in this fishery. Catch per trap in the Virgin Islands decreased 13 percent in 1980 and 15 percent in 1981. Total shallow-water reeffish landings for the entire area of Puerto Rico and the Virgin Islands, including estimated recreational catch, were 7.5 million pounds in 1982 (see Table 8).

6.2 Biologic, Economic, and Sociologic Data Bases

More extensive biologic, economic, and sociologic data bases are needed to manage the resource effectively. Present data only provide a basis for making preliminary fishery decisions. For example, many landings are not reported by fishermen (especially the recreational sector), the interactions of the numerous species and their environment are poorly understood, and the estimate of MSY, although based on the best available data, is limited by the quality of such data. The data on the socio-economic aspects of the fisheries in both Puerto Rico and the U.S. Virgin Islands also need improvement. (Sections 8.5, 8.6, 8.7 discuss the socio-economics of this fishery using the best available data.)

6.3 Different Management Measures and Objectives

The Governments of Puerto Rico and the U.S. Virgin Islands presently have different management regimes which collectively are not adequate for solving the problems in the fishery. The U.S. Virgin Islands has a fishery jurisdiction which extends to 3 nautical miles and Puerto Rico has fishery jurisdiction out to 9 nautical miles. Because the fishery is limited to a very small geological shelf area, most of which falls within these states' jurisdictions, a common regional management philosophy and framework is necessary. Individual boats and fishermen commonly fish from the shoreline to the edge of the platform and a common regime for the state waters and the FCZ is needed and desired. Both governments have recognized the need for cooperation and have endorsed the Council as the appropriate mechanism to effect coordinated management of fisheries throughout their range in state and federal waters. In addition, the Council has encouraged joint participation by other Caribbean nations in the preparation of FMPs, because many of the stocks are pan-Caribbean in nature. This approach exemplifies the kind of interjurisdictional management arrangement that the federal government has long advocated but failed to achieve in other areas.

6.4 Ciguatera

Certain fishes associated with coral reefs in Puerto Rico and the Virgin Islands are ciguatoxic and occasionally may cause illness, or even death. The fear of being poisoned causes consumers to reject an unknown portion of the landings. Some species that may or may not be toxic are regularly shunned. This is a waste of the resource and decreases the supply of locally available protein.

The etiology of the toxin has been widely studied and speculated upon, and such studies are continuing. It is believed that the causative organism is a dinoflagellate which often lives on pioneer blue-green algae and that the toxin is transferred through the food chain and gradually accumulates in large carnivorous individuals.

The disease is recognized as an important public health problem in the U.S. Virgin Islands and an increasing number of cases are occurring in Puerto Rico (at least 125 in April and May 1981). A recent investigation in the U.S. Virgin Islands indicated an incidence rate of 35 cases for 1000 population per 5 years (with a 95 percent confidence interval of $\pm$ 31). Three deaths were caused by ciguatera in Puerto Rico in 1981.

A number of poisoning cases have resulted in legal actions in the Caribbean and Florida and this further inhibits the marketing of reeffish.

The Council has endorsed research proposals and on-going projects in the U.S. Virgin Islands seeking answers to the various problems caused by the toxin. The most valuable contribution would be a simple, rapid, and effective method for determining whether or not an individual fish is toxic before it is sold or consumed.

Table 3 lists the species of fish reported as ciguatoxic by U.S. Virgin Islands fishermen.

Table 3. Incidence of ciguatera among reeffish species as reported by Virgin Islands commercial fishermen

		Frequency each species was reported as ciguatoxic in: 1/				
Common name	Scientific name	St. Thomas (28)	St. Croix (29)	St. John (13)	BVI (9)	Total (79)
Barracuda	*Sphyraena barracuda*	18	22	11	4	55
Amberjack	*Seriola dumerili*	8	13	7	2	30
Horse-eye jack	*Caranx latus*	9	7	6	3	25
Bar jack	*Caranx ruber*	11	1	7	-	19
Crevalle jack	*Caranx hippos*	4	6	3	2	15
Dog snapper	*Lutjanus jocú*	11	-	2	2	15
Yellowfin grouper	*Mycteroperca venenosa*	6	2	-	1	9
Kingfish	*Scomberomorus cavalla*	4	1	-	1	6
Blue runner	*Caranx crysos*	-	5	-	-	5
Conger	*Conger* spp	3	2	-	-	5
Rock hind	*Epinephelus adscensionis*	4	-	-	-	4
Black grouper	*Mycteroperca bonaci*	2	-	-	2	4
Cero mackerel	*Scomberomorus regalis*	3	-	-	-	3
Sardine	*Harengula* spp	-	3	-	-	3
Black jack	*Caranx lugubris*	1	-	-	1	2
Hogfish	*Lachnolaimus maximus*	1	-	-	1	2
Gray snapper	*Lutjanus griseus*	2	-	-	-	2
Almaco jack	*Seriola falcata*	-	-	1	-	1
Yellow jack	*Caranx bartholomaei*	-	1	-	-	1
Black snapper	*Apsilus dentatus*	1	-	-	-	1
Blackfin snapper	*Lutjanus buccanella*	-	-	-	1	1
Queen triggerfish	*Balistes vetula*	1	-	-	-	1
Tarpon	*Megalops atlantica*	1	-	-	-	1
All fish, occasionally		3	1	-	-	4
No fish		-	1	-	1	2

1/ Number in parenthesis refers to sample size and each represents the opinion of one or more fishermen.

Source: (Dammann et al. 1969)

7.0 STATEMENT OF OBJECTIVES

To address the problems set forth in Section. 6.0, the Council identified the following management objectives.

7.1 Specific Objectives

7.1.1 Obtain the necessary data for stock assessment and for monitoring the fishery.

7.1.2 Reverse the declining trend of the resource.

7.1.2.1 Restore and maintain adult stocks at levels that ensure adequate spawning and recruitment to replenish the population.

7.1.2.2 Prevent the harvest of individuals of species of high value (e.g., snappers, groupers, and others) that are less than the optimum size.

7.1.3 Reduce conflicts among users of the resource.

7.1.4 Promote international cooperation in managing the pan-Caribbean species.

7.1.5 Help solve the ciguatera problem.

7.2 Management Measures to Accomplish the Objectives

Management measures to accomplish the objectives are related to gear, minimum sizes of fish and closed seasons (for certain species), fishing practices, data gathering, and research. The FMP also includes recommendations to the Secretary of Commerce and local governments regarding fishing areas, gear, the ciguatera problem, and application of these measures to the other Caribbean nations that share the same stocks (see sections 10.0 through 13.0).

8.0 DESCRIPTION OF THE FISHERY

8.1 Description of the Stocks and Life History Features

The term "Stock Unit" is herein applied to homogeneous, discrete sub-populations of each of the major commercial reeffish groups discussed below. For proper management, any given stock unit must be defined in terms of its ecological distribution. The unit must also be assessed in terms of total weight. Not until this last task is completed can the stock unit be adequately managed. Little is known about the biological parameters necessary to define stock units within the Council's area of authority. For example, the Nassau grouper (*Epinephelus striatus*) ranges from South Florida and the Bahamas southward throughout the Caribbean area to Brazil. Puerto Rico and the U.S. Virgin Islands constitute only a small fraction of the total range of the species. It is not known if this species represents a single stock unit throughout its range, or if it is divided into a number of insular subpopulations, each representing a separate unit stock. The latter is probably the case, but until the proper studies are made, there is no way of knowing how many units are involved or their distribution. It is possible that part (or all) of the fish population of a given island was spawned hundreds of miles away and the larvae and/or juveniles brought there by ocean currents. By the same token, the red hind grouper occurring off the north coast of Puerto Rico may be sustaining the subpopulation along the north coast of Hispaniola, or even the southeastern Bahamas. Adult grouper and snapper are not known to be migratory, but their larvae are known to be widely distributed by ocean currents.

Pending the necessary basic studies, it is assumed that each isolated island, or bank, within the Council's area of authority, supports its own discrete stock unit of reeffish species. Based on the above possibilities, and considering local fishery practices, the stock units for the FMP are judged to be:

1. Puerto Rico, including the eastern islands of Culebra, Vieques and the surrounding cays, as well as the western islands of Mona, Monito, and Desecheo.

2. St. Croix.

3. St. Thomas-St. John and the surrounding cays.

The following sections include a brief discussion of the species by families included in the management unit and a table (Table 4) summarizing the major life history features of some of the most important species.

8.1.1 Groupers - family Serranidae

Groupers are the largest members of the family Serranidae, and are common throughout tropical and subtropical areas. They are carnivorous with a diet ranging from planktonic animals to large fish and marine invertebrates. They inhabit the shallow waters close to shore as well as waters more than a 100 fathoms deep near the shelf edge of islands and continents. Groupers are a very important component of the commercial catches throughout the Caribbean, and seven species are especially important in the shallow-water reeffish landings of Puerto Rico and the U.S. Virgin Islands. These seven species are included in the management unit and five are presented in Table 4 as representatives of the family. Some species of groupers spawn in aggregations at particular locations, and during specific times, and some species and undergo sex reversal.

8.1.2 Grunts - family Haemulidae

Grunts are the most abundant reeffish caught in the Caribbean and are a major component of the shallow-water trap and handline fisheries.

There are about 16 species of grunts of the genus *Haemulon* in the Western Atlantic, and about 12 occur in the management area. Of these, five species are dominant in the catches from shallow-water reefs and are included in the management unit. The majority of species are tropical, but a few species tolerate subtropical or warm-temperate waters.

8.1.3 Goatfishes - family Mullidae

Two species of goatfishes occur on or near the reefs in the West Indies, the yellow and spotted goatfish. The species are tropical and warm-temperate tolerant, extending from North Carolina through the Gulf of Mexico to Brazil. They occur on shallow reefs, less than 30 fathoms, in association with grunts, surgeonfishes and other common reef species. The majority of goatfishes do not live more than 3 years; 5 years of age is exceptional. They are commonly taken in fish traps.

8.1.4 Leatherjackets - family Balistidae

This family includes the triggerfishes which in the Western Atlantic, are tropical and warm-temperate species and are distributed from New England to Brazil. Four species comprise the majority of the catch in shallow water; *Balistes vetula*, *Canthidermis sufflamen*, *Xanthichthys ringens*, and *Melichthys niger*. *B. vetula* is the most important in the landings from Puerto Rico and the U.S. Virgin Islands.

8.1.5 Squirrelfishes - family Holocentridae

A tropical and subtropical group of fishes, ranging from North Carolina and Bermuda through the Gulf of Mexico to Brazil. They are most abundant in shallow waters and range offshore to depths of at least 90 meters. Holocentrus ascensionis and H. rufus predominate in catches from the West Indies.

8.1.6 Snappers - family Lutjanidae

This is one of the most important groups in all the Caribbean fisheries. Shallow-water snappers taken abundantly by traps and handline gear in Puerto Rico and the U.S. Virgin Islands are: yellowtail snapper, Ocyurus chrysurus; lane snapper, Lutjanus synagris; and mutton snapper, Lutjanus analis. These three species dominate the landings (by weight) of the shallow-water reef fishery. Other important species in the management unit are: schoolmaster L. apodus, dog snapper, L. jocu, mangrove snapper, L. griseus and mahogani snapper, L. mahogani. In general, the group is tropical and subtropical and inhabits shallow as well as deep water.

8.1.7 Wrasses - Labridae

About 500 species comprise this family around the world. It is a varied group represented most abundantly in warm seas, but also occurs in temperate to cool waters. The most important of the wrasses utilized commercially in the management area is the hogfish, Lachnolaimus maximus. It is considered one of the better tasting fishes, although implicated in several cases of ciguatera. Other species of importance in the management unit are: spanish hogfish Bodianus rufus; puddingwife, Halichoeres radiatus; and the pearly razorfish Hemipteronotus novacula.

8.1.8 Parrotfishes - family Scaridae

These fishes are found in tropical and warm-temperate seas. They are active in daylight and are herbivorous. Some species exhibit sex reversal.

Parrotfishes are abundant on the reefs of the U.S. Virgin Islands and Puerto Rico and in some areas are a preferred food fish. Species sold commercially belong to two genera, Scarus and Sparisoma. Species included in the management unit are: Scarus coelestinus, S. coeruleus, S. croicensis, S. guacamaia, S. taeniopterus, S. vetula, and Sparisoma aurofrenatum, S. chrysopterum, and S. viride. Two species presented in the table are representative of the family.

8.1.9 Jacks - family Carangidae

The species of jacks that are considered the most important on the shallow-water reefs are barjack, Caranx ruber, blue runner, C. crysos; yellowjack, C. bartholomaei; blackjack, C. lugubris; horse-eye jack, C. latus. Other species taken in shallow water include: jack crevalle, C. hippos; greater amberjack, Seriola dumerili; and almaco jack, S. rivoliana. C. ruber presented in the table is representative of the species in the management unit.

8.1.10 Porgies - family Sparidae

Porgies are found in tropical and subtropical waters around the world. In the Caribbean they constitute an important part of the shallow-water reef fishery. The species included in the management unit are: sea bream, Archosargus rhomboidalis; sheepshead porgy, Calamus penna; pluma, C. pennatula; and the jolthead porgy, C. bajonado. The last two are presented in Table 4 as representatives of the family.

8.1.11 Butterflyfishes - family Chaetodontidae

Butterflyfishes are important in the marine tropical aquarium trade and are eaten in the West Indies. They range as adults from North Carolina to Brazil in the Western Atlantic. They are found on shallow reefs to depths of at least 200 meters. Although in Puerto Rico they are not used as food, they are in the U.S. Virgin Islands. Three species (Chaetodon ocellatus, C. capistratus and C. striatus) are included in the management unit.

8.1.12 Angelfishes - family Pomacanthidae

Angelfishes are generally larger than butterflyfishes and their distribution extends from North Carolina to Brazil in the Western Atlantic. The species are tropical, subtropical, and warm-temperate tolerant. They are found from the shallow inshore areas to reefs as deep as 150 meters. The larger specimens enter the market for consumption in Puerto Rico and the U.S. Virgin Islands. The species included in the management unit are: queen angelfish, Holacanthus ciliaris; rockbeauty, H. tricolor; gray angelfish, Pomacanthus arcuatus; and french angelfish, P. paru. P. arcuatus represent the family in Table 4.

8.1.13 Surgeonfishes - family Acanthuridae

The surgeonfishes are widely distributed and represent a large potential unexploited resource in the tropical Western Atlantic, including Puerto Rico. In the U.S. Virgin

Islands they are eaten regularly. Three species are common in the management area (see Table 2).

8.1.14 Boxfishes

This family include the trunkfishes and cowfishes that are caught in both Puerto Rico and the U.S. Virgin Islands. These fishes are characterized by "a wide body nearly completely encased in a shell or cuirass formed of enlarged, thickened, usually hexagonal plates sutured to one another" (FAO, 1978). Although highly appreciated by local consumers their skin and viscera are very toxic. The species included in the management unit are: spotted trunkfish, Lactophrys bicaudalis; honeycomb cowfish, L. polygonia; scrawled cowfish, L. quadricornis; smooth trunkfish, L. triqueter; and trunkfish, L. trigonus. This last one is presented in Table 4, as representative of the family.

TABLE 4 SUMMARY OF THE DESCRIPTIONS OF STOCKS

Families and Species	Distribution	Occurrence[1]	Spawning Season	Maximum Size[2]	Matures at[2]	Sex ratio, F:M	Sex Reversal at[2]
Groupers (Serranidae)							
Red hind (*Epinephelus guttatus*)	Florida to Brazil	Shallow-water to 500	Dec. to July	575 TL	235 TL (female); 286 TL (male)	1:1.7	350 TL
Nassau grouper (*E. striatus*)	North Carolina, Bermuda to Brazil	Shallow inshore water to 91	Jan. to Mid August	1200 TL	300 TL	1:0.72	300 to 800 TL
Coney (*E. fulvus*)	Off Bermuda South Carolina to Brazil	Shallow inshore water to 200	May to Oct. Dec. to March	400 TL	160 TL	2.14:1	270 TL
Jewfish (*E. itajara*)	Carolinas to Brazil	Estuarine & mangrove to deep water	Peak: February to May	2400 TL	-	-	Occurs, Size unknown
Yellowfin grouper (*Mycteroperca venenosa*)	Carolinas to Brazil	Shallow water to 150	Peak in February to May	900 TL	510 TL	0.85:1	Occurs, Size Unknown
Grunts (Haemulidae)							
Bluestriped grunt (*Haemulon sciurus*)	South Carolina to Brazil	Shallow water to 55	January to March (in PR)	457 TL	180-220 FL (males); 158 FL (females)	1:1.14	Not known to occur
Tomtate (*H. aurolineatum*)	Cape Cod to Brazil	Shallow inshore reefs to 60	January to August (in PR)	250 TL	130 to 147 SL	1.12:1	Not known to occur
French grunt (*H. flavolineatum*)	South Carolina to Brazil	Shallow water to 60	Intermittent throughout the year (Sept. in P.R.)	220 TL	120 FL	40% females in exploited population; 57% females in unexploited	Not known to occur

1) Depth in meters
2) All fish measurements in mm TL = total length SL = standard length FL = fork length
- = Information not available

Families and Species	Distribution	Occurrence[1]	Spawning Season	Maximum Size[2]	Matures at[2]	Sex ratio, F:M	Sex Reversal at[2]
White grunt (*H. plumieri*)	Chesapeake Bay to Brazil	Shallow water species probably 50 m	Jan. to April and September to November in Puerto Rico	475 TL	144 TL	64% females on unexploited reefs. 57% females on exploited reef	Not known to occur
Goatfishes (Mullidae							
Spotted goatfish (*Pseudupeneus maculatus*)	New Jersey to Brazil	Shallow water to 60	Jan. to April in Puerto Rico	249 TL	160-175 FL	0.41:1	Not known to occur
Yellow goatfish (*Mulloidichthys martinicus*)	Bermuda to Brazil	Shallow water to 60	Feb. to May	328 TL	175-185 FL	1.52 to 1.86:1	Not known to occur
Leatherjackets (Balistidae)							
Queen Triggerfish (*Balistes vetula*)	New England to Brazil	Shallow water to 60	Jan. to July	570 TL	165-175 FL	1:1	Not known to occur
Squirrelfishes (Holocentridae)							
Squirrelfish (*Holocentrus ascensionis*)	N. Carolina, Gulf of Mexico, Bermuda to Brazil	Shallow water to 90	February and Sept. in P.R.	350 TL	130 to 140 FL (females)	1.57:1 to 0.93:1	Not known to occur
Snappers (Lutjanidae)							
Lane snapper (*Lutjanus synagris*)	North Carolina to Brazil	Shallow water to 400	March to July in PR peak in April to May	900 TL	-	-	Not known to occur
Schoolmaster (*Lutjanus apodus*)	Tropical & warm temp. tolerant species	Most Abundant in shallow water (in the West Indies)	September to October	600 TL	250 FL	-	Not known to occur

Families and Species	Distribution	Occurrence[1]	Spawning Season	Maximum Size[2]	Matures at[2]	Sex ratio, F:M	Sex Reversal at[2]
Dog snapper (*Lutjanus jocu*)	New England to Brazil	Shallow water to deep reefs	February to May in P.R.	775 FL	323 FL	-	Not known to occur
Mutton snapper (*Lutjanus analis*)	North Carolina to Brazil	Shallow water to 100	March & April	750 TL	-	-	Not known to occur
Gray snapper (*Lutjanus griseus*)	New England to Brazil	Mangrove areas to edge of shelf	May and August in Puerto Rico	900 TL	-	-	Not known to occur
Mahogany snapper (*Lutjanus mahogani*)	Carolinas to the Caribbean Sea	Shallow and clear water of high salinity	July & August	375 TL	-	-	Not known to occur
Yellowtail snapper (*Ocyurus chrysurus*)	Tropical Western Atlantic	Shallow-water grassbeds to 70	Feb. to Jun. and Sept. - Oct. in P.R.	750 TL	250-350 TL	-	Not known to occur
Wrasses (Labridae)							Not known to occur
Hogfish (*Lachnolaimus maximus*)	North Carolina to to the Guyanas	Shallow-water to edge of shelf	-	700 TL	-	-	Occurs in the group. No information on hogfish
Parrotfishes (Scaridae)							
Yellowtail parrotfish (*Sparisoma rubripinne*)	South Florida to Brazil	Inshore to shallow offshore reefs	Jan. to May in in P.R.; all year in other areas	475 TL	194 SL (males); 220 SL (females)	1:1	Occurs in the group
Princess parrotfish (*Scarus taeniopterus*)	Florida, Bermuda to Caribbean Sea	Shallow water to offshore reefs	All year; peak in December in in Puerto Rico	330 TL	172 FL (females)	4.6:1	Occurs in the group

Families and Species	Distribution	Occurrence[1]	Spawning Season	Maximum Size[2]	Matures at[2]	Sex ratio, F:M	Sex Reversal at[2]
Jacks (Carangidae)							
Bar jack (*Caranx ruber*)	North Carolina to Brazil	Shallow water to outer reefs	March to Aug. in Puerto Rico	690 TL	220 FL (male) 239 FL (female)	1.53:1	Not known to occur
Porgies (Sparidae)							
Pluma (*Calamus pennatula*)	South Florida to Brazil	Shallow water to 93	Dec. to March in P.R. and U.S.V.I.	294 TL	-	-	Occurs in the group
Jolthead porgy (*Calamus bajonado*)	New England to Brazil	Shallow water to 51	-	600 TL	Reach maturity in four years	-	Occurs in the group
Butterflyfishes (Chaetodontidae)							
Spotfin butterflyfish (*Chaetodon ocellatus*)	Juveniles occur from Mass. to Brazil	Shallow water to 81	Jan. to May with a peak in May in P.R.	203 TL	110 TL (females)	1.83:1	Not known to occur
Angelfishes (Pomacanthidae)							
Gray angelfish (*Pomacanthus arcuatus*)	New York to Brazil	Shallow inshore areas to 100	May to June in Puerto Rico	430 TL	130 TL (females); 220 TL (males)	2.51:1	Not known to occur
Surgeonfishes (Acanthuridae)							
Surgeonfish (*Acanthurus bahianus*)	Mass. to Brazil	Shallow water to deep reefs	Feb. to Nov. in Puerto Rico	256 TL	156 FL (females); 175 FL male	-	-
Boxfishes (Ostraciidae)							
Trunkfish (*Lactophrys trigonus*)	Mass. to Brazil	Shallow water to 50 m	-	450 TL	-	-	-

8.2 DESCRIPTION OF THE HABITAT

8.2.1 History of research

During the last 100 years well over 2,500 technical reports, scientific reports, and popular articles concerning the fish and fisheries in the Caribbean, including Puerto Rico and the U.S. Virgin Islands, have appeared. Many of these reports contain taxonomic descriptions or relate to very localized areas around the Caribbean. A prime source of information is the Bulletin of the U.S. Fish Commission, Volume 20 for 1900, published in 1902, reporting on the results of collections by the vessel Fish Hawk. More recent literature is voluminous and scattered, but covers many environmental and habitat features.

8.2.2 Habitats

The geological platforms that support the islands are very much like table tops. The shorelines drop rapidly to about 10 fathoms and then slope gently to about 50 fathoms on the Atlantic side (north) and to about 20 fathoms on the Caribbean (south) side. At these depths the table edge drops, sometimes vertically, to 100 fathoms and beyond. Depths of 1,000 fathoms and more surround the shelves. The Puerto Rican Trench, just north of Puerto Rico, reaches more than 4,000 fathoms. The northern U.S. Virgin Islands are separated from the St. Croix shelf by depths as great as 2,500 fathoms. These deep trenches are probably effective barriers to the dispersal of postlarval reeffish.

Puerto Rico has rivers which influence the near-shore reefs by discharging silt, nutrients, various chemicals and, of course, freshwater. The U.S. Virgin Islands have no permanent streams, and outflows only occur during periods of heavy rainfall. These are sometimes sufficient to muddy coastal surface waters up to 1/2 mile from shore. (On April 17-18, 1983 the northern U.S. Virgin Islands recorded 14-18 inches of rain in a 24 hour period.)

With the exceptions noted above, neritic waters support fringing reefs, turtle grass flats, and algal plains. Some of the reefs have evolved into small islands with lagoons that support mangrove stands.

8.2.3 Artificial Habitats

Man-made (artificial) reefs have been utilized in both marine and freshwater environments for many years. Some

countries such as Japan have very large investments and fisheries associated with artificial structures. They have become very popular with U.S. recreational fishermen.

Both Puerto Rico and the U.S. Virgin Islands have experimented with artificial reefs. While the data show that even in these regions of natural living reefs the artificial structures concentrate reeffish and provide additional sources of food and refuge, they have not yet been used as management tools, and no fisheries have developed around them. The Council encourages continuation of such studies and especially recommends that colonization of new surfaces by ciguatera-causative organisms be investigated.

8.3 FISHERY MANAGEMENT, JURISDICTION, LAWS, POLICIES, AND MANAGEMENT INSTITUTIONS

There are, at present, two political entities that are regulating the fisheries in the management unit: the governments of Puerto Rico and U.S. Virgin Islands. Each has a different set of legal procedures. In addition, the Federal Government, through the Caribbean Fishery Management Council, has managerial responsibilities in the FCZ. A fisheries agreement between the United States and the United Kingdom of Great Britain and Northern Ireland is in effect for certain waters that are shared by fishermen from the British Virgin Islands and the U.S. A similar agreement is being negotiated with the Dominican Republic.

8.3.1 Applicable Federal Laws

8.3.1.1 The Magnuson Fishery Conservation and Management Act

The Magnuson Fishery Conservation and Management Act created the Caribbean Fishery Management Council along with seven other Councils throughout the U.S. The Council is responsible for the preparation of fishery management plans. Detailed information on this Law is available at the Council's headquarters (see Section 1.0).

The Secretary has approved and implemented a spiny lobster FMP that was prepared by the Council. As in the shallow-water reeffish FMP, this plan requires an escape panel on every trap, prohibits the use of explosives, drugs, and other chemicals for fishing; requires marking of the gear and boats; and prohibits the hauling of another person's traps without the owner's written permission.

8.3.1.2 The Endangered Species Act

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*) Threat.; and Leatherback sea turtle (*Dermochelys coriacea*) Endang.; Critical habitat for the last species has been designated at St. Croix, U.S. Virgin Islands.

The Council prepared a biological assessment of the potential effects of the proposed management system on the above-listed species. Subsequently, consultation pursuant to Section 7 of the Endangered Species Act was completed with the National Marine Fisheries Service and the Fish and Wildlife Service. The consultation concluded that based on the best available information, populations of endangered and threatened species and their critical habitat, would not be adversely affected by this FMP.

8.3.1.3 The Marine Mammal Protection Act

All marine mammals in the region are protected by either the Marine Mammal Protection Act or the Endangered Species Act. There are no fisheries for marine mammals in the region and since they do not conflict or interact with fishermen, local fisheries and fishery regulations have no known or documented effect on any of the species.

8.3.1.4 Coastal Zone Management Act (Consistency Determination)

This Section constitutes the consistency determination for the Shallow-Water Reeffish Fishery of Puerto Rico and the U.S. Virgin Islands FMP, as required by the Coastal Zone Management Act of 1982, as amended, and NOAA regulations (15 CFR Part 93). As such, the proposed management system is examined in respect to the approved Coastal Zone Management Program (CZMP) of Puerto Rico and the U.S. Virgin Islands.

Pertinent information describing the fishery and associated problems and the objectives of the proposed management system is contained in sections 5.0, 6.0, 7.0, 8.0, and 10.0. Briefly, the proposed management strategy is designed to reverse declining stocks of shallow-water reeffish through restriction on the mesh size of fish traps, minimum size limitations on important species that are in a documented state of overfishing, and closed seasons for certain fishes. The FMP also contains provisions for collecting data that are necessary to further the management of this highly important resource.

Insofar as the CZMPs of Puerto Rico and the U.S. Virgin Islands contain no provisions directly relating to fishery management, there are no consistency issues. It should also be noted that the governments of both Puerto Rico and the U.S. Virgin Islands have adopted the Council as the management planning body and have agreed to institute compatible regulations in the waters under their jurisdiction (see Appendix II). The Council, therefore, concludes that the proposed management system is consistent to the maximum extent practicable with the approved programs of both affected States. This conclusion was supported in that the FMP was made available to the agencies responsible for administering the CZMP in Puerto Rico and the U.S. Virgin Islands twice; on January, 1984 and on May, 1984, and neither state responded within the required time frame (see Appendix II).

8.3.1.5 Sanctuaries

At this time only one sanctuary has been established in the area associated with this FMP; the Jobos Bay National Estuarine Sanctuary which was formerly designated as Aguirre National Estuarine Sanctuary. This area, along the south coast of Puerto Rico, provides a haven for many of the species in the management unit, as well as nursery area for many of these same species and other finfishes and invertebrates utilized in their food chain. A second estuarine sanctuary in Puerto Rico, named Humacao, is proposed but has little or no relevance to this action as the affected area is an inland lagoon.

A National Marine Sanctuary has been proposed at La Parguera along the southwest coast of Puerto Rico and is presently under review. Several other marine sanctuary sites that were earlier nominated have since been withdrawn. Presently there are no marine sanctuaries in the U.S. Virgin Islands and all of the sites that were proposed have been withdrawn from consideration.

8.3.2 Applicable Local Laws

8.3.2.1 Puerto Rico

Puerto Rico has a semi-autonomous agency, CODREMAR, associated with the Department of Natural Resources (DNR), which is responsible for all fishery management and development, except regulation within its waters. Fishery regulations are the responsibility of the Secretary of DNR.

Act 83 of 1936, as amended, of the Puerto Rican Code, vested ownership of the fish in the people of Puerto Rico. It also provided for limits of fishing, control over gear, methods, seasons and areas of fishing, size limits, registration,

and licenses for fishermen and boats and gear, and the marking of such equipment, sale of products, penalties, and establishment of a fishery fund. The DNR's legal division is presently examining Act 83 for improvements and updating. Amendments by Congress to the "Jones Act" in 1980 conveyed fishery jurisdiction to Puerto Rico out to 3 marine leagues (9 nautical miles) from shore.

Currently, the only regulations in Puerto Rico that would apply to the shallow-water reeffish fishery are the requirement for escape panels in traps, and the prohibition of the use of poisons, drugs, other chemicals, and explosives for harvesting fish.

8.3.2.2 U.S. Virgin Islands

The U.S. Virgin Islands has fishery jurisdiction to 3 nautical miles. This leaves areas of the shelf both north and south of St. Thomas-St. John as a part of the FCZ. Much of the eastern shelf area of St. Croix is also within the FCZ. In the U.S. Virgin Islands, Act 3330 was approved in 1972. It assigns commercial fishing promotion to the Department of Commerce and all other fishery matters, including enforcement, to the Department of Conservation and Cultural Affairs. The Commissioners of both Departments jointly appoint fishery advisory committees. Executive Order 241 of 1981 designated the Division of Fish and Wildlife as head agency with fishery management responsibility.

The Act provides for jurisdiction over all aquatic life in local waters, including inland ponds over 50 acres, which are declared the property of the Government of the U.S. Virgin Islands and of common ownership and public use. It establishes a separate and distinct fund in treasury as the "Fish and Game Fund". License fees and fines are deposited in the fund.

The Act further provides for conservation and management, regulation of vessels, issuance of licenses, certificates and registration, advice and assistance to fishermen, dissemination of information to the public, conduct and publication of scientific research, and enforcement. It establishes certain seasons and minimum sizes for some resources and places, regulates gear, mandates catch reports, and establishes penalties as well as rewards.

Regulations applicable to shallow-water reeffish resources in the U.S. Virgin Islands are prohibitions of the use of poisons, drugs, other chemicals, and explosives for harvesting fish, and the hauling of seines onto the beach. The use of escape panels in traps and the marking of gear and boat are also required.

8.3.3 Applicable International Treaties and Agreements

8.3.3.1 An agreement between the Governments of the United States and the United Kingdom of Great Britain and Northern Ireland establishes boundaries and allows for traditional levels of fishing in adjacent waters.

8.3.3.2 A fishing agreement between the United States and the Dominican Republic is under negotiation.

8.3.3.3 The boundary between the FCZ and Venezuelan waters has been ratified. (Venezuela has rights over Aves Island, which is located less than 400 miles from the southeast coast of Puerto Rico.)

8.4 DESCRIPTION OF FISHERY ACTIVITIES

8.4.1 History of Exploitation

The area around Puerto Rico and the U.S. Virgin Islands was utilized by aborigines of the islands. These Indians exploited a number of marine resources but the harvest was not likely to have been intense except near the larger villages.

The so-called "native" fishing methods in use today, particularly the Antillean "arrowhead" fish trap, are of African origin, and were introduced by slaves from the Guinea Coast.

During the colonial period, fisheries were extremely underdeveloped. In Puerto Rico, no elaborate fisheries developed under the Spanish dominion. Certain favorite fishing grounds were auctioned off each year by the Spanish authorities to the highest bidder who then received exclusive fishing rights. Throughout the colonial era, domestic fish were neglected in favor of "bacalao" (codfish), supplied by Spanish merchants who shipped the dried product to Puerto Rico in enormous quantities.

Prior to World War II, Puerto Rico and the U.S. Virgin Islands had a poorly organized fish trap fishery. The catch was seldom available any distance inland from the few fishing villages. The influx of military personnel into Puerto Rico and St. Thomas during World War II resulted in a dramatic increase in demand for local fish. Sales to military bases were followed by increasingly larger sales to the tourist hotels that were built during the succeeding decades as part of the government program to stimulate the economy.

Presently, Puerto Rican fisheries have two distinct elements; the local inshore fishery and the distant water tuna fishery. The U.S. 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 small scale.

8.4.2 Description of Vessels and Gear Employed

Most of the approximately 1,500 commercial 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 few large inboard-powered boats that fish further offshore, but the fishery remains predominantly small-boat and artisanal.

The most common gear is the fish trap, with the West Indian "arrowhead" or "chevron" being preferred. Some wire fish traps are now braced with welded iron rods rather than wooden sticks. There is an unreported recreational-commercial catch by divers who use spears in Puerto Rico. Scuba gear is replacing free-diving methods for spearfishing of finfish.

Fish traps catch a wide variety of finfish. In shallow water they cannot be said to target on any species, since almost everything caught by the trap is utilized. Nets are sometimes targeted to a particular school of fish and hook and line may be used at a given time for certain species such as lane snapper, yellowtail snapper, and Nassau grouper.

8.4.3 Foreign Fishing

A few small commercial boats from the British Virgin Islands do limited fishing in the FCZ (only 1 boat was licensed in 1978). 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. International sportfishing tournaments are held in this area. There is no documented recent foreign longline activity in the FCZ. Although the United States has ratified numerous Governing International Fishery Agreements, no foreign fishing vessels have permits to fish in this region.

8.4.4 Interaction With Other Fisheries

The shallow-water reeffish fishery consists of effort units that target different species at the same time or alternately. The resources are largely utilized by small-boat commercial fishermen, shoreline commercial fishermen, recreational fishermen, and divers.

Other fisheries in the region involve open ocean (pelagic) species and deep water reeffishes. These are largely sought by offshore fishing boats that may be owned and used by local fishermen, or chartered by local residents and/or visiting recreational fishermen. There is little interaction between shallow-water reeffish fisheries and the deep-water pelagic fishery. However, a few fishermen are sometimes involved in the above-mentioned fisheries, and some of the shelf species such as mullets and ballyhoo are used as bait in the offshore fishery. At times the open ocean pelagics occur very close to shore because of the extremely narrow shelves surrounding the islands.

Fish traps used in the shallow-water reeffish fishery catch lobsters incidentally. The lobster has been addressed in a separate FMP.

8.5 Economic Characteristics

8.5.1 Domestic harvesting and processing

8.5.1.1 Commercial Sector

In Puerto Rico, the dockside or ex-vessel annual value of shallow-water reeffish averaged $2.0 million during the 1975-1982 period.

Total value of grunt landings ranked first in importance among reeffishes. Their relative importance is mainly due to the large average annual volume of landings of 593,000 pounds in the 5-year period 1979-1983. Other important species are groupers, the prices of which increased from $.51/lb. in 1975 to $.71/lb. in 1979, and to $1.03 in 1983. Annual prices per pound for lane, yellowtail, and mutton snappers increased between 29 and 42 percent from 1975 to 1979. Their prices in 1983 were $1.06 for Lane snapper, $1.23 for Yellowtail snapper and $1.11 for Mutton snapper.

The north coast of Puerto Rico has the lowest landings and the highest prices compared to the other three coasts. The relationship is probably due to the composition of landings on the north coast. High-priced fish such as snappers make up a high proportion of north coast landings while a narrow shelf and exposure to sea conditions limit the landings.

An average of 30 traps are fished per boat with an average of two men per boat. There were 1449 commercial fishing boats in Puerto Rico in 1982, of which an estimated 786 fished with traps. There were 23,751 fish traps. Excluding helpers, there is one licensed fisherman per boat. In 1980, the

value of shallow-water reeffish caught in fish traps was $1.7 million with an estimated gross income per boat of $2,163 and an estimated gross income per fisherman (including helpers) of $1,081.

In the U.S. Virgin Islands, the best available data cover the period of 1974/75 to 1981/82. Shallow-water reeffish landings during that period including recreational landings increased from 1.4 million pounds in 1974/75 to 3.6 million pounds in 1981/82, or an increase of 157 percent. The value of commercial landings increased from 1.2 million dollars in 1974/75 to 3.0 million in 1981/82, or an increase of 150 percent. Prices increased from $0.90 to $1.78 per pound during the respective periods. Because most fishermen sell directly to the consumer, fishes have higher ex-vessel prices in the U.S. Virgin Islands than in Puerto Rico; ex-vessel value of the shallow-water reeffish catch in U.S.V.I., was estimated at $6.5 million for the year 1982 (see Table 8).

In Puerto Rico, all shallow-water reeffish species decreased in catch per trap per year except hogfish and porgies as shown below:

Species	Catch per Trap per Year in P.R.*		
	1978	1980	% change
Grunts	70 lbs.	27 lbs.	-61
Groupers	48 lbs.	21 lbs.	-56
Goatfish	24 lbs.	19 lbs.	-21
Snappers	35 lbs.	19 lbs.	-46
Parrotfish	16 lbs.	11 lbs.	-31
Squirrelfish	9 lbs.	2 lbs.	-78
Triggerfish	8 lbs.	7 lbs.	-13
Trunkfish	6 lbs.	3 lbs.	-50

*Pounds landed in the year, (fish-trap landings only) divided by the total number of traps. (Number of hauls assumed to remain constant)

Aside from the decline in CPUE of the fishes mentioned above, there has been a downward trend in CPUE for the total shallow-water reeffish trap fishery since 1976 in Puerto Rico and 1979 in U.S. Virgin Islands (Table 9).

Not all shallow-water reeffishes are caught with fish traps. Handline, spears, and nets are also used (see Table 5). The handline is the most important gear after traps; in 1980, the total income derived from this fishery was $476,750.

Table 5. Relative Importance of the Different Gear in the Shallow-Water Reeffish Fishery of Puerto Rico and the U.S. Virgin Islands

Gear	PUERTO RICO (1980)					U.S. VIRGIN ISLANDS (1979-80)		
	Number of Units	All Fisheries		Shallow-Water Reeffish			All Fisheries	
		Landings (1000 lbs.)	Per Cent	(1000 lbs.)	Per Cent	Gear	Landings (1000 lbs.)	Per Cent
ish Traps	12,586	2,798	42.0	2,245	68.4	Pot Fish	2,423	66.0
obster Pots	2,252	63	1.0	-	-	Pot Lobster	240	6.5
each Seine	238	550	8.2	124	3.8	Net Fish	475	13.0
ill Net	870	582	8.7	263	8.0	Hook Fish	324	8.8
and Line	2,391	1,402	21.0	578	17.6	Spear Fish	44	1.2
roll Line	2,057	462	6.9	3	0.1	Hand Lobster	25	0.7
rot Line	331	24	0.4	18	0.5	Conch	125	3.4
ast Net	827	41	0.6	-	-	Whelk	13	0.4
pear	341	371	5.6	31	0.9	Other	-	-
and	-	376	5.6	22	0.7		-	-
ther	-	-	-	-	-		-	-
TOTAL	-	6,669	100.0	3,284	100.0	-	3,669	100.0

8.5.1.2 Recreational Sector

For both Puerto Rico and the U.S. Virgin Islands, recreational fishery landings were estimated at 21.8 percent of total landings, based on a study conducted in the U.S. Virgin Islands (Olsen, 1979). The recreational fishery survey carried out by NMFS in Puerto Rico and the U.S. Virgin Islands supported this estimate (Clapp and Mayne, Inc. 1979). In the shallow-water reeffish fishery, it is estimated that recreational landings are 13 percent of total landings (see Table 7).

8.5.1.3 Subsistence fishing

No subsistence fishing can be identified.

8.5.1.4 Processing

Processing in the industrial sense is not a feature of this fishery in either Puerto Rico or the U.S. Virgin Islands. A few fish are gutted and/or scaled by hand in the fishery markets, but most processing is done by the consumer or restaurant.

8.5.2 International Trade

For Puerto Rico, statistics are not available specifically for imports of shallow-water reeffish. However, total fish and fish-products imports amount to over 50 million pounds annually (see Table 10). The 53.8 million pounds of seafood imported in 1979 was valued at 42 million dollars, excluding tuna. Comparison of landings with imports indicates that Puerto Rico produces only 15 percent of its domestic needs.

The U.S. Virgin Islands' fish and fish-products imports average 6 million pounds annually. The local annual production is around 3.6 million pounds. With a population of around 100,000, the annual per capita consumption of seafood is 58 lbs. However, most of this amount is consumed by the tourist population, which numbers more than 1.5 million annually.

In 1979, the imports of seafood into the U.S. Virgin Islands amounted to 5.7 million pounds with a value of 6.0 million dollars. This does not include amounts registered as imports in Puerto Rico and re-exported to the U.S. Virgin Islands.

Table 6. Number of Fishermen and Number of Vessels in Puerto Rico and U.S. Virgin Islands 1970-1981

Year	Number of Fishermen			Number of Vessels		
	Puerto Rico	US Virgin Islands	Total	Puerto Rico	US Virgin Islands	Total
1970	1,082	400 a/	1,482	869	-	-
1971	994	-	-	811	-	-
1972	968	-	-	797	-	-
1973	927	-	-	785	-	-
1974	1,182	-	-	835	-	-
1975	1,230	450	1,680	902	-	-
1976	-	509	-	-	-	-
1977	1,368	846	2,214	1,036	-	-
1978	1,442	265	1,707	1,073	231	1,304
1979	-	281	1,723	-	223	-
1980	1,447	355	1,802	1,084	237	1,321
1981	-	397	-	-	-	-
1982	1,872	578	2,450	1,449	-	-

Source: CODREMAR and U.S.V.I. Fish and Wildlife Division

- : Data not available

a/ : Dammann (1969)

Table 7 ESTIMATE OF RECREATIONAL LANDINGS IN THE SHALLOW-WATER REEFFISH FISHERY IN THE AREA OF AUTHORITY OF THE CFMC

ITEM	Landings (Puerto Rico, 1980) by Type of Gear (Thousand Pounds)			
	TOTAL	With Traps	Hook-line Troll-line Spears 1/	Other Gear
I. Total Finfish Landings				
A. Commercial 2/	6,165	2,744	2,086	1,335
B. Recreational	1,719 a/	- c/	1,719 d/	-
C. Total	7,884 b/	2,744	3,805	1,335
D. Percent Recreational (IB/ICx100)	21.8%	0.0 % c/	45.2%	-c/
II. Shallow-Water Reeffish Landings				
A. Commercial 2/	3,608	2,446	655	487
B. Recreational (See footnote (f))	540 e/	- c/	540 f/	-
C. Total	4,148	2,466	1,195	487
D. Percent Recreational (IIB/IIC x 100)	13%	0.0 % c/	45%	c/

1/ Gear most commonly used by recreational fishermen.

2/ Source: CODREMAR (adjusted by CFMC for underestimate by dividing by 0.91)

a/ Obtained by subtracting 6165 from 7884

b/ Obtained by dividing 6165 ÷ 0.782, on the basis that recreational landings for finfish have been estimated as 21.8 per cent of total finfish landings.

c/ Recreational fishermen do not fish with traps or any other gear than the ones specified in column 3.

d/ Copied from 1st column

e/ Copied from 3rd column

f/ Assuming that the ratio between recreational landings of shallow-water reeffish and recreational landings in all finfish for the gear most commonly used by recreational fishermen is the same as that observed in commercial landings: $\left(\frac{655}{2086} = \frac{x}{1719}\right)$; therefore, x = 540.

Table 8 Shallow-Water Reeffish Landings, Price and Value in Puerto Rico and in U.S. Virgin Islands 1975-1982

	PUERTO RICO 1/			U.S. VIRGIN ISLANDS 2/			TOTAL			ADJUSTED LANDINGS BY ADDING RECREATIONAL FISHERIES 3/		
Year	Landings (Ths. Lbs.)	Price Per Lb.	Value (Ths. $)	Landings (Ths. Lbs.)	Price Per Lb.	Value (Ths. $)	Landings (Ths. Lbs.)	Price Per Lb.	Value (Ths. $)	P.R.	U.S.V.I.	TOTAL
1975	2,828	$ 0.41	1,149	1359	$ 0.90	1223	4187	$ 0.57	2372	3251	1562	4813
1976	3,421	.44	1,509	1820	1.00	1826	5241	.64	3329	3932	2092	6024
1977	3,824	.49	1,879	2157	1.00	2157	5981	.67	4036	4396	2479	6875
1978	4,113	.56	2,297	1611	1.01	1627	5724	.69	3924	4728	1852	6580
1979	4,662	.58	2,714	2212	1.30	2876	6874	.81	5590	5359	2543	7902
1980	3,608	.69	2,489	2613	1.58	4129	6221	1.06	6618	4147	3003	7450
1981	3,196*	.72	2,301	2829	1.73	4894	6025	1.19	7195	3674	3252	6925
1982	2,849*	.77	2,194	3642	1.78	6483	6491	1.34	8677	3275	4186	7461

Source:

1/ CODREMAR

2/ Fish and Wildlife Division, U.S.V.I. (Revised Figures 1983)

3/ Dividing the totals by 0.87 (See Table 7)

* Sept. - Dec., 1981 and Jan. 1982 estimated by CFMC

Table 9 CATCH AND EFFORT IN THE SHALLOW-WATER REEFFISH FISHERY OF PUERTO RICO AND U.S. VIRGIN ISLANDS

Area and Year	Number of Traps	COMMERCIAL SHALLOW-WATER REEFFISH LANDINGS				
		Fish Trap Landings		All Gear Landings (1000 lbs.)	Adjusted Landings by Adding Recreational Fishery a/ (1000 lbs.)	Total Effort b/
		Landings (1000 lbs.)	Catch Per Trap (Lbs.)			
US Virgin Islands						
1975	5337	1041	195	1360	1563	8015
1976	8858	1500	169	1820	2092	12379
1977	8067	1879	233	2158	2481	10648
1978	4182	1108	265	1611	1852	6989
1979	4465	1551	347	2212	2543	7329
1980	6418	1938	302	2613	3003	9944
1981	7133	1826	256	2829	3252	12703
1982	10176	2588	254	3642	4186	16480
Puerto Rico						
1975	8191	2407	294	2828	3251	11058
1976	8967*	2881	321	3421	3932	12249
1977	9743	3074	316	3824	4395	13908
1978	12586	3036	241	4113	4728	19618
1979	15252*	3344	219	4662	5359	24470
1980	19165	2466	138	3608	4147	30051
1981	21368	N/A	-	3196	3674	-
1982	23571	N/A	-	2849	3275	-
All Area						
1975	13528	3448	255	4188	4814	19073
1976	17825	4381	246	5241	6024	24628
1977	17810	4953	278	5982	6876	24556
1978	16768	4144	247	5724	6580	26607
1979	19717	4895	248	6875	7902	31799
1980	25583	4404	181	6221	7150	39995
1981	28501	N/A	-	6025	6925	-
1982	33747	N/A	-	6491	7461	-

Source: CODREMAR and U.S.V.I. Fish and Wildlife Division (Revised Figures 1983)

* Obtained by interpolation

a/ Obtained by dividing all gear landings by 0.87, since recreational Shallow-Water reeffish are estimated as 13% of total shallow-water reeffish landings (See Table 7)

b/ For comparison purposes all effort units have been converted to traps, since more than 2/3 of all landings are caught with traps.

$$\text{TOTAL EFFORT} = \frac{\text{TOTAL CATCH}}{\text{CPUE of Traps}}$$

Table 10. Imports of Fish and Fish Products into Puerto Rico (million pounds) 1974/75 - 1980/81*

Year	Fish				Shellfish			Fish and Shellfish			
	Fresh and Frozen	Smoked and Salted	Canned	Total	Fresh	Canned	Total	Fresh and Frozen	Smoked and Salted	Canned	Total
Imports											
1974/75	13.5	16.4	6.5	36.4	7.1	0.8	7.9	20.6	16.4	7.3	44.3
1975/76	16.7	18.2	6.7	41.6	12.5	0.9	13.4	29.2	18.2	7.6	55.0
1976/77	17.5	9.1	6.0	32.6	16.6	0.8	17.4	34.1	9.1	6.8	50.0
1977/78	22.0	14.4	6.3	42.7	10.2	1.3	11.5	32.2	14.4	7.6	54.2
1978/79	20.2	18.2	11.3	49.7	5.7	1.1	6.8	25.9	18.2	12.4	56.5
1979/80	17.5	20.2	10.7	48.4	6.8	1.1	7.9	24.3	20.2	11.8	56.3
1980/81	17.8	19.0	11.9	48.7	4.4	0.7	5.1	22.2	19.0	12.6	53.8
Exports											
1974/75	0.4	0.1	0.4	0.9	1/	2.0	2.0	0.4	0.1	2.4	2.9
1975/76	0.5	0.1	2.2	2.8	1/	1/	1/	0.5	0.1	2.2	2.8
1976/77	4.1	0.1	5.7	9.9	0.1	1/	0.1	4.2	0.1	5.7	10.0
1977/78	5.6	0.3	1.2	7.1	0.2	1/	0.2	5.8	0.3	1.2	7.3
1978/79	1.8	0.5	4.7	7.0	0.3	0.1	0.4	2.1	0.5	4.8	7.4
1979/80	0.9	0.2	3.5	4.6	0.5	0.5	1.0	1.4	0.2	4.0	5.6
1980/81	1.3	0.6	5.5	7.4	0.3	0.9	1.2	1.6	0.6	6.4	8.6
Net Imports											
1974/75	13.1	16.3	6.1	35.5	7.1	(1.2)	5.9	20.2	16.3	4.9	41.4
1975/76	16.2	18.1	4.5	38.8	12.5	0.9	13.4	28.7	18.1	5.4	52.2
1976/77	13.4	9.0	0.3	22.7	16.5	0.8	17.3	29.9	9.0	1.1	40.0
1977/78	16.4	14.1	5.1	35.6	10.0	1.3	11.3	26.4	14.1	6.4	46.9
1978/79	18.4	17.7	6.6	42.7	5.4	1.0	6.4	23.8	17.7	7.6	49.1
1979/80	16.6	20.0	7.2	43.8	6.3	0.6	6.9	22.9	20.0	7.8	50.7
1980/81	16.5	18.4	6.4	41.3	4.1	(0.2)	3.9	20.6	18.4	6.2	45.2

1/ Less than 0.05 million pounds

* Source: External Trade Statistics (P.R. Planning Board)

8.6 DESCRIPTION OF THE BUSINESS, MARKETS, AND ORGANIZATIONS ASSOCIATED WITH THE FISHERY

8.6.1 Relationship Among Harvesters, Intermediaries, and Processors

Fishermen in Puerto Rico sell their catch through a variety of market channels. Fish are sold through wholesalers or fishing associations. No published statistics are available on number of dealers handling the catch, but CODREMAR officers have estimated that around 20 fish dealers handle most of the catches.

Research reports for 1965 (Holmsen, 1966, and Canion Torres, 1965) are the latest available published information describing the marketing and wholesaling system for fish in Puerto Rico. Fish that are sold are categorized into three quality classes (Canion Torres, 1965) as follows:

Class 1: groupers, snappers, kingfish, cero, mullet, and hogfish
Class 2: blue runners, wahoo, smaller groupers and snappers
Class 3: parrotfishes, squirrelfishes, and trash fishes

The dealer's margin of profit depends on whether he sells to retailers or directly to consumers. Margins appear to be lower than in other countries, but this is because a limited amount of processing, storage, and transportation is provided by fish handlers. The only significant amount of processing is with Class 1 fish, which are sometimes gutted and scaled. This amounts to a weight loss of 5 to 12 percent (Holmsen, 1966).

Marketing margins were computed from the two previously mentioned studies and are reported below. An average of the two estimates made from the individual studies is also presented. Marketing margins for Class 2 fish average 81.5 percent markup from ex-vessel to retail price. The average margin for Class 1 fish is 50 percent, while the average for Class 3 is 180.5 percent. Class 1 fish consistently have the lowest margin while Class 3 have the highest. The dealer's margin is inversely related to market prices, that is, the higher the price the lower the margin. One reason for this relationship is because class 3 fish are generally smaller and thus, the waste is generally higher. Absolute margins decline from Class 1 to Class 3 fish.

Estimated marketing margins for three classes of fish sold in Puerto Rico

Study	Fish Class		
	Class 1	Class 2	Class 3
	(Percent of fishermen price)		
Torres	67	80	140
Holmsen	33	83	221
Average	50.0	81.5	180.5

Estimates of the market value of major shallow-water reeffish at retail and marketing margins are possible through the use of the estimated percentage markup by classes and recorded values of 1979 landings. The total estimated 1979 retail value of the major reeffishes groups is $5.3 million. The marketing margin is estimated at $2.6 million. This margin represents the value generated within the marketing system from handling the 1979 domestic catch of major shallow-water reeffish in Puerto Rico. Grunts have the highest total retail value because of the relatively high margin for this species per pound and because it is the leading fish in terms of volume landed. Groupers rank second in importance. Shallow-water snappers are a close third in dockside and retail value.

8.6.2 Fishery Cooperatives and Associations

The number of private wholesalers handling fish in Puerto Rico is about 20, and an additional 17 fishing associations sell the catch provided by their members. It is estimated that 90 percent of the locally caught fish are sold through wholesale channels.

At present, fishery cooperatives or associations are not active in U.S.V.I.

8.6.3 Labor Organizations

In Puerto Rico there are three groups that are considered labor organizations by their leaders: "Congreso de Pescadores del Este", "Congreso de Pescadores del Oeste", and "Federación de Presidentes de Asociaciones de Pescadores de Puerto Rico, Inc."

There are no known labor organizations involved in the harvesting or processing sectors of the shallow-water reeffish fishery in the U.S. Virgin Islands.

8.6.4 Foreign Investment

There are no known significant foreign investments in the shallow-water reeffish fishery either in Puerto Rico or in the U.S. Virgin Islands.

8.7 DESCRIPTION OF SOCIAL AND CULTURAL FRAMEWORK OF DOMESTIC FISHERMEN AND THEIR COMMUNITIES

8.7.1 Ethnic Character, Family Structure, Social and Cultural Framework of the Fishermen and their Communities

In broad terms there are several ethnic and cultural groups among residents that utilize the resources of the management unit. These are: 1) West Indians; 2) Puerto Ricans; 3) Continental North Americans; 4) various groups of Europeans, Asians, Latin Americans; and 5) non-resident tourists. Politically, fishermen in the U.S. area are American citizens or permanent residents of the islands. Puerto Rico has approximately 3,338,000 residents, the U.S. Virgin Islands has around 100,000.

The West Indians are further subdivided into those of African descent and those of European or Asian descent. In St. Thomas, for example, there are two rather distinct groups of West Indians of French descent that are strong components of the fishing community. On St. Croix and the Puerto Rican islands, the majority of the fishermen are of Puerto Rican background. Continental North Americans are heavily involved in the recreational fishing and diving enterprises in the islands.

In 1981, a socio-economic characteristic study of commercial fishermen was conducted in Puerto Rico by Clapp and Mayne, Inc., for CODREMAR. It was found that the typical fisherman interviewed was between 35 and 54 years of age and had fewer than 9 years of schooling. He had a family monthly income of less than $600 and was the owner of the vessel in which he carried out his fishing activities. Fishermen interviewed in the area of Mayaguez were, in general terms, younger than their counterparts in Ponce and Humacao-Fajardo.

8.7.2 Socio-economic Characteristic of the Commercial Fishermen in Puerto Rico (Clapp and Mayne, Inc., 1982)

8.7.2.1 Age - The majority of the fishermen interviewed, 81 percent, were between the ages of 35 and 64. Almost 30 percent were between 35 and 44 years of age and another 30 percent were between the ages of 45 and 54. Only 5.3 percent

of the fishermen were 65 years old or more. Likewise, only 14 percent were in the younger age group between 25 and 34 years of age. None of the fishermen interviewed in the area of Mayaguez was in the older age group. Half of them were between 25 and 44 years old. A large proportion of those interviewed in the Humacao-Fajardo fishing zones were between 45 and 54 years of age. Moreover, two-thirds or more of the fishermen in the area were between 45 and 64 years of age.

8.7.2.2 Education - Slightly over one-half of the commercial fishermen had less than 6 years of schooling. Nevertheless, 7 percent completed one or more years of college. Close to 11 percent of the fishermen operating in the area of Ponce, and 5 percent of those in Mayaguez, achieved this level of formal education.

Most fishermen interviewed on the west coast completed only 6 years or less of schooling (70%). A lower proportion of fishermen 65 years and over, as well as those in the younger group of 25 to 34 years of age attained less than 6 years of schooling, in contrast to their middle-aged counterparts. Over one-third (36.4%) of the fishermen with 10 to 12 years of schooling were between the ages of 45 and 54. A larger proportion of the fishermen 65 years and over (66.7%) achieved more than 10 years of schooling, whereas only from 8 to 25 percent of the younger ones had done so. A noticeable proportion of middle-aged fishermen had less than 6 years of schooling. All of those having completed one or more years of college were between the ages of 25 and 54.

8.7.2.3 Family Income - One-third of the fishermen interviewed reported family monthly income of less than $200 and 56.1 percent had monthly incomes of less than $300. Only 3.5 percent of the fishermen had a monthly income in excess of $800 and all of them were from the Ponce area. None of the fishermen interviewed in the Humacao-Fajardo area reported monthly family incomes in excess of $600, while 55.5 percent reported incomes of $300 or less as compared to 40 percent of those in the Mayaguez area.

Seventy-three percent of the fishermen reporting monthly family incomes of less than $200 were between the ages of 45 and 64, while those with monthly incomes in excess of $400 were between 35 and 44 years of age (64.3%). Close to two-thirds of the fishermen reporting monthly family incomes of less than $200 attained less than 6 years of schooling, while only 10.5 percent of those in the lowest income bracket were among those with more advanced formal education. Noticeably, none of the fishermen reporting the higher family incomes had college training and 71.4 percent had 9 or fewer years of schooling.

Over 40 percent of the fishermen with less formal education had incomes of less than $200 a month, compared to only 18.2 percent of those who had attained more than 10 years of schooling. The proportion of fishermen receiving low monthly incomes diminished as their schooling increased, although there were some who had less than 6 years of formal education and monthly incomes of more than $800.

8.7.2.4 Boat Ownership - Almost all of the fishermen interviewed (96.5%) were both owners and operators of the fishing vessel. All of the operators interviewed in the area of Humacao-Fajardo owned their boats. A lower proportion of boat owners (87.5%) was found among young fishermen between the ages of 25 and 34 years. All of those with the highest monthly family incomes of $301 and over were boat owners.

8.7.2.5 Socio-Economic Characteristics of the Commercial Fishermen in U.S.V.I.

No information available.

8.7.3 Socio-Economic Characteristics of the Sport Fishermen in Puerto Rico and Virgin Islands

8.7.3.1 In Puerto Rico the average age for sport/commercial fishermen (recreational fishermen who sell their catch) was 45 years in 1979. For the same year the recreational fishermen average age was 41 years. The family had an average of 4 members in sectors with annual income of $6,781 for the sport/commercial and $17,807 for the sport fisherman. (Clapp and Mayne, Inc., 1979)

8.7.3.2 In the Virgin Islands, a sport fisherman average age was 43 years in 1979. Family size averaged 3 members with an average income of $18,551. No sport/commercial fishermen were reported in the "Socio-Economic Survey of Recreation Boating and Fishing in the U.S. Virgin Islands" (Olsen, 1979).

8.7.4 Economic Dependence on Commercial or Marine Recreational Fishing and Related Activities

Tourism is a major industry. People visit the islands from around the world and in 1979 there were 2,886,273 visitors recorded in the U.S. possessions. These visitors were prime consumers of seafood and participated in fishing, diving, snorkeling, and sailing. An unknown number of visits are dependent upon the shallow-water reeffish resources.

9.0 CAPACITY DESCRIPTORS

9.1 MSY Calculation

Estimating the potential fishery yield of the world's insular shallow-tropical-coralline-grassbed-mangrove banks presents many difficulties. So many different researchers and methods of estimating have surfaced in recent years that making such estimates has become a rather classic fishery management problem. All available methods depend upon different sets of assumptions and none of them yield results that are entirely satisfactory. Hence, an MSY that is used at the present time must be considered provisional. Not only the actual number, but the method used to obtain it, can be expected to change as methods are refined.

There is widespread belief among local scientists and fishermen that the shallow-water stocks are being heavily fished and are under considerable stress. Evidence for this belief can be found in the landings data for 1975-1982, which show a declining trend in the catch per unit of effort (traps) in the fishery (see Table 9).

Given the difficulty of calculating an accurate MSY, uncertainty may allow the stocks to be biologically and/or economically overfished before present methodology can document that fact. The Council has, thus, assumed the conservative position of preventive management and rejects the notion that dire troubles within a fishery must unequivocally be documented before protective measures are implemented.

The sources of the problems with estimating MSY mainly arise from the following set of conditions: (1) the reef environment and its fishery stocks comprise the world's most complex aquatic assemblage; (2) very little is known of the biological reactions and interactions of the assemblage and the growth and mortality rates of the various species; (3) the number of species utilized is very high compared to non-tropical fisheries while the number of individuals per species is very low by the same standards; (4) the bulk of the landings come from a single type of rather unselective gear--the fish trap; and (5) long and accurate time series of fishery data are generally not available.

In an effort to overcome the problems of estimating MSY, the Council investigated the following assessment techniques: (1) the unfished stock biomass (logistic) model of Gulland; (2) various carbon fixation models which address trophic

levels; (3) surplus production models such as that of Schaeffer; (4) various analytic models such as those of Ricker and Beverton and Holt; and (5) combinations of the above. (Ranges of the various techniques investigated are shown in Appendix I, Table A-7.)

As previously mentioned, the assumptions that must be made for each of these methods may not always provide the desired degree of accuracy that effective management requires. After careful consideration of all possibilities, the biomass approach was used to calculate the MSY for this fishery, since the assumptions of this model best fit the available data. Among the best alternatives, Table A-7 of Appendix I provides a range of the different estimates; other calculations using the various methods mentioned above are available at Council headquarters for public inspection.

The calculations for the MSY estimate of 7.7 million pounds are shown in detail in Table 11.

TABLE 11

MSY ESTIMATE FOR SHALLOW-WATER REEFFISH IN PUERTO RICO AND U.S. VIRGIN ISLANDS, USING THE BIOMASS APPROACH (Gulland, 1969)

Factors	Puerto Rico	U.S.V.I.	All Areas
Shelf Area (Ha.)	553,779	196,650	750,429
Kg/ha/yr	33 a/	33 a/	33 a/
Biomass (Thd. Kg.) 1/	18,275	6,490	24,765
Natural Mortality	0.5	0.5	0.5
Fishing Mortality	0.5	0.5	0.5
Biomass adjusted for mortality (Thd. Kg.)	4,569	1,622	6,191
% Finfish	76 b/	80 b/	-
Total Finfish (Thd. Kg.)	3,472	1,298	4,770
% Shallow-Water	70 b/	80 b/	-
Total Shallow-Water (Thd. Kg.)	2,431	1,038	3,469
MSY (Million pounds)	5.4 c/	2.3 c/	7.7 c/

1/ Fish and shellfish only
a/ 33 kg/ha/yr is Council's conversion of 73 lbs./ha/yr (Juhl, 1973)
b/ According to 1982 landings
c/ Conversion of kilograms into pounds (1 kg. = 2.2 lbs.)

9.2 Optimum Yield

OY is all of the fishes in the management unit that can be harvested by U.S. fishermen under the provisions of the FMP, i.e., gear and size restrictions, as well as closed seasons for certain species.

This amount is currently estimated at 7.7 million pounds, which is equivalent to the provisional estimate of MSY for the fishery.

9.3 Domestic Annual Harvest

The reported 34,000 fish traps (see Table 9) in the U.S. Caribbean waters have the capacity to exceed the estimate of MSY. As other gear are added the capacity to exceed productivity is further increased.

Between 1975 and 1979 shallow-water reeffish landings for Puerto Rico and the U.S. Virgin Islands increased from 4.8 million pounds to 7.9 million pounds. In 1982 landings were 7.5 million pounds (see Table 8).

9.4 Domestic Annual Processing

Processing is not an integral and important aspect of this fishery. Only sporadic heading and gutting takes place and there are no processing plants in the islands. In Puerto Rico some of the shallow-water reeffishes are cut into steaks or fillets and sold fresh or frozen to restaurants or directly to consumers.

Inasmuch as all reeffish landed currently enter the market with little or no processing involved; harvest is already at OY levels; and Puerto Rico and the Virgin Islands import over 55 million pounds of seafood annually, which is substantially more than the amount produced locally, there is no surplus for joint ventures. Consequently, the amount of reeffish available for joint venture processing (JVP) is zero.

9.5 Total Allowable Level of Foreign Fishing

By definition, total allowable level of foreign fishing (TALFF) is equal to OY-DAH. OY equals 7.7 million pounds and the 1982 DAH was 7.5 million pounds. Because of the closeness of these estimates and the uncertainty of the data, there is no surplus of shallow-water reeffish to be made available for foreign fishing.

9.6 Estimate of Future Stock Conditions

Landings in 1982 for the commercial and recreational shallow-water reeffish fishery were 7.5 million pounds (see Table 8). These landings are approaching the MSY, and it is expected that they will reach and go over the MSY, as can be seen from the more recent data of the U.S. Virgin Islands. Analysis of CPUE for the last 5 years shows a declining trend in catch per trap (see Table 9). These are two indicators of overfishing of the shallow-water reeffish resource. Unless some management action is taken, the condition of the stocks will deteriorate as the result of increased effort.

10.0 MANAGEMENT MEASURES AND REGULATORY IMPACT REVIEW

10.1 Introduction

This section addresses impacts of the proposed and alternative management measures and relates the rationale of the Council in adopting, postponing or rejecting these alternatives. Also this 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 from the regulation outweighs 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 priorities regularly 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 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 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 (PL 96-354).

Since approval was granted to develop the Shallow-Water Reeffish FMP prior to the requirement for Work Plans under Executive Order 12044, the Council conducted a series of fact-finding meetings to verify the problems in this fishery and their magnitude. These meetings, coupled with the problems which surfaced during examination of the current and historical data, served as the basis for determining the appropriate mix of measures needed to manage the fishery.

10.2 Management Measures

10.2.1 Establish a 1 1/4" (in the smallest dimension) as the minimum mesh size for fish traps.

Rationale: This measure will benefit the fishery by prohibiting the use of smaller mesh sizes that would entrap the young of many species of the management unit. Although management by mesh size restrictions is very complicated when dealing with such a large complex of species, a minimum mesh size restriction of 1 1/4 inches will preclude fishing with smaller mesh traps which would undoubtedly prevent the escape of a greater number of immature individuals. Conversely, a larger mesh size (e.g. 1 1/2 inches) would afford more protection to a greater number of small fish, however, adverse economic impacts would result from the escape of marketable-sized fish, especially goatfish which are an important component of the management unit. Therefore, 1 1/4 inches was selected as a point of departure in managing reeffish resources until data becomes available that would allow a more thorough evaluation of the biological and economic trade-offs involved in the selection of an ideal mesh size.

Impact: The majority of the fishermen in both Puerto Rico and the U.S. Virgin Islands use the 1 1/4" mesh size wire on their traps. According to fishermen interviewed at the fact-finding meetings, the 1 1/4" mesh wire is usually cheaper than the available 1" mesh wire. Therefore, there will be almost no extra economic burden on the fishermen. The 1 1/4" mesh size will select larger individuals of some species, that in term will command a greater market value. To further lessen any impacts associated with this measure, implementation will be delayed for one year. Since average wire trap duration is around 6 to 8 months, this will allow the fishermen to recuperate any investment made on a smaller size mesh prior to the implementation of the regulations.

10.2.2 Require a self-destruct panel (not smaller than the funnel opening of the trap) and/or self-destruct door fastening in fish traps.

Rationale: Every year numerous traps are lost due to ship traffic (buoy lines cut by propellers), trap poaching (thieves emptying traps and throwing them back into the water without buoys) and bad weather conditions, including storms and hurricanes. These derelict (ghost) traps continue to catch fish and, as indicated in a study by Munro (1974b) only about 50 percent escape in 7 to 10 days. Munro et al. (1971) reported that fish confined to traps for two weeks showed signs of physical deterioration. This measure will enhance the opportunities of the fish to escape from ghost traps; thereby, increasing the probability that these fish will enter the landings later to the benefit of fishermen.

Impact: The self-destruct panel and self-destruct door fastening can be made with cheap materials, such as jute and ungalvanized wire, readily available to local fishermen. The local governments already have this provision in their fishery laws, therefore, no major impact is expected from this measure.

10.2.3 Require owner identification and marking of traps, buoys, and boats. Marking/identification systems of P.R. and U.S. Virgin Islands can be used by fishermen of those states to meet the federal marking requirements. If the state(s) eliminates the marking system or a fisherman will fish only in the FCZ, an identification number and color code will be assigned by Regional Director upon application.

Rationale: The marking of the gear employed in this type of fishery will diminish the trap thievery problem. Owner identification will allow enforcement authorities to implement management measure 10.2.4 which is directed at stopping trap poaching. In addition, trap identification will assist in attaining the objective of measure 10.2.9, by aiding in verification of trap ownership for harvest reporting purposes.

Impact: This management measure will cause very little impact on the fishery, since the marking requirement by all governments (local and federal) will represent a minimal extra cost to the fishermen (average fisherman utilizes only 30 traps); the marking could be easily done with paint or carving of the wood in the trap frame, and is already required under U.S. Virgin Islands and Puerto Rican law.

10.2.4 Prohibit the hauling or tampering of another person's traps without owner's written permission, except by authorized enforcement officers.

Rationale: As stated in 10.2.3 this measure will help to alleviate the theft-of-traps problem in the area.

Impact: No adverse impact is expected from the measure, which already is part of the Virgin Islands code.

10.2.5 Prohibit the use of poisons, drugs, other chemicals, and explosives for fishing in the management area

Rationale: These methods of fishing do not discriminate among species or the size of individual fish, and at the same time are very detrimental to habitat, particularly coral reefs. As a result, this measure will be beneficial to both marine populations and their habitat. Powerheads are allowed only for protection against sharks.

Impact: The prohibition of these fishing methods is already in the local laws; therefore, no extra enforcement cost or burden on the fishermen is expected. Also, having compatible laws among federal and local governments, and the spiny lobster FMP will enhance fishery management in the area.

10.2.6 The minimum size limit for yellowtail snapper taken by any fishing method will be 8 inches total length for the first fishing year and will be increased one inch per year until it is stabilized at 12 inches. All undersized yellowtail snappers must be returned to the sea immediately with the minimum amount of injury and in such a manner as to ensure maximum probability of survival.

Rationale: According to fishermen interviewed in the fact-finding meetings, yellowtail snappers are being landed at a smaller size than in previous years. The survey conducted by the Council on length-weight frequencies shows that 42 percent of yellowtail snapper landings are less than 12 inches (Table A-2, Appendix I).

In the absence of the necessary data from the Puerto Rico - U.S. Virgin Islands area to determine the appropriate size to ensure adequate growth and recruitment to the fishery, a minimum size of 8 inches total length, is adopted for the first year of this FMP. The minimum size will be increased one inch per year until it is stabilized at 12 inches. This will provide time to gather better data to perform yield-per-recruit analyses for the yellowtail snapper of this area.

Impact: By starting with a minimum size of 8 inches and increasing it to 12 inches over a period of 5 years, a portion of the catch will be returned to the sea, allowing these fish to enter the fishery at a larger size. This amount will fluctuate from 5 percent the first year to 9 percent the tenth year (see Table 10.2.6-A).

The economic impact of this measure is summarized in Table 10.2.6-A. In the first year after plan implementation fishermen will lose $12,376, however, a positive balance of $20,422 will result at the end of the second year, $61,592 the third year, and so on; therefore, this measure will be of economic benefit to the fishermen.

10.2.7 The minimum size limit for Nassau grouper taken by any fishing method will be 12 inches total length for the first fishing year and will be increased one inch per year until it is stabilized at 24 inches. All undersized Nassau groupers must be returned to the sea immediately with the minimum amount of injury and in such a manner as to ensure maximum probability of survival.

Rationale: According to the fishermen interviewed at the fact-finding meetings on this subject, the Nassau grouper has practically disappeared from the local catches and the ones that do appear are small compared with previous years. The survey conducted by the Caribbean Fishery Management Council shows that 31 percent of landings of this species are below the initial minimum size of 12 inches total length (Table A-2, Appendix I).

In the absence of the necessary data from the Caribbean to determine the appropriate size to ensure adequate growth and recruitment to the fishery, a size limit of 12 inches total length, as established for Nassau grouper in the Snapper/Grouper FMP of the South Atlantic area, is adopted as an initial limitation during the first year after FMP implementation. The yield-per-recruit analysis made (by analogy with the red grouper, *E. morio*) by the South Atlantic Fishery Management Council points out that 24 inches will produce maximum yield for this species. The data available show no females spawning at less than 19 inches total length. Taking note of the above and the fact that starting with a 24 minimum size will cause severe economic impact on this fishery (nearly 100 percent of the landings of Nassau grouper are less than 24 inches, according to the survey conducted by the CFMC) and assuming that the growth coefficient for this species is approximately the same for the two areas, the Council has decided to implement a system by which an inch per year will be added to the minimum size until the ultimate goal of 24 inches is attained.

Impact: This scheme will cause less economic disruption and at the same time will provide time for conducting

the necessary studies to obtain pertinent data (such as the one needed for yield-per-recruit analysis of Nassau grouper for this area) to provide for better management of this resource.

Table 10.2.7-A shows that fishermen will lose $4,985 the first year of the FMP. However, in the second year they will start gaining in gross income. The gain will be derived from an increase in pounds landed due to a higher proportion of large fish in the catches. Results of regression analysis (available at Council's headquarters) indicate that no major change in price-trends will result from the increase in landings. Since there are no projected employment changes, the production of Nassau grouper by individual fishermen should increase. This increase will be totally absorbed by the market in these islands as they import a large amount of the fresh fish consumed locally. No changes in market structure or income distribution are expected. (Present value of the figures corresponding to this measure are also shown in Table 10.2.7-A).

10.2.8 Closed season for Nassau grouper: Their landing will be prohibited from January 1 to March 31 of each calendar year; fish of this species caught during this period must be returned to the sea immediately with the minimum amount of injury in such a manner as to ensure maximum probability of survival.

Rationale: This species exhibits spawning aggregations during 4 months of the year in the U.S. Virgin Islands and Puerto Rico. Spawning aggregations have been fished with such intensity that many have been depleted. This has caused landings of these species (according to fishermen interviewed during the fact-finding meetings) to diminish to a point that protection is needed.

Olsen and LaPlace (1978) documented that a spawning aggregation of spawning Nassau grouper from St. Croix was "fished for ten years until 1971 when the fishes ceased to aggregate." In the same paper he predicted the disappearance of another aggregation of Nassau grouper off southeastern St. Thomas, if no measures were taken. The Nassau grouper ceased to aggregate at this site according to fishermen interviewed at the fact-finding meetings conducted in St. Thomas in 1983. Smith (1972) stated that "the existence of localized spawning sites where most of the reproduction takes place means that the grouper fishery is more precarious than we have heretofore suspected. If these spawning sites were destroyed by improper fishing methods or anything that seriously upset the habitat, reproduction of the species would drastically decline, although the results would not be immediately apparent since groupers are long-lived fish.

Furthermore, because of the long-distance transport of larval groupers, the effects of the loss of a particular spawning site would be reflected in the grouper populations some distance away rather than in the immediately adjacent area. Thus, the only tangible evidence of the destruction of the run would be cessation of the annual aggregations at the site in question."

The Council concurs with Olsen, Smith and the fishermen of St. Thomas, on the problem and importance of this resource and believes that this measure is necessary to provide the conditions for the recovery of the spawning aggregations. This species spawns mainly from January through April in this area. The Council decided to implement a closed season for 75 percent of the total spawning-aggregation time to prevent overfishing of these spawning aggregations. Although total closure would undoubtedly afford maximum protection to the spawning stock, the Council believes that reducing effort by 75 percent over the spawning season coupled with the annual incremental size limit adjustment will be sufficient for the recovery of the Nassau grouper population and, at the same time, create less socio-economic disruption.

Impact: The economic impact of prohibiting the landings of Nassau grouper during 75 percent of their spawning season depends on the quantity and value of Nassau grouper currently landed during these months. The available literature indicates that Nassau grouper spawn mainly during the months of January through April. Data on landings by month, for this species are not available. Assuming, however, that in the trap and hook-line fisheries monthly landings of Nassau grouper are proportional to monthly landings of all species, we estimate the impact of this management measure as follows:

Landings of shallow-water reeffish in January through April, in the trap and hook-line fisheries, comprise 8 percent of annual landings in U.S.V.I. In Puerto Rico, monthly landings of Nassau grouper by gear are not available; for groupers, however, landings from January through April represent 28 percent of annual landings. Applying these relationships to total annual landings of Nassau grouper, which are 4 percent of all trap and hook-line landings in U.S.V.I. and 6 percent in Puerto Rico (percentage obtained from the survey conducted by the Caribbean Fishery Management Council combined with official landings figure) we estimate that the fishermen will lose $24,306 (Table 10.2.8-B) by not taking Nassau groupers during their spawning season. This loss will be more than compensated by the benefit obtained in the long run by allowing more individuals reach spawning size. However, since this is a pan-Caribbean species, it is impossible to quantify these benefits. The calculations to estimate the economic impact of this measure are summarized in Tables 10.2.8-A and 10.2.8-B.

TABLE 10.2.6

ECONOMIC ANALYSIS OF THE YELLOWTAIL SNAPPER BEFORE FMP IMPLEMENTATION

ITEM	8 in. or less	9 in.	10 in.	11 in.	12 in.	over 12 in.	TOTAL
Size Distribution *	5%	7%	11%	20%	13%	44%	100%
Catch (No. of fish)	23,094	32,331	50,806	92,374	60,043	203,223	461,871
Releases (No. of fish)	-	-	-	-	-	-	-
Landings (No. of fish)	23,094	32,331	50,806	92,374	60,043	203,223	461,871
Average weight (lbs.)	.40	.41	.63	.79	.99	1.47	1.05
Pounds caught	9,237	13,256	32,008	72,976	59,443	298,046	484,966
Pounds released	-	-	-	-	-	-	-
Pounds landed	9,237	13,256	32,008	72,976	59,443	298,046	484,966
Average price per lb.	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Value of catch	$ 12,378	$ 17,763	$ 42,890	$ 97,787	$ 79,654	$ 399,381	$ 649,853
Value of releases	-	-	-	-	-	-	-
Value of landings	$ 12,378	$ 17,763	$ 42,890	$ 97,787	$ 79,654	$ 399,381	$ 649,853

* From special survey July - September, 1983

TABLE 10.2.6 - A

ECONOMIC IMPACT ANALYSIS OF MINIMUM SIZE LIMITS FOR YELLOWTAIL SNAPPER

Year and Size Group	Number of Fish: Percent Distr. 1/	Stocks 2/	Catch (24%) 3/	Releases	Survivals (80%)	Landings: Number of Fish	Average Weight 1/	Pounds	Price per Pound	Value	Value with no Plan 4/	Gain in Gross Income	Accumulated Gain	Present 5/ Value
Year 1	1.000	1,956,199	461,871	23,094	18,475	438,777	1.08*	475,729	1.34	$ 637,477	$649,853	$- 12,376	$- 12,376	$- 11,251
< 8	.050	97,810	23,094	23,094	18,475	0		0	-	-				
≥ 8	.950	1,858,389	438,777	0	-	438,777	1.08*	475,729	1.34	637,477				
Year 2	1.000	1,974,674	466,685	27,908	22,326	438,777	1.14	500,205	1.34	670,275	649,853	20,422	+ 8,046	6,650
< 9	.059	116,285	27,908	27,908	22,326	0		0	-	-				
≥ 9	.941	1,858,389	438,777	0	-	438,777	1.14	500,205	1.34	670,275				
Year 3	1.000	1,997,000	472,044	33,267	26,614	438,777	1.21	530,929	1.34	711,445	649,853	61,592	69,638	52,320
< 10	.069	138,611	33,267	33,267	26,614	0		0	-	-				
≥ 10	.931	1,858,389	438,777	0	-	438,777	1.21	530,929	1.34	711,445				
Year 4	1.000	2,023,614	478,431	39,654	31,723	438,777	1.36	596,737	1.34	799,628	649,853	149,775	219,413	149,862
< 11	.081	165,225	39,654	39,654	31,723	0		0	-	-				
≥ 11	.919	1,858,389	438,777	-	-	438,777	1.36	596,737	1.34	799,628				
Year 5	1.000	2,055,337	486,045	47,268	37,814	438,777	1.47	645,002	1.34	864,303	649,853	214,450	433,863	269,395
< 12	.096	196,948	47,268	47,268	37,814	0		0	-	-				
≥ 12	.904	1,858,389	438,777	0	-	438,777	1.47	645,002	1.34	864,303				
Year 6	1.000	2,073,191	490,260	47,268	37,814	442,992	1.47	651,198	1.34	872,605	649,853	222,752	656,615	370,642
< 12	.094	196,948	47,268	47,268	37,814	0		0	-	-				
≥ 12	.906	1,876,243	442,992	0	-	442,992	1.47	651,198	1.34	872,605				
Year 7	1.000	2,091,045	494,476	47,268	37,814	447,208	1.47	657,396	1.34	880,911	649,853	231,058	887,673	455,517
< 12	.093	196,948	47,268	47,268	37,814	0		0	-	-				
≥ 12	.907	1,894,097	447,208	0	-	447,208	1.47	657,396	1.34	880,911				
Year 8	1.000	2,108,899	498,691	47,268	37,814	451,423	1.47	663,592	1.34	889,213	649,853	239,360	1,127,033	525,769
< 12	.091	196,948	47,268	47,268	37,814	0		0	-	-				
≥ 12	.909	1,911,951	451,423	0	-	451,423	1.47	663,592	1.34	889,213				
Year 9	1.000	2,126,753	502,907	47,268	37,814	455,639	1.47	669,789	1.34	897,517	649,853	247,664	1,374,697	583,006
< 12	.089	196,948	47,268	47,268	37,814	0		0	-	-				
≥ 12	.911	1,929,805	455,639	0	-	455,639	1.47	669,789	1.34	897,517				
Year 10	1.000	2,144,607	507,122	47,268	37,814	459,854	1.47	675,985	1.34	905,820	649,853	255,967	1,630,664	628,692
< 12	.088	196,948	47,268	47,268	37,814	0		0	-	-				
≥ 12	.912	1,947,659	459,854	0	-	459,854	1.47	675,985	1.34	905,820				

1/ Percent distribution by size and average weight was obtained from the 3-month survey.

2/ Total stocks the first year were calculated as follows:

a) From table 11 of the Plan, total shelf productivity is 24,765 thd. kg.
b) 24,765 x 2.2 = 54,483 thd. pounds
c) 54,483 x 0.58 = 31,600 thd. pounds shallow-water reeffish
d) 31,600 x 0.065 = 2,054 thd. pounds yellowtail snapper
e) 2,054 ÷ 1.05 (from survey) = 1,956,199 fish (yellowtail)

3/ According to the 3-month survey, the catch is around 24% of the stocks.

4/ See Table 10.2.6

5/ 10% annual discount rate.

* Rounded from 1.0842159

TABLE 10.2.7 - A
ECONOMIC IMPACT ANALYSIS OF MINIMUM SIZE LIMITS FOR NASSAU GROUPER

Year and Size	Number of Fish: Percent Distrib. 1/	Stocks 1/	Catch (80%) 2/	Releases	Survivals (60%)	Landings: Number Fish	Pounds	Price/ Pound	Value	Value With No Plan 3/	Gain in Gross Income	Present Value of Gain	Accumulated Gain
ear 1	1.000	123,241	98,593	30,465	18,279	68,128	147,156	1.38	$203,021	$ 208,006	$ - 4,985	$- 4,532	$ - 4,532
<12	.309	38,081	30,465	30,465	18,279	-	-	-	-				
≥12	.691	85,160	68,128	-	-	68,128	147,156	1.38	$203,021				
ear 2	1.000	141,520	113,216	45,088	27,053	68,128	170,320	1.43	243,898	196,143	$ + 47,755	$+39,467	$ + 34,935
<13	.398	56,361	45,088	45,088	27,053	-	-	-	-				
≥13	.602	85,160	68,128	-	-	68,128	170,320	1.43	243,898				
ear 3	1.000	168,573	134,859	66,731	40,039	68,128	214,603	1.48	317,476	184,731	$ +132,745	$+99,733	$ 134,668
<14	.495	83,414	66,731	66,731	40,039	-	-	-	-				
≥14	.505	85,160	68,128	-	-	68,128	214,603	1.48	317,476				
ear 4	1.000	208,612	166,889	98,762	59,257	68,128	247,305	1.54	380,836	174,921	$ +205,915	+140,643	$ 275,311
<15	.592	123,452	98,762	98,762	59,257	-	-	-	-				
≥15	.408	85,160	68,128	-	-	68,128	247,305	1.54	380,836				
ear 5	1.000	267,869	214,295	146,167	87,700	68,128	297,038	1.59	472,127	164,346	$ +307,781	$191,108	$ 466,419
<16	.682	182,709	146,167	146,167	87,700	-	-	-	-				
≥16	.318	85,160	68,128	-	-	68,128	297,038	1.59	472,127				
ar 6	1.000	355,570	284,456	216,328	129,797	68,128	322,297	1.65	532,761	155,199	$ +377,562	$213,124	$ 679,543
<17	.760	270,410	216,328	216,328	129,797	-	-	-	-				
≥17	.240	85,160	68,128	-	-	68,128	322,297	1.65	532,761				
ar 7	1.000	485,366	388,293	320,165	192,099	68,128	362,441	1.72	623,371	147,222	$ +476,149	$244,340	$ 923,883
<18	.825	400,206	320,165	320,165	192,099	-	-	-	-				
≥18	.175	85,160	68,128	-	-	68,128	362,441	1.72	623,371				

'Total stocks the first year were calculated on the basis that Nassau grouper population is 6.3% of the Yellowtail snapper opulation, according to the 3-months survey (see Table 10.2.6-B). The percent distribution was also obtained from the 3-months urvey. Mortality and recruitment are assumed to cancel each other; releases of small fish, however, must generate an increase in ocks.

'According to Olsen (1975), trap fishery mortality ranged from 76 to 99.5%, handline on fish aggregations, were 60 to 75%. Thus a nservative average of 80% was used for these calculations.

Best available data indicate that with no Plan, Nassau grouper landings will continue to decline 9% every year.

CONTINUATION OF TABLE 10.2.7 - A

Year and Size	Number of Fish: Percent Distrib. 1/	Stocks 1/	Catch (80%) 2/	Releases	Survivals (60%)	Landings: Number Fish	Pounds	Price/ Pound	Value	Value With No Plan 3/	Gain in Gross Income	Present Value of Gain	Accumulated Gain
Year 8	1.000	677,465	541,972	473,844	284,307	68,128	405,362	1.78	$721,476	$ 138,646	$ +582,830	$271,894	$1,195,777
<19	.874	592,305	473,844	473,844	284,307	-	-	-	-				
≥19	.126	85,160	68,128	-	-	68,128	405,362	1.78	$721,476				
Year 9	1.000	961,172	769,417	701,290	420,774	68,128	438,063	1.84	805,954	130,421	$ +675,533	$286,492	$1,482,269
<20	.911	876,612	701,290	701,290	420,774	-	-	-	-				
≥20	.089	85,160	68,128	-	-	68,128	438,063	1.84	805,954				
Year 10	1.000	1,382,545	1106,036	1037,909	622,745	68,128	476,215	1.91	909,509	123,197	$ +786,312	$303,157	$1,785,426
<21	.938	1,297,386	1037,909	1037,909	622,745	-	-	-	-				
≥21	.062	85,160	68,128	-	-	68,128	476,215	1.91	909,509				
Year 11	1.000	2,005,290	1604,233	1536,105	921,663	68,128	519,135	1.98	1028,052	116,218	$ +911,834	$319,592	$2,105,018
<22	.958	1,920,131	1536,105	1536,105	921,663	-	-	-	-				
≥22	.042	85,160	68,128	-	-	68,128	519,135	1.98	1028,052				
Year 12	1.000	2,926,953	2341,563	2273,435	1,364,061	68,128	545,024	2.06	1122,749	110,033	$+1,012,716	$322,683	$2,427,701
<23	.971	2,841,794	2273,435	2273,435	1,364,061	-	-	-	-				
≥23	.029	85,160	68,128	-	-	68,128	545,024	2.06	1122,749				
Year 13	1.000	4,291,014	3432,811	3364,684	2,018,810	68,128	545,024	2.13	1160,901	103,531	$+1,057,370	$306,282	$2,733,983
<24	.980	4,205,855	3364,684	3364,684	2,018,810	-	-	-	-				
≥24	.020	85,160	68,128	-	-	68,128	545,024	2.13	1160,901				

1/Total stocks the first year were calculated on the basis that Nassau grouper population is 6.3% of the Yellowtail snapper population, according to the 3-months survey (see Table 10.2.6-B). The percent distribution was also obtained from the 3-months survey. Mortality and recruitment are assumed to cancel each other; releases of small fish, however, must generate an increase in stocks.

2/According to Olsen (1975), trap fishery mortality ranged from 76 to 99.5%, handline on fish aggregations, were 60 to 75%. Thus a conservative average of 80% was used for these calculations.

3/Best available data indicate that with no Plan, Nassau grouper landings will continue to decline 9% every year.

TABLE 10.2.8-A

Percentage of Landings During 75% of Spawning Season:

Landings	Hook-line and fish-trap landings of all finfish species in US Virgin Islands 1/	Puerto Rico Groupers 1/
A. Annual Reported Landings (1980-81) (Lbs.)	320,967	742,000
B. Reported Landings During Spawning Season (January through April)	32,335	273,000
C. Reported landings during 75% of spawning (B x .75)	24,251	205,000
D. Percent that (C) is of (A)	8%	28%

1/ In order to estimate the economic impact of the proposed management measure prohibiting landings of Nassau groupers during 75% of their spawning season, it is necessary to estimate landings separately for Puerto Rico and U.S.V.I. due to the nature of the available data in both areas. In Puerto Rico, Nassau grouper is not separated from the rest of the grouper species, which are reported collectively as "groupers" on a monthly basis. In U.S.V.I. the data most related to groupers are catch by traps and hook-line.

TABLE 10.2.8-B

Total Landings and Value During the Closed Season:

Landings & Value	U.S.V.I.	Puerto Rico
E. Total Estimated Commercial Landings (Lbs.)	1,090,000	815,000
F. Total Estimated Landings Including Recreational (E ÷ 0.87)*	1,253,000	841,000
G. Total Landings of Finfish in USVI and Groupers in P.R. during 75% of the Nassau grouper spawning season	100,240 a/	235,480 b/
H. Percentage of Nassau grouper 1/	4%	6%
I. Nassau grouper Landings Affected (H x G)	4,010	14,129
J. Value of Nassau grouper Landings 2/ Affected ($1.34/lb.)	$ 5,373	$ 18,933

* Recreational catch of these species is estimated as 13% of total landings (Table 7).

1/ From the three-months survey combined with official landings figures.

2/Total value of Nassau grouper landings affected: $24,306 ($5,373 plus $18,933).

a/8% of F (see D)

b/28% of F (see D)

10.2.9 Data Collection: Gather catch/effort, length/frequency, as well as any necessary biological information, through the improvement of the existing state-federal agreements formulated by NMFS/PR/USVI and/or Council's own data gathering program.

Rationale: There is a need for much more information on shallow-water reeffish stocks than the available data provide. Through the strengthening and/or creation of better data collection programs, the Council will be able to manage and monitor the fisheries more efficiently. At present the state-federal program for fishery statistics will cover the Council's needs in this respect, however, if this system fails in any significant way, the Council data gathering system will be implemented by regulatory amendment.

Impact: The state-federal programs have been dynamically revised to accommodate the Council's needs for better management. It is expected that the information needs for this fishery will be supplied by this mechanism on a continuous basis at no additional cost. For the same reasons, this measure does not represent any extra burden to the fishermen.

10.3 Management Measures Considered and Rejected

10.3.1 No Action Alternative

Rationale and Impact: The shallow-water reeffish fishery is the most important fishery for the local fishermen of the area under Council authority (see Section 2.0). The available data show a clear downward trend in the fishery, that if not curtailed or stopped will result in an unrecoverable damage to this fishery. No action will result in a continuing adverse impact on the resource, since local governments have no resources or mechanisms to achieve unified management of the stocks throughout their range.

10.3.2 Limit Gear

Rationale and Impact: The Council considered limiting the number of fish traps per fisherman or boat. These were not adopted at this time because of the severe economic and social impact. These measures limit the economic potential of individual trapping enterprises and discriminates against larger operators that may be more efficient in some locations. In addition, these measures will not restrict total effort unless the number of fishermen or boats is also restricted (limited entry).

10.3.3 Minimum mesh size of 1 inch for fish traps

Rationale and Impact: This mesh size retains almost all fishes entering the trap (Olsen, 1976a and Stevenson, 1978) and was considered too small and, therefore, detrimental to the fishery by both the Council and the fishermen in general (from fact-finding meetings). Also, wire of this mesh size is generally more expensive for the fishermen and the majority have abandoned its use.

10.3.4 Minimum mesh size of 1 1/2 inches for fish traps

Rationale and Impact: This mesh size was suggested by some fishermen as the minimum mesh size to use, but the Council concluded that it will cause too severe an impact on the important goatfish fishery of the area given that adult marketable-size individuals of this species will escape. Also in the majority of the fishing areas around Puerto Rico, this mesh size is not available to the fishermen.

10.3.5 Rotating area closures

Rationale and Impact: The Council did not adopt this measure at the present. This management method has never been used before in a tropical-multispecies fishery. The fact-finding meetings results show that this measure would cause tremendous socio-economic problems to local fishermen without assuring overall benefit after its implementation. However, it was decided to experiment on a small scale to determine the possible value of this measure (see Section 13.0).

10.3.6 Twenty-four inches total length minimum size for Nassau grouper

Rationale and Impact: According to the yield per recruit analysis made by analogy for Nassau grouper by the SAFMC, the optimum size to maximize yield will be around 24 inches TL. In the survey conducted by the CFMC, 98.78 percent of Nassau grouper sampled were presently less than 24 inches total length (Appendix I, Table A-2).

The Council determined that the 24 inches size will optimize yield, but it also will cause adverse economic impact on those fishermen involved in the Nassau grouper fishery at this time. Therefore, the Council adopted a management scheme by which the 24 inches minimum size will phase in over a period of 12 years to minimize the economic impact and to provide for additional time to monitor the fishery for better management of this resource (see Section 10.2.7).

10.3.7 Size limits for other species

Rationale and Impact: Several other species were considered for a minimum size management scheme. However, from the size frequency survey it was found that the average size was above the one considered optimum for these species; and with respect to other species such as yellowfin grouper, schoolmaster, mutton snapper, and trunkfish, not enough information was available for a Council decision (see Appendix I, Table A-3). The local Governments will be collecting more information through PL 88-309 Programs. If the data obtained through the monitoring programs show a need for Council action, more species restrictions will be incorporated into the FMP following the procedure explained in Section 12.0.

10.3.8 Closed season for other species

Rationale and Impact: No other species were proposed for seasonal closure, with the provision that as new data are acquired other species will be considered (see Section 12.0).

10.3.9 Closed areas where fishes have spawning aggregations

Rationale and Impact: The Council considered the closure of spawning aggregation areas too burdensome to the fishermen and the enforcement agencies. To protect these aggregations a closed season will be established when necessary and enforcement will be done via the landing prohibition of the pertinent species during the closed season.

10.3.10 Installation of Artificial Reefs

Rationale and Impact: The Council feels that there is no need for further artificial reefs, as a management tool, at this time. Artificial reefs are presently established both in Puerto Rico and the U.S. Virgin Islands (Section 8.2.3). Scientific evidence does not clearly define the overall impact of artificial reefs on habitat productivity. Artificial reefs require permits for installation and also maintenance of navigational aids. The present lengthening of the runway at Harry S. Truman Airport on St. Thomas inadvertently provides a high quality artificial reef on a scale that could never be specifically financed by the local government. This provides a perfect laboratory for studying biological succession on a large area of complex new surface. Relationship of newly exposed surfaces to ciguatera could also be monitored here. Impact of artificial reefs should be addressed on a case by case basis.

10.4 Impact of the Proposed Regulations on Small Business

In Puerto Rico and the U.S. Virgin Islands, around 2,000 fishermen sell a total of $9,000,000 in fish, which represents $4,500 per fishermen. Also there are 26 dealers and 17 marketing associations operating in Puerto Rico and 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", and if fish dealers 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".

Table 10.4 summarizes the cost and benefit derived from the management measures of this plan. The size limits for yellowtail snapper and Nassau grouper will have a negative economic impact in the first year; however, after that year the fishermen, fish dealers, etc. will derive an economic benefit, (see sections 10.2.6 and 10.2.7). Regarding the other management measures, no significant economic impact is expected (see sections 10.2.1 - 10.2.9) except for the closed season on Nassau grouper, that will have a negative impact of $24,306 during the first year of the plan. Due to the pan-Caribbean nature of the larval dispersal and recruitment of this grouper it is impossible to quantify the benefits to the fishermen (see Section 10.2.8).

There are no directed efforts toward any particular species in the shallow-water reeffish fishery (except for Nassau grouper and red hind, when spawning aggregations are formed); therefore, the management measures should affect all users in almost the same way. Thus, no distributional impacts are expected.

Therefore, the Council determined that the proposed regulations for the shallow-water reeffish fishery will not have a significant economic impact on a substantial number of small entities.

10.5 Management Cost

10.5.1 FMP Development

FMP development was estimated to be $196,840. Detailed information on cost estimates is available at Council office for general inspection.

10.5.2 Data Collection Cost

Both the U.S. Virgin Islands and Puerto Rico Governments have revised their fishery statistics programs to accommodate the Council's data needs for FMPs. No additional cost is expected to be incurred by local agencies as a consequence of this FMP.

10.5.3 Enforcement Cost

To enforce the management measures of this FMP effectively, it is essential that the Commonwealth of Puerto Rico and the Territory of the Virgin Islands implement compatible regulations for their waters. The minimum size limits and closed season, in particular, would be prohibitively expensive to enforce if harvest from the FCZ had to be proven for each violation. Therefore, enforcement cost is calculated based on compatible regulations. Dockside enforcement will be required to monitor landings and check gear. At-sea enforcement will be required to spot-check gear, prevent trap poaching, and enforce the prohibitions on use of poisons, drugs and explosives. To some extent, these requirements can be met concurrently with other enforcement activities of NMFS and state enforcemnt officers. Therefore, enforcement cost will be somewhat reduced. The enforcement cost shown in Table 10.4 is based on the addition of 48 days of at-sea boat patrols per year and one and one-half agent man-years for manning the patrols, monitoring landings, conducting investigations and training.

TABLE 10.4

ESTIMATES OF THE ECONOMIC IMPACT OF MANAGEMENT MEASURES FOR THE SHALLOW-WATER REEFFISH FISHERY (PRESENT VALUE INCLUDED)

1	2	3	4	5	6	7	8	9	10
	Gross Benefits (Gain in Gross Income)								
Year	Yellowtail	Nassau Grouper Minimum Size	Nassau Grouper Closed Season	TOTAL	Enforcement Costs	Plan Preparation 1/	Net Benefit (Col. 5 - Col. 6 - Col. 7)	Present Value of Column 5*	Present Value of Column 8*
1	$- 12,376	$- 4,985	$- 24,306	- 41,667	103,800	19,684	$- 165,151	$- 37,879	$- 150,137
2	20,422	47,755	- 24,306	43,871	103,800	19,684	- 79,613	36,257	- 65,796
3	61,592	132,745	- 24,306	170,031	103,800	19,684	46,547	127,747	34,971
4	149,775	205,915	- 24,306	331,384	103,800	19,684	207,900	226,340	141,998
5	214,450	307,781	- 24,306	497,925	103,800	19,684	374,441	309,172	232,498
6	222,752	377,562	- 24,306	576,008	103,800	19,684	452,524	345,142	255,438
7	231,058	476,149	- 24,306	682,901	103,800	19,684	559,417	319,647	287,069
8	239,360	582,830	- 24,306	797,884	103,800	19,684	674,400	372,219	314,613
9	247,664	675,533	- 24,306	898,891	103,800	19,684	775,407	381,218	328,848
10	255,967	786,312	- 24,306	1,017,973	103,800	19,684	894,489	392,473	344,864
TOTAL	$1,630,664	$3,587,597	$- 243,060	4,975,201	1,038,000	196,840	$ 3,740,361	$ 2,472,336	$1,724,366

* 10% Annual Discount Rate

1/ $196,840 distributed evenly among 10 years

11.0 RESEARCH AND DATA NEEDS

11.1 Biological

Size/age/weight frequency surveys are needed for practically all species included in the stock unit of shallow-water reeffish. Literature research as well as field research on species composition and relative abundance, growth and mortality rates (fishing mortality by gear and species, if possible), survival of fishes released, migration patterns, seasonal distribution, spawning behavior, and seasonality, predator-prey and habitat relationships, and research on ciguatera are also needed.

11.1.1 If the Commonwealth of Puerto Rico adopts Section 13.1 (the recommendation of closing Mona, Monito, and part of Peninsula Flamenco in Culebra) a study of these areas will help determine the feasibility of closing other areas as a management tool for the shallow-water reeffish fishery. This should be done for at least a period of one year. The study should include aspects of species composition of the area, habitats, rate of stock recovery, etc.

11.2 Socio-Economic

Development and enhancement of an adequate socio-economic data base are necessary for projecting impacts caused by the management measures. This should include marketing and wholesaling systems for fish in Puerto Rico and USVI: (a) retail prices, (b) marketing margin by classes (or species), (c) investment in fleet and gear of the commercial and recreational sector, (d) annual participation of commercial and recreational fishermen in terms of boat-days, man-days, frequency at which traps are hauled, etc.

12.0 STATEMENT OF COUNCIL INTENTION TO MONITOR THIS FMP AFTER APPROVAL BY THE SECRETARY

12.1 The Council will maintain a close liaison with the Puerto Rican Department of Natural Resources and the Marine Resources Development Corporation, and the U.S. Virgin Islands Department of Conservation and Cultural Affairs.

12.2 Monitoring and evaluation will be made of the data assembled through the State/Federal agreements 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.

12.3 It is the intention of the Council to collect information needed for yield-per-recruit analysis for those species of high value (such as snappers and groupers, etc.) and monitor these species to detect any significant changes that will merit the establishment of a size limit. However, it could take several years before enough data are available to perform yield-per-recruit analysis of all the species of the shallow-water regime addressed by this FMP.

The Council has found the present size frequency survey very useful in detecting trends and size composition of the catches of four important species (Table A-2, Appendix I). Thus, this mechanism will be used to establish minimum sizes for other species whenever necessary. At the same time the Council will continue collecting data through the State/Federal Statistics Programs that later could be used for yield-per-recruit analysis. Once the Council obtains the necessary baseline data for these analyses, other species may be incorporated into the size limit management scheme as warranted.

12.4 The Council will encourage research by local, national, and international groups that will contribute to the improvement of this FMP.

12.5 The Council will conduct public hearings at appropriate times and places regarding the need for change in the FMP or its regulations and incorporate those changes, through the amendment process.

13.0 RECOMMENDATIONS TO OTHER INSTITUTIONS

The Council recommends[1]:

13.1 That the Secretary of Commerce and the Government of the Commonwealth of Puerto Rico work in coordination with the Council to close (to all fishing) a section of Flamenco Peninsula of the Island of Culebra, on a trial basis, for a minimum of one year. This will serve to assess the effectiveness of closed areas as a management tool.

13.2 That the Secretary of Commerce and the Government of the U.S.V.I. cooperate with the Council and the National Park Service in the U.S. Virgin Islands in establishing fishery research projects to assess stocks inside and outside the National Park waters.

13.3 That the Secretary of Commerce provide additional funding and personnel to help solve the vexing and dangerous problem of ciguatera.

13.4 That the local governments prohibit the landing of haul or beach seines onto the beach, except the short seines used for shrimp. The hauling of seines onto the beach causes high mortality of juvenile and mature individuals of small species of reeffish. The desired fish should be removed by brail or any appropriate method while the net is in the water.

13.5 That the local governments adopt and implement the management measures proposed in this FMP within their area of jurisdiction in order to manage the species uniformly throughout their range.

13.6 That the local governments further assist the Secretary and the Council in addressing and supporting the research and monitoring needed for this FMP.

APPENDIX I

APPENDIX I

TABLE A-1

SIZE DISTRIBUTION OF VESSELS IN P.R. AND U.S.V.I. (1983)

Size Group	Number of Vessels			Total	Size Distribution
	Puerto Rico	St. Thomas	St. Croix		
16 ft.	213	21	46	280	19.3%
16-25	810	101	126	1,037	71.4%
25-36	86	16	14	116	8.0%
36	16	1	2	19	1.3%
TOTAL	1,125	139	188	1,452	100.0%

APPENDIX I

TABLE A-2

CFMC'S REEFFISH SURVEY FINAL RESULTS*

(SIZE DISTRIBUTION OF FOUR MAIN SPECIES FROM THE 3-MONTHS SURVEY)

Size (in.)	Yellowtail Snapper	Queen Triggerfish	Red hind	Nassau Grouper
	Cummulative Percentages			
Below 10 inches	11.86	15.72	29.83	8.26
Below 11 inches	22.87	31.44	52.95	14.07
Below 12 inches	42.27	49.70	74.83	30.89
Below 13 inches	55.97	68.20	85.87	45.26
Below 14 inches	71.50	82.11	92.01	63.00
Below 15 inches	82.31	90.45	95.67	71.26
Below 16 inches	89.39	95.65	98.15	80.74
Below 17 inches	95.29	99.28	99.20	83.80
Below 18 inches	97.71	99.64	99.76	87.47
Below 19 inches	98.76	99.88	99.88	90.84
Below 20 inches	99.41	100.00	99.94	92.67
Below 21 inches	99.80	100.00	100.00	95.73
Below 22 inches	99.87	100.00	100.00	97.56
Below 23 inches	99.94	100.00	100.00	98.17
Below 24 inches	100.00	100.00	100.00	98.78
Below 25 inches	100.00	100.00	100.00	99.39
Below 26 inches	100.00	100.00	100.00	100.00

*The complete report is available at Council's office.

APPENDIX I
TABLE A-3

CFMC'S REEFFISH SURVEY FINAL RESULTS

	Fishes Measured		LENGTH (INCHES) 1/			WEIGHT (LBS.)			Proposed Minimum Size	Percent of Fish Below Proposed Minimum Size
	Number	% By Species	Minimum	Maximum	Average	Minimum	Maximum	Average		
.lowtail ıpper	1526	34	6	23	12	0.15	4.00	1.05	12	43%
ısau Grouper	327	7	7.	29	13	0.27	10.01	1.68	12 2/	31%
ıen .ggerfish (FL)	827	18	7	20	12	0.26	4.20	1.55	3/	-
ıen .ggerfish (TL)	258 4/	6	9	24	15	0.31	4.12	1.48	-	-
l hind Grouper	1614	36	6	20	11	0.19	4.67	0.75	3/	-
.lowfin ıuper	63*	2	1	26	17	0.31	11.07	3.78	-	-
ıoolmaster	45*	1	7	17	12	0.49	3.75	1.48	-	-
.ton Snapper	47*	1	9	28	19	0.46	13.51	5.10	-	-
ınkfish	63*	1	5	13	8	0.15	1.25	0.50	-	-
TOTAL	4512	100	-	-	-	-	-	-	-	-

ıt enough observations to be representative.

lefers to TOTAL LENGTH except for Queen Triggerfish, for which both fork length and total length are ıluded.

linimum size proposed for the first year of the plan size will increase on a yearly basis (see Section).

.verage size bigger than optimum size for management purposes (i.e. size at first spawning, etc.; 10 hes in case of redhind).

ıf the 827 fish measured for fork length, 258 were also measured for total length.

APPENDIX I

TABLE A-4

SHALLOW-WATER REEFFISH LANDINGS DISTRIBUTED BY TRAPS AND OTHER GEAR BY SPECIES AND SPECIES-GROUPS IN PUERTO RICO
1980

Species	Thousand Lbs.			Per Cent		
	Trap	Other	Total	Trap	Other	Total
1. Lane snapper	161	127	288	55.9	44.1	100.0
2. Grunt	524	201	725	72.3	27.1	100.0
3. Hogfish	43	33	76	56.6	43.4	100.0
4. Trunkfish	64	7	71	90.1	9.9	100.0
5. Yellowtail snapper	74	139	213	34.7	65.3	100.0
6. Squirrelfish	39	11	50	78.0	22.0	100.0
7. Parrotfish	214	50	264	81.1	18.9	100.0
8. Grouper	401	341	742	54.0	46.0	100.0
9. Other snappers	49	48	97	50.5	49.5	100.0
8. Triggerfish	139	26	165	84.2	15.8	100.0
11. Porgy	108	21	129	83.7	16.3	100.0
12. Goatfish	358	0	358	100.0	0	100.0
13. Mutton snapper	70	35	105	66.7	33.3	100.0
TOTAL	2,245	1,038	3,283	68.4	31.6	100.0

APPENDIX I

TABLE A-5

SHALLOW-WATER REEFFISH LANDINGS PERCENTAGE DISTRIBUTION BY SPECIES, TRAPS, AND OTHER GEAR IN PUERTO RICO
1980

Species	Trap Fisheries		Other Fisheries		All Fisheries	
	Thd. Lbs.	Percent	Thd. Lbs.	Percent	Thd. Lbs.	Percent
1. Lane snapper	161	7.2	127	12.2	288	8.8
2. Grunt	524	23.3	201	19.4	725	22.1
3. Hogfish	43	1.9	33	3.2	76	2.3
4. Trunkfish	64	2.9	7	0.7	71	2.2
5. Yellowtail snapper	74	3.3	139	13.4	213	6.5
6. Squirrelfish	39	1.7	11	1.0	50	1.5
7. Parrotfish	214	9.5	50	4.8	264	8.0
8. Grouper	401	17.9	341	32.9	742	22.6
9. Other snappers	49	2.2	48	4.6	97	3.0
10. Triggerfish	139	6.2	26	2.5	165	5.0
11. Porgy	108	4.8	21	2.0	129	3.9
12. Goatfish	358	15.9	0	0	358	10.9
13. Mutton snapper	70	3.1	35	3.4	105	3.2
TOTAL	2,245	100.0	1,038	100.0	3,283	100.0

APPENDIX I

TABLE A-6

YELLOWTAIL SNAPPER CATCH DISTRIBUTION BY GEAR
IN PUERTO RICO 1980

Gear	Pounds	Percent
Fish Traps	74,000	35.1%
Handline	111,000	52.6%
Trot line	1,000	0.5%
Beach Seine	15,000	7.1%
Troll line	1,000	0.5%
Gill Net	9,000	4.2%
TOTAL	211,000	100%

1/ Similar data for Nassau grouper are not available.

APPENDIX I

TABLE A-7

THREE ALTERNATIVES FOR MSY ESTIMATE OF SHALLOW-WATER REEFFISH IN P.R. AND IN U.S.V.I.

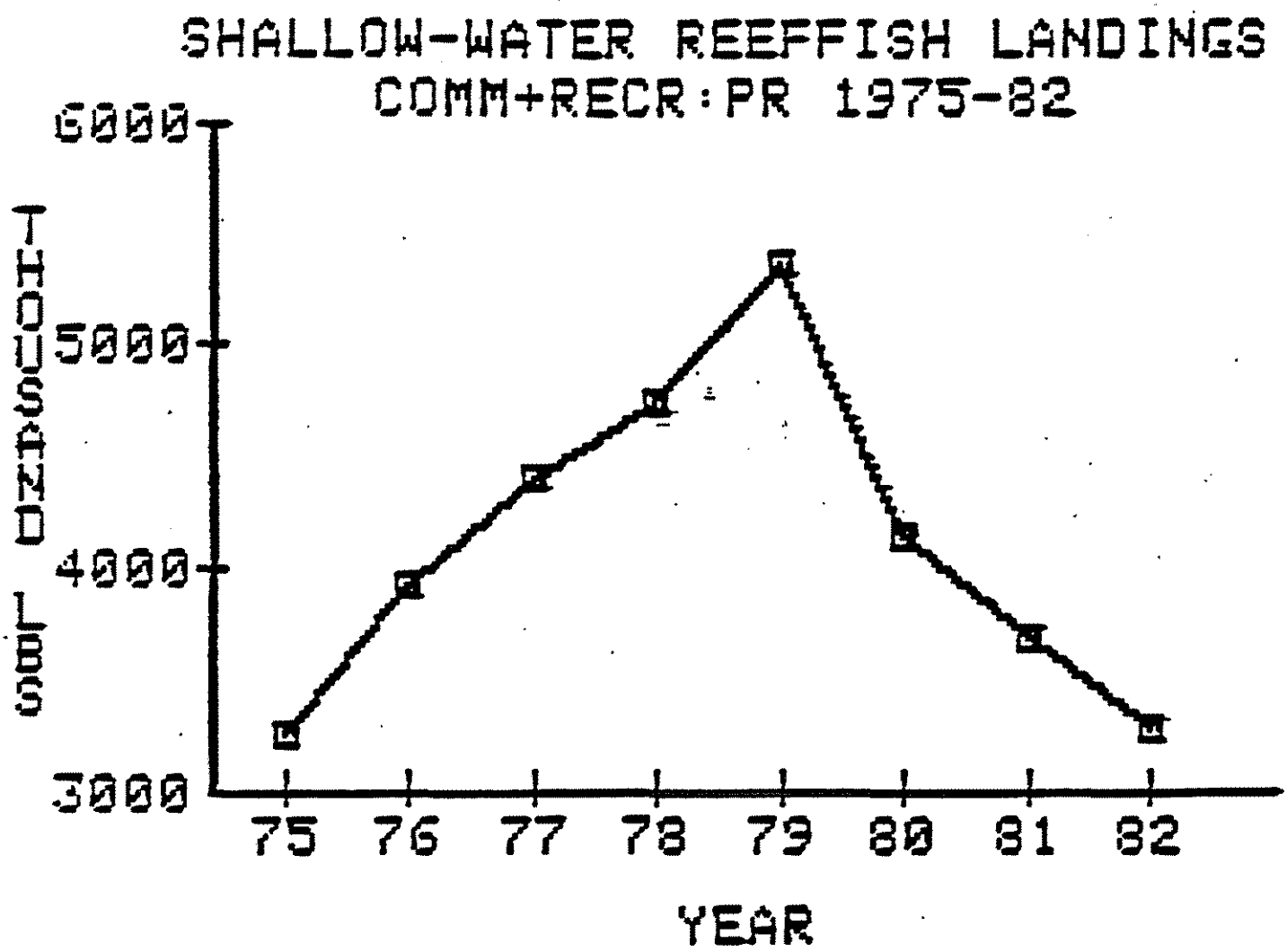
Item	Puerto Rico	U.S.V.I.	All Areas
	(million pounds)		
MSY: Shaeffer Model	5.0	2.4	8.2
MSY: Biomass 1/	5.4	2.3	7.7
MSY: Biomass 2/	a/	a/	8.3

a/ Calculated for the total area only

1/ Juhl's productivity study 1973 (Puerto Rico). This alternative used for the Fishery Management Plan (see Table 7).

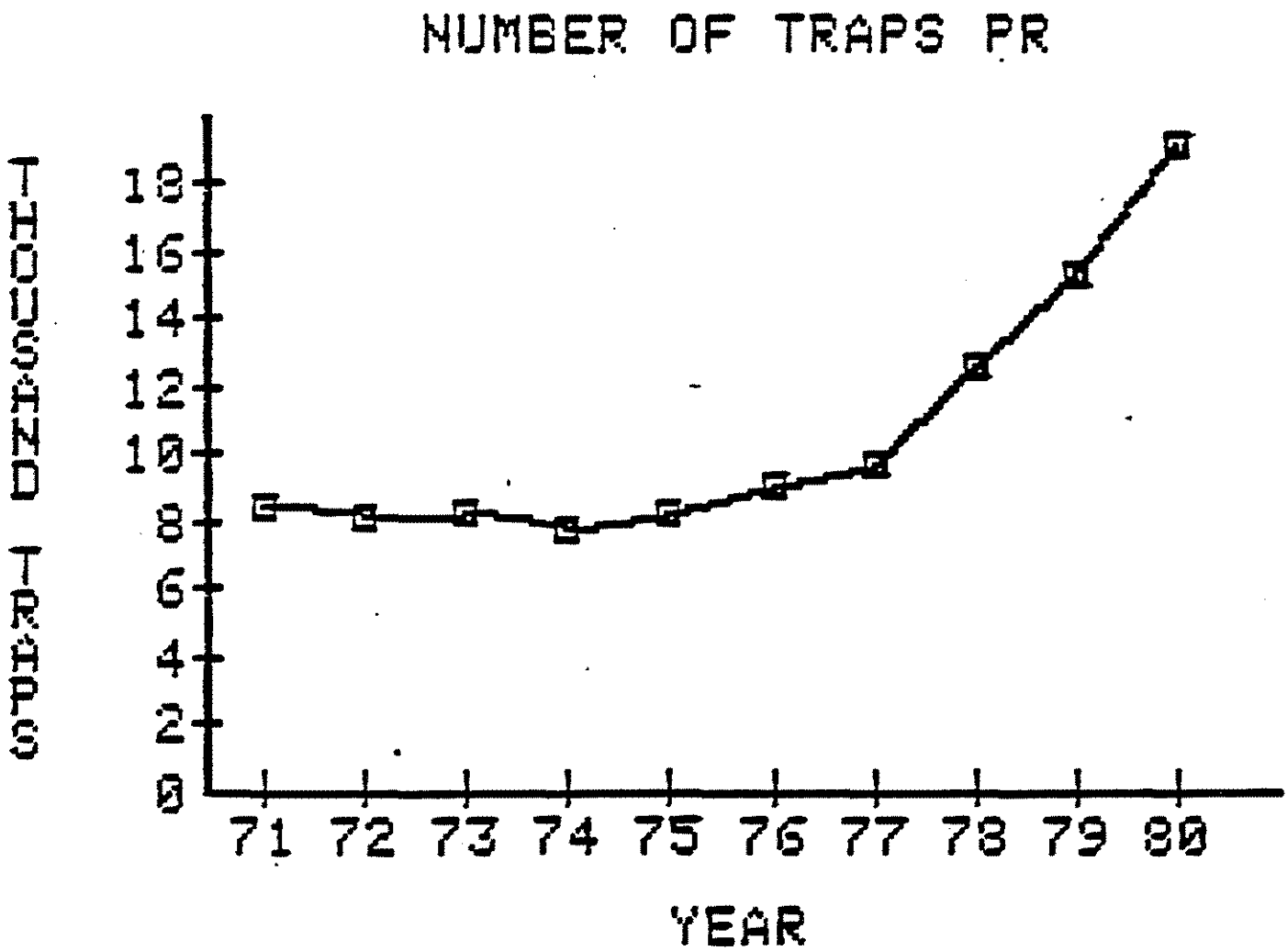
2/ Munro's productivity study 1977 (Jamaica)

GRAPH 1



SOURCE: TABLE 9

GRAPH 2


NUMBER OF TRAPS PR
STORAGE PEARLS
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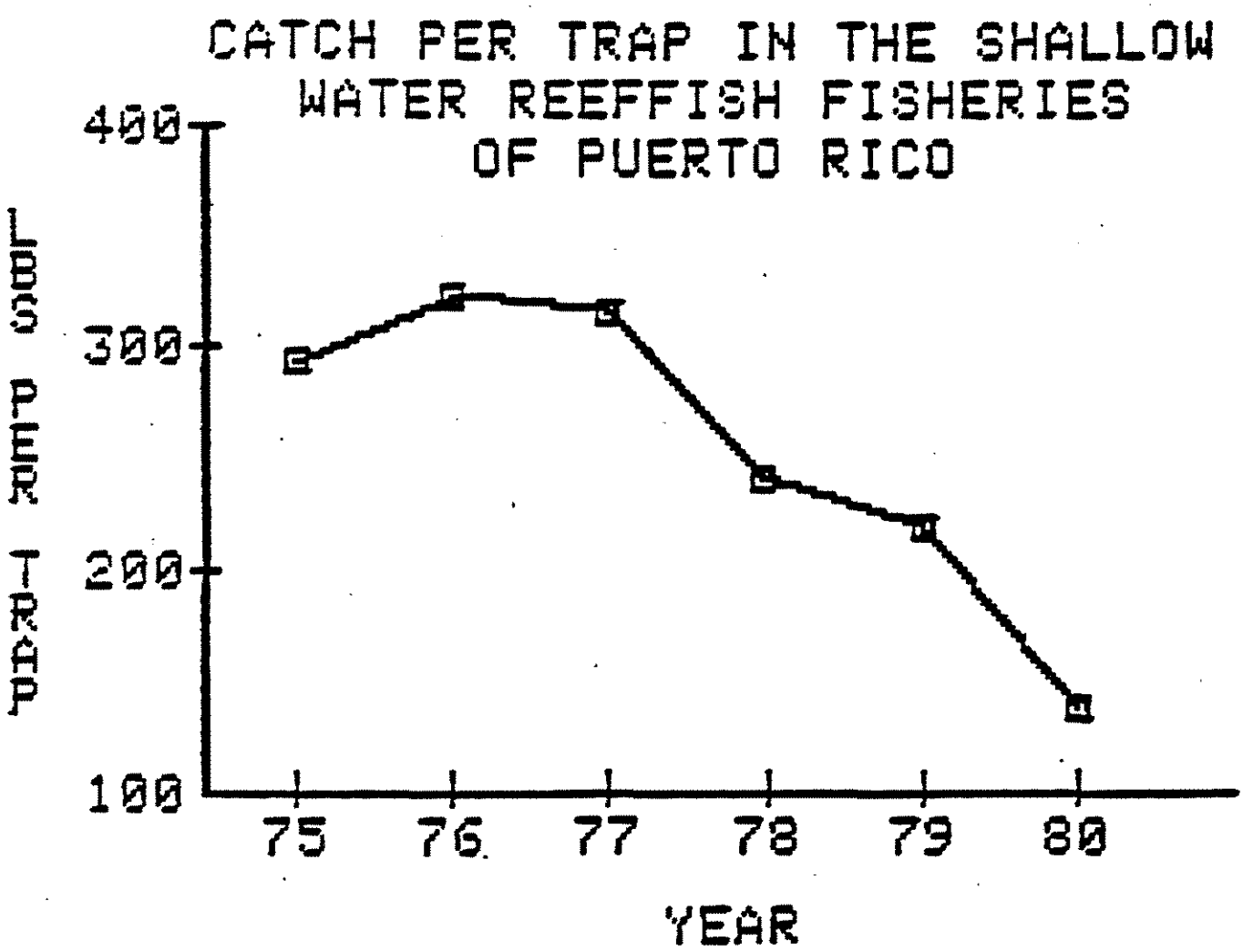
2
4
6
8
10
12
14
16
18
71 72 73 74 75 76 77 78 79 80
YEAR

GRAPH 3



SOURCE: TABLE 9

APPENDIX II

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

March 4, 1981

The Honorable Malcom Baldrige
Secretary of Commerce
Room 5840, Main Commerce
Washington, D.C. 20230

Dear Mr. Baldrige:

I am writing to reaffirm that the development of Fishery Management Plans by the Caribbean Fishery Management Council (CFMC) continues to be an important aspect of the fishery development efforts of the Territory of the Virgin Islands. It is imperative that the CFMC continue to develop fishery management plans throughout the range of the various fisheries because the species involved cross boundries between the Territory Commonwealth of Puerto Rico, and the British Virgin Islands, as well as Federal/Territorial jurisdictions. Resource management can only be effective if it occurs throughout the range of the species.

Additionally, the management planning resource represented by the CFMC is providing a level of effort which would otherwise be unavailable to the Territory. We actively support this planning and intend to implement companion management measures within the territorial sea. It is our hope that the CFMC will continue to receive the support and priority necessary to continue its valuable role.

Sincerely,

JUAN LUIS
Governor

cc: Executive Director, Caribbean Fishery Management Council
Director, Division of Fish and Wildlife

Office of the Governor
La Fortaleza
San Juan, Puerto Rico 00901

October 8, 1981

The Honorable Malcolm Baldrige
Secretary
U.S. Department of Commerce
Room 5840, Main Commerce Building
Washington, D. C. 20230

Dear Secretary Baldrige:

I would like to take this opportunity to acknowledge and endorse the work accomplished by the National Marine Fisheries Service in Puerto Rico under the Grant-in-Aid Program of Public Law 88-309 and the work of the Caribbean Fishery Management Council (CFMC) in developing Fishery Management Plans for the U.S. Fishery Conservation Zone (FCZ).

The Commercial Fisheries Research and Development Act (P.L. 88-309) has undoubtedly been the most beneficial to Puerto Rico. The Caribbean Fishery Management Council is instrumental in the management and conservation of fisheries resources throughout the range of the Fishery Conservation Zone in the Caribbean and it can prove to be extremely useful by participating jointly with the Government of Puerto Rico in the preparation of a fisheries management plan for the new, expanded territorial waters of Puerto Rico which now extend outward 10.35 statute miles.

Now more than ever we recognize the need for a close Federal-State working relationships which includes management coordination. This is especially important now because two management systems will be in operation simultaneously and there is a direct need to ensure that the systems are well coordinated and complement each other.

In this spirit, we are prepared to work in close coordination with your Department and the Federal Government as a whole, in managing the marine fisheries resources of the Caribbean Region, including the adoption by Puerto Rico of those management measures that are applicable within our territorial waters.

The primary goal of this decade for us is the establishment of fisheries development and management regimes which complement the federal system.

With respect to most of the resources in the Puerto Rico and Virgin Islands areas, we believe that an individual stock of fish should be managed, to the extent practicable, as a unit throughout its range and that this concept is definitely appropriate for sound and effective management purposes in the Caribbean. We will actively support this concept and hope that the level of effort being provided by the CFMC in relation to resource management planning continues to be available in the future. We hope the Council will continue its fundamental role in the Caribbean and we also expect that the Council's support and priority will be of a continuing nature.

Cordially,

Carlos Romero Barceló

Carlos Romero-Barceló

CRB:MUD:FER:dsd

cc: Dr. Francisco Pagán, Hon. Hilda Díaz Soltero, Mr. Carlos S. Quirós

CARIBBEAN FISHERY MANAGEMENT COUNCIL
Suite 1108 Banco de Ponce Building • Hato Rey, Puerto Rico 00918

Telephones: FTS (809) 753-4926, 753-4927, 753-4928, Comm. (809) 753-6910

CERTIFIED

May 18, 1984

Mr. Nelson Soto Velázquez
President
Puerto Rico Planning Board
Ofice of the Governor
Commonwealth of Puerto Rico
P. O. Box 41119
San Juan, Puerto Rico 00940

Dear Mr. Soto Velázquez:

Please find attached copy of a letter and application for Certification of Consistency with the Puerto Rico Coastal Zone Management Program of our "Fishery Management Plan, Regulatory Impact Review and Environmental Impact Statement for the Shallow-Water Reeffish Fishery of Puerto Rico and the U. S. Virgin Islands" that were mailed to you on January 27, 1984.

Having received no answer, on May 10, 1984 we inquired via telephone, with your office, about the status of our application. Your personnel acknowledged having received the documents but suggested sending you an additional copy in order to trace the original ones.

Considering the circumstances, we will appreciate it very much whatever action you can initiate, for us to receive from you or your authorized representative, an official reaction to our letter and application for "Certification of Consistency".

Please feel free to call on us if we can be of assistance.

Thank you very much for your cooperation.

Sincerely,

Omar Muñoz-Roure
Executive Director

cc Mr. Jack T. Brawner, SERO/NMFS
Ms. June E. Cradick, N/ORM3
Council Members (L)

Attachment

CARIBBEAN FISHERY MANAGEMENT COUNCIL
Suite 1108 Banco de Ponce Building • Hato Rey, Puerto Rico 00918
P.O. Box 1001, Hato Rey, P.R. 00919
Telephones: FTS (809) 753-4926, 753-4927, 753-4928, Comm. (809) 753-6910
Telex: "Carifish" 385-790

January 27, 1984

Mr. Nelson Soto Velázquez
President
Puerto Rico Planning Board
P. O. Box 41119
San Juan, Puerto Rico 00940

Dear Mr. Soto Velázquez:

Please find attached an application for Certification of Consistency with the Puerto Rico Coastal Zone Management Program of our Fishery Management Plan (FMP), Regulatory Impact Review, and Environmental Impact Statement for the Shallow-Water Reeffish Fishery of Puerto Rico and the U. S. Virgin Islands (integrated in a single document).

In addition to your application form, we are submitting two copies of the above-mentioned document. Please notice the FMP's consistency determination under A. 3. 1. 4, page 20. As stated under this Section, we feel that the proposed fishery management system is consistent, to the maximum extent practicable, with the approved programs of Puerto Rico.

Sincerely,

Omar Muñoz Roldán
Executive Director

OMR/rr

cc: Mr. Jack T. Brawner, SERO/NMFS
Ms. June E. Cradick, N/ORM3
Mr. Jose González-Liboy, DNR
Council Members (L)
Council Staff

Encls.

COMMONWEALTH OF PUERTO RICO
OFFICE OF THE GOVERNOR
PUERTO RICO PLANNING BOARD
SOCIAL AND ECONOMIC PLANNING AREA
FEDERAL AFFAIRS OFFICE

APPLICATION FOR CERTIFICATION OF CONSISTENCY WITH THE PUERTO RICO COASTAL MANAGEMENT PROGRAM

General Instructions:

A. Attach a 1:20,000 scale, U. S. Geological Survey topographic quadrangular base map of the site

B. Attach a reasonably scaled plan or schematic design of the proposed project, indicating the following:

1. peripheral areas
2. bodies of water, tidal limit and natural systems

C. You may attach any further information you consider necessary for proper evaluation of the proposal.

D. If any information requested in the questionnaire does not apply in your case, indicate by writing "N/A" (not applicable).

DO NOT WRITE IN THIS BOX

Type of application: Application number:

Date received: Date of certification:

Evaluation result: ☐ objection ☐ acceptance ☐ negotiation

Technician: Supervisor:

Comments:

1. Name of Federal agency:
Caribbean Fishery Management Council (operates under NOAA U. S. Department of Commerce)

2. Federal Program Catalog Number:
N/A

3. Type of action:
☒ Federal Activity ☐ License or permit ☐ Federal assistance

4. Name of Applicant
Caribbean Fishery Management Council
Postal Address:
P. O. Box 1001, Hato Rey, Puerto Rico 00919
Telephone:
(809) 753-4926

5. Project Name: Fishery Management Plan, Regulatory Impact Review, and Environmental Impact Statement for the Shallow-Water Reef Fish Fishery of Puerto Rico & the U. S. Virgin Islands

6. Physical Description of Project Location:
(area, facilities such as vehicular access, drainage, storm and sanitary sewer placement, etc.)
N/A

7. Type of construction or other work proposed: N/A

drainage ( ) channeling ( ) landfill ( ) sand extraction ( ) pier ( )

bridge ( ) residential( ) tourist ( )

Other (specify and explain)

N/A

Description of proposed work:

N/A

8. Natural, artificial, historic or cultural systems likely to be affected by the project N/A

Place an X opposite any of the systems indicated below that are in the project area or its surroundings which are likely to be affected by the activity. Indicate the distance from the project to any outside system that would likely be affected.

System	Within Project	Outside Project	Distance (meters)	Local name of affected system
beach, dunes				
marshes				
coral, reefs				
river, estuary				
bird sanctuary				
pond, lake, lagoon				
agricultural unit				
forest, wood				
cliff, breakwater				
cultural or tourist area				
other (explain				

Describe the likely impact of the project on the identified system (s) .

Positive ☐ Negative ☐

Explain:

9. Indicate permits, approvals and endorsements of the proposal by Federal and Puerto Rican government agencies. Evidence of such support should be attached to the proposal.

	Yes	No	Pending	Application Number
a. Planning Board	( )	( )	( )	N/A
b. Regulation and Permits Administration	( )	( )	( )	N/A

	Yes	No	Pending	Application Number
c. Environmental Quality Board	( )	( )	( )	N/A
d. Department of Natural Resources	( )	( )	( )	N/A
e. State Historic Preservation Office	( )	( )	( )	N/A
f. U. S. Army Corps of Engineers	( )	( )	( )	N/A
g. U. S. Coast Guard	( )	( )	( )	N/A
h. Other (s) (specify)	( )	( )	( )	N/A

This question is intended for site development and construction proposals which is not the case presented here?

CERTIFICATE: I certify that (project name) FMP, RIR and EIS for the Shallow-Water Reef Fish Fishery of P. R. & the U. S. Virgin Islands. is consistent with the Puerto Rico Coastal Zone Management Program, and that to the best of my knowledge the above information is true.

(Signed) Omar Muñoz-Roure

(Position) Executive Director

DATE: January 27, 1984

CARIBBEAN FISHERY MANAGEMENT COUNCIL
Suite 1108 Banco de Ponce Building • Hato Rey, Puerto Rico 00918

Telephones: FTS (809) 753-4926, 753-4927, 753-4928, Comm. (809) 753-6910

May 18, 1984

CERTIFIED

Honorable Angel Luis Lebrón, Commissioner
Department of Conservation and Cultural Affairs
Government of the Virgin Islands of the United States
P. O. Box 4340, Charlotte Amalie
St. Thomas, US Virgin Islands 00801

Dear Mr. Lebrón:

Please find attached copy of a letter and application for Certification of Consistency with the Virgin Islands Coastal Zone Management Program of our "Fishery Management Plan, Regulatory Impact Review and Environmental Impact Statement for the Shallow-Water Reeffish Fishery of Puerto Rico and the U. S. Virgin Islands" that were mailed to the former Administrator of your Division of Coastal Zone Management on January 30, 1984.

On May 10, 1984 we inquired via telephone, with the CZMP, about the status of our application. We were explained that as a result of recent changes in personnel, no action had been taken on this case and suggested sending copy of the documents in order to be able to trace the original ones. They suggested to contact you directly on the subject.

Considering the circumstances, we will appreciate it very much whatever action you can initiate, for us to receive from you or your authorized representative, an official reaction to our letter and application for "Certification of Consistency".

Please feel free to call on us if we can be of assistance.

Thank you very much for your cooperation.

Sincerely,

Omar Muñoz-Roldán
Executive Director

cc Mr. Jack T. Brawner, SERO/NMFS
Ms. June E. Cradick, N/ORM3
Council Members (L)

Attachment

CARIBBEAN FISHERY MANAGEMENT COUNCIL
Suite 1108 Banco de Ponce Building • Hato Rey, Puerto Rico 00918
P.O. Box 1001, Hato Rey, P.R. 00919
Telephones: FTS (809) 753-4926, 753-4927, 753-4928, Comm. (809) 753-6910
Telex: "Carifsn" 385-790

January 30, 1984

Mr. Marc E. Crandall, Administrator
Division of Coastal Zone Management
Department of Conservation and Cultural
Affairs
P. O. Box 4340, Charlotte Amalie
St. Thomas, US Virgin Islands 00801

Dear Mr. Crandall:

This is an application for Certification of Consistency with the U. S. Virgin Islands Coastal Zone Management Program of our "Fishery Management Plan (FMP), Regulatory Impact Review, and Environmental Impact Statement for the Shallow-Water Reeffish Fishery of Puerto Rico and the U. S. Virgin Islands" (integrated in a single document).

We are submitting two copies of the above-mentioned document. Please notice the FMP's consistency determination under A. 3. 1. 4, page 20. As stated under this Section, we feel that the proposed fishery management system is consistent, to the maximum extent practicable, with the approved programs of the U. S. Virgin Islands.

Sincerely,

Omar Muñoz-Roure
Executive Director

OMR/rr

cc: Hon. Angel LeBron, Commissioner DCCA
Mr. Jack T. Brawner, SERO/NMFS
Ms. June E. Cradick, N/ORM3
Council Members (L)
Council Staff

Encls.

APPENDIX III

APPENDIX III

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APPENDIX IV

APPENDIX IV

This appendix summarizes testimony on the Draft FMP/EIS/RIR at 9 public hearings or submitted by letter to the Caribbean Fishery Management Council and the National Marine Fisheries Service. Included herein are the written depositions and letters received, as well as Council's responses to comments on this FMP.

Public hearings were held at the following dates and locations.

1.	St. Croix	July 2, 1984
2.	St. Thomas	July 5, 1984
3.	Culebra	July 9, 1984
4.	Humacao	July 11, 1984
5.	Cabo Rojo	July 12, 1984
6.	Vieques	July 16, 1984
7.	Salinas	July 18, 1984
8.	Arecibo	July 19, 1984
9.	Aguadilla	July 23, 1984

1. Comment: Disagreement with enforcement cost statement in Section 10.5.3.

   Response: This section has been expanded to include all pertinent suggestions made, including a better estimate of this cost.

2. Comment: Oppose to recommendations to close Mona and Monito Islands and part of Peninsula Flamenco, Culebra, to all fishing.

   Response: After pertinent analysis of comments received, the CFMC decided not to pursue further this management recommendation. However, on account of the support expressed by fishermen on the temporary closure of Peninsula Flamenco and the feasibility of its enforcement and management, the recommendation will be sustained for the Culebra section only.

3. Comment: Some information must be available for the socio-economic characteristics of the commercial fishermen on the Virgin Islands.

Response: Considerable information is available for Puerto Rico as a result of the socio-economic study by Clapp and Mayne, 1979. Similar studies have not been conducted in the Virgin Islands, hence, such data still does not exist for that area.

4. Comment: The list of species (Section 8.3.1.2), for which consultation was carried out under Section 7, should have been limited to species likely to occur in Puerto Rico and the U.S. Virgin Islands.

Response: Section 8.3.2.1 was revised as suggested.

5. Comment: This plan has been promulgated without adequate participation of the persons of the western area (of Puerto Rico), which will be directly affected by it.

Response: At the time the comments were made, the FMP was still in the public consultation process. The CFMC has followed all the procedures required by the MFCMA to allow full participation of its constituents in the preparation of this FMP. The public hearings themselves were part of the process.

6. Comment: The documents were distributed shortly before the hearings, not allowing enough time to the fishermen to study and discuss carefully the documents submitted.

Response: The CFMC made the draft FMP available to interested persons within the time specified by the guidelines applicable to public hearings. The Council even went beyond its official responsibilities by translating into Spanish the FMP and other related documents before public hearings. The Council mailed the notification of public hearings to persons, organizations and governmental agencies in addition to the publication in local newspapers.

7. Comment: Not enough copies were sent to the different fishing centers causing a further delay of the discussion. Even if the documents were available at the CFMC's office, we remind you about the limitation of resources and mobility of the Puerto Rican fisherman.

Response: As in 5 and 6, the CFMC followed the procedure established for these hearings. The fishermen had ample opportunity to contact the Council for extra

copies; those who did, received the documents on time.

8. Comment: Although the "Congreso de Pescadores del Este y Oeste de Puerto Rico" belongs to the CFMC, its representatives do not recall being consulted regarding the implementation of this plan.

Response: The statement is a misconception of the Council's organization and membership. Two of the members of the "Congresos" are also members of the Advisory Panel (A.P.) of the CFMC since 1983 and 1984 respectively, not the "Congresos" themselves. This FMP has been under consideration by the Council almost continuously for the last 6 years, with participation of fishermen from both Puerto Rico and the U.S. Virgin Islands.

9. Comment: Section 8.6.3 should be rewritten to include "Congreso de Pescadores del Oeste" and "Congreso de Pescadores del Este" as labor organizations in Puerto Rico.

Response: Section 8.6.3 rewritten as suggested.

10. Comment: Oppose to the 1 1/4" wire mesh size limit because does not allow for capturing goatfish as efficiently as the 1" mesh.

Response: Goatfish is only one of 64 species addressed by this FMP and even if this statement was true, still it would be a good management strategy to protect the majority of the other species for the benefit of the resource. However, several fishermen pointed out to the fact that they get a better quality (and bigger size) goatfish with 1 1/2" wire mesh. The Council is proposing 1 1/4", which will ensure escapement of juveniles and individuals of commercial and recreational species, including goatfish, in order to reverse the overfishing trend detected in this fishery.

11. Comment: A self-destruct panel should be used only when traps are made with wire heavier than gauge 16, less than this are destroyed by predators.

Response: Destruction by predators of the traps with this wire in all places and circumstances has not been documented and is not likely to occur, according to fishermen and scientist that keep finding ghost traps fishing for months after being lost. The measure will ensure the escapement of fish if the trap is lost.

12. Comment: Does not favor centralization of marking the gear, boats and buoys.

Response: In order to establish a uniform regulation that will protect the fishermen from trap poaching or thievery, a system such as the one proposed has to be implemented in all the areas to be managed. This will protect all fishermen without discrimination from area to area, and will be enforceable, which is a requirement in all regulations.

13. Comment: The decrease in landings is explained as a consequence of overfishing, without mentioning the terrible impact of pollution over the marine species. Also the destructive practices of the Navy, to the marine environment, are not analyzed in this document.

Response: The decrease in landings and the increase in fishing effort have been documented with official statistical reports. Although the CFMC recognizes the pollution problems in some areas, the best available data reveals an overfishing trend in this fishery that needs to be addressed by proper management. No official information could be obtained regarding the Navy activities and the fishery in Vieques at the time this FMP was developed.

14. Comment: Opposed to minimum size limit of 12 inches for the yellowtail snapper because the species is in abundance, the average size landed fluctuates between 7 to 9 inches, they spawn at a size of around 5 to 6 inches, and predators will eat most of the fishes released.

Response: This measure was suggested by the Council based on the best available data prior to public hearings. The data point to a downward trend of the yellowtail landings. The measure adopted the size limit imposed in Florida, since no information was available from this area. (According to scientific information available to the Council, the majority of the yellowtail snapper go sexual maturation between 250 and 350 TL ($\geq$ 10 inches), 5 to 6 inches is not the general size at which this fishes spawn.)

After careful consideration of the comments received, the CFMC decided to modify the measure to a size limit of 8 inches for the first year of plan implementation. This will be increased one inch per year until it is stabilized at 12 inches.

The action will provide the opportunity to gather some data that will allow the evaluation of the fishery while ensuring the protection of the species from possible overfishing.

15. Comment: Opposed minimum size for Nassau grouper because the predators will eat the released fish.

Response: Although some of the fishes will be eaten by predators there is no documentation stating that all fishes will be eaten when released. On the other hand studies made with red snapper and other finfish has shown survival of releases up to 90%. NMFS is conducting additional studies to determine if there are other rates of survival. The CFMC assumes a conservative survival estimate of released fish of 60%, for the impact analysis.

16. Comment: The fish should be protected at time of aggregation, not by minimum size.

Response: The minimum size scheme proposed is designed to ensure that enough Nassau grouper will attain sexual maturity. This will ensure reproduction for monitoring and restore this resource, which has been found to be in very critical conditions. The management strategy in this case is to combine closed season with minimum size in order to be able to recover the Nassau grouper fishery.

17. Comment: Close the area where Nassau grouper spawn, instead of prohibiting landings during the closed season.

Response: The spawning site of this grouper is usually at the edge of the shelf, that in some cases is various miles offshore. The Council has been advised of the enforcement problem that closing the area represents. Also, although not specifically documented, fishermen and scientists believe that there are several spawning sites (at least in St. Thomas) were the Nassau grouper spawns at the same time of the year. Establishing a closed season will protect the spawning even if the precise location of spawning aggregation site is not known, while at the same time it will be enforceable.

18. Comment: Plan is based on insufficient data.

Response: This FMP was prepared using the best available data as required by law.

19. Comment: In Section 10.2.2, the "and/or" should be either "and" or "or" not both.

Response: Some of the traps are built with the door openings on any of the side panels; however, the Council was advised that in some areas of Puerto Rico, the trap's door consists of the whole top of the trap. Therefore, if only the door fastening is required, these traps will continue killing fishes if they "land" up-side-down when lost.

20. Comment: Use yield per recruit as justification for suggested regulations.

Response: After discussion of the issue, the Council determined its rationale as adequate, since the management measure proposed tend to maximize yield per recruit while providing less economic burden to the fisherman. The measure also incorporates a 13-year period, that allows pertinent improvements to the data to be used in the revision of this FMP.

* Denotes changes were made in the text of the FMP in response to the comment.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278

JUL 23 1984

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 completed our review of the draft environmental impact statement (EIS) and proposed regulations for the Caribbean Shallow Water Reeffish Fishery Management Plan. The proposed plan provides for modifications of the existing local fishery management strategies in Puerto Rico and the Virgin Islands in order to make them more consistent. The plan also highlights certain priority management measures, such as size limits on the grouper and yellow snapper and seasonal restrictions on the taking of groupers, based on a detailed analysis of economic impact to local fishermen versus overall benefits to the fishery.

We agree with the measures proposed in the fishery management plan and believe that the proposed regulations sufficiently address the enforcement strategies necessary to effectively implement the plan. Therefore, we have rated this draft EIS as LO-1, indicating that we lack objections (LO) to the project, and that there is sufficient information in the draft EIS (1) upon which to make this determination.

Further inquiries in this matter may be directed to Mr. Edward Als of my staff at (212) 264-1375.

Thank you very much for this opportunity to comment.

Sinncerely yours,

Richard M. Walka

Richard M. Walka, Chief
Environmental Impacts Branch

cc: Joyce Wood, DOC

U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

Washington, DC 20593
Staff Symbol: G-OLE/1
Phone: (202)426-1178

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JUN 21 1984

RECEIVED F/M11 6/25/84

Mr. William P. Jensen
Chief, Fishery Management Operations
Division
National Marine Fisheries Service
Washington, DC 20235

Dear Mr. Jensen:

I am responding to your letter of June 4, 1984 concerning the draft fishery management plan for Shallow Water Reeffish Fishery of Puerto Rico and the U.S. Virgin Islands.

In part 8.4.3 on pg. 26 entitled Foreign Fishing I recommend rephrasing the last sentence to read "There is no documented recent foreign longline activity in the FCZ. Although the United States has ratified numerous Governing International Fishery Agreements, no foreign fishing vessels have permits to fish in this region. *

I disagree with paragraph 10.5.3. on pg. 65 entitled Enforcement Cost. First the lobster plan is not yet in effect. Second if the lobster plan were in effect the Coast Guard would still have an incremental increase in the cost of enforcement. This would hold true unless, as the wording of paragraph 10.5.3 and the previous Spiney Lobster FMP seem to imply, the council anticipates no need for Coast Guard at sea enforcement in the EEZ beyond nine miles around Puerto Rico and three miles around the U.S. Virgin Islands. Since this matter is unclear I would request that this paragraph be expanded to include what forces would be utilized to ensure compliance and how would they be distributed between the at sea/dockside enforcement mode and between federal/local resources. 1.*

Thank you for an opportunity to comment on this proposed Fishery Management Plan.

Sincerely,

R. E. GRONBERG
Commander, U. S. Coast Guard
Chief, Fisheries Law Enforcement Branch
By direction of the Commandant

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

JUL 20 1984

ER 84/766

Mr. William P. Jensen
Chief, Fishery Management Operations Division
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Washington, D.C. 20235

Dear Mr. Jensen:

This letter responds to your request for the Department of the Interior's review of the Draft Environmental Impact Statement, Draft Fishery Management Plan, and Draft Regulatory Impact Review for the Shallow-Water Reeffish Fishery of Puerto Rico and the U.S. Virgin Islands.

General Comments

We are pleased with the documentation that the Caribbean Fishery Management Council has prepared for this fishery management proposal and the use they have made of available data in its preparation. For the most part, we are in agreement with the proposed management plan and wish to commend the Council on it. We have some specific comments, presented below, relating to the management plan and supporting documentation that we believe should be incorporated into the final plan and documents.

Specific Comments

The addition of maps that show the shallow-water reef areas considered in the Management Plan would greatly improve the document. In addition to making the document easier to understand, maps would prevent misinterpretation of the planned management actions. *

Table 1, pages ix and x. This table could be improved by the addition of another column entitled "Cause of Problems." The information presented in the column entitled "Problem" sometimes reveals causes but does not always state the problem. For instance, the "Declining CPUE and other evidence of overfishing" is not the problem that the management plan needs to address. The problem is declining stocks. Overfishing is undoubtedly the cause of most of the problem, and the CPUE is a method of detecting and measuring the problem. * Also the range of the stocks (No. 4) is not the problem that the management plan can solve or change. The problem is that the Caribbean Fishery Management Council does not have authority to manage these species throughout their ranges; consequently, the Caribbean Fishery Management Council must arrange to obtain data for maximum sustainable yield determinations and agreements with other countries to control harvests.

The list of objectives in the Abstract on page xii should include an objective for improving stock conditions and maintaining them at optimal levels for maximum harvests.

Section 8.3.1.2--Endangered Species Act, page 22 - Although consultation has been completed under Section 7 of the Endangered Species Act, the list of species for which consultation was carried out should have been limited to species likely to occur in Puerto Rico and the Virgin Islands. The Caribbean monk seal (*Monachus tropicalis*) may still exist in small populations in isolated parts of the Caribbean, although there is some doubt as to whether it is extant. The species has not been reported in modern times from the waters near Puerto Rico and the Virgin Islands, and we therefore do not generally mention it in our Section 7 consultations. The olive Ridely sea turtle (*Lepidochelys olivacea*) has been reported from the Pacific, Indian, and South Atlantic Oceans, but the nearest nesting sites to Puerto Rico are in Mexico and Costa Rica. Because of the low probability of finding this species in the northeastern Caribbean, we generally do not list it among our consultation species. All of the other species mentioned in the Section may be found in our waters and should be included in the considered species. The correct spelling for the genus of the brown pelican is *Pelecanus*, not *Pelicanus*. 4

Abstract, page xii, and Section 13.0, Recommendations to Other Institutions, page 66 - Both of these sections recommend that the government of Puerto Rico close a portion of the island of Culebra and the islands of Mona and Monito to all fishing on an experimental basis. We believe that this recommendation would be difficult to implement from both economic and enforcement standpoints. Mona and Monito Islands are very important fishing grounds for fishermen from western Puerto Rico. Most of the commercial fishing is in fairly deep water (100-300 fathoms) with hooks and traps. Deep water red snappers are the most important catches of the local fishermen. To impose a ban on all fishing in this area would be a great economic burden on fishermen who have used these grounds for generations, and it would also have a drastic impact on the seafood restaurants in western Puerto Rico. The harvest of shallow-water reeffishes accounts for only a small portion of the catch from Mona and Monito Islands. The closure of this type of fishery might not be too damaging of commercial fishermen, but it would be very hard to verify or enforce because of the limited number of regulatory personnel on Mona. Spearfishing by visitors to the Islands probably accounts for most of the capture of shallow-water reeffishes. The enforcement of a ban on spearfishing may be logistically impossible. The closure of a portion of Flamenco Peninsula on Culebra might be more manageable, but it would require intense vigilance. 2

The documents need several additional minor editorial changes. We have not listed most of them because we are sure that Caribbean Fishery Management Council's editors will take care of them. However, the following are important enough that we are listing them to be sure they are corrected.

1. The "List of Tables" on pages iv and v has the wrong page numbers for many of the tables.

2. The first paragraph under "SUMMARY" on page vii states that there are 35 commonly landed species in Puerto Rico and the Virgin Islands. Table 3 on pages 3, 4, and 5 lists 36 species.

3. The second paragraph under the "SUMMARY" on page vii and the first paragraph on page 6 state that there are approximately 1,800 commercial fishermen, but in the last paragraph on page 25, the statement is made that there are approximately 2,000 commercial boats in the fishery.

4. The family name for grunts is Haemulidae. In numerous places in the report, such as pages 2 and 3, another name is used.

5. The section entitled "6.2 Biologic, Economic, and Sociologic Data Bases" on page 7 discusses only biological data bases.

6. The heading for Table 3 on page 9 is misleading. A better title might be "Incidence of Ciguatera among reeffish species, as reported by Virgin Island commercial fishermen".

7. The section "8.2.1 History of Research" on page 20 should be moved to some other part of the report. This discussion does not fit logically under "8.2 Description of the Habitat."

8. The acronym "CFC" that appears on line 5 in the first paragraph under "8.3.1.4 Coastal Zone Management Act (Consistency Determination)," page 22, is probably CFR (Code of Federal Regulations).

*

9. Section "8.7.2.5 Socio-Economic Characteristics of the Commercial Fishermen in the U.S.V.I." page 40, states that there is no information available. Some information must be available for the socio-economic characteristics of the commercial fishermen in the Virgin Islands. 3

10. The "and/or" should be either "and" or "or", not both, in the section heading "10.2.2 Require a self-destruct panel (not smaller than the funnel opening of the trap) and/or self destruct door fastening in fish traps."

11. The size of the yellowfin grouper (1 inch) listed in Table A-2, Appendix I, page 2, is probably inaccurate. *

Summary Comments

We hope that our comments will be of assistance to you and that they will be incorporated into the final documents. We appreciate the opportunity to comment on this fishery management plan.

Sincerely,

Bruce Blanchard, Director
Environmental Project Review

United States
Department of
Agriculture

Soil
Conservation
Service

Caribbean Area
GPO Box 4868
San Juan, PR 00936

June 19, 1984

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

RE: Draft fishery management plan, Shallow Water Reefish fishery of Puerto Rico and the U. S. Virgin Islands

Dear Mr. Muñoz Roure:

After reviewing the draft Environmental Impact Statement for the above referenced project, we find that we have no pertinent comments to make at this time. The subject is one very specialized in which we have no expertise nor direct involvement. If in the future any land development is considered in relation to the project, an erosion and sediment control plan will be advisable.

Sincerely,

Iván R. Emmanuelli
Director

pc: Thomas N. Shiflet, Director, Ecological Sciences Division, Washington, DC

PONENCIA PRESENTADA EN VISTAS PUBLICAS CELEBRADAS POR EL CONSEJO DE ADMINISTRACION PESQUERA DEL CARIBE SOBRE EL PLAN DE MANEJO PESQUERO PARA LA PESQUERIA DE PECES DE ARRECIFE DE AGUAS SOMERAS DE PUERTO RICO Y LAS ISLAS VIRGENES

Sandra M. Laureano
Aguadilla, P.R.
23 de julio de 1984

Buenos dias a todos los presentes. Mi nombre es Sandra M. Laureano y depongo en estas vistas públicas en calidad de especialista en asuntos marinos en representación del Congreso de Pescadores del Oeste. Los puntos que expreso a continuación representan el sentir de los pescadores que represento según fuera discutido en reunión celebrada la semana pasada.

En primer lugar, el Congreso de Pescadores del Oeste quiere comunicarle al Consejo de Administración Pesquera del Caribe el que no acepta el Plan de Manejo Pesquero para la pesquería de peces de arrecife de aguas someras. Esta decisión responde a las siguientes razones:

1. Este plan se ha promulgado sin la participación adecuada de las personas, de esta área oeste, que van a ser directamente afectadas por él. Estas vistas públicas se están celebrando por petición expresa del Congreso ya que el Consejo no había tan siquiera planificado unas vistas para los pescadores de ésta área. Se pretendía que fuéramos hasta Cabo Rojo o Arecibo. 5

2. Los documentos se distribuyeron con poca antelación a la celebración de las vistas, evitando que los pescadores tuvieran tiempo suficiente para estudiar y discutir cuidadosamente los documentos presentados. 6

3. No se enviaron suficientes copias del documento a los distintos centros pesqueros atrasando aún más la discusión del mismo, ya que había que circular las copias disponibles. Aunque el documento estuviera disponible en las oficinas centrales del Consejo y/o varios otros lugares queremos recordarle al Consejo la limitación de recursos y movilidad que caracterizan al pescador puertorriqueño. 7

4. Aunque el Congreso del Oeste pertenece al Consejo de Administración Pesquera del Caribe, su representante no recuerda haber sido consultado con respecto a la implantación de este plan. 8

5. El Congreso de Pescadores del Oeste quiere expresar su oposición enérgica a las ~~causas~~ razones que se aducen en el plan de manejo como causantes de la disminución en la pesca. En todo momento se trata de explicar esta disminución como consecuencia únicamente de la actividad de sobrepesca y no se hace mención del terrible impacto que ha tenido la contaminación sobre las especies marinas. El Congreso no puede aceptar un plan de manejo que no toma en consideración variables tan importantes como la mencionada y que entonces trata de controlar la disminución en la pesca afectando la actividad económica de los pescadores. No estamos de acuerdo con que se penalice al pescador porque no se pueda controlar a las grandes industrias. Por otro lado, prácticas destructivas al ambiente marino llevadas a cabo por la Marina de los Estados Unidos tampoco son objeto de análisis en este documento. 13

6. Resulta inaceptable que se quieran imponer unas reglamentaciones sin los estudios previos. En varias instancias en el documento se menciona la dificultad de estimar las poblaciones existentes o sus hábitos reproductivos, sin embargo se elaboran medidas restrictivas a la pesca. Nos parece que hubiese sido más apropiado haber hecho algunos estudios antes de querer implantar un plan de manejo. Relacionado con esto está la percepción de los pescadores del Congreso del Oeste de que las estadísticas provistas por CODREMAR son insuficientes y en casos inadecuadas, por lo que no se deberían usar para justificar planes de manejo como el presentado por el Consejo. 18

Aunque nos oponemos a la implantación de este plan de manejo quisiéramos comunicarles nuestro parecer al respecto de las medidas que propone.

1. La recolección de datos confiables es indispensable en el buen manejo de recursos marinos. Es el interés de todos los pescadores del Congreso del Oeste poder conservar los recursos haciendo uso adecuado de los mismos. Sin embargo no estamos dispuestos a cumplir con una reglamentación que

entendemos no está bien documentada.

2. Entendemos que es tarea de las agencias estatales y federales llevar a Cabo investigaciones sobre los problemas de abasto pesquero, pero las mismas deben incluir todos los elementos que intervienen tales como la contaminación, la destrucción de "habitats" por sedimentación y otros.

3. La experiencia de nuestros pescadores indica que las especies tienen mucha movilidad por lo que hay que estudiar si al dejar de pescar una especie, en efecto no se va a beneficiar un pescador en algún otro punto del Caribe.

4. Es la práctica de los pescadores que utilizan el arte de la nasa, en ésta área, contruir la misma con alambre de 1 1/4" de dimensión. Hay incluso pescadores que utilizan la de 1 1/2" o hasta 2". En muchas ocasiones los pescadores se toman iniciativas encaminadas a conservar los recursos

5. Con respecto al panel perecedero en las nasas, es costumbre de los pescadores que pertenecen al Congreso del Oeste tomar medidas que posibiliten el escape de los peces de las nasas fantasmas.

6. En esta zona se desconoce la práctica de la pesca mediante el uso de venenos, drogas, químicos y explosivos.

7. El chinchorro que se conoce en ésta área es el chinchorro de arrastre. Tal y como está elaborada esta medida, en el plan de manejo, se afecta severamente a los pescadores que utilizan este arte. Antes de implantar cualquier reglamentación, que afecte a los pescadores, debe darse un proceso de consulta extenso de modo que las medidas de manejo surjan como ~~respuesta~~ alternativas de parte de los mismos pescadores. Es la recomendación del Congreso de Pescadores del Oeste que se estudie la posibilidad de implantar reglamentación por área ya que la práctica de pesca con chinchorro varía a través de nuestra costa.

8. Con respecto al establecimineto de tamaños mínimos para la pesca de colirrubia, la cherna y otras especies, es la opinión del Congreso que la colirrubia no crece generalmente a un tamaño tan grande que amerite el establecimiento de un tamaño mínimo. El mero cherna se pesca en ésta área fundamentalmente con anzuelo y palangre para cubrir los gastos de gasolina, cuando la pesca de nasa no ha sido productiva. Tal y como está expuesto en el plan de manejo puede prestarse a confusión la especie a la que nos referimos ya que existen multiplicidad de nombres para el mismo pez. Esto puede llevar a un pescador a inhibirse de pescarlo por no estar seguro.

Es de preocupación general cómo es que se va hacer valer este plan de manejo con pescadores deportivos y busos ya que estos también utilizan los recursos y en ocasiones de manera destructiva.

9. Al presente, tanto los botes como las artes de pesca de nuestros pescadores están debidamente identificadas. Esta práctica debe continuarse del modo en que los pescadores entiendan más adecuado sin que se trate de centralizar un mecanismo particular. Es el sentir del Congreso que el robo y la piratería de nasas no van a terminar hasta que los pescadores asuman mutuamente la responsabilidad de cuidrse las artes de pesca.

10. Como se ha dicho ya, es importante el desarrollo de estudios que ayuden a conservar las especies, sin embargo, el Congreso del Oeste piensa que la información con respecto a la ciguatera está prejuiciada con la experiencia de los pescadores de Isla Vírgenes. La experiencia nuestra no es igual a la de ellos, sin embargo, los análisis tienden a responder más a la información suministrada por ese sector de pescadores.

Finalmente, queremos reiterar que el Congreso de Pescadores del Oeste está dispuesto a coloborar con cualquier esfuerzo del gobierno estatal, federal o sector privado que vaya encaminado a verdaderamente mejorar su

condición de trabajador del mar.

MUCHAS GRACIAS

Quisiera aprovechar este momento para hacer algunos señalamientos en mi carácter personal. En primer lugar, me parece indispensable que al redactar documentos de esta clase se ofrezca toda la información necesaria para poder evaluar adecuadamente lo que se expone. Me parece que se utilizan las reuniones ad hoc tenidas con pescadores como fuente principal de apoyo a los planteamientos que aquí se emiten. Sin embargo, no se ofrece un listado de quienes fueron, a quién representan, cuantas personas participaron, cúal fue el método de selección de los participantes y de qué áreas de la isla provienen. Esta información es importante para saber cúan representativos fueron estos grupos de consulta. Sería importante ver cuántos de éstos entienden que el plan de manejo presentado por el Consejo responde a sus inquietudes.

En segundo lugar, aunque el Consejo de Administración Pesquera ofrece darle seguimiento a este plan al igual que recolectar datos relacionados, no se establece qué mecanismos se van a utilizar y cómo se va a insertar al pescador en ese proceso. Se plantea además la posibilidad de alterar en el futuro, este plan de manejo, sin dejar establecido cuál va a ser el mecanismo y nuevamente si el pescador va a tener la oportunidad de participar en el mismo.

Por ultimo, cualquier intento de desarrollar la industria pesquera en nuestro país tiene que contar con varios componentes. Aunque reconozco que no es jurisdicción del Consejo el desarrollo integral de nuestra industria

pesquera, por otro lado, entiendo que el manejo de las especies de forma aislada y sin que se acompañe por mayor conciencia, adiestramientos, educación al consumidor, protección y asistencia económica ~~de~~ a nuestros pescadores entre otros, no tendrá el resultado esperado. Esperamos que alguna de las agencias concernidas se tome la iniciativa de coordinar el esfuerzo necesario que logre el desarrollo real de nuestros pescadores.

El Consejo de Administración Pesquera del Caribe debe reconocer que tanto el área como la condición de los pescadores es distinta a la que enfrentan otros consejos pesqueros en Estados Unidos. La ley que crea los consejos no responde a esta realidad sino a una muy distinta en Estados Unidos y es importante que los integrantes del consejo local comuniquen estas diferencias reales a las agencias federales pertinentes. Como dije anteriormente los pescadores puertorriqueños están en espera de que se implementen programas de desarrollo para poder colaborar en los mismos. De la misma forma nos encontramos personas que en nuestro carácter individual estamos al servicio de los pescadores y de cualquier agencia que tenga a bien el desarrollo de la pesca en Puerto Rico.

MUCHAS GRACIAS

Dirija toda correspondencia
al Director Ejecutivo

10 de agosto de 1984

Sr. Omar Muñoz Roure
Director Ejecutivo
Consejo Pesquero del Caribe
Suite 1108, Edif. del Banco de
Ponce
Hato Rey, PR 00918

Estimado señor Muñoz:

La Corporación para el Desarrollo y Administración de los Recursos Marinos, Lacustres y Fluviales de Puerto Rico (CODREMAR) está muy consciente de la situación por la que está atravesando la situación pesquera. Los datos obtenidos sugieren que existe la posibilidad de que algunas de las especies que se están pescando estén sintiendo los efectos de una presión pesquera sostenida sobre ellos. Esto obedece a que la tradición pesquera que ha seguido el pescador puertorriqueño, prácticamente no ha variado durante el presente siglo, excepto por los cambios en materiales y la adopción de algunas ventajas motorizadas para la embarcación. Así, la pesca de nasa, chinchorro y cordel se ha perpetuado sobre un área de plataforma insular que resulta limitada, con el posible efecto antes mencionado.

CODREMAR concuerda que la mejor forma de velar por que la pesca comercial local se sostenga, es mediante la adopción de medidas preventivas y no correctivas. O sea, tratar de evitar que surjan los problemas, antes que esperar a que surjan para luego corregirlos. Muchas veces, al llegar a esta segunda etapa, se ha llegado a un punto en que la situación no tiene solución o ésta es demasiado costosa.

Es por esto que la Agencia, CODREMAR, cree en una planificación del uso de los recursos que tenemos disponible. Para ello, cuentan con unos programas de seguimiento continuo de la operación pesquera, como lo son la recolección de estadísticas pesqueras y la pesca exploratoria, para que nos guíe en nuestra toma de decisiones.

La jurisdicción del Consejo aplica a aguas fuera de las aguas territoriales nuestras. Este punto debe de ser llevado de forma clara a nuestros pescadores, ya que existe gran confusión en torno a ello. Cualquier medida adoptada por el Consejo es aplicable solamente a las aguas

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codremar

bajo su jurisdicción y no a las aguas que pertenecen a Puerto Rico. Claro, cabe también señalar que el Gobierno de Puerto Rico, si lo cree deseable, puede adoptar cualquier reglamentación promulgada por el Consejo, para que también sea efectiva localmente.

Este no es el caso con el enfoque de todas las medidas restrictivas sometidas en el Plan de Manejo Pesquero de Peces de Arrecifes de Aguas Someras de Puerto Rico e Islas Vírgenes que recientemente fue a vistas públicas. Las soluciones que se plantean en dicho documento no necesariamente concuerdan con la política de CODREMAR respecto a la pesca. Entendemos que el carácter restrictivo del Plan, no es el ideal de CODREMAR para la solución de los problemas que se aducen.

La visión de CODREMAR es buscar alternativas que a la vez que ayuden a expandir la operación pesquera del país, a su vez resuta en un alivio a la pesca de las especies capturadas tradicionalmente. Esto recae principalmente sobre la pesca de especies subutilizadas o que no están siendo utilizadas actualmente por nuestros pescadores. Ejemplo de ello es la pesca del tiburón, del calamar y la del pez espada, entre otros. Al lograr desplazar el esfuerzo de algunos de nuestros pescadores hacia estas áreas, se espera que la presión baje sobre los recursos actualmente en uso.

Somos de la creencia de que el control sugerido es muy conservador e impráctico, ya que no hay estudios sobre estas especies que determinen su supervivencia una vez devueltas al mar. Adjunto un análisis de diferentes aspectos establecidos en su Borrador del Plan de Administración de Peces de Aguas Someras que establecen las bases para la posición de CODREMAR referente al mismo.

Espero que luego de revisar esta carta comprenda nuestra preocupación en torno a las implicaciones del mencionado Plan, aparte de las bondades que este pueda tener desde el punto de vista del manejo del recurso así.

Estamos en la mejor disposición de continuar colaborando con ustedes en estos objetivos en común.

Me reitero una vez más a sus órdenes.

Atentamente,

Frank Torres
Director Ejecutivo

JER/crl

Anexo

Plan de Manejo Pesquero de Peces de Arrecife de Aguas Someras
de Puerto Rico e Islas Vírgenes

Historial

El Consejo de Pesca del Caribe recibe la encomienda federal de promover reglamentos para la administración y preservación de peces y otros recursos marinos en la zona de conservación que en el caso de Puerto Rico es de las 9 millas náuticas (10.35 millas) a 200 millas estatutorias. La reglamentación que establezca el Consejo de Pesca no aplica a las aguas territoriales. De considerarse adecuado, el Gobierno establecerá una reglamentación paralela para aplicarse en las aguas territoriales.

Para el establecimiento del primer borrador, el Consejo realiza una serie de reuniones (Fact Finding) en varias asociaciones pesqueras. No se cursa invitación por escrito a CODREMAR a participar en estas reuniones.

Se esboza un borrador con el asesoramiento de los comités asesores científicos y ciudadanos del Consejo Pesquero.

En resumen el borrador establece lo siguiente:

1- Utilizar un mínimo de 1 1/4" en el tamaño de la malla de alambre en la construcción de nazas. Esta recomendación está ya establecida en la nueva ley de pesca. Esta es la malla usada en la actualidad y aún así muchos peces pequeños (juveniles) quedan atrapados. Sin embargo, el requerir un tamaño mayor de la malla dificultaría la pesca del salmonete. Algunos pescadores favorecen el uso de una malla de 1 1/2 pulgada. 10

2- Requerir un panel perecedero y/o amarras perecederas en las puertas de la naza. Esta medida se ha incorporado en la ley de pescas y el reglamento de la langosta. Un panel perecedero es impráctico ya que resulta difícil su 11

remplazo en alta mar. El uso de un alambre # 18 en la puerta es lo más adecuado. Este alambre se oxida en corto tiempo permitiendo que se abra la puerta en caso de que se pierda la naza. 11

3- Requerir identificación del dueño y marcar las boyas y botes

Medida incluidas en el reglamento de la langosta. Favorable en la reducción del problema de robo de nazas.

4- Prohibir levar o en cualquier forma intervenir con una naza, sin autorización escrita del dueño, excepto por oficiales autorizados.

Medida incluida en el reglamento de langosta. Favorable en el problema de la reducción del robo de nazas.

5- Probibir el uso de venenos, drogas, químicos y explosivos para pescar

Medida incluida en la ley de pesca.

6- Devolver al mar toda colirubia menor de 12 pulgadas 14

Medida conflictiva (Ver discusión)

7- Devolver al mar todo mero cherna de 12 pulgadas. El tamaño mínimo será aumentando un pulgada por año hasta alcanzar un mínimo de 24 pulgadas. 15

Medida conflictiva, (Ver discusión)

8- Recomendar a los Gobiernos que se vede la pesca en los siguientes lugares: Mona, Monito y Península Flamenco por un año. 2

Medida conflictiva, ver discusión.

9- Veda de la cherma desde el 1ro. de enero al 31 de marzo de cada año 16

Medida conflictiva - Ver discusión.

DISCUSION

De las nueve (9) medidas, las primeras cinco (5) están incluidas en la ley de pesca y/o reglamento de langosta. La mayoría de estas están siendo aplicadas en la actualidad.

Las medidas 6, 7, 8 y 9 son conflictivas. Las pesca principal en Puerto Rico contrario a la mayoría de la pesca en Estados Unidos se lleva a cabo en aguas de mayores de 100 pies de profundidad. Cuando la Colirubia se pesca de corrida ésta se puede hacer casi de la superficie y los peces no sufren daños irreversibles. Sin embargo, cuando se levan de profundidades de 100 pies o más se le infla la la vejiga natatoria y en muchos casos se le brota por la boca y también le brotan los ojos. Estos peces, para todos los efectos prácticos están muertos. Se han hecho muy pocas pruebas en Estados Unidos con la supervivencia de peces que se sacan del fondo. Todas son en produndidades de 100 pies o menos y con especies diferentes. No existe base alguna para determinar una supervivencia de un 60% sobre el cual luego se proyecta un impacto económico. Los pescadores alegan que casi todos estos peces son víctimas de las tijeretas. El pinchar la vejiça con un alfiler O aguja resultaría impráctico en la pesca con nazas. Antes de implantar esta medida se debe determinar el % de supervivencia de estas especies cuando se devuelvan al mar a las diferentes profundidades pescadas.

Asumiendo que exista una supervivencia significativa, los largos mínimos recomendados no parecen ser adecuados. En una muestra de Colirubias, obtenidas en una leva no se encontró ninguna de 12 pulgadas de largo (fork length). No se establece si el largo es total o en la bifulcación del rabo (fork length). No hay datos sobre el tamaño mínimo donde ocurre madurez sexual en estas especies. Un taño de 12 pulgadas, es mayor que el promedio según datos obtenidos por el Laboratorio de Investigaciones Pesqueras. No se puede determinar un tamaño mínimo hasta que no se determine el tamaño en que ocurre madurez sexual. Se debe añadir más datos de relación de tamaño y peso. Esta situación también es aplicable al Mero Cherna.

Los datos de impacto económico se basan en un 60% de supervivencia lo cual es dudosa según la versión vertida aquí..

CODREMAR no puede endosar la liberación de peces de aguas profundas hasta que no se aclaren las dudas aquí vertidas, incluyendo el periodo de veda del Mero Cherna.

La disminución del Mero Cherna comienza con el auge de la pesca con fizga.

Este mero es menso, además de ser curioso. Generalmente, se acerca a los buzos a inspeccionar el extremo o punta de la fizga. El plan no establece una medida para este tipo de pesca en el Mero Cherna.

A LAND-GRANT UNIVERSITY

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

August 10, 1984

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

Dear Omar:

Thank you for the copy of the draft shallow water reeffish plan you recently sent me. It is obvious that a lot of work and careful thinking went into this latest version. I know it must have been difficult to establish the minimum length restrictions, but I agree with you and the Council that they are necessary. I am enclosing a list of some suggestions for the improvement (mostly grammatical) of the Plan.

On another subject, I would like your permission to use you as a reference on some job applications that I will soon be submitting. Because the jobs that I will be applying for will be in the field of commercial fisheries management rather than academia, I feel it would be more advantageous to have as a reference someone such as yourself rather than just another university professor. Also, if you know of any employment opportunities I would appreciate hearing about them. Thanks and

Best Regards,

John

John M. Mudre
Dept. of Fisheries and Wildlife Sciences
Virginia Tech
Blacksburg, Va. 24061

Notes on CFMC Shallow Water Reeffish Plan, JMM

1) use "such as" instead of "like", pages vii (paragraph 5, line 6) and xii (p2,line 9).
2) page viii delete "a", line 1.
3) page viii, last paragraph, make into two sentences (i.e. "... Section 7.0. Table...". *
4) page ix, objective 2.b), use "e.g." rather than "i.e.".
5) page x, problem 5: the word "problem" is missing at end (i.e. "... and marketing problem".
6) page xii, measure 4 would read better "hauling of or tampering with".
7) page 1, paragraph 2, line 1 might mean to say "fish community" instead of "fishery".
8) Table 1 is not numbered.
9) Table 2 and sect. 8.1.4 (page 12) should read "leatherjackets" rather than "triggerfish". This was changed rather recently but is incorporated into AFS Special Pub. No. 12. *
10) page 49, "Olsen (1978) is not listed in the references.
11) page 60, "effectively" instead of "efficiently."

paragraph 1, line 5

THOMPSON MANAGEMENT INC.

P.O. DRAWER V
740 SCALLOP DRIVE
PORT CANAVERAL, FLORIDA 32920
305 784-0843

July 29, 1984

Mr. Omar Munoz
Executive Director
Caribbean Fishery Management Council
Suite 1108
Banco de Ponce Building
Hato Rey Puerto Rico 00918-2577

Dear Omar;

I had occasion to go through the reef fish plan and would like to offer the following comments:

MSY It is reassuring to see the convergency of MSY estimates utilizing the various techniques. I think that more accurate catch data will serve to refine these estimates but that no gross changes will occur.

Management Measures- Sufficient information exists for the council to utilize yield per recruit as a justification for the suggested regulations instead of this intuitive line currently being used. For example, page 48 of the management plan states that there is an "absence of necessary data from the Caribbean to determine the appropriate size to ensure adequate growth and recruitment to the fishery". Both Munro and I have furnished the necessary data which is in papers cited in the plan. In the case of my work the growth equation ($L_t = L_{\infty}(1-e^{-k(t-t_o)})$) has been provided with L_{∞} = 97.4 cm SL; k-0.183 and t_o=0.488. Natural Mortality was equal to 0.316 and fishing pressure during the aggregation was equal to 0.916. The yield per recruit analysis (enclosed indicates that current harvest which appears to average around 11 inches SL or around 1 year age is providing a yield of around 200 gms/recruit at F=1.5. The proposed size limit, of 12 inches (around 1.9 years of age) will raise the yield to around 400 grams per recruit and the 24 inch size limit will raise the age to 3.9 years and the yield to 1000 grams/recruit. This increase nearly maximizes the YPR which maximum is slightly less than 1200 gms per recruit.

I raise this point because I feel that the Council is not adequately utilizing the information resources available to it. By so doing, the strongest case is not being put forward for the management recommendations. 18, 20

I also note that the information on reproductivity cited as unavailable in the document is available from a variety of sources. *

Information-Since this document has been in preperation for almost 8 years, I think that it is also time to go through it an update some of the primary sources since a considerable amount of information cited in the bibliography does not form the basis of the discussion in the document.

In general the management plan continues to provide a valuable source of information on the area. I think that the Council is apparently becoming less reluctant to suggest necessary regulations but one can clearly see that the situation is deteriorating within the fishery and that implementation of the regulations may not come in time to accomplish the desired ends. As an example I point out the issue of the Grouper breeding aggregation which is now being suggested for regulation six years after the collapse of the fishery. The Council should consider the timliness issue.

On a final point, I would appreciate it if the published versions of my own work were cited instead of the project reports. The published versions have been subjected to more review and represent a more accurate version of the work. I have included a publications list for that purpose. If you lack any of them, let me know and I'll send reprints.

I'll see you at the SS meeting.

Sincerely,

David A. Olsen, Ph.D
Managing Director

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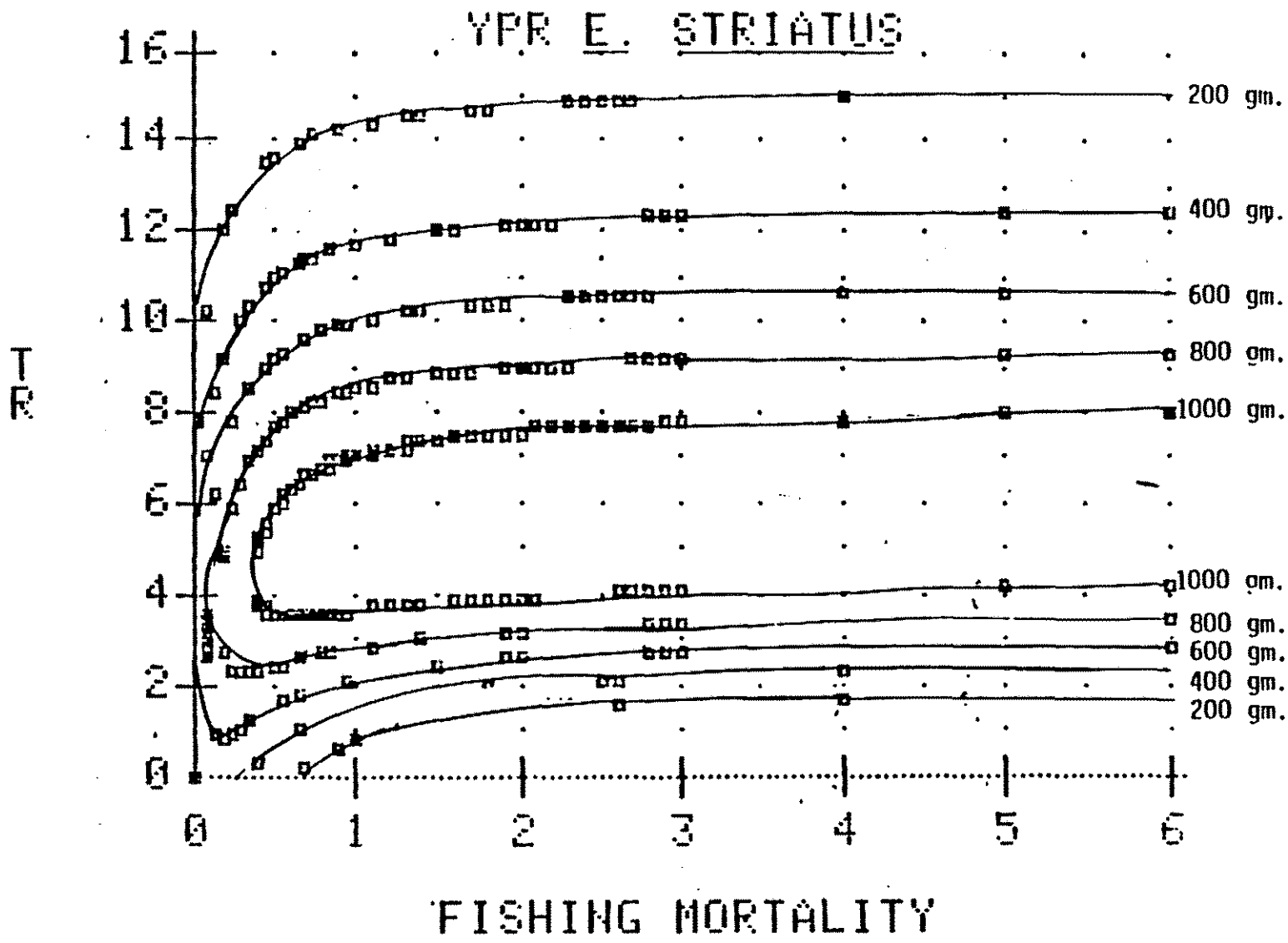
YPR E. STRIATUS
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PONENCIA DEL CONGRESO DE PESCADORES DEL ESTE SOBRE EL PLAN DE MANEJO PESQUERO PARA AGUAS SOMERAS ANTE EL CONSEJO DE PESCADORES DEL CARIBE.

Mi nombre es José Anibal Oquendo, Presidente del Congreso de Pescadores del Este, Inc. Comparecemos a estas vistas en ánimo de defender los intereses de los trabajadores del mar, los pescadores, y a la vez canalizar su sentir y opinión con relación al Plan de Manejo para la Pesquería de Peces de arrecifes en aguas someras.

Comenzaremos por reconocer el esfuerzo e interés del Consejo de Pescadores del Caribe, la Administración Occéanica y Atmósferica y otras entidades, por proteger la vida marina de nuestra plataforma. Parte de la información y data aquí suministrada podría ser un gran instrumento para esclarecer pasos a seguir en relación al futuro de la pesca en Puerto Rico. Sin embargo, la poca o ninguna participación de los pescadores, los datos insuficientes, el enfoque irreal de las causas que han reducido la producción de pescado, la falta de alternativas reales para el futuro de los pescadores, nos obliga a rechazar la aprobación de este documento porque sería lo mismo que entregar un cheque en blanco en manos ajenas a los trabajadores del mar que en últimas circunstancias estarían obligados a cargar con los resultados de estas decisiones sean buenas o malas.

Como nuestra organización no posee recursos que tuvieron a disposición las personas que estuvieron a cargo de preparar este documento utilizaremos su mismo documento para exponer las realidades denunciadas por los pescadores. Queremos destacar como primer hecho de relevancia la pobre participación y poco poder que tiene el pescador en el Consejo de Pesca del Caribe, resulta altamente peligroso y poco demócratico que una entidad que tiene el poder decisional sobre los pescadores estos no tengan poder decisional en la entidad. A pesar de que miembros del Congreso de Pescadores del Este y Oeste de PR somos parte del Comité Asesor del Consejo de Pescadores del Caribe, no fuimos consultados ni participamos

8

En este documento ni siquiera aparecemos en la Tabla de Contenido que aparece en el capítulo XVII en la lista de anexos y entidades a las que se les envió este documento.

Nuestras recomendaciones son las siguientes: Que se reorganice el Consejo de Pescadores del Caribe y que se garantice la participación y poder decisional del pescador. Que las organizaciones pesqueras sean las que nombren pescadores miembros del Consejo. En la Sección 5.0, Pág. 1, titulada Unidad de Manejo, nos preocupa el señalamiento que acuerdos por escrito entre el Gobierno de PRico y Estados Unidos le otorgan la jurisdicción de las 9 (nueve)millas que le fueron otorgadas a Puerto Rico bajo la enmienda a la Ley Jones en el 1980, esto crearía una problemática de caracter constitucional porque entendemos que es el Gobierno de Puerto Rico el que debe responsabilizarse directamente con el pescador en caso que nos veamos amenzados de subsistir. 8

Entendemos que una carta que aparece en este borrador Apendice II-3 firmada por el Hon. Gobernador de P.Rico, Don Carlos Romero Barceló, apoyando la idea, no es suficiente para señalar que los ciudadanos de P.Rico muy especialmente los obreros de la pesca renunciamos al derecho de posesión de las nueve (9) millas marinas.

Nuestra recomendación:

1. Que se clarifique el poder constitucional de estos acuerdos.
2. Que P.Rico no ceda nuestro derecho a adquirido de 9 millas.
3. Que los pescadores participen activamente en cualquier negociación o acuerdo donde esté envuelto este derecho figurando como parte afectada y como nuestro más valioso recurso.

Sección 7.1 <u>Objetivos Específicos</u>. Página 10. Esta sección del borrador en consideración detallada, clara y específica de las medidas que se tomaran para mantener los abastos de adultos y evitar la captura de especies de gran valor.

Se pretende reducir los conflictos entre pescadores y promover la colaboración internacional. Aquí. comienza a floral lo desarticulado de este documento al dejar fuera de sus objetivos específicos los verdaderas causas que amenazan la vida marina. Se pretende intervenir con el modus vivendi del pescador estando conscientes que alteraría costumbres sociales y estilos de vida del pueblo puertorriqueño según lo señala la Sección 2.0, Resume Página VIII, Párrafo 4.

Se le ofrecen garantías a los pescadores de futuras capturas, más sin embargo hasta el día de hoy no se ha podido definir las unidades de abasto pesquero dentro del área de autoridad del Consejo, según Sección 8.1, pág. 11, Descripción de los abastos pesqueros. 18

No existe un método para calcular el rendimiento máximo sostenible en los abastos pesqueros de aguas someras, según indica este documento. Sección 9.1 titulado Cálculos de Rendimiento, pág. 44, párrafo 1. Sin embargo; en este documento se aventura a garantizar las ganancias y pérdidas que tendrán los pescadores. Estas improvisaciones son altamente peligrosas para el pescador. 18

En estos momentos preguntamos por qué se pretende hacer creer que la merma en la pesca se debe específicamente a la sobre pesca de la plataforma marina, cuando en realidad el pueblo de Puerto Rico, los Estados Unidos y las personas que prepararon este documento saben que la amenaza principal que tiene la vida marina que circunda nuestra Isla es la contaminación y falta de leyes que tiene Puerto Rico para proteger nuestro recurso y atacar y detener la causa principal en la merma de las especies principales que capturan nuestros pescadores. Tenemos evidencia suficiente de los daños que han provocado la contaminación a la vida marina a través de toda la Isla, más sin embargo estos datos no se tocan en este documento.

Esto ha causado gran preocupación dentro del liderato pesquero y nuestras comunidades pesqueras y uele mal.

En la Sección 4.0, pág. vii, último párrafo, titulado Declaración de Impacto Ambiental, citamos " Se prohibirá el uso de venenos, drogas, químicos y explosivos para pescar. " Este documento se hace de la vista larga ante el efecto desvastador que ha causado el uso de químicos y explosivos de la Marina de Guerra de los Estados Unidos en las aguas de Vieques y Culebra que son nuestros mayores recursos pesqueros dentro de la pescadería de aguas someras de P.Rico. 13

"Entre tanto se tengan los estudios necesarios, puede asumirse que cada isla, o banco dentro de la jurisdicción del Consejo, sostiene su propio abasto individual de peces de arrecifes", por lo tanto podemos asegurar que aún reglamentando o controlando la pesca en su totalidad sin detener la contaminación el sacrificio al que se sometería al pescador sería en vano.

Con relación al tamaño que recomienda este documento para reglamentar la pesca de la colirrubia y la cherna citamos Sección 10.2 b., segundo párrafo. "En ausencia de los datos para el Caribe necesarios para determinar el tamaño apropiado que garantice el crecimiento adecuado y abastecimiento de la pesquería se ha adoptado el tamaño mínimo de 12 pulgadas de largo según se establece. 14

en la zona de manejo pesquero del pargo y el mero para el área del Atlántico-Sur. Nuevamente personas ajenas a los pescadores deciden por los pescadores,en este caso el tamaño de los peces reconociendo no tener los datos científicos en forma adecuada para tomar tan importante decisión. 14

La realidad práctica y conclusiones con relación al tamaño de la cherna y la colirubia es que debido a las presiones a que son sujetos en los arrecifes de aguas someras, especialmente por la contaminación y si excluir la pesca ha provocado que los adultos sean de menor tamaño esto no implica que tanto la cherna como la colirubia se puedan reproducir a un tamaño menos de 12 pulgadas. Prueba de esto es que el 42% que midan menos de 12 pulgadas que fueron desembarcadas se pescaron mientras realizaban sus agregaciones y los peces realizan estas agregaciones para desobar y reproducirse. Esperar peces de mayor tamaño y estimar su crecimiento anual es un poco irreal e iluso. 14,18

Por otro lado la mayor parte de los peces capturados en nasas mueren irremediablemente y no pueden devolver al mar. 15

El único método de conservación que entendemos es viable y práctico es proteger la especie en la época de agregación para darle oportunidad a desobar como señala este borrador.

Para concluir hacemos las siguientes recomendaciones a vuestra consideración:

I- La reorganización del Consejo de Pesca del Caribe para garantizar participación directa del pescador con poder desicional.

II- Que se provean nuevas alternativas de desarrollo al pescador y a las especies explotadas.

1. arrecifes artificiales
2. pesca de profundidad
3. maricultura
4. participación en la industria del atún en Puerto Rico

Que se cree el Instituto Caribeño de Pesca. Que se incluya en el plan de manejo para la pesca de aguas someras la problemática creada por la contaminación y se provean alternativas reales para afrontar este mal. Que Puerto Rico mantenga su judirisción sobre las 9 millas marinas que nos corresponden.

No podemos terminar esta ponencia sin hacer referencia a la Sección 8.63 titulada Organizaciones Obreras y citamos página 40 párrafo 1, no se conocen organizaciones obreras que se relacionen con los sectores de producción, elavoración o mercadeo de los peces del arrecifes de aguas someras en las Islas Virgenes ni en Puerto Rico.

Si señores estamos aquí los obreros del mar en Puerto Rico existen dos organizaciones que velan por los intereses de los pescadores, el Congreso de Pescadores del Este y el

Congreso de Pescadores del Oeste. Ambas organizaciones tenemos propósitos comunes. Nuestro lema es: UNA SOLA VOZ, UNA SOLA FUERZA, UNA SOLA ESPERANZA.

José Aníbal Oquendo
Presidente Congreso Pescadores
del Este Inc.

11 Julio 1984

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23 de julio de 1984

Buenas tardes, Miembros del Consejo de Pesca del Caribe, Señores y Señoras del público, pescadores. Mi nombre es Nelson Carrasquillo, coordinador del Trabajo Comunal del Movimiento Ecuménico Nacional de Puerto Rico (PRISA), Inc. En esta calidad asistimos a estas Vistas Públicas en relación al borrador del reglamento propuesto para implantar el plan de manejo pesquero, análisis del impacto de la reglamentación y declaración de impacto ambiental para la pesquería de peces de arrecife de aguas someras de Puerto Rico y las Islas Vírgenes.

El carácter de celebrar vistas públicas para consultar a los pescadores sobre una serie de medidas de reglamentación, manejo, control y penalización es indicativo de una relación existente por muchos años en nuestro país. Al igual que en la situación del Santuario Marino propuesto para La Parguera y en la relación con las distintas agencias gubernamentales con los trabajadores del mar, éstos como cuerpo organizado se enteran cuando en la etapa de finalizar el proceso requerido por la ley Federal está por terminar. Esto disminuye la aportación que puedan contribuir los pescadores y limita la posibilidad de generar un proceso de discusión donde todas las partes puedan aprender y llegar a un mejor entendimiento de las causas de una aparente reducción en la actividad pesquera.

Esta problemática no es exclusiva del Consejo de Pesca del Caribe, sino indicativa de las causas por las cuales los Congresos

de Pescadores del Este y Congreso Pescadores del Oeste convocaron a la Marcha del Remo en el mes de febrero. En la misma los pescadores de toda la isla se reunieron y marcharon en protesta por la pésima comunicación existente, la cual quedaba retratada con la propuesta del Santuario Marino en La Parguera. De igual forma en reunión entre el Consejo de Pesca del Caribe y representantes de ambos Congresos se acordó que los presidentes de ambos organismos formarían parte del Comité Asesor del Consejo de Pesca del Caribe. Froilán López es miembro de este Comité Asesor, sin embargo se enteró cuando recibió por correo copias del borrador.

Por eso y en gran medida por la influencia de los pescadores es que estas vistas se realizan hoy en Aguadilla. La falta de comunicación no es porque los pescadores no quieran participar, sino porque las demás agencias incluyendo el Consejo de Pesca del Caribe no lo han permitido.

Entendemos que los pescadores que han participado a través de las vistas públicas en éstos días han sido lo suficientemente generales y específicos como para que se inicie un proceso de reconsideración por parte del Consejo. Ante lo cual y en la medida en que se incorporen las recomendaciones, será indicativo de cuan genuino es el Consejo para bregar con la realidad del trabajador del mar en la realidad del Puerto Rico de hoy. Ante lo cual el Movimiento Ecuménico, se solidariza con las expresiones vertidas por los Congresos de Pescadores del Este y Oeste, así como las de los pescadores en general.

No obstante queremos hacer los siguientes señalamientos a ambos borradores. Parten de la premisa que la pesca comercial en los últimos años va disminuyendo y que si no se toman medidas de control esta entrará en crisis donde ni tan siquiera podrá atender

una actividad pesquera mínima. Para esta posición se apoya en una investigación científica, en entrevistas con grupos de pescadores y en el sistema de estadísticas de CODREMAR. Además señalan como hecho que antes la crisis económica del país, ha aumentado el desempleo y el número de pescadores a nivel parcial o completo ha aumentado. El conjunto de factores señalan o indican la necesdiad de implantar un mecanismo que reglamente la actividad pesquera para así beneficiar a los pescadores.

Si examinamos el conjunto encontramos los supuestos de que son los pescadores los principales responsables de la sobre pesca. Y por eso se establecen unas recomendaciones encaminadas a reglamentar, controlar y penalizar la actividad de los pescadores comerciales, para así poder revertir la sobre explotación del recurso pesquero. El Departamento de Recursos Naturales, así como otras entidades del gobierno han reconocido por lo menos como se desprende de los documentos oficiales, Plan de Manejo de la Zona Costanera y anteriormente en el estudio Puerto Rico y el Mar las causas irreversibles en la destrucción del medio ambiente marino. Y ninguno de ellos señalan al pescador comercial como responsables.

Los arrecifes llanos en Puerto Rico están sometidos a un proceso de sedimentación y contaminación irreversibles. De lo cual la costa norte es testigo vivo. El este de Puerto Rico sufre de la destrucción sistemática por causas de bombardeos y contaminación. En Vieques se dice que hay sobre pesca, cuando se le obliga al pescador realizar su actividad en áreas limitadas, sin embargo la marina bombardea y destruye. En Culebra hay áreas donde Recursos

Naturales no se puede responsabilizar por que queden un sinnúmero de bombas por explotar. La destrucción de los manglares, habitat natural para una serie de especies comerciales sistemáticamente se está logrando.

Esta situación es enfrentada por una serie de medidas totalmente inadecuadas, que a su vez son combatidas por las propias agencias del gobierno tanto federal como estatal. Por ejemplo, el tirar desperdicios químicos en el área norte era hecho por barcaza, ante la presión de sectores del pueblo incluyendo a los pescadores, se logró eliminarla. La Agencia de Protección Ambiental, determinó que se construyera una Planta de Tratamiento para solucionar el problema. Sin embargo, esta no está preparada para bregar con la problemática y tira los mismos desperdicios cercana al mar, afectando gravemente lo poco que sobrevivió a la época de la barcaza. El Gobierno Estatal establece una demanda contra la Marina de Guerra en defensa del interés de los pescadores, para finalmente negociar unas supuestas áreas de conservación y permitir el bombardeo indiscriminado. Y en aras de mantener y preservar el ambiente, Recursos Naturales sugiere la creación de Santuarios Marinos en La Parguera ignorando los estudios que señalan que el deterioro del medioambiente en La Parquera se debe a la actividad terrestre.

En resumen esto es reflejo de toda una serie de medidas de las cuales han tenido la respuesta de los pescadores en defensa de sus intereses. Ante esta situación le corresponde al Consejo de Pesca del Caribe si va a responder con medidas que no van a la raíz del problema o como organismo que pretende representar y canalizar el mejor interés público, defender los intereses de los