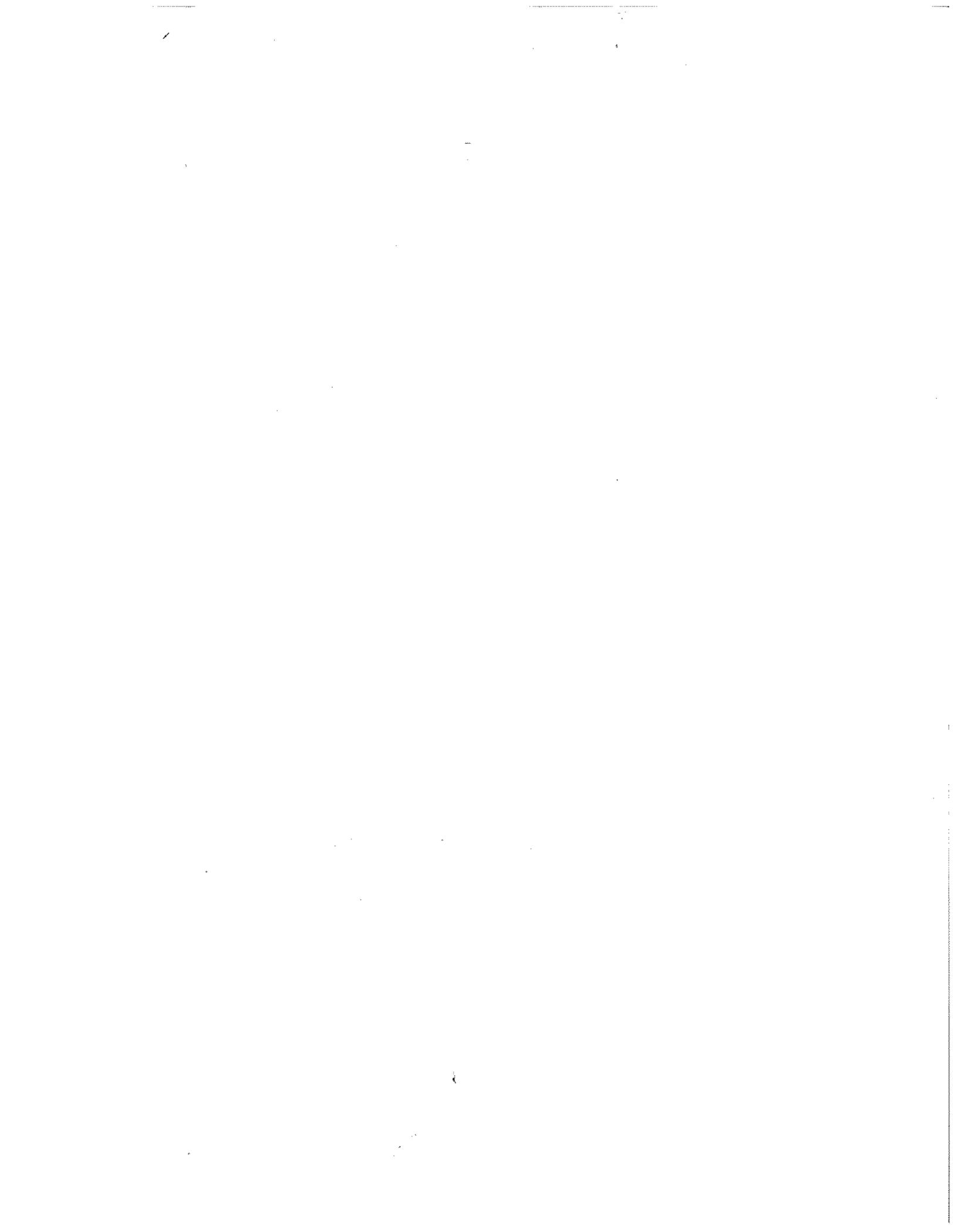


**AMENDMENT NUMBER 1 TO THE FISHERY
MANAGEMENT PLAN FOR THE SHALLOW-WATER
REEFFISH FISHERY, PRELIMINARY
ENVIRONMENTAL ASSESMENT AND
REGULATORY IMPACT REVIEW**



MAY 1990

CARIBBEAN FISHERY MANAGEMENT COUNCIL



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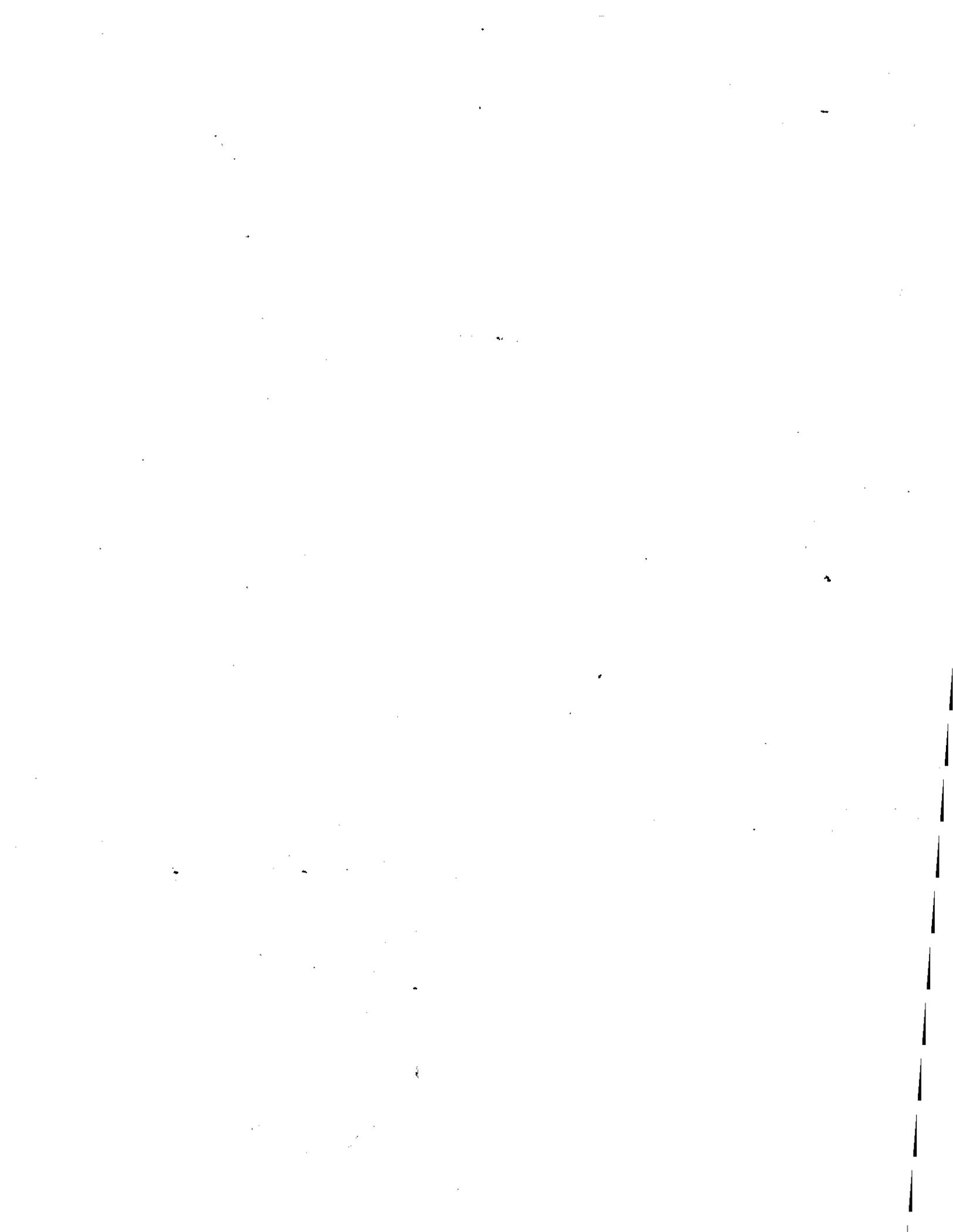
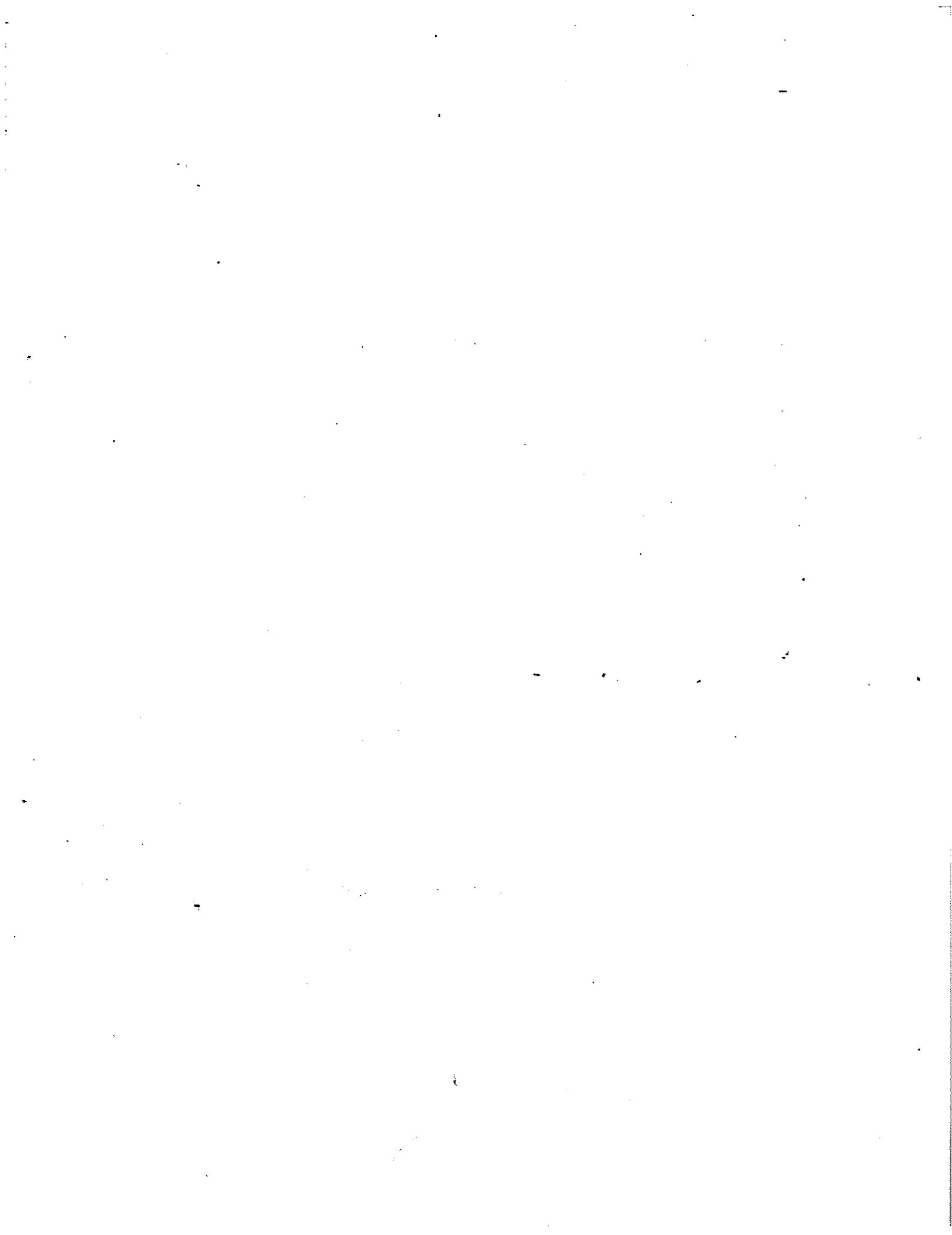


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I Introduction

The Fishery Management Plan for the Shallow-Water Reefish Fishery of Puerto Rico and the U.S. Virgin Islands (FMP) became effective September 22, 1985. The FMP was prepared by the Caribbean Fishery Management Council to establish a management system for the shallow-water reefish resources within the Exclusive Economic Zone (EEZ) and the waters under the authority 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 reefish in the Caribbean, about 180 are landed and used 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 FMP established regulations to rebuild declining reefish species in the fishery and reduce conflicts among fishermen. It established criteria for the construction of fish traps; required owner identification and marking of gear and boats; prohibited the hauling of or tampering with another person's traps without the owner's written consent; prohibited the use of poisons, drugs, other chemicals and explosives for the taking of reefish; established a minimum size limit on the harvest of yellowtail snapper and Nassau grouper; and established a closed season for the taking of Nassau grouper.

II Statement of the Problem

Since the implementation of the FMP, new information indicates that more stringent management measures are needed to accomplish the objectives of the FMP. Data from CODREMAR's¹ Cooperative Fishery Statistics Program shows a downward trend in these fisheries indicated by a shift in species composition and decrease in volume of landings. For example, the parrotfish, which was considered second and third class in most sectors of this fishery, is now sold as first class and is one of the most frequently landed species displacing the less abundant snappers and groupers. This is occurring in spite of the management measures implemented so far.

The red hind size frequency distribution shows a decline in the average size in Puerto Rico. The situation in the U.S. Virgin

¹ CODREMAR, (Corporation for the Development and Administration of the Marine, Lacustrine and Fluvial Resources) is Puerto Rico's governmental agency in charge of fishery development.

Islands regarding this species is such that the fishermen themselves have requested a closure of the specific sites during the spawning season (December - February) of the red hind. They have identified a "spawning hot spot" as crucial to the survival of the fishery. This area is important not only for the fishermen in the U.S. Virgin Islands, but also for the fishermen in Puerto Rico who might benefit from the larvae carried by the currents.

A task team was assembled by the Council to examine the available data. Recommendations were made and accepted by the Council to amend the plan in order to increase the minimum mesh size in fish traps and to protect the spawning aggregations of the red hind, especially those spawning areas identified around St. Thomas and St. John.

The measures which amend the plan are responsive to the objectives of the plan which are: restore and maintain adult stocks at levels that ensure adequate spawning and recruitment to replenish the population; prevent the harvest of individuals of species of high value that are less than the optimum size; and obtain the necessary data for stock assessment and for monitoring the fishery.

III Proposed Action

The actions proposed in this Amendment consist of the following revisions of existing measures or sections.

Management measure 10.2.1 is modified to allow a larger dimension for the minimum mesh size for fish traps.

Management measure 10.2.7 is modified to prohibit the harvest and possession of the Nassau grouper.

Management measure 10.2.9 is modified to include socio-economic information.

Management measure 10.2.10 is added to establish an area closure during the red hind spawning season.

ACTION 1: MANAGEMENT MEASURE 10.2.1

Section 10.2.1 is revised by modifying the minimum mesh size for fish traps (change underlined):

10.2.1 Establish 2 inches (in the smallest dimension) as the minimum mesh size for fish traps.

Rationale: The 1½" mesh size was too small to reduce bycatch of immature individuals and those herbivorous adults essential to the maintenance of the reef ecosystem balance. Two inches

minimum size will allow the escapement of these fishes and more likely achieve the objective of the plan.

In a study by Bohnsack (1988) comparing different mesh sizes in fish traps, a mesh size 2" by 3" or larger tended to catch larger fish, but fewer species and individuals. Also, when comparing this mesh size with those currently legally specified in the Gulf of Mexico (1.5" X 1.5", and 1.5" hexagonal) the results show that "the presently legal minimum mesh appears to do little to reduce bycatch." This statement agrees with the Council's rationale to increase the present legal minimum mesh size from 1½" to 2".

This measure could reduce the number of part-time fishermen. It has been argued that larger mesh would discourage the use of traps by part-time fishermen because average number of fishes per trap will decrease. However, it will provide better economic return to the full-time fisherman because the catch of larger fish, with the escapement of a greater number of juveniles, will bring higher market values. If 2" mesh size wire is readily available, no significant economic hardship is foreseen.

Delaying measure implementation for one year after Amendment Number 1 approval should offset any economic impacts associated with the switch to traps with a larger mesh size. Since the life expectancy of fish traps is about one year, this time frame should allow the fishermen to gradually replace the traps that are lost or that reach their full life expectancy. This delay will lessen the economic impact of the measure.

The Council considers this measure as one of the most important for this fishery due to the complex assemblage of species. At the same time it is conscious of the need for an inventory of traps by mesh size and the consequent economic analysis. This could be done during the moratorium, not banning, however, the implementation of the measure.

Rejected Alternatives to Action 1

a. Retain the minimum mesh size of 1½" (no action).

Rationale: Current minimum mesh size is not allowing the escapement of a significant number of juveniles which are important to the fishery. Bohnsack (1988) found that the size of retained fish in traps is directly related to mesh size and shape. He found that mesh sizes of 2" by 3", or larger, tend to catch larger fish, but fewer species and individuals; and that the larger mesh size is more efficient in reducing bycatch of immature individuals and small adults of certain species.

b. Establish the minimum mesh size at 1½".

Rationale:

There is no significant difference in catch sizes between the 1½" and 1¼" minimum mesh size.

Regarding the economic impact of this measure, some fishermen from St. Croix believe that if the minimum mesh size is established at 2", approximately 50 percent of their catch will be lost. This seems to be unique to St. Croix, because of their particular cultural eating habits. This community consumes species (e.g. doctorfish and butterflyfish) that are smaller than those consumed in Puerto Rico, St. Thomas and St. John. The St. Croix fishermen would therefore, prefer the 1½" minimum mesh size.

Representatives from the U.S. Virgin Islands Division of Fish and Wildlife believe that the available data indicate that this 50 percent loss is overstated and that actual loss is closer to 20 percent.

The Council cannot corroborate any of these figures for lack of adequate scientific data. The scientific data available (Bohnsack, 1988) indicate that the 2" minimum size is a better alternative for the recovery of the resource.

ACTION 2: MANAGEMENT MEASURE 10.2.7

Section 10.2.7 is modified to prohibit the harvest and possession of Nassau grouper:

10.2.7 A total closure of the Nassau grouper fishery is established, until the species is rebuilt to exploitable levels.

Rationale: The Council's decision to adopt a minimum size of 24 inches total length for Nassau grouper (Epinephelus striatus) to ensure spawning, was based on the best available information at the time. Due to the taxonomic relationship of the species with the red grouper (E. morio), whose first spawning size corresponds to approximately 19 inches total length, and its maximum yield is obtained at 24 inches, the assumption was that, the same parameters could be used for the Nassau grouper.

The measure was implemented with a phase-in schedule starting with a base line of 12 inches total length for the minimum size and adding a one-inch increase per year, until reaching 24 inches. This phase-in would allow sufficient time for the development of scientific research which would provide an estimate of the age-length at first spawning.

The age-length at maturity of Nassau grouper has been determined to be at least 17 inches standard length (22 total length) in a study conducted in the Bahamas during 1988 (Yvonne Sadovy,

personal communication). Therefore, the Council would have to modify the minimum size limit of Nassau grouper to 22 inches total length following the original rationale for the size limit measure for this fish. However, current information on landings shows that the capture of Nassau grouper is a rare event. This situation can only be corrected by a total closure until the stock has recovered.

Rejected Alternative to Action 2

a. Retain management measure as presently stated (no action).

Rationale: The present size limit management measure was selected based on studies by the South Atlantic Fishery Management Council because the Caribbean Council lacked information of its own regarding the species in local waters. However, the information now available indicates that more drastic action is needed to conserve and rebuild the resource.

ACTION 3: MANAGEMENT MEASURE 10.2.9

Section 10.2.9 is revised to include socio-economic information (change underlined):

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

Rationale: The current provisions of the data collection effort are limited to the collection of biological data. The reefish fishery is very complex and in order to appropriately evaluate impacts associated with various management strategies the Council needs complete information. The collection of this information is requisite for the preparation of the SAFE reports now required by the 602 regulation. Thus, the need to collect socio-economic data.

Rejected Alternative to Action 3

a. Retain measure as is currently stated (no action).

Rationale: The Council is managing a very complex fishery. Requiring only biological data is not sufficient for the evaluation of the impacts associated with management.

ACTION 4: AREA CLOSURE FOR RED HIND DURING BREEDING SEASON

Section 10.2.10 is added to the FMP and will read:

10.2.10 To prohibit during the red hind spawning season, from

December 1 through February 28, the use of any fishing gear capable of capturing reeffish, such as fish traps, hook and line, bottom nets, and spear, in an area southwest of St. Thomas enclosed by the quadrilateral formed by connecting the following four points in Chart 25641:

18 13.2° N; 65 06°W
18 13.2° N; 64 59°W
18 10.7° N; 65 06°W
18 11.8° N; 64 59°W

Rationale:

Protecting reproductive stages of species is one of the major problems of fishery management as well as one of the most important management measures that can be implemented. During this stage the species become extremely vulnerable to fishing pressure, and protecting them is sound management. Total closure of the area covered under this measure is necessary because it is not possible to fish other species to the exclusion of red hind.

Red hind is so concentrated in this area during the spawning season that it is impossible to fish this area and not catch red hind. At present, red hind constitute the backbone of not only the trap fishery, but also the hook-and-line fishery.

This particular area has been identified by the fishermen as "one of the hottest spots for spawning aggregations." The fishermen are concerned that average size at harvest is decreasing. They know they are taking too many juveniles and that they have to protect the resource "so they will have something to keep going back to." Conscious of the importance of protecting spawning aggregations, fishermen are trying to conserve the resource, requesting from the Council a management measure that will ensure the survival of the species in federal waters. There are pending regulations in the U.S. Virgin Islands to close spawning areas in the territorial waters. Outside fishermen are currently not being regulated, therefore, U.S.V.I. fishermen are interested in seeing federal regulations that protect the species.

Red hind in the U.S. Virgin Islands spawn during the full moon cycle from December through February. The spawning season peaks usually during January. Only two spawning areas have been identified in the U.S. Virgin Islands although more are suspected. Scientists from Puerto Rico have identified spawning sites along the western coast of that island, within the EEZ. These will be addressed, as appropriate, through the Procedures for Adjusting Management Measures, or through another amendment to the Shallow-Water Reefish FMP. Presently there is lack of information regarding the number of spawning areas, the percent of spawners represented by known aggregations or information on where the potential new recruits eventually go. Nonetheless, scientists do agree that the closure of the area defined by this measure is important for red hind recovery or reversal of the present rate of decline.

Rejected Alternative to Action 4

- a. To keep the identified spawning area open to fishing.

Rationale: Leaving the identified area unprotected from the intensive fishing pressure would most probably eliminate this spawning aggregation in a short period of time. Fishermen once identified spawning areas of the red hind around St. Croix that were not adequately managed and no longer exist. Once a species is depleted of a spawning area apparently it does not return.

- b. To close all areas identified as possible or actual spawning grounds of red hind during the period of December through February.

Rationale: There is little information with respect to the areas (location and dimension) that serve as spawning grounds for the red hind through the year. Although it is known that additional areas considered spawning grounds occur around Puerto Rico and the U.S. Virgin Islands, the precise locations have not been identified.

The Council has decided to accept the recommendation closing the indicated area (management measure 10.2.10) as the first step to assess the usefulness of this measure. It is expected that after proper monitoring and evaluation of the closed area proposed in this FMP, other areas could be closed if this measure proves to be effective.

ACTION 5: DESCRIPTION OF HABITAT OF STOCKS

Section 8.2 of the FMP is updated and editorially revised to provide descriptions and analyses required by amendment of the Magnuson Act. See Appendix B for a complete habitat document.

IV Regulatory Impact Review and Initial Regulatory Flexibility Analysis

A INTRODUCTION

Executive Order 12291 "Federal Regulation" established guidelines for promulgating new regulations and reviewing existing regulations. Under these guidelines each agency, to the extent permitted by law, is expected to comply with the following requirements: (1) administrative decisions shall be based on adequate information concerning the need for and consequences of proposed government action; (2) regulatory action shall not be undertaken unless the potential benefit to society for the regulation 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 regulatory priorities with the aim of maximizing the aggregate net benefit to society, taking into account the condition of the particular industries affected by regulations, the condition of the national economy, and other regulatory actions contemplated for the future.

In compliance with Executive Order 12291, the Department of Commerce (DOC) and the National Oceanic and Atmospheric Administration (NOAA) 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 plan, or may be significant in that they reflect important DOC/NOAA policy concerns and are the object of public interest.

The RIR is part of the process of preparing and reviewing fishery management plans. The RIR provides a comprehensive review of the level and incidence of impact associated with the proposed or final regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve problems. The purpose of the analysis is to ensure that the regulatory agency 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 serves as the basis for determining whether the proposed regulations implementing the fishery management plan or amendment are major/non-major under Executive Order 12291, and whether or not the proposed regulations will have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (P.L. 96-354).

The purpose of the Regulatory Flexibility Act is to relieve small businesses, small organizations, and small governmental entities from burdensome regulations and record keeping requirements. Since small businesses will be affected by the regulations to be promulgated under the FMP, this document also includes as the Initial Regulatory Flexibility Analysis (IRFA) for the FMP. In addition to analyses conducted for the RIR, the IRFA provides an estimate of the number of small businesses affected, a description of the small businesses affected and a discussion of the nature and size of impacts.

The Small Business Administration (SBA) defines a small business in the commercial fishing activity, classified and found in the Standard Industrial Classification Code, Major Group, Hunting, Fishing and Trapping (SIC 09), as a firm with receipts up to \$2.0 million annually, SBA defines a small business in the charter boat activity to be in the SIC 7999 code, Amusement and Recreational Services, not elsewhere classified as a firm with receipts up to \$3.5 million per year.

B PROBLEM STATEMENT

The FMP for the Shallow-Water Reefish Fishery of Puerto Rico and the U.S. Virgin Islands became effective September 22, 1985 and established a management system for this resource within the Exclusive Economic Zone (EEZ) and the waters under the authority 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 reefish in the Caribbean, about 180 are landed and used throughout the region and collectively comprise the most important fishery in the islands. The FMP's management unit includes the 64 major commonly landed species (distributed among 14 families) that compose the bulk of the catch.

The FMP established the following regulations to rebuild declining reefish species in the fishery and reduce conflicts among fishermen:

- established criteria for the construction of fish traps
- required owner identification and marking of gear and boats
- prohibited the hauling of or tampering with another person's traps without the owner's written consent
- prohibited the use of poisons, drugs, other chemicals and explosives for the taking of reefish

- established a minimum size limit on the harvest of yellowtail snapper and Nassau grouper
- established a closed season for the taking of Nassau grouper

Since the implementation of the FMP, new information indicates more stringent management measures are needed to accomplish the objectives of the FMP. Data from CODREMAR's Cooperative Fishery Statistics Program shows a downward trend in these fisheries indicated by a shift in species composition and decrease in volume of landings. For example, the parrotfish which was considered second and third class in most sectors of this fishery is now sold as first class and is one of the most frequently landed species displacing the less abundant snappers and groupers. This is occurring in spite of the management measures implemented so far.

The red hind size frequency distribution shows a decline in the average size in Puerto Rico. The situation in the U.S. Virgin Islands regarding this species is such that the fishermen themselves have requested a closure of the specific sites during the spawning season (December - February) of the red hind. They have identified a "spawning hot spot" as crucial to the survival of the fishery. This area is important not only for the fishermen in the U.S. Virgin Islands, but also for the fishermen in Puerto Rico who might benefit from the larvae carried by the currents. In addition, the Nassau grouper has become so scarce that its capture is considered a rare event.

C OBJECTIVES

The original plan objectives addressed by this amendment are:

1. Obtain the necessary data for stock assessment and for monitoring the fishery.
2. Reverse the declining trend of the resource.
 - a. Restore and maintain adult stocks at levels that ensure adequate spawning and recruitment to replenish the population.
 - b. Prevent the harvest of individuals of species of high value (e.g., snappers, groupers, and others) that are less than the optimum size.

D MANAGEMENT MEASURES

The amendment contains five proposed actions. One of these actions revises the data collection activities to provide socio-economic information. Another of the actions revises the habitat section of the FMP. These two actions are not a part of the management structure and are not addressed further by this RIR/RFA.

The three remaining actions are directly related to management and are listed below along with the respective alternatives that were considered and rejected.

10.2.1 Trap Mesh Size

Proposed Measure: Establish 2 inches (in the smallest dimension) as the minimum mesh size for fish traps. This is a proposed change to the current mesh size of 1½ inches.

Alternative Measure 1: No action. Retain the current 1½ inch mesh size rule.

Alternative Measure 2: Establish a minimum mesh size of 1½ inches.

10.2.7 Nassau Grouper

Proposed Measure: A total closure of the Nassau grouper fishery is established, until the species is rebuilt to exploitable levels.

Alternative Measure: No action. Retain current minimum size of 24 inches total length.

10.2.10 Area Closure of Red Hind Spawning Ground

Proposed Measure: To prohibit during the red hind spawning season, from December 1 through February 28, the use of any fishing gear capable of capturing reef fish, such as fish traps, hook and line, bottom nets, and spear, in an area southwest of St. Thomas enclosed by the quadrilateral formed by connecting the following four points in Chart 25641:

18 13.2° N; 65 06° W
18 13.2° N; 64 59° W
18 10.7° N; 65 06° W
18 11.8° N; 64 59° W

Alternative Measure 1: No action.

Alternative Measure 2: Close all areas identified as possible or actual spawning grounds of red hind during the period of December through February.

E APPROACH TO THE ANALYSIS

The three changes to the current management structure for the shallow-water reef fish fishery have a similar intent. All are specifically designed to help meet the primary objective of the FMP regarding rebuilding the stocks and thus resolving the primary problem generally described as biological overfishing. In the case of shallow-water reef fishes overfishing is related to a combination of circumstances that have led to increased levels of fishing effort (see Section 6 of the original FMP for the

shallow-water reefish fishery). Since the measures have a similar intent, any changes in net economic benefits derived from the fishery depend on the effect that the changed management strategy will have on the biological well-being of the resources. Also since the measures are designed to rebuild the resource, the combined biological effect of the measures serve as the basis for the economic outcome. Examining combined effects is more appropriate than examining separate effects because some of the effects overlap and the combined effect will not be the same as adding the separate effects from the measures. Nonetheless, the measures will be analyzed separately at the start to determine whether or not they contribute, in a positive manner, to the RIR condition of realizing a net positive economic benefit (benefits net of public and private costs). The combined effect of the alternative measures also will be contrasted with the results obtained by the preferred measures.

Since the adopted measures all involve more restrictive fishing practices, the analysis will contrast short term losses with long term gains as is usual with management programs designed to rebuild over fished resources. However, these "short term" restrictions will be operational for the entire time period covered by the analysis, so labeling these measures as short term may be somewhat misleading.

The net economic impacts (negative or positive) will include the sum of expected changes in producer and consumer surplus for landings from the commercial fishery, potential changes in consumer surplus from recreational fishing trips, and management costs (plan preparation, and enforcement costs).

F ANALYSIS OF PROPOSED AND ALTERNATIVE MEASURES

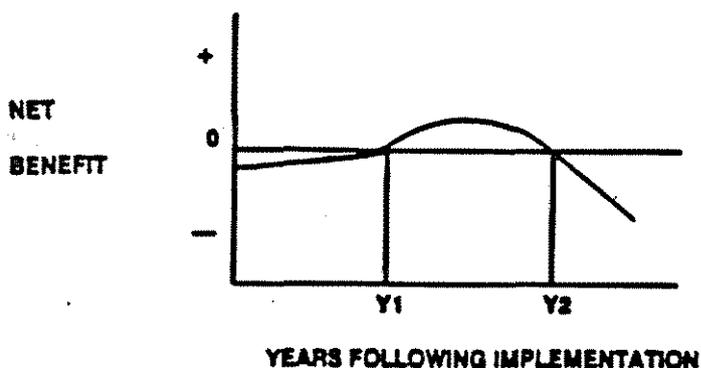
10.2.1 Trap Mesh Size

The biological evidence, although not conclusive, indicates that an enlarged mesh size will lead, given sufficient time, to an increase in the total pounds of target species landed. If this occurs, the increase probably would not be great enough to reduce prices received by fishermen because the area already relies heavily on imports and the impact on total fish supplies will not be great. The increased weight is attributed to increased growth of snappers, groupers, grunts, and other species prior to harvest. Some of these gains will be offset by permanent reductions in the catch of other species that do not reach these larger sizes. The landings of these smaller species have become more prominent in the last decade, because local consumers are switching to these species as their next best alternative. The loss of the landings of these inherently smaller species is not necessarily negative as consumers will switch back to preferred species. The total gross revenue obtained from the resource is therefore expected to increase as a result of the management action. Offsetting this potential gain in revenue will be increased costs associated with a one time conversion to traps

with larger mesh size. This negative impact would be lessened by phasing in the larger mesh size on a replacement basis by delaying the effective date of the measure for one year. This procedure would allow fishermen to replace 1 1/4" mesh traps as they are lost or deteriorate at a much lower cost, since traps last an average of one year.

The period of analysis employed for this measure is critical and will change the outcome. This measure will increase total net revenue, after a short period of time (probably one or two years) during which net revenues decrease because the catch of smaller fish will decline. Then for several years, there would be net producer benefits. However, after several years these increased benefits will attract more fishermen or more effort by existing fishermen (or both). Eventually the benefits will disappear because increased effort means increased costs and even if there is a long duration of greater catches (a permanent increase in yield per recruit) the net revenue of individual fishermen and the industry will eventually decline to current levels (or lower). This outcome stresses the importance of the period of analysis as shown in the following graph.

Graph 1



The graph reiterates the discussion in the text. For years 0-Y, there will be a decrease in producer surplus (small fish excluded and potentially larger fish not yet caught). Then for years Y1 - Y2 there will be an increase in producer surplus. Finally, for years following Y2 there will be a decrease because the costs of new effort in response to the increased profits will wipe out the "profit." This situation will exist for all such management measures of this nature and the general discussion will be referred to other measures. If the measure can be viewed as having only a temporary life described as long enough to capture the benefits from years Y1-Y2 but to be replaced by other management regulations after Y2 then the measure has a benefit from the producer surplus viewpoint. Actually it may be more complicated than this because the increased effort could result in a worse than current recruitment overfishing scenario

(although the evidence suggests that it cannot get any worse from the recruitment standpoint).

Consumer surplus is expected to be greater with this measure because a larger poundage of fish will be purchased at roughly unchanged prices (recall the discussion that supplies are not expected to increase enough to materially affect prices). The recreational surplus is also expected to increase based on the assumption that the catch of larger fish provides increased fishermen satisfaction and hence greater benefits from any given level of fishing effort.

One alternative for this measure is no action. By definition, the status quo implies no change in benefits or costs. Comparatively it is sufficient simply to look at the result of the preferred alternative (except for any administrative costs associated with the no action decision). The effects of the alternative of 1½ inch mesh would be essentially the same as no action since there are no significant differences in catch sizes between the 1½ and 1¼ inch minimum mesh sizes.

10.2.7 Nassau Grouper

This measure replaces existing minimum size and spawning time closures for Nassau grouper. The measures in the original FMP were forecast to have a high degree of economic benefits related to the biological recovery of Nassau grouper. However, the current amendment indicates that the species has decreased since implementation of the original management measures to the extent that the Nassau grouper is so scarce that it is rarely captured. This outcome is important for the purposes of this RIR and it is worthwhile to look at the reasons why the original management measures did not resolve the problem and did not achieve the expected benefits (over \$2.7 million from the size limit).

One possible explanation that the measure did not achieve the desired result is that the status of the resource was much worse than estimated at the time of implementation of the FMP. If one starts with an extremely depressed population, measures such as those in the current FMP simply may not be strong enough to achieve a biological and economic recovery in any reasonable period of time. Other reasons may include a lack of enforcement or limited recruitment from adjacent waters.

A total closure may be viewed as extreme, but if the current value of producer surplus, consumer surplus and recreational surplus is essentially nil, then at worst the measure results in negative economic consequences which can be expressed as the present value of government costs associated with implementing the measure. The possibility of benefits exceeding costs at some time in the future appears fairly high, assuming that a cessation of landings will yield the necessary biological recovery and that a reasonable level of compliance is achieved. The RIR depends

heavily on models or other predictive capabilities that could be furnished by biologists if and when the appropriate data bases are available.

If the biological models or other information can forecast a recovery of the resource in a reasonable number of years, then the resulting economic benefits from this measure would have to be adjusted because part of the benefits are gained from the mesh trap size and the red hind spawning area closure.

The only alternative expressed is the status quo and there is no need for analysis of impact.

10.2.10. Area Closure of Red Hind Spawning Ground

The analysis of this measure is based on the assumption that the Council proposes to eliminate all fishing effort from this area during the period of the closure. This would mean the exclusion of all commercial and recreational fishing effort.

This measure provides several potential areas of benefits in the form of increased surpluses for producers, consumers and recreational fishermen. It could also produce less desirable side effects which can offset at least part of the potential gains. The potential gains and losses will probably result in a net economic benefit from this measure as discussed below.

Although the proposed measure is directed specifically at recovery of the red hind resource, there are implications for all the species in the shallow-water FMP, as well as for lobsters and pelagic finfish that are present in the area during the closure period.

The amendment does not have details on the importance of this red hind spawning area, i.e., there is no description of the percent of spawners represented by this aggregation or information on where the potential new recruits eventually go, due to lack of information regarding these matters. There does appear to be some level of agreement among those with knowledge of the fishery that this closure will result in a trend toward resource recovery, or at least a slowing of the present rate of decline. This should lead to benefits from the closure, even if the total fishing effort around St. Thomas does not change because fishermen elect to fish in adjacent areas. Even if this relocation of effort occurs it may not significantly alter the total catch of fish in adjacent areas because the present level of effort may be so high that increases (or decreases) in effort will not affect the total catch.

The possible relocation of effort just alluded to does have potential adverse consequences that are not related to the total fish catch. One consequence is that any potential gains from reduced mortality of undersized fish in the spawning closure area

will be offset by increased juvenile mortality in other areas. A second possible problem is that the fishermen may have knowledge of "second-best" spawning aggregations and the effort previously devoted to fishing on the spawning aggregation referenced in the measure may simply be relocated to other spawning aggregations. If this happens, then most of the potential benefits from the closure will be lost due to "damage" to these other concentrations of red hind spawners.

Regardless of potential consequences of the relocation of fishing effort, there appears to be some consensus that there are biological benefits of some sort which derive from allowing a "rest period" for any heavily fished area. Although this concept is not well articulated or quantified in the literature, this RIR assumes that such an effect exists and will not be offset by relocation of effort to other areas since the other areas are already "stressed" by the present level of effort. The existence of this somewhat biological benefit should eventually translate into net economic benefits for the producer, consumer and recreational fisherman.

The only alternatives to the preferred action, was no action which has no impact. The other alternative is to close all possible or actual red hind spawning grounds during the spawning season. Full details on other potential spawning aggregation locations are not available and it is difficult to provide an economic impact analysis. However, if these become known the benefits from closing all the spawning grounds at the same time should exceed the benefits from the proposed measure as long as one major condition is met. The closures should not be so extensive as to halt a major portion of the capture (for commercial and recreational purposes) of all species in the waters surrounding Puerto Rico and the USVI. A closure of a significant portion of all fishing grounds for a three month period during the height of the tourist season undoubtedly would cause major disruptions in commerce related to both commercial and recreational fishing. The temporary dislocation of the small firms involved would probably create the need for government expenditures that would exceed the expected economic benefits related to resource recovery. On the other hand, if other specific spawning areas are identified later, and if they do not imply a closure of the total fishery, a subsequent RIR would probably identify a positive net benefit from such additional closures.

Management Costs

The total cost for preparation of the Amendment Number 1 and enforcement of the red hind area closure are summarized as follows:

ESTIMATED COST OF THE AMENDMENT NUMBER 1
TO THE SHALLOW-WATER REEF FISH FMP

I CONSIDERATION AT THE COUNCIL MEETINGS

Estimated Compensation Cost of one Council Meeting (Council Members)	\$ 4,335.00
Estimated Travel Expenses of one Council Meeting (Council Members)	2,250.00
Estimated Cost Of One Meeting	\$ 6,585.00

Council Meetings are estimated to last 16 hours, of which at least 2 hours have been devoted to the Amendment Number 1 during the past five meetings. The Council devoted at least 12.5% of its time to the Amendment Number 1 during those five meetings.

Estimated Cost Per Meeting - 12.5% x \$6,585 x 5 Meetings =	4,115.65
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II TIME DEVOTED BY STAFF

It is estimated that the Technical Writer dedicated at least 40% of the time to the development of the Amendment Number 1 since the time staff was instructed by the Council (October 1988) to undertake the task.

Salary from Oct/88 to March/90 by 40%	\$ 8,031.20
Estimated Fringe Benefits	1,409.48

Estimated Cost for Staff	9,440.68
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III PUBLIC HEARINGS

Estimated Council Member Compensation (one Council Member x one day x 7 hearings)	\$ 2,023.00
Estimated Staff Compensation (two staff members x 5 hours x 7 hearings)	1,442.00
Estimated Travel Expenses	1,050.00
Estimated Travel Expenses-Staff	2,100.00
Estimated Conference Rooms Cost	1,050.00
Estimated Cost of Announcements	1,575.00

Estimated Cost of Seven Public Hearings	<u>9,240.00</u>
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Total Estimated Cost	<u>\$22,796.33</u>
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ESTIMATED ANNUAL COST OF
ENFORCING THE RED HIND AREA CLOSURE

The above costs are one-time expenditures associated with developing the amendment. The following are estimated annual costs for enforcement of the red hind from December 6, 1989 through February 28, 1990. The changes resulting from the amendment are not expected to warrant any increased enforcement costs.

I. U.S. VIRGIN ISLANDS GOVERNMENT

Division of Fish and Wildlife	\$ 1,400.00
Division of Environmental Enforcement	4,813.00
Estimated Cost U.S.V.I.	\$ 6,213.00

II FEDERAL GOVERNMENT

U.S. Coast Guard	\$ 7,000.00
National Marine Fisheries Service	6,000.00
Estimated Federal Costs	\$13,000.00
TOTAL ANNUAL ENFORCEMENT COST	\$19,213.00

Other Possible Actions

This RIR has served to point out that the set of preferred options do not provide for continuing long term benefits with the possible exception of the red hind spawning closure. The reason is that once any benefits from stock recovery become known (or perhaps even anticipated) the total amount of fishing effort will increase and the benefits will be dissipated. This outcome will not exist if these management measures are in effect long enough to realize the stock recovery benefits but not long enough to allow the addition of a significant amount of new effort. In other words, if these measures can be considered as interim, then the identified benefits can be realized.

One problem with interim restrictions that provide benefits for some period of years is that the next set of rules has to be more restrictive if continuing benefits are to occur. This phenomenon is showing up in the mainland snapper/grouper fisheries. The Gulf of Mexico and South Atlantic Fishery Management Councils have FMP's for these fisheries, and are in the process of formulating more restrictive rules.

Alternatives involving limited entry, limited access or limited effort have been widely discussed for Caribbean fisheries for a number of years. These alternatives should be considered for adoption. With the exception of marine reserves, there are no other long term management approaches associated with overfishing in shallow-water reefish environments. The concept of limited entry has a host of socio-political obstacles. This probably accounts for the reason of why limited entry programs have been difficult to implement. There are some useful features of limited entry beyond resolving the problems associated with an ever-increasing level of total fishing effort. In general, the cost of management could be reduced if the limited entry program is less cumbersome than a host of individual restrictive measures on various gears, areas, individuals, etc. The potential of simpler, less costly and more effective enforcement may be one of the more attractive features.

SUMMARY OF NET ECONOMIC BENEFIT FROM PREFERRED AND ALTERNATIVE MEASURES

<u>PREFERRED MEASURES</u>	<u>PRODUCER SURPLUS</u>	<u>CONSUMER SURPLUS</u>	<u>RECREATIONAL SURPLUS</u>	<u>ADMIN. COSTS¹</u>	<u>NET ECONOMIC BENEFITS</u>
1. Trap Mesh Size	Small Positive	Small Positive	Small Positive		Small Positive ²
2. Nassau Grouper Closure	Small Positive	Small Positive	Small Positive		Positive ³
3. Red Hind Spawning Closure	Positive	Positive	Positive		Positive ⁴
Preferred Measures As a Unit	Positive	Positive	Positive	Fairly Large	Uncertain ⁵
ALTERNATIVE MEASURES					
1. No Action	0	0	0	Small	Negative ⁶
2. Preferred Measures with More Red Hind Area Closures	Positive	Positive	Positive	Costly	Uncertain ⁷

¹ Costs will not be estimated for individual measures, but dollars will be shown for sets of measures when the cost estimates are made.

² Assumes that measures are interim (see text).

³ This conclusion depends on resource recovery within a reasonable amount of time (see text).

⁴ This measure appears to have a net economic benefit which is more certain than the effects from other preferred measures.

⁵ The overall outcome of the combined effect of the preferred set of measures depends heavily on the cost and effectiveness of law enforcement.

⁶ No action provides no benefits but some government costs are associated with a determination of no action.

⁷ This set of alternative measures which includes trap mesh size, Nassau grouper closure and additional red hind spawning area closures has potentially larger net economic benefits than the preferred set of measures (see text).

G SMALL BUSINESS CONSIDERATIONS

Determination of Significant Impact on a Substantial Number of Small Entities: The proposed action will affect most of the 1500-2000 small business entities involved in the Shallow-Water Reefish Fishery, so the "substantial number" criterion will be met. All the measures combined should result in a temporary reduction in gross revenues by more than five percent, so there is also a "significant impact" on the small business entities. Therefore, an Initial Regulatory Flexibility Analysis (IRFA) is required. A Regulatory Impact Review (RIR) was done to satisfy the requirements of E.O. 12291 and the results of that analysis apply for the purposes of the IRFA since all the firms involved are small business entities. Therefore, most of this IRFA will consist of references to the RIR. Other information required for the IRFA is contained either in the Fishery Management Plan or in the amendment and will be referenced as appropriate.

Explanation of Why the Action is Being Considered: Refer to the statement of problems in Sec. IV, B.

Objectives and Legal Basis for the Rule: Refer to Section IV, C for a statement of objectives. The Magnuson Fishery Conservation and Management Act of 1976 provides the legal basis for the rule.

Identification of Alternatives: Refer to Sec. IV, D,F.

Demographic Analysis: Refer Section 8.4 and 8.7 in the FMP.

There are several ethnic and cultural groups among residents that utilize the resources of the management unit; West Indians, Puerto Ricans, Continental North Americans; various groups of Europeans, Asians, and Latin Americans.

The "Comprehensive Puerto Rico Fishery Census, 1988," published by CODREMAR, found that of 1,731 fishermen interviewed:

- 51 percent were full-time fishermen,
- 40 percent are members of associations or groups,
- 46 percent fish on the insular platform,
- 44 percent sell their catch directly to the public and 53 percent clean the catch before selling it,
- 60 percent own their own fishing gear, and
- 72 percent consider fishing to be worse than in previous years; man-made changes, natural changes and overfishing were rated as major contributors.
- Major commercial fishing gears are the fish pot (46%), the hand line (8%) and the bottom line (8%).
- 1,107 fishing craft were reported by interviewed fishermen; 52 percent were "yolas," 34 percent "botes" and 13 percent were "lanchas."
- About half of the fishing crafts reported were from 16 to 18 feet in length.

- 45 percent of all reported fishing craft are homemade of wood and resin; 25 percent of wood and fiberglass and 29 percent of fiberglass.
- 51 percent of all fishermen own their fishing crafts.

Cost Analysis: Refer to Sec. IV, E, and table SUMMARY OF NET ECONOMIC BENEFIT FROM PREFERRED AND ALTERNATIVE MEASURES.

Competitive Effects Analysis: The industry is composed entirely of small businesses (harvesters, processors and charter boat operations). Since no large businesses are involved, there are no disproportional small vs. large business effects.

Identification of Overlapping Regulations: The proposed amendment does not create overlapping regulations with any state regulations or other federal laws. Refer to the original FMP and the amendment to the FMP.

V Overfishing Definition

A reefish stock or stock complex is overfished when it is below the level of 20 percent of the spawning stock biomass per recruit that would occur in the absence of fishing.

When a reefish stock or stock complex is overfished, overfishing is defined as harvesting at a rate that is not consistent with a program that has been established to rebuild the stock or stock complex to the 20 percent spawning stock biomass per recruit level.

When a reefish stock or stock complex is not overfished, overfishing is defined as a harvesting rate that if continued would lead to a state of the stock or stock complex that would not at least allow a harvest of OY on a continuing basis.

Rationale and the Approach to Measuring Overfishing

When a stock is being fished, the potential that an individual will reproduce itself is indicated by the amount of reproductive products it can produce over its lifetime, discounted by the chance that it will die from natural causes (natural mortality rate) and due to fishing (fishing mortality rate). When the level of reproduction at given rates of fishing is compared to the case when there is no fishing, then there is a ratio that indicates the increased stress placed upon a population of these individuals in order to maintain itself. This ratio is called spawning stock biomass per recruit (SSBR) and can be used to measure the reproductive potential of a stock of fish and the reduction of that potential in the face of fishing (Goodyear, 1989).

It remains to specify what the "adequate" level of spawning potential is. The spawning potential should be big enough such that large, long-term reductions in recruitment and the resultant reduction in yields in the fishery are avoided. Empirical evaluations by Gabriel et al. (1984) for temperate marine groundfish fisheries in the North Atlantic indicated that observed recruitment-collapses of stocks tended to occur when the SSBR of those stocks was between 20 and 40 percent.

One of the species for which there is sufficient data to establish the SSBR is the red snapper of the Gulf of Mexico. A SSBR of 20 percent was chosen for this species stock as the target level for recovery from excessive fishing. Since, the fish stocks of concern in the Shallow-Water Reefish FMP are dominated by snappers and fishes of similar life histories as the Gulf of Mexico red snapper, a similar response of SSBR to fishing is also expected. Therefore, the definition of overfishing for this FMP establishes 20 percent SSBR as the criterion. Note that maintaining a 20 percent SSBR does not guarantee that there will not be a subsequent decline in recruitment. Nor does a 30

percent or 40 percent guarantee it will not occur or that 19 percent will guarantee it will. Selection of a higher criterion will reduce the risk that recruitment-collapse might occur. However, initial evidence indicates that chances of low recruitment when 20 percent SSBR is maintained are not large.

Alternative procedures for evaluating the status of the Shallow-Water Reefish stocks relative to overfishing will be developed to allow for the traditional problems of data collection and insufficient detailed time series. Relative catch rates will be examined for the individual times and locations in which they have been collected and compared to present or recent locales. Limited species composition data of the catches will be studied to indicate shifts in the species abundance and/or availability. The size/age data that is available will also be examined.

Reductions in catch rates are indicative of reduction of the overall resource levels. If the catch rate of a single species is less than 20 percent of what it was during some previous time period, then it would be likely that the SSBR would be less than 20 percent in most fisheries. However, if the catch rate includes multiple species and/or the initial catch rate was measured in a period of significant exploitation, then reductions of less than 80 percent could be occurring when an individual species SSBR is less than 20 percent. A scientific evaluation of the above data by a panel of expert biologists will be employed to make findings as to the likelihood that specified stocks are above or below the criterion.

Because of the nature of the data bases available, these determinations will be imprecise. Therefore, management decisions should take into account the lack of precision if overfishing cases are to be avoided.

VI Environmental Consequences

The actions proposed in this amendment will have no significant impact on the physical environment.

The effects of these actions is to permit a greater degree of escapement of juveniles in the reefish fishery and adults of small size species and to reduce mortality of red hind while they are spawning at a particular site. The actions are geared towards promoting, maintaining and restoring the spawning stocks.

The actions will have short-term and, long-term benefits on the resources, because statistics for both the reefish and the red hind fisheries, show a decrease in catch per unit of effort. The proposed actions are directed towards reversing this trend.

There will be a short-term adverse impact on the human environment, especially on the part-time fishermen and the trap

fishermen who fish in the identified spawning area of the red hind. This activity will be eliminated or limited during three months of the year. This negative impact is, nonetheless, overshadowed by the long-term benefit which assures that the stock will not collapse and will result in increased productivity and yield from the resource, with the associated economic benefits.

VII Relationships of the Recommended Measures to Existing Applicable Laws and Policies

Coastal Zone Management Act (Consistency Determination)

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 requires that all federal activities which directly affect the coastal zone be consistent with approved State coastal zone management programs to the maximum extent practicable.

The Amendment of the FMP was made available to the agencies responsible for administering the CZMP in Puerto Rico and the U.S. Virgin Islands. Final determination of consistency by both governments is included in Appendix C.

Federalism Statement

No Federalism issues have been identified relative to the actions proposed in this amendment and associated regulations. The affected States have been closely involved in developing the proposed management measures and the principal State officials responsible for fisheries management in their respective States have not expressed federalism related opposition to adoption of this amendment.

Weather/Vessel Safety Act

Amendment by P.L. 99-659 to the Magnuson Act requires that a fishery management plan or amendment must consider, and may provide for, temporary adjustment (after consultation with the Coast Guard and persons utilizing the fishery) regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of the vessels.

No vessel will be forced to participate in the fishery under adverse weather or ocean conditions as a result of the imposition of the management regulations set forth in Amendment 1. Therefore, no management adjustments for fishery access will be provided.

There are no fishery conditions or management measures or regulations contained in this amendment that would result in the loss of harvesting opportunity because of the crew and vessel

safety effects of adverse weather or ocean conditions. There are no procedures for making management adjustments in the amendment due to vessel safety problems because no person will be precluded from a fair or equitable harvesting opportunity by the management measures set forth.

Endangered Species Act and Marine Mammal Protection Act

The proposed actions have no anticipated impact on threatened or endangered species or on marine mammals. A section 7 consultation was conducted for the original FMP and it was determined the FMP was not likely to jeopardize the continued existence of threatened or endangered animals or result in the destruction or adverse modification of habitat that may be critical to those species; this amendment proposes no changes to the FMP relative to species included in the Endangered Species Act or the Marine Mammal Protection Act.

Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to control paperwork requirements imposed on the public by the federal government. The authority to manage information collection and record keeping requirements is vested with the Director of the Office of Management and Budget. This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

No information requirements under this amendment are subject to the PRA. Socio-economic information will be collected through existing state/federal cooperative programs.

VIII Conclusions

Mitigating Measures Related to the Proposed Action

No significant environmental impacts are expected, therefore, no mitigating actions are proposed.

Unavoidable Adverse Effects

Some adults of the smaller, less valuable species as well as some juveniles of the larger species will continue to be killed, because even the 2" mesh size will be too small for their escapement.

With respect to the red hind closure, fishermen will be prohibited from catching other species that are found in the red hind spawning sites, therefore, they will be losing income derived from red hind as well as from any other species that can be caught in this site during three months.

Relationship Between Local, Short-term Use of the Resources and Enhancement of Long-term Productivity

The 2" mesh size will permit the escapement of some fish presently caught in fish traps with smaller mesh size which will have a short-term negative impact on the yield per trap, in terms of number of fish. However, on a long-term basis, the fishermen will benefit from larger fish with greater market value.

Irreversible or Irretrievable Commitment of Resources

None.

RECOMMENDATIONS

Having reviewed the environmental assessment and available information related to the proposed action, I have determined that there will be no significant environmental impact resulting from the proposed actions.

Approved: _____
Title

_____ Date

RESPONSIBLE AGENCIES

Caribbean Fishery Management Council
Suite 1108, Banco de Ponce Bldg.
Hato Rey, Puerto Rico 00918
(809) 766-5926

LIST OF AGENCIES AND PERSONS CONSULTED

- Caribbean Fishery Management Council
- Task Team for Shallow-Water Reefish FMP
 - Scientific and Statistical Committee
 - Advisory Panel
- National Marine Fisheries Service
- Southeast Regional Office
 - Southeast Fishery Center

LIST OF PREPARERS

- Caribbean Fishery Management Council
- Miguel Rolon, Executive Director
 - Sandra M. Laureano, Special Assistant to the Executive Director
 - Stephen Meyers, Fishery Statistician
 - Richard Appeldoorn, Fishery Biologist
 - Manuel Valdés Pizzini, Social Anthropologist

Southeast Regional Office, NMFS

- Bill Turner, Chief, Fisheries Operations Branch
- Richard C. Raulerson, Chief-Economics Unit

Southeast Fishery Center, NMFS

- James L. Bohnsack, Fishery Biologist (Research)
- Joseph E. Powers, Director Miami Laboratory

LOCATIONS AND DATES OF PUBLIC HEARINGS

First Round of Hearings

St. Croix, U.S.V.I.	April 5, 1989
St. Thomas, U.S.V.I.	April 6, 1989
Cabo Rojo, P.R.	April 18, 1989
Ponce, P.R.	April 19, 1989
Fajardo, P.R.	April 20, 1989

Second Round of Hearings²

St. Croix, U.S.V.I.	June 26, 1989
St. Thomas, U.S.V.I.	June 27, 1989

² A second round of public hearings were held in St. Croix and St. Thomas due to changes in the management measures proposed. Appendix D includes summaries of comments received at the public hearings as well as the written statements sent to the Council office.

PROCEDURES FOR ADJUSTING MANAGEMENT MEASURES

A final rule revising the guidelines for fishery management plans was published on July 24, 1989, and became effective August 23, 1989. Section 602.12 (e) of the guidelines describes a Stock Assessment and Fishery Evaluation (SAFE) Report that is used by the Councils to evaluate the success of management programs implemented for each FMP. The SAFE report should summarize the biological condition of species in the management unit, contain information on the social and economic condition of the fishery, and provide information needed to determine harvest specifications. Each SAFE report should be updated periodically as new information becomes available, and reviewed annually by the Councils or as significant changes occur in the fishery.

The SAFE report serves as the basis for making adjustments in the management program implemented under the FMP. For the Shallow-Water Reefish FMP, the Scientific and Statistical Committee will review the SAFE report annually, and revise it as new data becomes available. Based upon its interpretation of the condition of the fishery, the Committee will evaluate alternatives for adjusting the management program and present them to the Council for consideration and action. The Council will conduct one or more public hearings, depending on the nature of the proposed adjustments, prior to taking final action. For adjusting measures within the regulatory scope of the FMP, a regulatory amendment, consisting of a regulatory impact review, environmental assessment, and a proposed rule, will be prepared for submission to the Regional Director. After reviewing the proposed regulatory adjustment for consistency with the Magnuson Act, other applicable law, and the objectives of the FMP, the Regional Director will forward the proposed rule for publication in the Federal Register. The proposed rule will describe the proposed change(s) and make the supporting documents available for public review and comment. After a 30-day comment period, public input will be addressed by the Council and Regional Director and a final rule prepared for publication. In addition to overfished conditions of a resource, other concerns may trigger the adjustments of management measures. These concerns may involve new gear introductions that might damage overfished resources, environmental disasters, etc.

Adjustments that may be made by this procedure include size limits, closed seasons or areas, and fish trap mesh size, and the level of SSBR necessary to rebuild an overfished stock.

REFERENCES

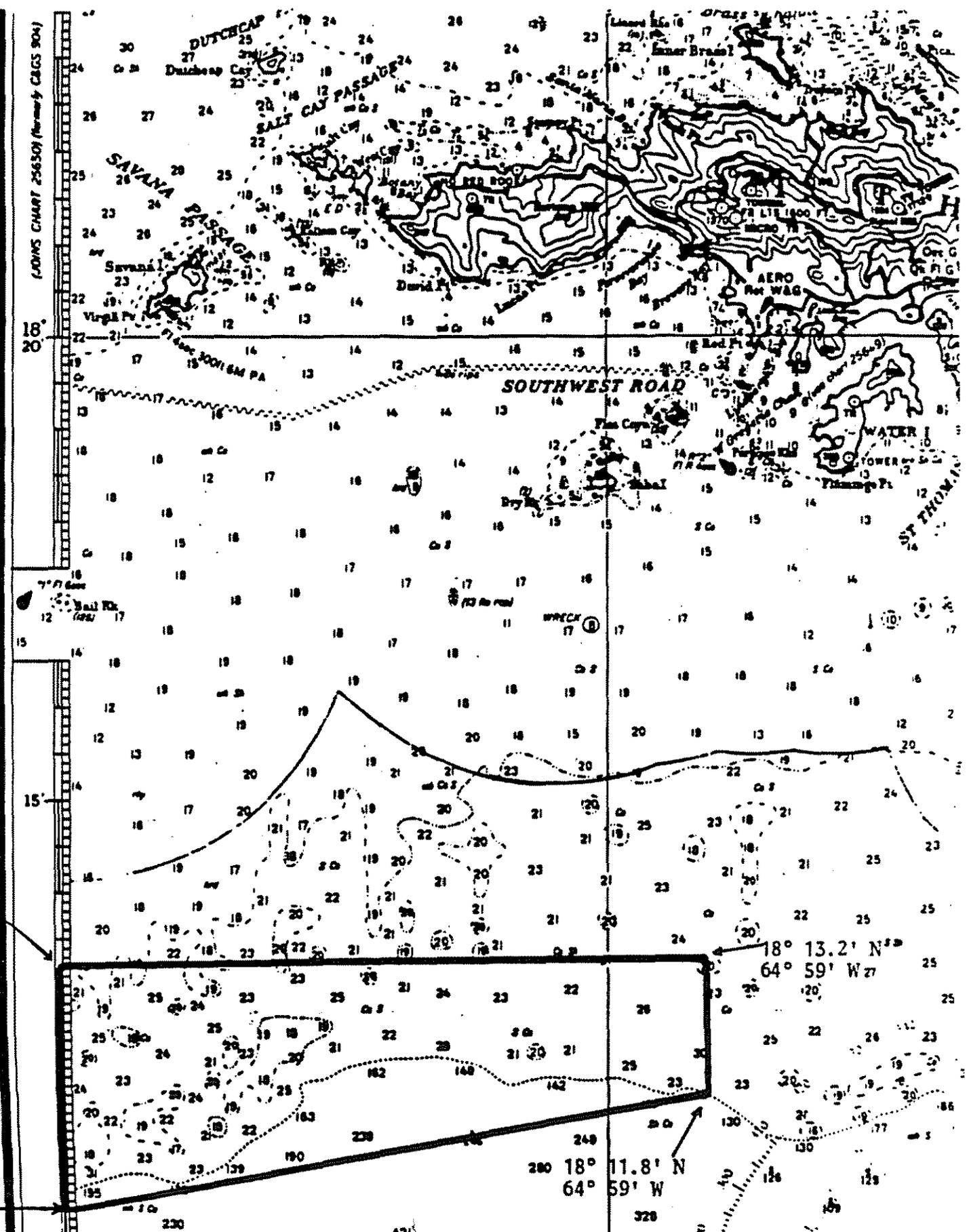
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Torres-Rosado, Z.A., Matos-Caraballo, D. and Garcia-Moliner, G. 1988. Comprehensive Puerto Rico Fishery Census, Corporation for the Development and Administration of the Marine, Lacustrine and Fluvial Resources.

APPENDIX A

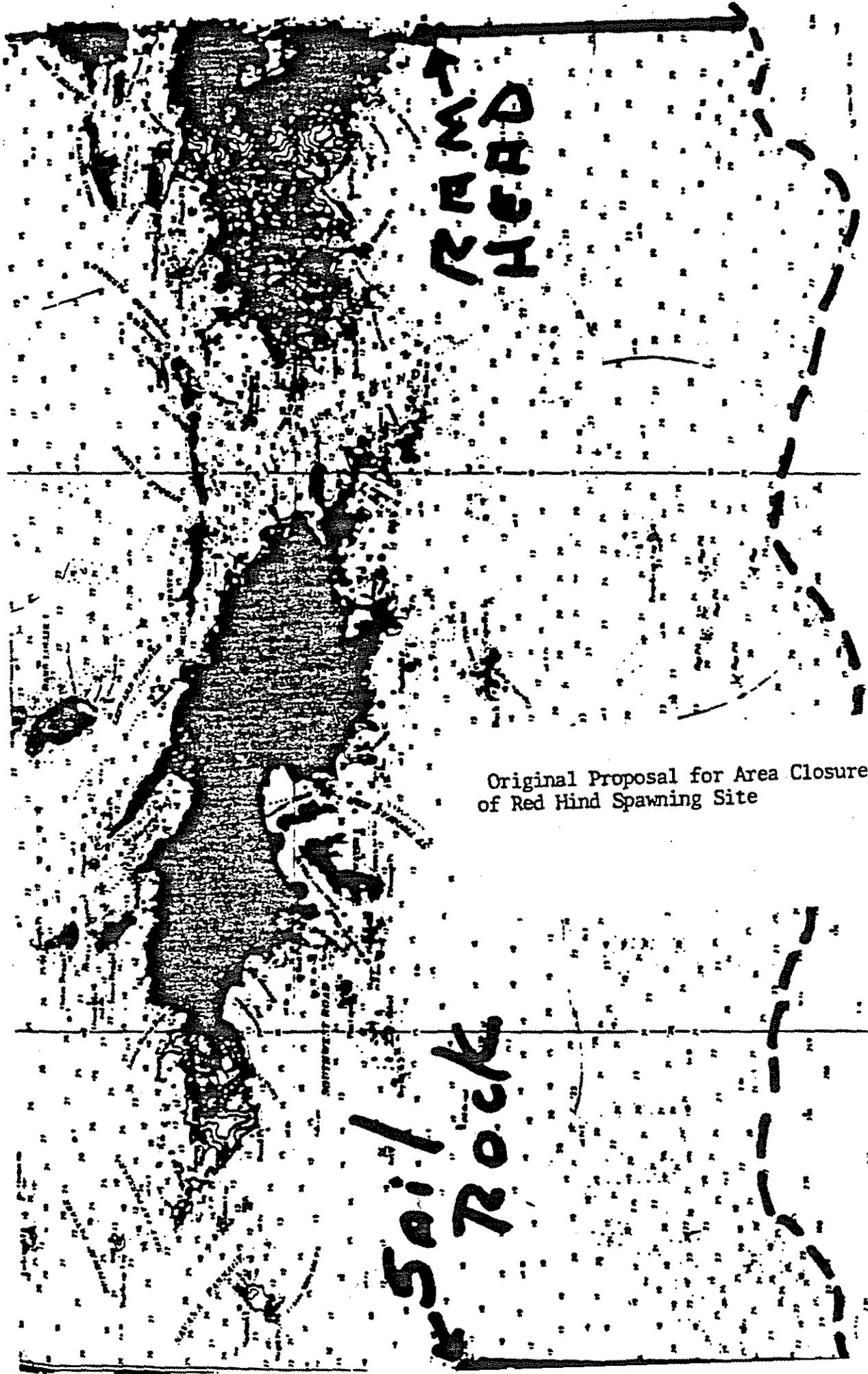
JOINS CHART 25630 (Nominally CGCS 804)



Map for Adopted Area Closure of Spawning Sites of the Red Hind

(Reference: Chart 25641)

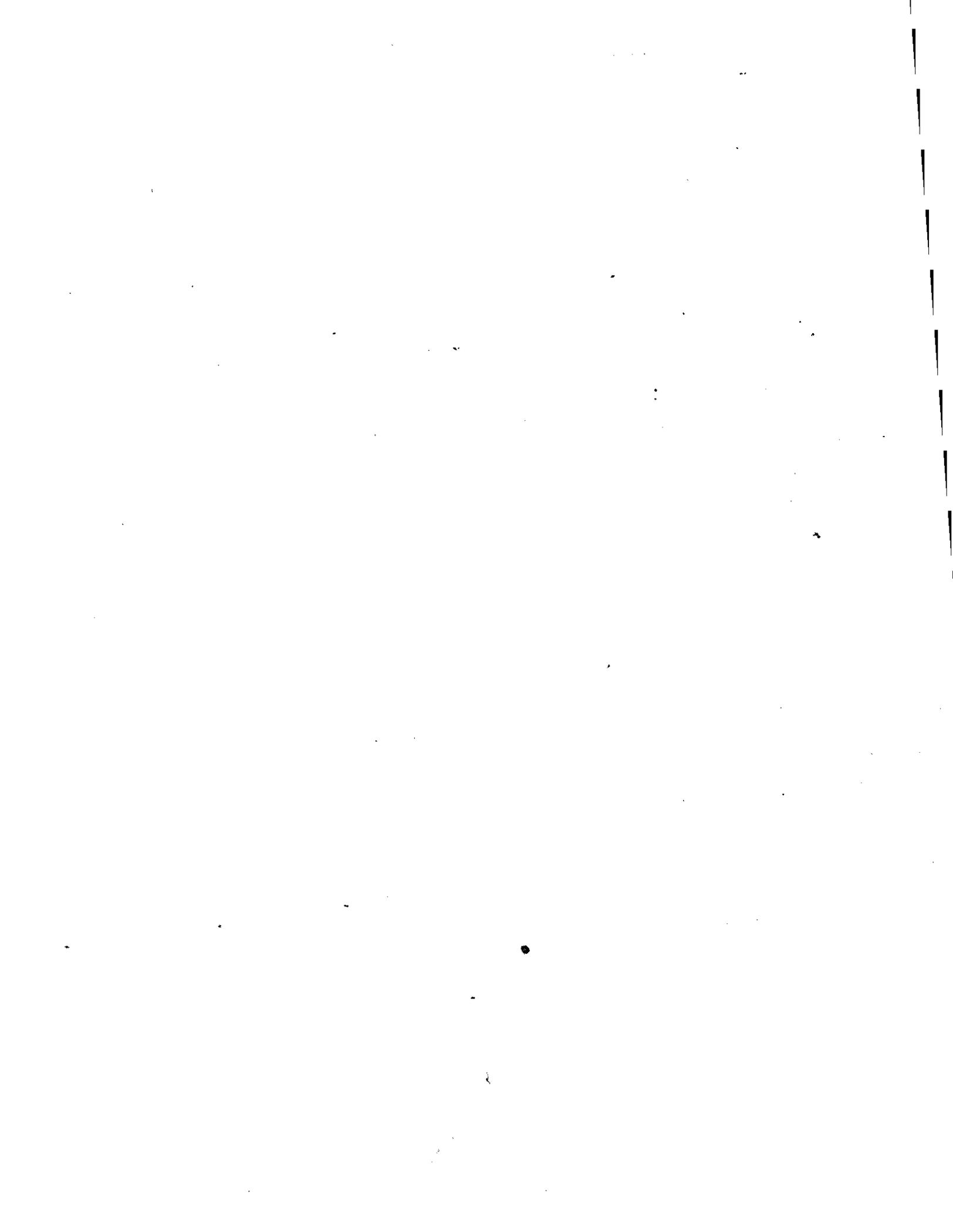
ST. THOMAS - ST. JOHN



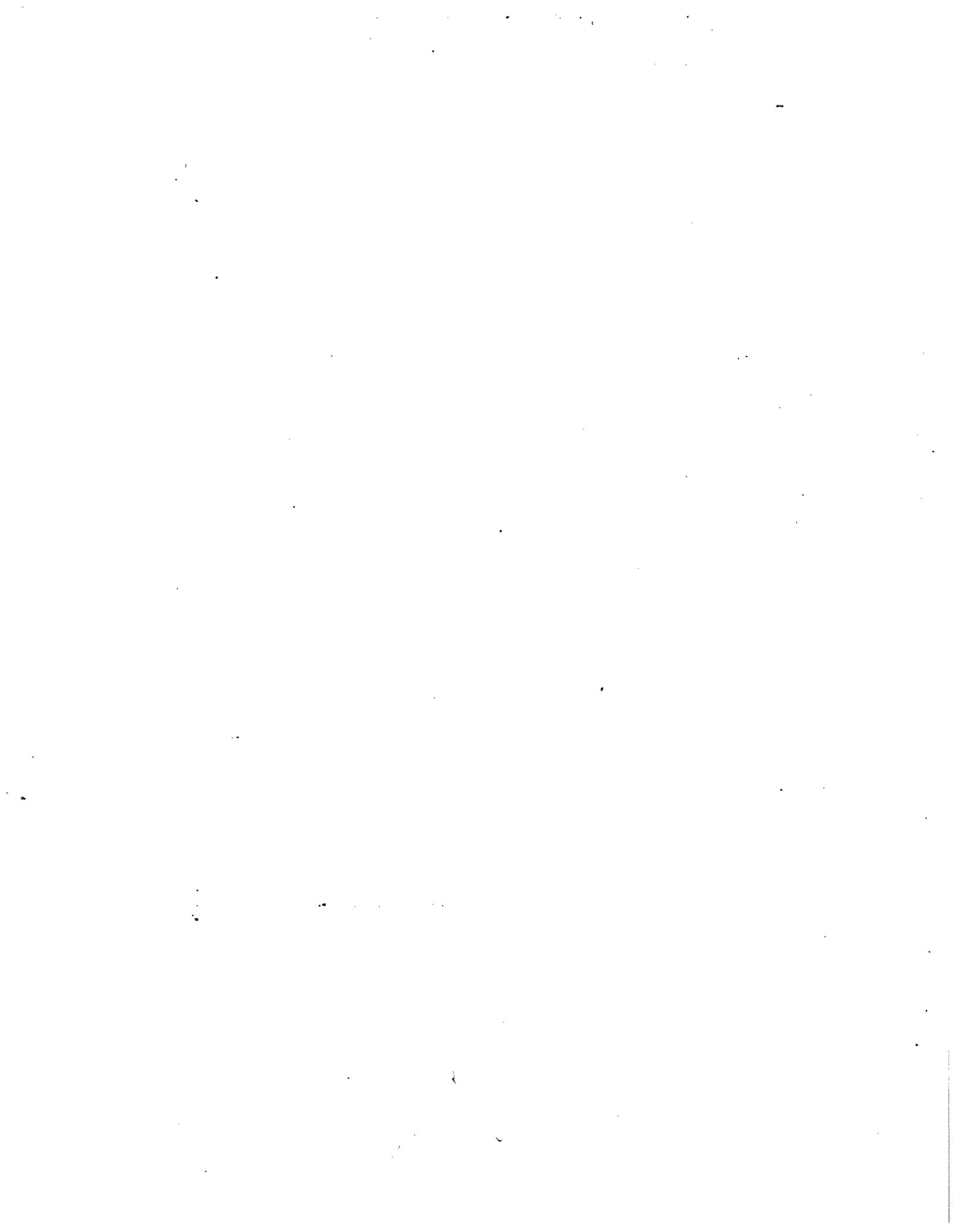
SAIL ROCK

RED HIND SPAWNING SITE

Original Proposal for Area Closure of Red Hind Spawning Site

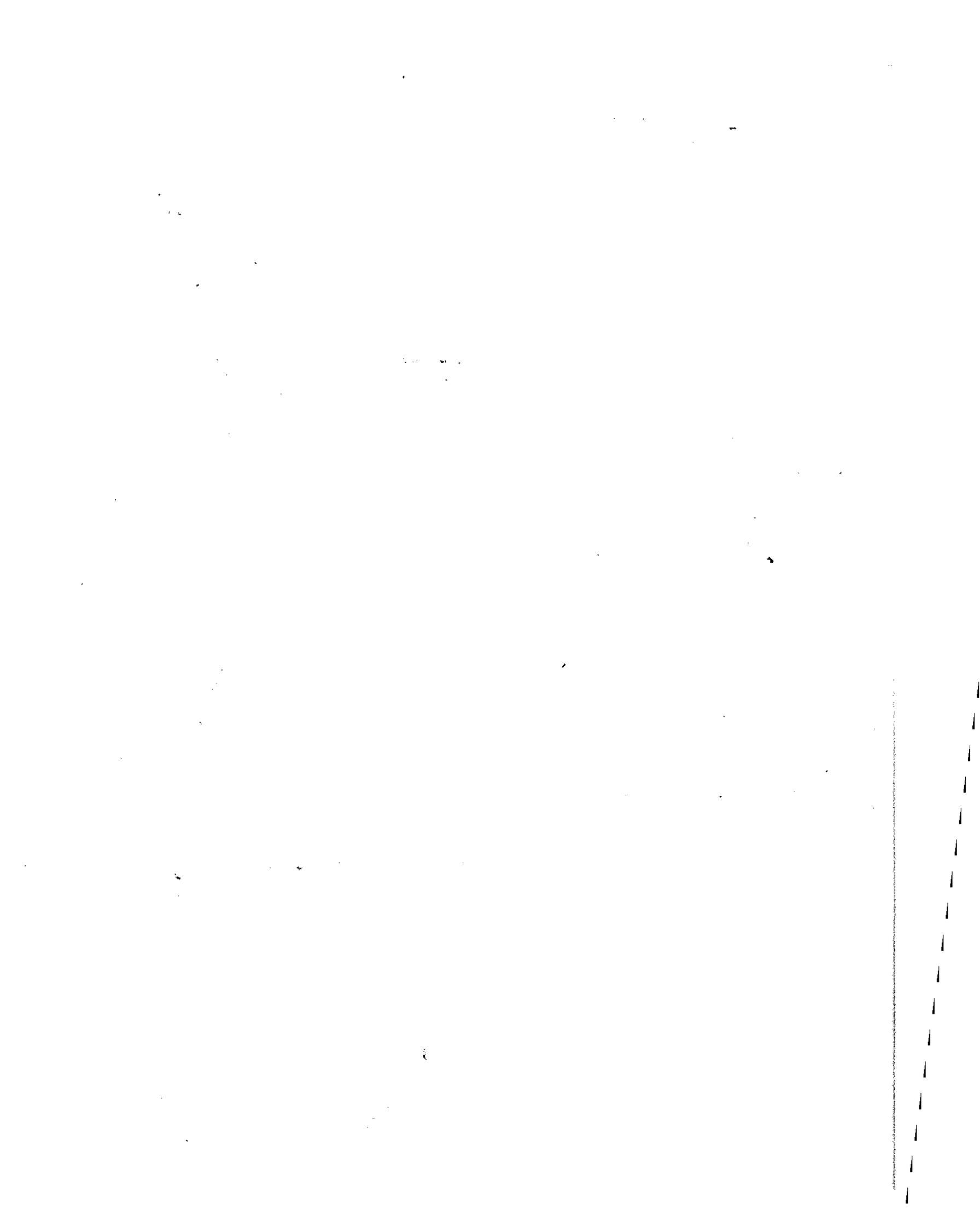


APPENDIX B



**HABITAT SECTION FOR THE
AMENDMENT NUMBER 1 TO THE SHALLOW
WATER REEF FISH FISHERY
MANAGEMENT PLAN**

4.2	Description of habitat of the stock(s) comprising the management unit.....	1
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4.2 Description of habitat of the stock(s) comprising the management unit.

This management plan covers inhabited and uninhabited islands in Puerto Rico and the U.S. Virgin Islands (USVI). The principal islands are: Puerto Rico, Culebra, Vieques, Mona, Monito, Desecheo and Culebrita. Puerto Rico has about 380 miles of coastline. The USVI include St. Thomas, St. John, St. Croix and several uninhabited smaller islands. These islands have a combined coastline of about 234 miles.

About thirty different bottom types are found around Puerto Rico and about fifty around the USVI (CFMC, 1984). The bottom types vary with depth as shown in Table 4.1 and consist of combinations of gravel, rock, sand, mud, and clay. Many of the hard bottom areas consist of coral and non-coral reefs. Nearshore, coral reefs are common. Inshore of the reefs the dominant tidal wetlands are seagrasses and mangroves (Table 4.2). Acting together these coastal areas provide food, habitat, and water quality maintenance functions that support the areas important fisheries.

The wetland habitats (i.e., mangroves) interact to protect each other. The reef are efficient wave energy dissipators and provide the shelter required for establishment of seagrass and mangrove habitats. Mangrove fringes trap fine sediments that would otherwise be carried into reef areas. Seagrasses bind and stabilize the sediments that could otherwise damage the reefs. Seagrass beds and reefs are also important sediment sources in these areas where external sediment inputs are very small (Cintron, 1987).

In view of the importance of reefs, seagrasses, and mangroves for fisheries production, the following habitat descriptions are provided:

Reefs

Coral reefs are among the most productive and diverse tropical marine habitats. Although highly productive, they develop best in shallow, well-lighted tropical waters which are usually poor in nutrients such as nitrates, ammonia and phosphates. Coral reef environments have among the highest rate of photosynthetic carbon fixation, nitrogen fixation, and limestone deposition of any ecosystem (Goureau et al., 1959).

Table 4.1
SUMMARY OF THE FREQUENCY DISTRIBUTION
OF TYPES OF OCEAN BOTTOMS IN THE P.R.
AND THE U.S.V.I. GEOLOGICAL PLATFORMS

Types of Bottoms	North					South					West					East*				
	Fathoms					Fathoms					Fathoms					Fathoms				
	10	10-19	20-99	100-299	300	10	10-19	20-99	100-299	300	10	10-19	20-99	100-299	300	10	10-19	20-99	100-299	300
Gravel	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hard	33	65	35	19	28	28	53	16	13	-	15	40	-	4	4	17	27	9	16	21
Rocky	17	9	12	1	-	26	22	32	3	12	43	16	3	-	4	15	10	2	-	-
Corals	8	7	9	5	-	2	-	11	8	-	3	12	56	37	34	19	15	12	9	-
Reefs	-	-	-	-	-	33	-	-	-	-	21	-	-	-	-	41	-	-	-	-
Sticky	-	2	-	-	-	5	5	-	-	-	10	20	-	-	-	2	-	-	-	-
Sand & Hard s.	-	9	4	-	-	-	8	5	-	-	-	-	-	-	-	-	12	7	-	-
Soft	-	2	-	-	-	-	8	-	-	-	-	4	-	-	-	-	-	-	-	-
Sand Corals	-	-	-	-	-	-	1	-	5	4	-	8	-	3	4	-	10	-	5	9
White Sand (Coral & Gravel)	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	13	-	10	17
Hard Corals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-	-
Gray Sand	-	-	22	9	3	-	-	5	5	-	-	-	21	22	22	-	-	23	12	6
Sand Shell	-	-	3	-	-	-	-	10	-	-	-	-	1	-	-	-	-	3	-	-
Mud (various)	-	-	6	60	56	-	-	21	63	20	-	-	-	3	4	-	-	-	12	9
Yellow Clay	-	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-	2

* Includes U.S. Virgin Islands

gravel = small stones and pebbles mixed with sand
hard = unyielding to pressure
rocky = consisting of rock
sticky = covered with viscid matter
soft = yielding readily to touch, smooth
mud = wet soft earth, or earthy matter

Source:
Caribbean Fishery Management Council, 1984. Frequency Distribution of Types of Ocean Bottoms in the Puerto Rico and U.S. Virgin Islands Geological Platforms.

TABLE 4.2

**Areal Extent (in hectares) of Marine Biotopes for
Coastal Areas of Puerto Rico and the U.S. Virgin Islands¹**

	Vieques	Culebra	P.R. ²	St. Thomas	St. John
Lagoons	1,295	68	2,069	---	---
Mangroves	395	345	3,580	---	---
Shallow sand	686	161	7,327	512	616
Deep sand	6,440	2,179	---	---	---
Shallow seagrasses	378	125	5,102	597	418
Shallow coral reefs	1,669	---	---	---	---
Deeper seagrasses and coral assemblages	21,838	---	---	---	669
Other coral reef areas	---	---	3,230	---	---
Reef-flat areas	---	377	---	---	---
Fringing reefs	---	---	409	---	---
Other reef areas	---	436	---	---	---
Inshore water	---	316	33,595	---	---
Turbid water	1,906	---	245	---	---
Shelf water	---	---	99,272	---	6,637
Cloud and cloud shadows	---	---	2,247	---	---

The ecological importance of coral reefs is well documented (Goenaga and Cintron, 1979). Many fish species and crustaceans of commercial and recreational value depend on coral reefs during some or all their life stages. They provide a buffer against shoreline erosion and influence the deposition and maintenance of sand on the beaches which they protect. The sand in these beaches originates principally from the reefs.

¹ This table is a summary of information presented in "Thematic Mapping of the Coastal Marine Environments of Puerto Rico and the U.S. Virgin Islands" by Roy A. Armstrong.

² These numbers correspond only to the main island of Puerto Rico.

Seagrasses

Important seagrasses of the Caribbean Region include turtlegrass (Thalassia testudinum), shoal grass (Halodule wrightii), manatee grass (Syringodium filiforme), Halophila baillonis, and Halophila engelmanni. Turtlegrass, however, is the most abundant in the coastal waters of the Gulf of Mexico and the Caribbean Sea (Buesa, 1974). These plants grow on sand or mud bottoms, from the shoreline to depths of 20 to 30 feet, depending on the species and sunlight penetration (Stephens, 1966). In the clear waters of the USVI, turtlegrass beds have been found at depths of 43 feet (Randall, 1965).

Seagrass leaves are the primary food source for a variety of organisms that include some fish, sirenians, turtles, sea urchins, gastropods, amphipods and other invertebrates. The great number of species that feed on seagrass leaves or their epiphytes, make them a unique and important resource (Ogden, 1976). Turtlegrass leaves provide a substrate for more than 100 species of algae. Other organisms (crustaceans, hydrozoans, snails) live on the blades. The beds themselves provide shelter and nursery grounds for larvae and juveniles of several fish and invertebrate species such as grunts, wrasses, parrotfish and snappers and conch (Stephens, 1966). More than one hundred species are known to rely on turtlegrass beds for protection and food (Croze et al., 1975).

Seagrass meadows are important in controlling and reducing erosion they trap and consolidate bottom sediments with their extensive root and rhizome network. They also accumulate organic matter that is, in turn, utilized by resident species.

Mangroves

Mangroves inhabit low energy intertidal areas in Puerto Rico and the USVI (Cintron, 1987). The four species found here are the red mangrove (Rhizophora mangle), black mangrove (Avicennia germinans), white mangrove (Laguncularia racemosa), and buttonwood (Conocarpus erecta). In general, mangroves form fairly uniform forests dominated by a single species. In some instances all four species may be present in a location and segregate among themselves and other wetland plants based on as elevation, and substrate suitability, salinity, availability of sediments and nutrients, and seed source availability. Mangrove forests are highly productive and support complex assemblages of marine plants and animals.

Important inhabitant of mangrove wetlands are: invertebrates, sponges, crabs, tunicates, bivalves (oysters), and lobsters; fish, grunts, snappers, parrotfish, barracuda, eels, surgeonfish, doctorfish, tangs; algae, many species of red and green algae.

A significant amount of the plants' net production is incorporated into woody tissues, roots, leaf tissues and fruit. Part of this

productivity is exported as detrital material and eventually enters the marine food web. In mangrove areas where access to fish and invertebrates is available, considerable nursery and forage habitat is provided. Massive juvenile mullet and shrimp migrations into and out of mangroves are well known. These migrations link mangroves directly to other coastal systems such as coral reefs, and seagrass beds.

4.2.1. Habitat condition.

All of Puerto Rico's nearshore fringing reefs have been impacted adversely to some degree by man's actions, increased sedimentation, raw sewage discharges, marina construction, sand extraction, and thermal water discharges are characteristics of the activities known to damage reefs (Map 4.1).

Overall the nearshore area is in good condition, but local problem areas exist. For example, water quality may be reduced in areas affected by the river plumes. Local disturbances occur in association with coastal development and dredged material disposal.

The U.S. Virgin Islands nearshore reefs have been degraded during recent decades due to sedimentation, boat groundings, storm damage and overfishing. The seagrass beds have been reduced in size due to anchor damage from ever increasing boat activity.

The estuarine nursery areas appear to be the most impacted of the habitats used by fishery resources. Natural and man-induced alterations of this fragile environment have altered freshwater inflow and removed much of the area that would be considered suitable habitat. The amount of remaining wetlands suitable for fishery production has not been quantified; however, Alexander et al. (1986) estimate that for the last 25 years, coastal wetlands in the coterminous United States have been depleted at an average rate of 20,000 acres per year.

Estuaries have been among the areas most impacted by water quality degradation. Although numerous reports and publications exist (e.g., NOAA, 1987), a complete list of chemical contaminants, their concentrations, or effects is not available. A comprehensive inventory assessing the seriousness of pollution of Puerto Rico and the USVI's estuaries is needed. In St. Thomas, Mangrove Lagoon receives approximately 170,000 gpd of "treated sewage" which has diminished its capacity of acting as a nursery ground for different species. Similar problems exist in other areas such as Red Hook.

4.2.1.1 - Habitats of particular concern (HPC) are those which are essential to the life cycle of important species. Since Puerto Rico and the USVI estuaries are important to many fishery species, particularly as nursery grounds, we are generically identifying them as HPCs. Nearshore reefs and other hard bottom areas also are considered HPCs because of their fishery value. A great deal of

life history work needs to be done in order to adequately identify HPCs.

4.2.1.2 - Conditions that restrict commercial and recreational fish harvest presently do not exist. Stout (1980), has found low levels of DDT, PCB, endrin, and dieldrin organochlorines in fish such as red and black grouper, gag, and red snapper. Should high levels of contaminants be found in fishery resources around the Islands, the edibility as well as marketability of fishery resources could be affected adversely.

Traditionally the northern part of the Caribbean has had a serious problem with ciguatera poisoning.³ Caused by a tiny benthic dinoflagellate organism, ciguatera is widespread in a tropical belt extending worldwide between latitudes 35 degrees North and 35 degrees South. Curiously, occurrence of poisonings is highly variable. Fish on one side of an island have been found to be toxic, while those caught on the other side of the same island are often harmless. Scientists believe that the poison-producing organisms routinely exist in the world's coral reefs but multiply when the environment is disturbed.

In the U.S. Virgin Islands and Puerto Rico, some species of fish are more likely to be ciguatoxic than others. As a family, the carangids or jacks contain the most species prone to ciguatera, they are followed by the snappers and groupers. (For further information see Section 6.4 in the Fishery Management Plan for the Shallow-Water Reef Fishery of Puerto Rico and the U.S. Virgin Islands)

4.2.2 Habitat threats.

A direct quantitative relationship between fishery production and habitat has not been developed for the habitats addressed in this document. Accordingly, the degree that habitat alterations have affected fishery production is unknown. Turner and Boesch (1987) assembled and examined the relationship between wetland abundance and the yield of fishery species dependent on coastal bays and estuaries.

Natural Factors

Factors affecting habitat quantity and quality in the Islands are discussed below.

³ A survey of the emergency room records of 10 hospitals in five areas of Puerto Rico from 1980-1982 disclosed 122 apparent ciguatera cases involving 212 individuals. Assuming that these records represented 10-15 percent of the total number of cases during this period, an estimate of 8-11 cases per 10,000 residents per year was calculated (Escalona de Motta, et. al., 1986).

Flooding

Although the southern part of the island of Puerto Rico receives less rainfall than northern or eastern areas, the coral reefs located in the south are affected to a larger extent by flooding and runoff. Heavy rainfall coupled with inadequate preparation of construction sites (poor soil conservation practices) are the reasons why large amounts of silt and fine particles are transported towards the coast where the accumulation on reefs, mangroves and seagrasses may cause severe damage to the ecosystem.

Erosion

Erosion is the transport of sediment from one place to another. Although a certain degree of erosion is natural, severe erosion may result from large-scale disturbances of the earth's top layers. Island erosion is exacerbated by the short distances between interior and the coastal areas.

Tropical Disturbances

The passage of storms and hurricanes through mangroves, coral reefs and seagrasses can cause uprooting, defoliation, and deposition of sediment and other materials. This stress can eliminate vegetation from some areas. For mangroves, rapid re-establishment by seedlings occurs on suitable habitats. Seagrasses may recover quickly if damage is slight and the substrate has not been severely altered. Some storms may benefit mangroves by removing accumulations of materials that choke drainage ways and by reopening salt ponds. They also are important in the redistribution of accumulated materials. The impact on coral reefs depends on the intensity of the storm and on the distance from its center.

Hypersalinity

Hypersalinity affects mainly mangroves. The accumulation of high salt concentrations through evaporation is a chronic natural stressor in dry areas. When evaporation exceeds rainfall throughout the year, tidal action and evaporation accumulate salt in certain areas of the forest. Eventually the soil salinity increases beyond the tolerance of the mangroves and a barren zone develops. Mangrove coverage in these areas is unstable, with coverage fluctuating between expansion following storms or a succession of very wet years, and contraction triggered by drought or silting of drainage ways. During different periods, an area may undergo several changes and subsequently provide food and other benefits to resident and migratory species.

Reef Diseases

Reef corals in the Islands are affected by diseases such as black,

and white band diseases and bleaching. White band disease is serious in areas such as Buck Island in St. Croix where it is widespread and significant. Black band disease is more limited in its occurrence and has little overall effect. The bleaching occurrences are intermittent and of minor effect in the U.S. Virgin Islands.

Human-related Factors

The amount and rate of human-induced wetland losses have not been quantified. These losses are controlled by state and/or federal regulatory agencies. The Environmental Protection Agency (EPA) for example, has the responsibility to regulate wastewater discharges and the Corps of Engineers (COE) manages a program that regulates physical wetland alterations (dredging, filling, impounding, etc.). The amount of fishery habitat affected by EPA's program is unknown, but data on the effect of the COE's regulatory program in the Southeast are available. The National Marine Fisheries Service (NMFS) tracked habitat alterations involved in 7,408 water development projects proposed between 1981-1987. Almost 300,000 acres of wetland losses were proposed in the southeast, including the Islands (Mager and Ruebsamen, 1988). This provides an indication of the significance of the COE's program and the potential cumulative nature of wetland losses.

Water quality degradation also is a threat to fishery habitat. This results from the discharge of petrochemicals, sewage, heavy metals, and other chemicals in industrial and chemical wastes and from non-point-source discharges such as from septic tanks and parking lots. Urban and agricultural runoff can be laden with toxic substances such as petrochemicals, pesticides, heavy metals, and herbicides. The aerial spraying of large areas for mosquito control results in the addition of pesticides to estuarine waters. These pesticides are extremely toxic to larval aquatic organisms. Thermal effluent from steam and nuclear generating facilities using "once-through" cooling can raise the temperature of estuarine waters making them less suitable or uninhabitable, especially during summer (López, 1979). The discharge of sewage also can create problems for the organisms that reside in the estuaries where the discharge occurs.

Offshore species, may be affected adversely due to the discharge of petroleum products. Malins (1982) reviewed laboratory experiments describing the deleterious effects of petroleum fractions on fish. Grizzle (1981) and Pierce et al. (1980) have documented that wild fish have been injured by petroleum pollutants. Grizzle (1983) suggested that larger liver weights in fish collected in the vicinity of oil and gas production platforms versus control reefs could have been caused by increased toxicant levels near the platforms. He also suspected that severe gill lamella epithelium hyperplasia and edema in red snapper, vermilion snapper, wenchman, sash flounder, and creole fish were caused by toxicants near the

platforms. These types of lesions are consistent with toxicosis and their prevalence and severity increased near drilling platforms.

The destruction of reefs (natural and man-made) or other hard bottom areas also may prove deleterious to the species that use these habitats. Human impacts on reef habitat result from activities such as pollution, dredging and treasure salvage, boat anchor damage, fishing and diving related perturbations, and petroleum hydrocarbon discharges (Jaap, 1984).

According to Lindall et al. (1979) the major man-induced activities that impact environmental gradients in the estuarine zone are:

1. construction and maintenance of navigation channels;
2. discharges from wastewater plants and industries;
3. dredge and fill for land use development;
4. agricultural runoff;
5. ditching, draining, or impounding wetlands;
6. oil spills;
7. thermal discharges;
8. mining, particularly for phosphate, and petroleum;
9. entrainment and impingement from electric power plants;
10. dams;
11. marinas;
12. alteration of freshwater inflows to estuaries;
13. saltwater intrusion; and
14. non-point-source discharges of contaminants.

Marinas bring recreational boat traffic, hence the shallow water of estuaries, the extremely soft sediments, and the turbulence caused by outboard motors (especially when operated at high speeds) results in highly turbid waters which transport sediment to reef areas.

All of the Island's estuaries have been impacted to some degree by one or more of the above activities. The more significant man-induced impacts to the coastal areas around the islands are described below (Map 4.1).

Sedimentation

Sediment resulting from erosion and runoff inevitably causes damage to coastal waters. Erosion from agricultural and development practices in coastal areas is a principal factor. Sedimentation is increased by unsuitable agricultural practices, overgrazing of rangeland, and indiscriminate deforestation, all of which help remove the leafy humus base that protects the soil. Rapid urban development in many parts of the islands has also caused major erosion and sedimentation; improper cutting and grading practices at construction sites accelerate erosion, as do poor sloping and lack of revegetation on cuts, fills, and ditches.

Sedimentation affects coral abundance, growth and distribution. Whether natural or man-induced, it is detrimental to corals (Dodge and Vaisnys, 1977). Although most corals have effective means of shedding sediments which have fallen on their tissues, sedimentation and turbidity will decrease available light which is needed for photosynthetic fixation of calcium carbonate (Lasker, 1980).

In addition to turbidity increases, sedimentation may adversely affect reef corals by smothering, increasing energy expenditure in particle rejection, and increasing potential for bacterial infection. Abrasion, creation of conditions unsuitable for larval settlement, alteration of feeding habits, alteration of food supplies such as plankton, and alteration of species composition on reefs may also occur.

With increased sedimentation and turbidity, mangroves are degraded through the loss of floral and faunal communities found on the prop roots, this in turn, reduces habitat quality for juvenile fish.

Seagrasses are similarly affected by reduced light transmission that is needed for photosynthesis and increased epiphytic colonization. Because they are an important food source for conch, turtles and other species, loss of seagrasses will severely impact the life cycles of these species.

Sewage Disposal

Nutrient enrichment (eutrophication) seriously stresses wetlands and associated fauna. Pollution by fecal bacteria and viral agents also pose serious health hazards. Commercially valuable species may become vectors of serious water borne diseases and toxic substances which can be incorporated into the food web. Nutrient enrichment of coastal waters, mainly by the dumping of poorly treated water or raw sewage directly into the ocean or into rivers and creeks, stresses mangroves and seagrass and/or their associated biota. Coral reefs, however, can be the most seriously impacted. High nutrient concentrations stimulate high phytoplankton production as well as high benthic algae production (Birkeland, 1977). This will favor the establishment of organisms that compete with or damage corals (such as burrowing bivalves and boring algae and sponges). High recruitment by benthic algae would reduce the substrate available for coral larvae settlement and may result in the young corals being overgrown (Birkeland, 1977). Heavy metal accumulations in sediment and reef biota near population centers also have been noted (Manker, 1975). Disposal of wastes may further create local problems.

Oil Pollution

The most common sources of oil contamination of coastal waters are marinas, refineries, bilge pumping, deballasting of tankers, ship

accidents, and vessel operations. During 1975, some 150 oil spills occurred in Puerto Rican waters. Major spills occurred in 1969, when the tanker Ocean Eagle broke up in San Juan Bay, and in 1974 when the Zocolocotronis ran aground off the south coast.

Damage caused by oil spills depends on the quantity and type of oil, the degree to which it has been refined, wind and wave conditions, and the location of the spill. The most serious damage normally occurs in near-shore waters and enclosed bays and estuaries.

Mangroves are extremely sensitive to oil pollution. Oil fouls the intertidal root region where gas exchange takes place. A heavy coating of oil always leads to death (Cintron, 1987). In addition to the mechanical damage caused by coating, oil may be toxic and poisonous to the trees. Since the toxic fractions come in contact with the roots, where vital functions take place, toxic products cause rapid mortality. Residual amounts of the spilled product may remain trapped in the sediment for long periods. As a result, natural restoration may be very slow, if at all. There are no effective ways to clean oiled mangroves because efforts are labor intensive, costly, and inefficient. Only protection by booming can reduce damages. Effects of oil on reefs and seagrasses develop as soluble components of oil become "balled" with sand and sink.

Channelization

Diversion of fresh water flows causes nutrient deprivation and development of stressed, nutrient limited wetland vegetation. Recovery is not possible and massive die-offs may occur unless the fresh water source is restored. Both white and black mangrove species are susceptible because of their high dependence on fresh water flow.

Impoundment

Impoundments may occur when roads are built through wetlands and provisions are not made to preserve water flows. In the Islands, this practice commonly affects mangrove wetlands. Impounding may cause water levels to rise, suffocating the trees. The results of impoundment is rapid because the tidal range is small and evaporation is high. In some cases when dikes are abandoned, partial recovery may occur. The Salt River in St. Croix is an example. On the other hand, Martin Marrietta in St. Croix was impounded and turned into a sedimentation basin; recolonization or restoration of this area is not likely (Cintron, 1987).

Solid Waste Disposal

Solid waste disposal is a major problem both in the Virgin Islands and in Puerto Rico. Excessive waste disposal due to consumption practices and limited land disposal sites have lead to lax

practices. Not only are coastal areas used for the dumping of wastes (domestic and industrial) but, as previously stated, the limited size of the islands creates an inherent problem regarding solid waste disposal.

4.2.3 Habitat information needs.

The vast majority of our highly-valued living marine resources require healthy environments. Declines in commercially and recreationally important fisheries may be attributed to over-fishing, loss of habitat, pollution, disease, environmental alteration, and natural variability of the stocks. Effective fisheries management requires an improved understanding of these factors.

A chief concern regarding living marine resources is the effect of human activities on fishery productivity. Research is needed about the elements that are affecting energy flow within ecosystems. This understanding of ecological processes can then be combined with information on the health, distribution, and abundance of ecologically important organisms. By understanding the ecology and status of fishery stocks, resource managers will be better able to manage estuarine dependent living marine resources.

The following research needs must be addressed in order for state, federal, and private research efforts to develop measures needed to better manage fishery resources and their habitat:

1. Identify optimum coastal habitat;
2. Identify environmental and habitat conditions that limit production;
3. Focus more on life history studies that will define the critical fisheries habitats for food, cover, spawning, nursery areas, and migration routes;
4. Quantify the relationships between fishery production and habitat (e.g., what are the key trophic pathways in the ecosystem, and how does the flux of essential nutrients, carbon compounds, and energy through these systems influence fisheries productivity?);
5. Determine the relative effects of fishing, pollution, and natural mortality on fishery population dynamics. Also determine the effects of cumulative habitat loss on fisheries productivity and economic value; and
6. Determine habitat of particular concern and means for enhancing and/or maintaining critical habitats.

4.2.4 Habitat conservation programs.

Involvement by federal and state agencies in habitat conservation programs are noted as follows.

Office of Coastal Zone Management (OCZM), Marine Sanctuaries Program (MSP), NOAA. This program manages and funds the marine sanctuaries program (MSP). On-site management and enforcement are generally delegated to the states through special agreements. Funding for research and management is arranged through grants. This program was authorized under Title III of the Marine Protection Research and Sanctuaries Act (MPRSA) of 1972. Its purpose is to preserve or restore the conservation, recreational, ecological, or aesthetic values of localized areas "... as far seaward as the outer edge of the continental shelf, ...(and in) other coastal waters whether the tide ebbs and flows ..." (MPRSA, Section 302a). In effect, the MSP is a coastal water counterpart to the more familiar national park, forest, wildlife refuge, and wilderness systems. Site management and administrative responsibility for a sanctuary may either be retained by OCZM or delegated with necessary funding support to other appropriate management units.

National Marine Fisheries Service. The enactment of the Magnuson Act provides for exclusive management of fisheries seaward of state jurisdiction. This includes both specific fishery stocks and their habitat. The process for developing FMPs is highly complex. It includes plan development by various procedures through fisheries management councils. NMFS implements approved plans. The Coast Guard (CG), NMFS, and some states under agreements, enforce regulations implemented by FMPs. FMPs for shallow water reef fish and Caribbean spiny lobster are in effect.

National Park Service (NPS). National parks and monuments are under the jurisdiction of NPS. Management, enforcement, and research are accomplished in house. The system of national parks and monuments operated by the NPS, in the broadest terms, preserve for all times scenic beauty, wilderness, native wildlife, indigenous plant life and areas of scientific significance and antiquity {16 U.S.C. (1)}.

The U.S. Virgin Islands presently have two national parks; St. John and Buck Island.

Minerals Management Service (MMS). This agency has jurisdiction over mineral and petroleum resources on the continental shelf. The MMS along with the U.S. Geological Survey is charged with administering mineral exploration and development on the Outer Continental Shelf (OCS), pursuant to the OCS Lands Act (OCSLA), as amended in 1978 [43 U.S.C. (1331 et seq.)]. The MMS serves as the administrative agency for leasing submerged federal lands.

Fish and Wildlife Service (FWS). FWS assists with environmental impact review, develops biological resource evaluations, and administers the endangered species program with the NMFS. The FWS also manages national refuges for wildlife.

Geological Survey (USGS). The USGS conducts considerable research in nearshore areas and assists or cooperates with other institutions and agencies to facilitate logistics and support of research. The USGS also is charged with supervising mineral development operations on the OCS. The USGS ensures oil company compliance with regulations and lease stipulations once a lease is sold. This represents a key management authority for ensuring protection of nearshore communities. Although these authorities are not comprehensive, they are significant because of the widespread interest in current OCS oil and gas development and its potential impacts.

Coast Guard. The 1978 Waterways Safety Act charges the CG with marine environmental protection. The CG is the general enforcement agency for all marine activity in the federal zone. Among the duties are enforcement of sanctuary and fishery management regulations, managing vessel salvage, and coordinating oil spill cleanup operations at sea.

U.S. Army Corps of Engineers. The COE contracts and regulates coastal engineering projects, particularly harbor dredging and beach renourishment projects. The COE also reviews and is the permitting agency for coastal development projects, artificial reefs, and offshore structures.

Environmental Protection Agency. This agency has general responsibility for controlling air and water pollution. Disposal of hazardous wastes and point-source discharge permitting are EPA functions. Certain mineral and petroleum exploration and production activities are managed by EPA. Environmental research germane to waste disposal and pollution also are funded.

Federal environmental agencies such as the NMFS, MMS, FWS, and the EPA also analyze projects proposing inshore and offshore alterations for potential impacts on resources under their purview. Recommendations resulting from these analyses are provided to the permitting agencies (the COE for physical alterations in inshore waters and territorial sea, the MMS for physical alterations in the OCS or the offshore Exclusive Economic Zone (EEZ) and EPA for chemical alterations). Even though the COE issues permits for oil and gas structures in the EEZ, they only consider navigation and national defense impacts, thus leaving the rest to the Department of Interior, in a nationwide general permit.

EPA is the permitting agency for chemical discharges under the National Pollution Discharge Elimination System program of the Clean Water Act for chemicals used or produced in the Islands

(i.e., drilling mud, produced water or biocides) and then released, or under the Ocean Dumping Regulations of the Marine Protection, Research and Sanctuaries Act if the chemicals are transported into the Islands for the purpose of dumping. When discharge or dumping permits are proposed, federal and state fish and wildlife agencies may comment and advise under the Fish and Wildlife Coordination Act and the National Environmental Policy Act (NEPA). The CFMC may do likewise under the Magnuson Act and NEPA.

The proposed U.S.V.I. Territorial Marine Reserve System will protect a number of inshore grassbeds and coral reef areas which will hopefully serve as refuges for species which utilize them (Map 4.2). In addition, the government runs several terrestrial wildlife sanctuaries in offshore cays.

4.2.5 Habitat recommendations.

The fisheries of the Islands contribute to the food supply, economy, and health of the Nation, and provides recreational and economic opportunities. Continued existence of the fisheries is dependent upon the prudent management of all aspects of the fishery, including habitat. Accordingly, activities that adversely affect habitat will need to be addressed by the Councils. Increased productivity of stocks may not be possible without habitat maintenance and regulatory restrictions.

Recognizing that all species are dependent on the quantity and quality of their essential habitats, it is the policy of the Caribbean Fishery Management Council (CFMC) to protect, restore, and improve habitats upon which commercial and recreational marine fisheries depend, to increase their extent, and to improve their productive capacity for the benefit of the present and future generations. This policy shall be supported by the following three objectives:

1. To maintain the current quantity and productive capacity of habitats supporting important commercial and recreational fisheries, including their food base (This objective may be accomplished through the recommendation of no net loss and minimization of environmental degradation of existing habitat);

2. To restore and rehabilitate the productive capacity of habitats which have already been degraded; and

3. To create and develop productive habitats where increased fishery productivity will benefit society.

The CFMC has formed Habitat Committees and Advisory Panels for the Islands to address activities that may affect the habitat of fisheries under the Councils management. The Councils, pursuant to the Magnuson Act, will use existing authorities to support state and federal environmental agencies in their habitat conservation

Map 4.2

PROPOSED U.S.V.I. TERRITORIAL MARINE RESERVE SYSTEM



- ⊖ Seagrass Beds
 - ⊕ Coral Reefs
 - ⊙ Suggested Anchorages
- > No anchoring - No spearfishing

efforts and will directly engage the regulatory agencies on significant actions that may affect habitat. This may include commenting on specific actions, policies, or regulations that affect the habitat of managed species.

Public hearings and the building of administrative records may be conducted to assure an adequate disclosure of facts and public participation in actions that adversely affect habitat. The goal is to insure that habitat losses are avoided or minimized and that appropriate mitigation strategies and applicable research are supported.

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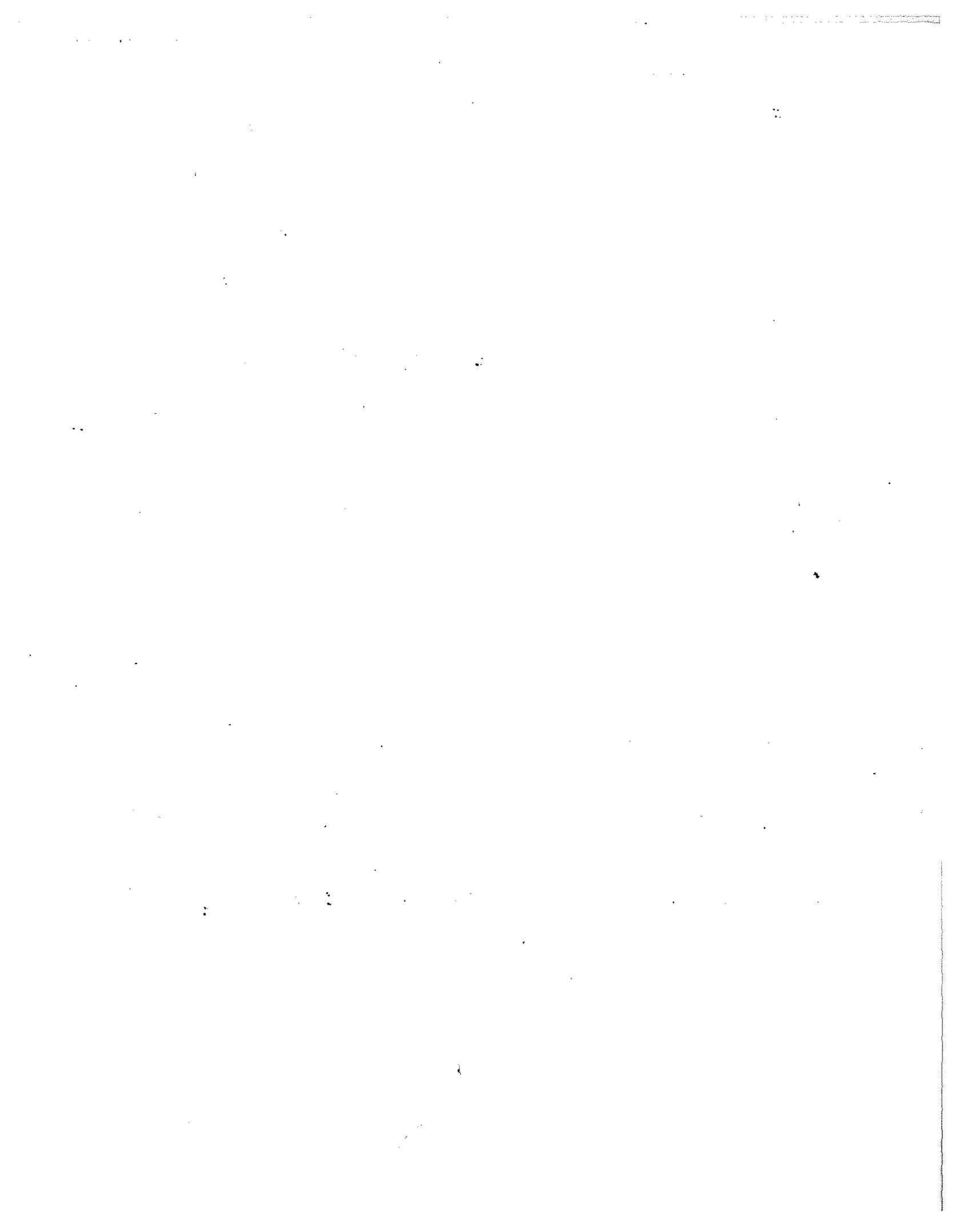
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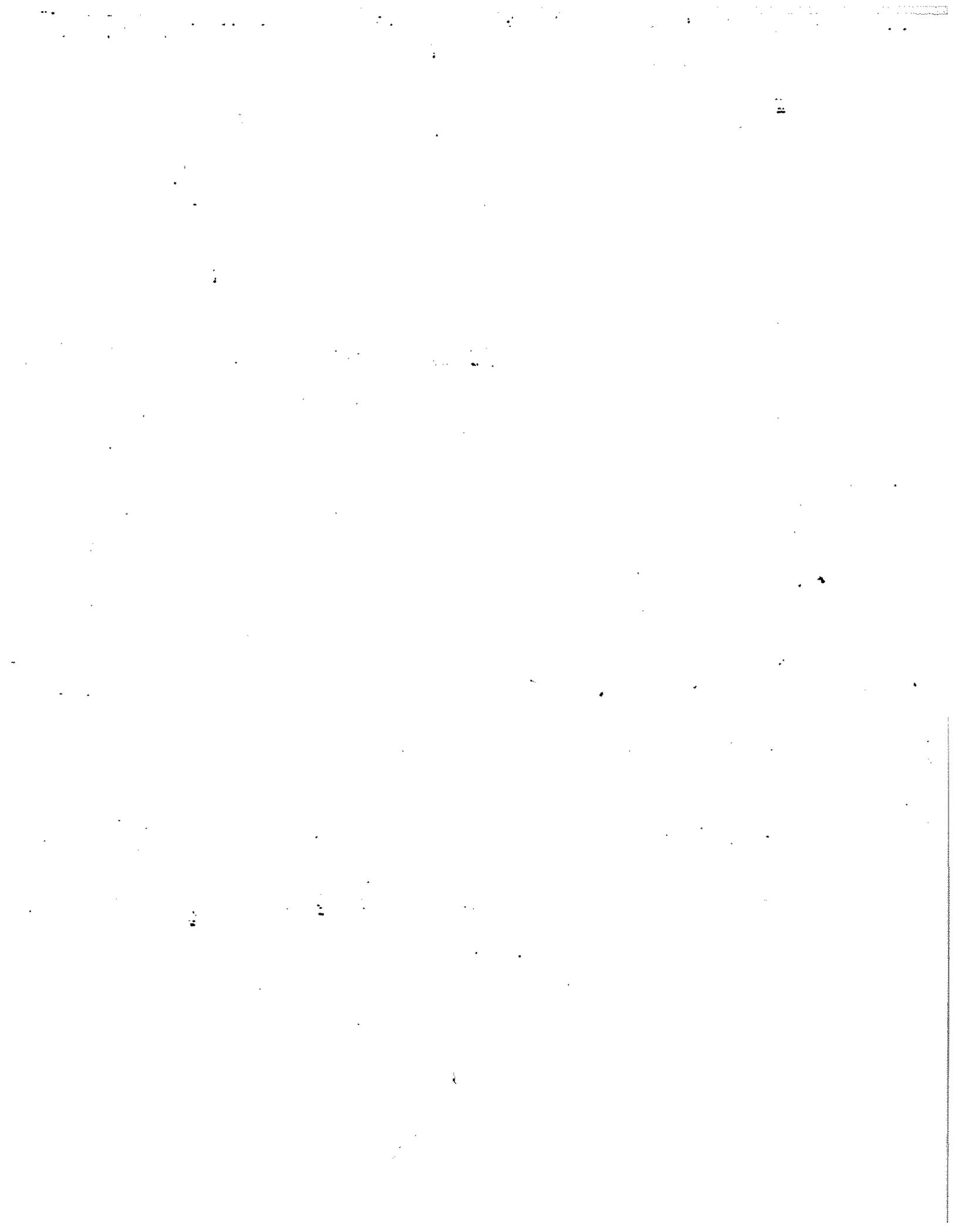
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APPENDIX C



CARIBBEAN FISHERY MANAGEMENT COUNCIL
Suite 1108 Banco de Ponce Building • Hato Rey, Puerto Rico 00918-2577
Telephones: FTS (809) 766-5926, 766-5927, 766-5928, Comm. (809) 753-8910

February 8, 1990

Ms. Patria Custodio
President
Puerto Rico Planning Board
P.O. Box 41119
San Juan, P.R. 00940

Dear Ms. Custodio:

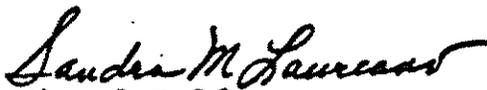
Enclosed are copies of Amendment Number 1 to the Fishery Management Plan for the Shallow-Water Reefish Fishery, Preliminary Environmental Assessment and Regulatory Impact Review, of Puerto Rico and the U.S. Virgin Islands of October 1989, and a copy of the Fishery Management Plan, Final Environmental Impact Statement, and Draft Regulatory Impact Review, for the Shallow-Water Reefish Fishery of Puerto Rico and the U.S. Virgin Islands of February 1985.

We are requesting a Certification of Consistency with the Virgin Islands Coastal Zone Management Program for our First Amendment. As stated under Section VII of the Amendment, we understand that the proposed fishery management system is consistent, to the maximum extent practicable, with the approved programs of the U.S. Virgin Islands.

It is very important that we receive this consistency determination before mid-April in order to submit the document to NMFS in May which will permit the red hind area closure due to begin in December 1990.

Most grateful for your cooperation.

Sincerely,


for Miguel Rolón
Executive Director



COMMONWEALTH OF PUERTO RICO
OFFICE OF THE GOVERNOR
PUERTO RICO PLANNING BOARD

Minillas Governmental Center, North Bldg.
De Diego Ave, Stop 22
P.O. Box 41119, San Juan, P.R. 00094-0985

CERTIFICATE OF PROJECT CONSISTENCY WITH THE
PUERTO RICO COASTAL MANAGEMENT PROGRAM

DATE: May 18, 1990

NAME OF APPLICANT: Caribbean Fishery Management Council
C/O Mr. Miguel A. Rolón, Executive Director

ADDRESS: Banco de Ponce
Suite 1108
Hato Rey, Puerto Rico 00918

PROJECT DESCRIPTION: First amendment to: Fishery Management Plan
for the Shallow-water Reefish Fishery for
Puerto Rico and the U.S. Virgin Islands.

PROJECT LOCATION: Coastal waters around Puerto Rico.

TYPE OF PROJECT: Federal activity
 Activity requiring a federal license or permit
 Federal assistance to State or Local Government

FEDERAL ADMINISTERING AGENCY: U.S. Department of Commerce,
National Marine Fisheries Service

PROGRAM IDENTIFICATION: 15 CFR Part 905

COASTAL ZONE APPLICATION IDENTIFIER: CZ-90-0302-100

CLEARINGHOUSE CERTIFICATION:

The Puerto Rico Planning Board, the designated state agency for administering Federal consistency procedures in Puerto Rico, CERTIFIES that it has received the notification and supporting documents related to the above project. As a result of an analysis of the comments by relevant agencies of the Government of Puerto Rico, the Planning Board concurs with objects to the consistency determination relating to the proposed project.

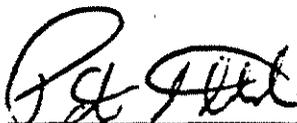
- 2 -

Coastal Zone Application
Identifier Number CZ-90-0302-100

COMMENTS:

The proposed project is consistent with the Puerto Rico Coastal Zone Management Program. The consulted agencies did not present objections to the amendments to the Fishery Management Plan during the granted review period.

PUERTO RICO PLANNING BOARD
EXECUTIVE ORDER 12372



Patria G. Custodio
Chairperson

cc: María M. Cassé, DNR (C-390-297-CZ)
F.W.S., Boquerón

CARIBBEAN FISHERY MANAGEMENT COUNCIL
Suite 1108 Banco de Ponce Building • Hato Rey, Puerto Rico 00918 2577
Telephones: FTS (809) 766-5926, 766-5927, 766-5928, Comm. (809) 753-6910

March 21, 1990

Honorable Alan Smith, Commissioner
Department of Conservation and Cultural Affairs
Government of the U.S. Virgin Islands
P.O. Box 4340, Charlotte Amalie
St. Thomas, U.S. Virgin Islands 00801

Dear Commissioner:

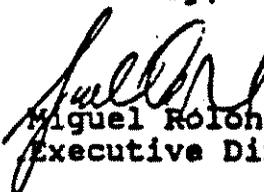
Enclosed are copies of Amendment Number 1 to the Fishery Management Plan for the Shallow-Water Reefish Fishery, Preliminary Environmental Assessment and Regulatory Impact Review, of Puerto Rico and the U.S. Virgin Islands of October 1989, and a copy of the Fishery Management Plan, Final Environmental Impact Statement, and Draft Regulatory Impact Review, for the Shallow-Water Reefish Fishery of Puerto Rico and the U.S. Virgin Islands of February 1985.

We are requesting a Certification of Consistency with the Virgin Islands Coastal Zone Management Program for our First Amendment. As stated under Section VII of the Amendment, we understand that the proposed fishery management system is consistent, to the maximum extent practicable, with the approved programs of the U.S. Virgin Islands.

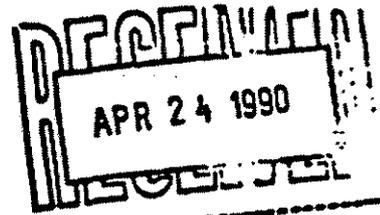
It is very important that we receive this consistency determination before mid-April in order to submit the document to NMFS in May which will permit the red hind area closure due to begin in December 1990.

Most grateful for your cooperation.

Sincerely,


Miguel Rolon
Executive Director

COPY



GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

NISKY CENTER—SUITE 231

NO. 45A ESTATE NISKY

CHARLOTTE AMALIE, ST. THOMAS, V.I. 00802

April 17, 1990

Mr. Stephen Monsanto
Chairman
Caribbean Fishery Management Council
Suite 1108
Banco de Ponce Building
Hato Rey, Puerto Rico 00913

Re: Fishery Management Plan Amendment No. 1.
Federal Consistency Determination

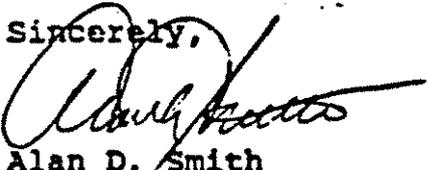
Dear Mr. Monsanto:

Thank you for the opportunity to review the proposed Amendment No. 1 to the Fishery Management Plan for the shallow water reef fish of Puerto Rico and the U.S. Virgin Islands.

I have reviewed the proposal with the Coastal Zone Management and Fish and Wildlife staff and independently evaluated it's merits. As a result, I concur that the proposed activity is consistent, to the maximum extent practicable, with the V.I. Coastal Zone Management Program. This consistency determination is made pursuant to Section 904-7 of the CZM Rules and Regulations for the Virgin Islands.

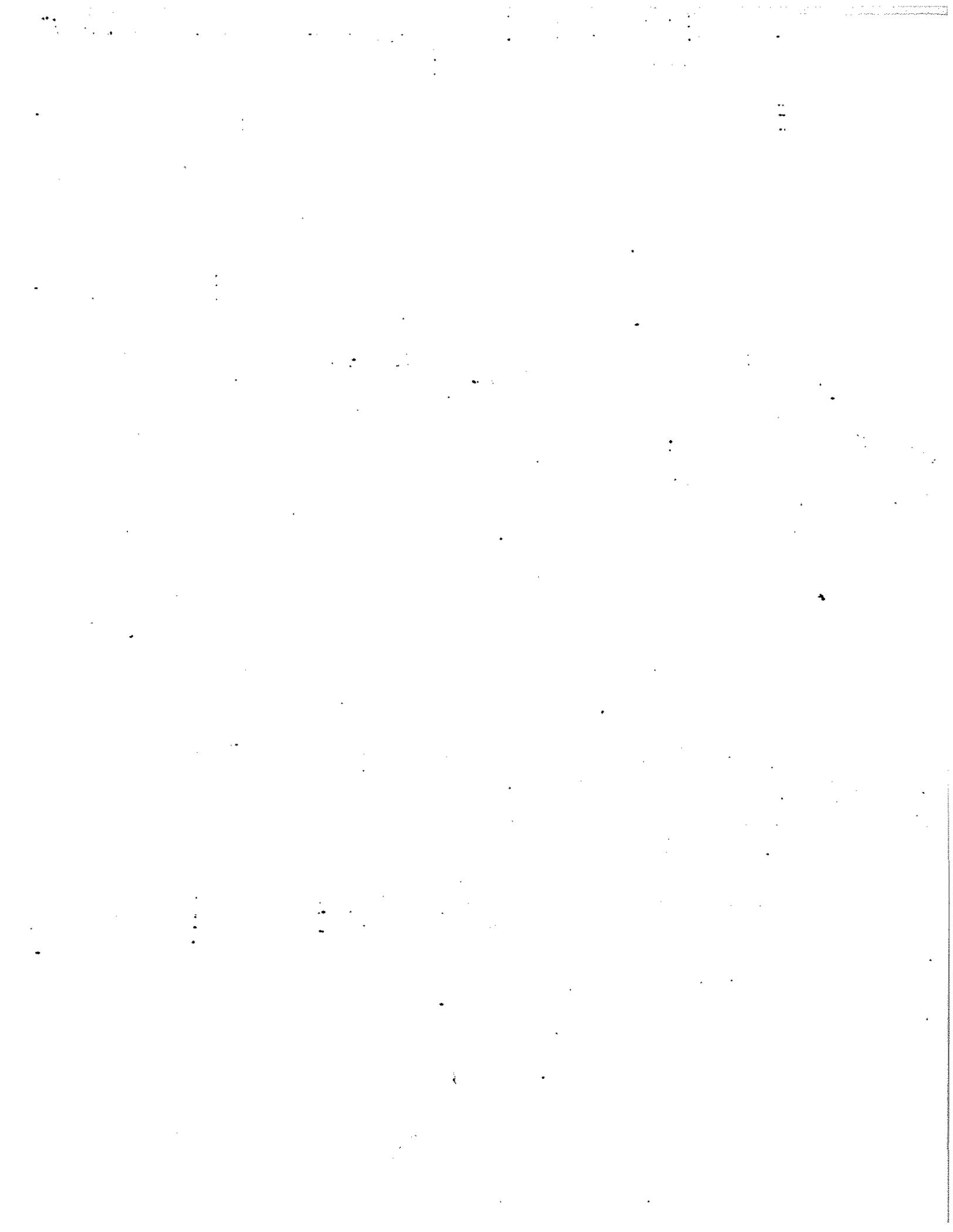
Thank you for your courtesy in affording me the opportunity to review and comment on this important document.

Sincerely,


Alan D. Smith
Commissioner

ADS/RHP/nad

cc: Hon. David Canegata
Mr. Denton Moore
Mr. Onaje Jackson
Mr. Robert H. Pederson
OCRM



APPENDIX D

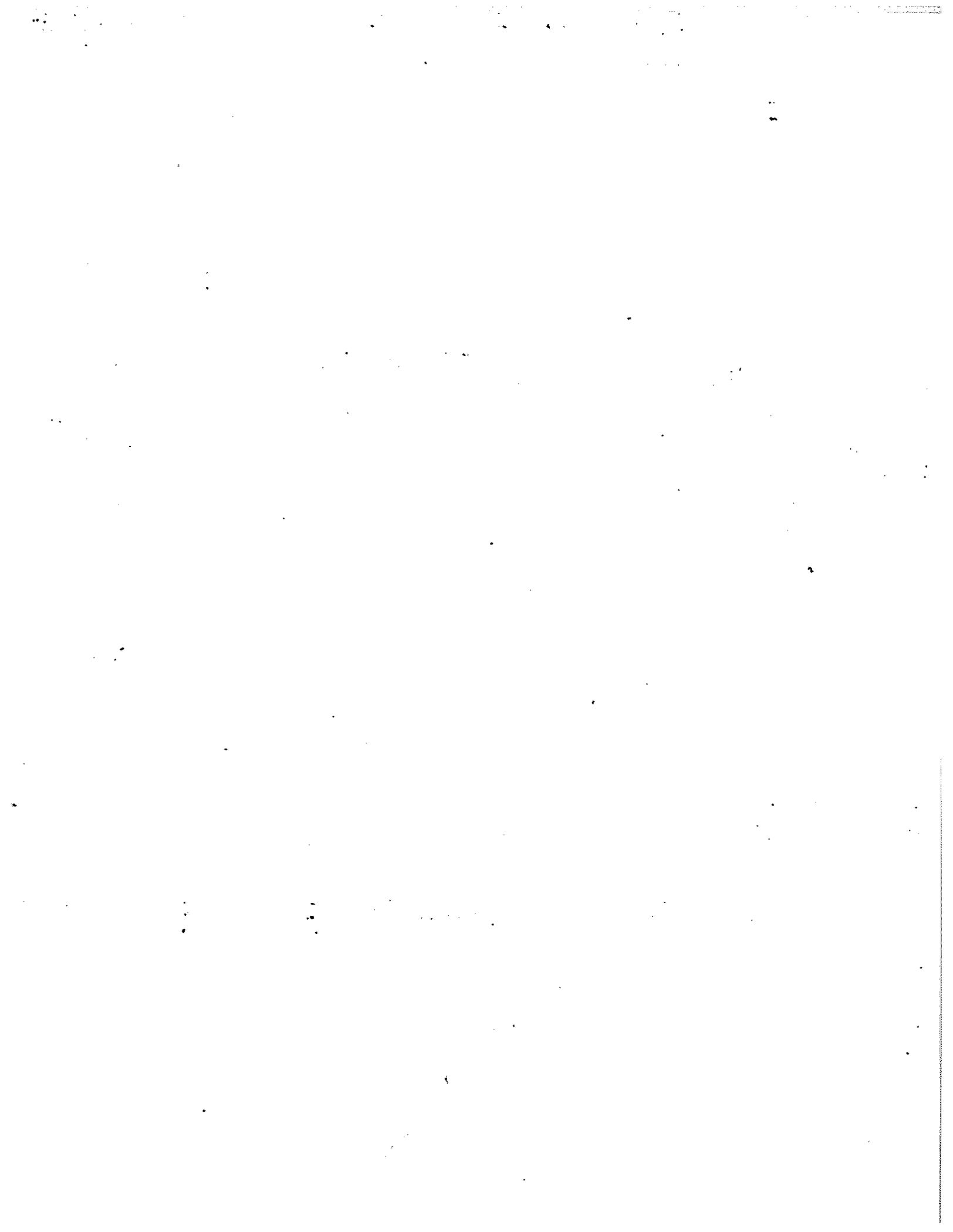
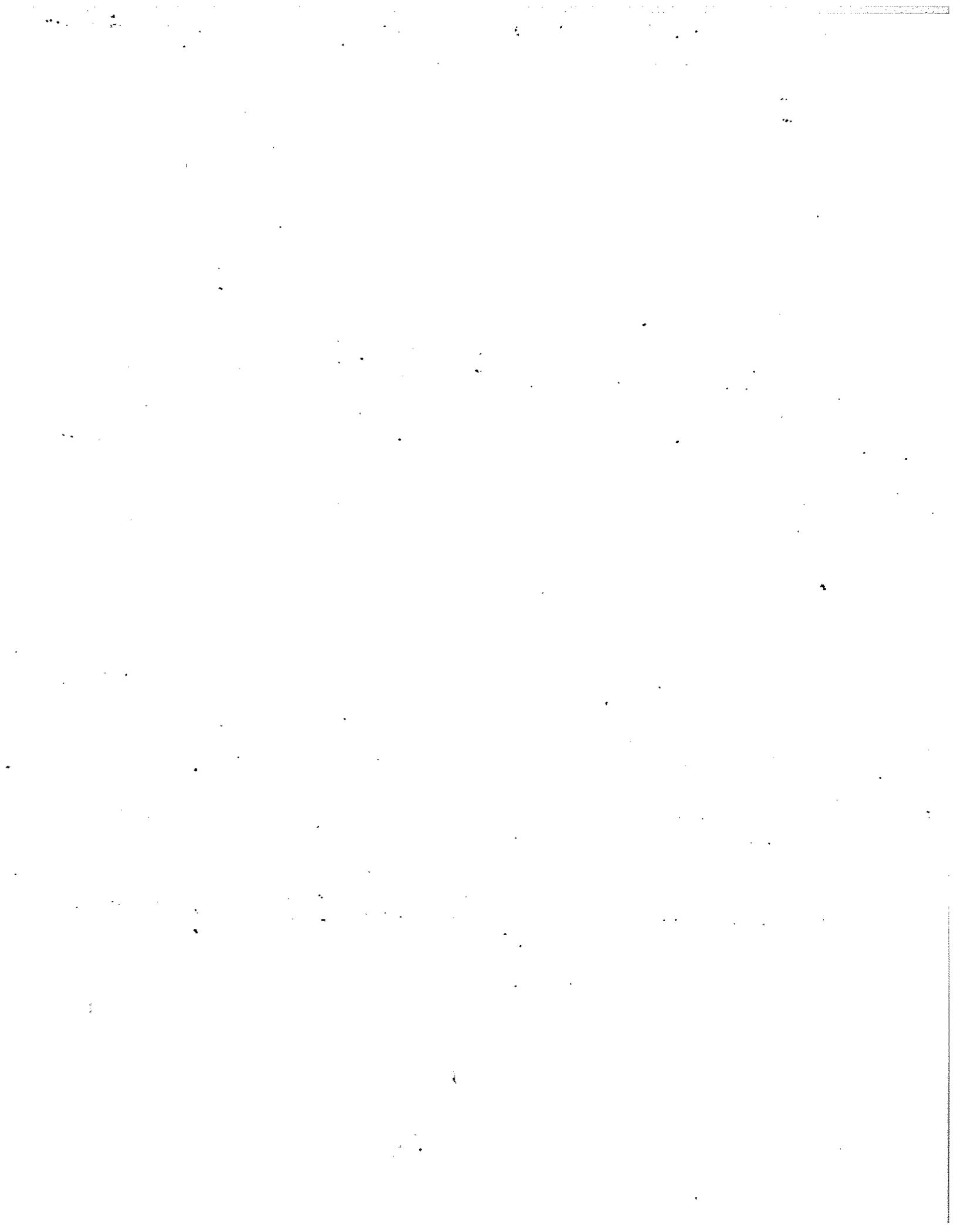


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 Thomas Daley
 Lillian Greaux
 American Littoral Society
 Department of Planning and Natural Resources, U.S.V.I.
 CODREMAR, Government of Puerto Rico



This Appendix summarizes testimony on the Draft Amendment number One to the Shallow-water FMP/EIS/RIR at seven public hearings. Included are summaries of comments received at the public hearings as well as the written statements received at the Council office.

LOCATIONS AND DATES OF PUBLIC HEARINGS

First Round of Hearings

St. Croix, U.S.V.I.	April 5, 1989
St. Thomas, U.S.V.I.	April 6, 1989
Cabo Rojo, P.R.	April 18, 1989
Ponce, P.R.	April 19, 1989
Fajardo, P.R.	April 20, 1989

Second Round of Hearings¹

St. Croix, U.S.V.I.	June 26, 1989
St. Thomas, U.S.V.I.	June 27, 1989

SUMMARY OF TESTIMONIES AND COUNCIL'S RESPONSE TO PUBLIC HEARINGS

Measure 10.2.1 Establish 2 inches (in the smallest dimension) as the minimum mesh size for fish traps.

Comments

- opposition to the measure and proposal of the actual 1½" mesh size;
- opposition to the measure and proposal of the 1½" mesh size;
- opposition to the measure without a proposal.

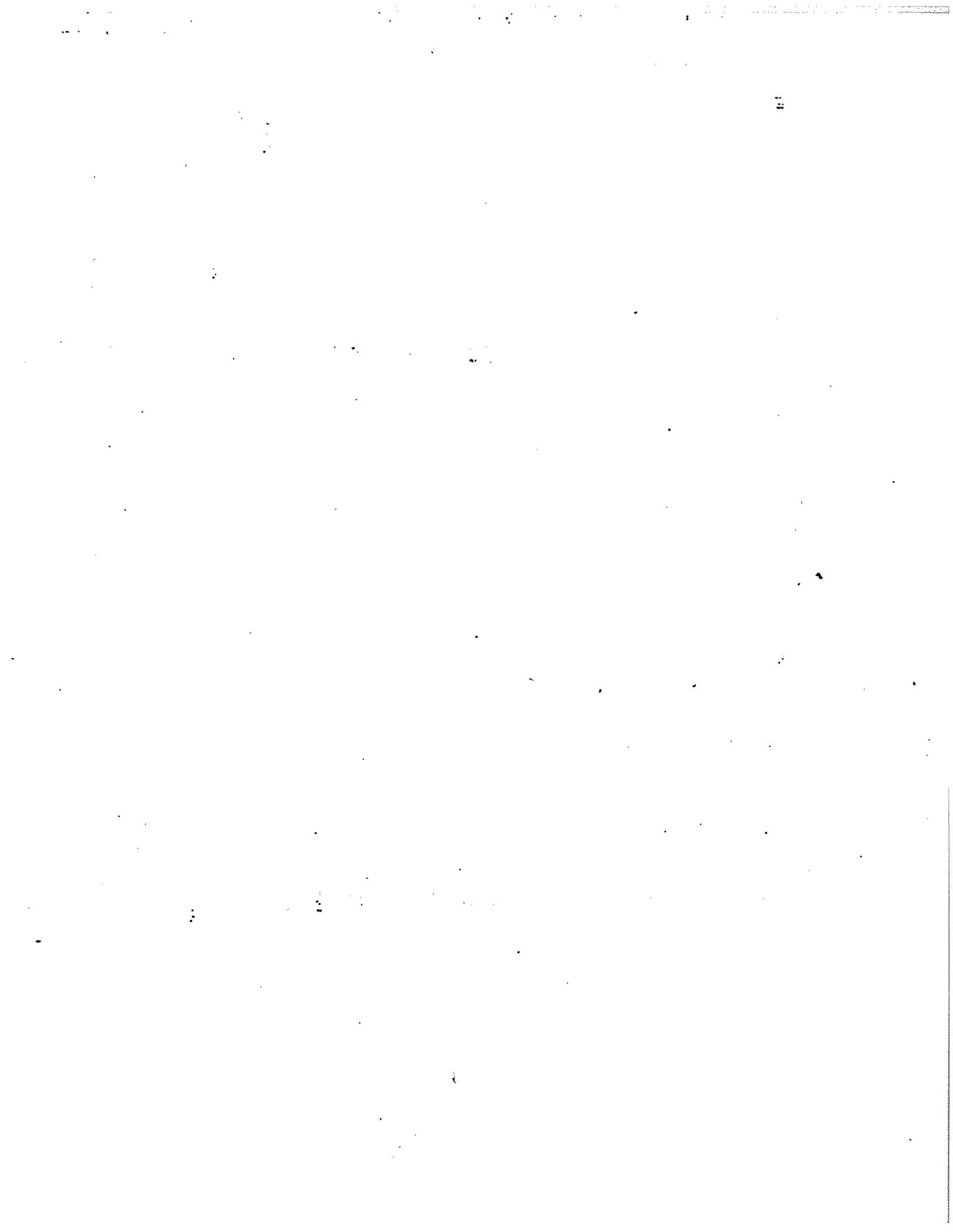
This measure received opposition from fishermen who considered it to be too large, leading to escapement of marketable fish, thus affecting their income. Fishermen from St. Croix think that the measure will impact their cultural eating habits which differ from other Caribbean Islands, and include a variety of smaller fish species not consumed elsewhere.

Representatives from the U.S. Virgin Islands Division of Fish and Wildlife believe that the possible loss of fish is overstated by fishermen in St. Croix and that real loss will amount to 20% instead of 50%.

Council's Response

After careful scientific analysis the Council understands

¹ A second round of public hearings were held in St. Croix and St. Thomas due to changes in the management measures proposed.



that the 2 inch mesh is a necessary measure to insure the recuperation of declining stocks. Any smaller mesh size would not allow the escapement of a significant number of juveniles which are important to the fishery. The economic impact of the measure is lessened by the one year delayed implementation.

Measure 10.2.7 A total closure of the Nassau grouper is established, until the stocks are rebuilt to exploitable levels. (The adoption of this measure logically implies the derogation of the minimum size and closed season.)

Comments

Fishermen opposed the measure as presented by the Council voicing their concern with an indefinite closure. Although many fishermen accepted this fishery as almost non-existent and in any case, only an insignificant bycatch, they proposed a time frame for the total closure. Many fishermen recommended a two year time frame as an adequate amount of time in which to study the resource and determine its recuperation.

Council's Response

The Council has concluded after available data analysis that the capture of the Nassau grouper is a rare event. Past spawning aggregations in St. Thomas and St. Croix have been found to be non-existent. Total closure is the last management alternative to allow species recuperation. During the public hearings, fishermen compared previous catches with almost present total decline of the species. In response to what appears to be a total collapse of the fishery, the Council has adopted the measure. It hopes that a presently spawning aggregation identified in British Virgin Islands waters, if protected, might contribute to the reestablishment of the Nassau grouper populations in the shelf shared by Puerto Rico, U.S. Virgin Islands and British Virgin Islands.

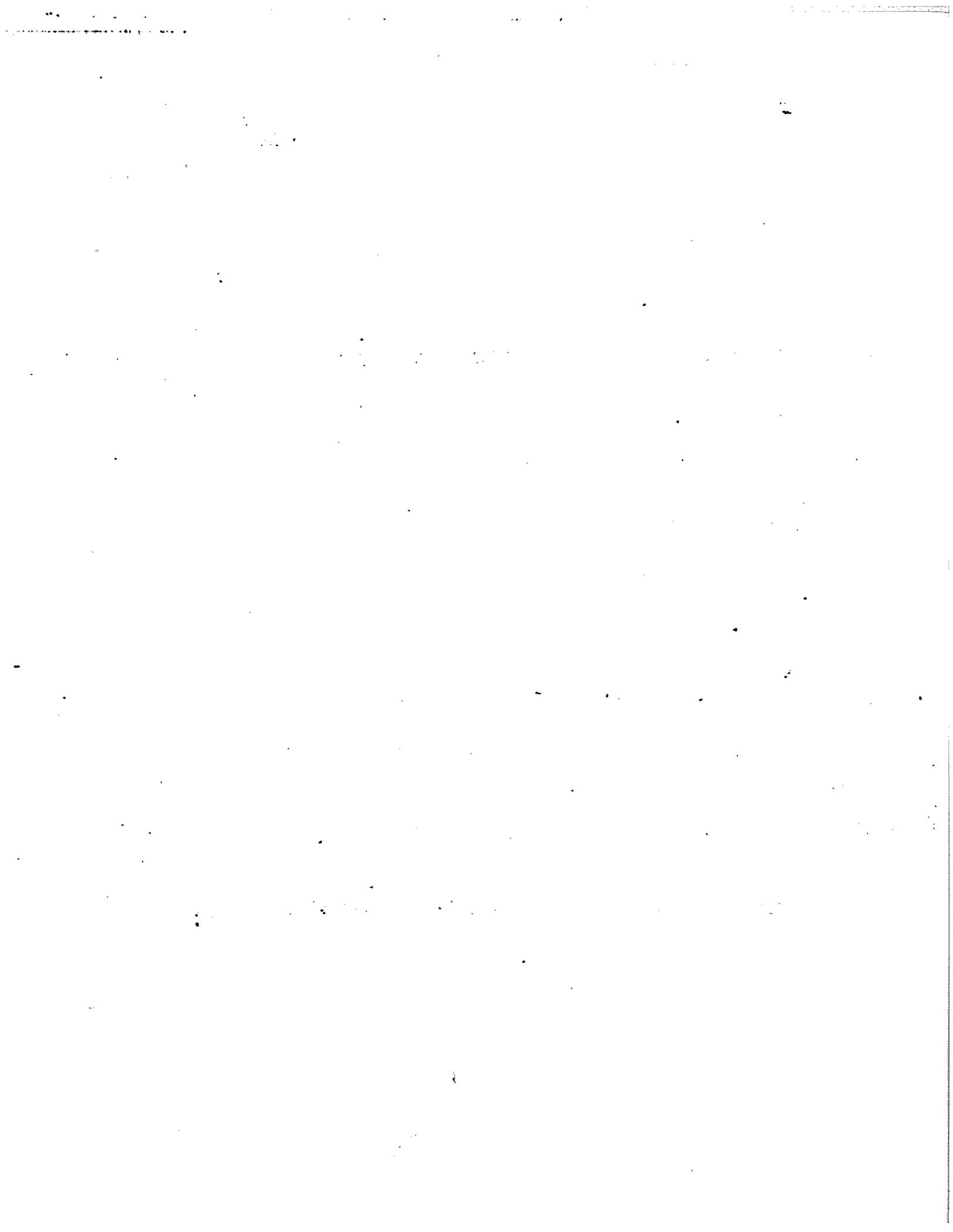
Measure 10.2.9 Data Collection: Gather catch/effort, length/frequency, as well as any necessary biological and socio-economic information, through the improvement of the existing state-federal agreements formulated by NMFS/PR/USVI and/or Council's own data gathering program.

Comment

The only comment received with respect to this measure recommended that any socio-economic data collected should include fishery-independent data.

Council's Response

The Council is currently in total agreement with this suggestion



and will try to coordinate data collection with fishery-independent entities such as SEAMAP.

Measure 10.2.10 To prohibit, during the red hind spawning season, from December 1 through February 28, the use of any fishing gear capable of capturing reefish, such as fish traps, hook and line, bottom nets, and spear, in an area southwest of St. Thomas enclosed by the quadrilateral formed by connecting the following four points in Chart 25641:

18 13.2° N; 65 06°W
18 13.2° N; 64 59°W
18 10.7° N; 65 06°W
18 11.8° N; 64 59°W

Comments

This measure was amended after fishermen in public hearings opposed the area closure proposed by the Council. The original proposal included the south area of St. Thomas, from Ram Head to Sail Rock (Appendix A includes maps of the original proposal as well as the final area closure determined by the coordinates in Chart 25641). Fishermen's main concern was that the original area encompassed an area too big and that the purpose of protecting spawning stocks could be accomplished with a smaller area.

Council's Response

After examining information received at the first round of public hearings, identifying critical spawning sites, the Council decided to review the original area and adopted a smaller area closure in the EEZ Southwest of St. Thomas which includes identified spawning areas. This action was supported by fishermen and local government representatives in charge of fishery management and enforcement.

The NMFS and Coast Guard are in agreement in the effectiveness of this management measure and its enforceability, as demonstrated by the Emergency Action closing this area from December 6, 1989 to February 28, 1990 which was enforced by these agencies and supported by the majority of the fishermen.

Other general comments were received but the Council declined to respond at this time as they were not pertinent to the actions proposed in this amendment. These are listed in the Summary of Comments available at the Councils' Central Offices. The Council will be addressing some of these comments through the Information and Education Program to be implemented during 1990.



The federal area here is about 4 x 2 x 3 miles. This area, as the chart explains, rolls in bad weather. The area is so small that if St. Croix were not there to be used as a marker it may not have been found, even with today's modern equipment.

This area, more so than any of the federal areas, has a balance of nature, except for the high population of turtles. St. Croix on a whole, because of the deep waters that surround it, has an edge that serves as shelter or hiding place for the many species of fish that lurk on our shelf. As a result of the sudden drop off fishermen here do not fish the edge. (Losses outweigh profit)

All fish here are seasonal, though more than one species may be present at the same time. While those species occupy the shelf, all the others return to the edge. In this way the edge serves as a productive force.

Because the balance of nature in this area is at work, ghost fishing, or lost traps, which is one area of concern that the counsel has, is irradicated each time we have bad weather. New traps are known to stay in the same place and are totally smashed.

We do not have a red hind problem in the St. Croix area. The red hind that spawn here in January are never again seen or caught by any fisherman for the rest of the year. It is a totally different kind of hind, and where they come from or where they go nobody knows.

The laws adopted by the counsel and the way they are written serves to do more harm in this area than good. By catching and throwing fish back with the hope that they will live is generally not successful. Because of strong currents and other natural conditions they die. Fish (Nassau Grouper, Red Hind, etc.) once they leave the bottom and come to the surface, even though they return to the bottom can not live. The maw, or belly lining comes through its mouth and gills, and only surgery can correct that. That fish when returned to the water stays afloat, or even if they make it to the bottom, is dazed or retarded and does not function as a normal fish ever again and is eaten by a bigger fish.



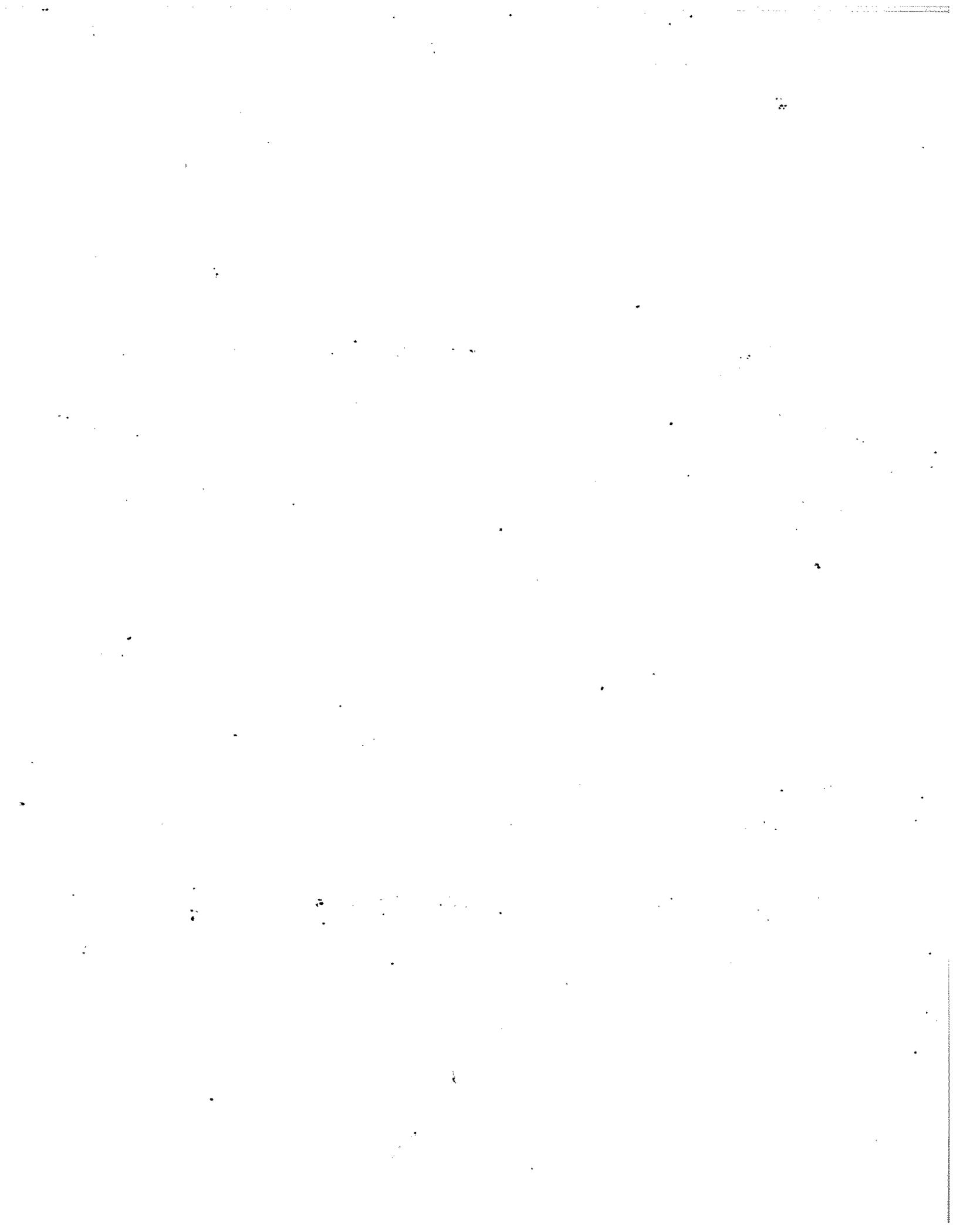
This causes shark and barracuda to come across the shallow before their time and thus disrupts the natural course of nature.

Fishermen of St. Croix are disenchanted with authorities that represent fishing on both a local and federal level. This is the only region in the Caribbean where nothing has been done to promote the fishing industry. To the fishermen these agencies are bearers of bad news. Each time a meeting is called instead of uplifting the industry they are constantly tearing it down. At these meetings our input is asked for, but it is cast aside. At public hearings we testify and our testimony is ignored. They leave the office with a set of take it or leave it ideas, and bring them to the fishermen. If the fishermen get together and make enough noise they take it back to the office, disguise it a little and bring the same thing back. It just looks a little different.

BE BEARERS OF GOOD NEWS

SUGGESTIONS

- 1) Acquire a boat for the region equipped for long lining to be used for training.
- 2) Make a study of the turtle population on an island by island basis. Because of the sightings by fishermen on St. Croix, they believe that the balance of nature is hard to maintain. I have seen turtle feeding on seaweed burdened with fish eggs. The turtle are being blamed for some ghost fishing because they feed on barnacles on the rope and buoys and sometimes cut the rope with their sharp teeth.
- 3) Fish attractors. St. Croix with her deep waters that start so close to here shoreline and an existing bouy, 7 or 8 miles north of Christiansted that is responsible for about 25% of all fish caught on St. Croix, except long liners, can be used for experiment because it would be easier to monitor.
- 4) Disaster. Break the barrier down so that when there is a major disaster (bad weather or loss of boat by accident) the funds will be readily available (not grants or hand outs)

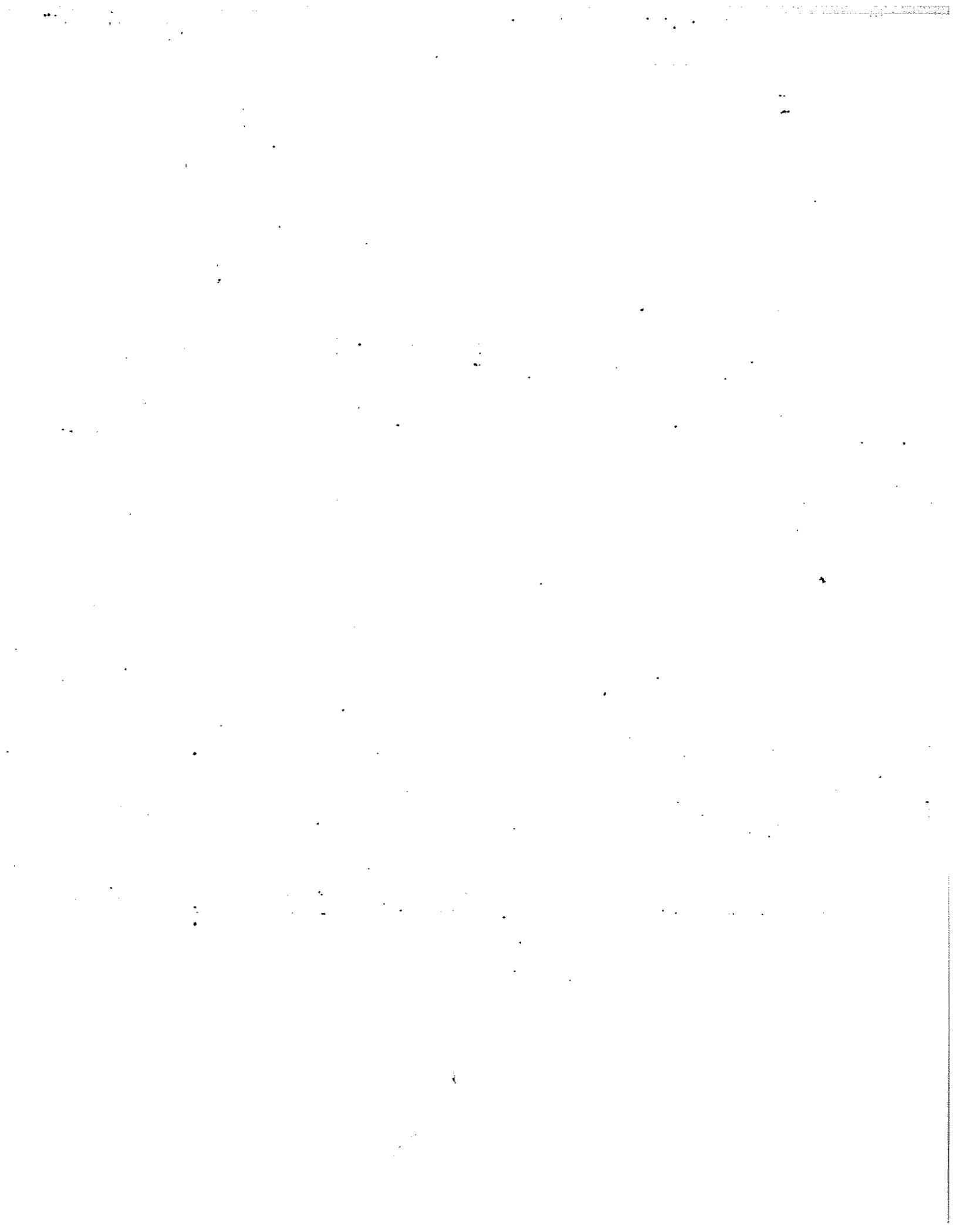


- 5) True Reporting. Instead of relying solely on fishermen for catch data which is the cause of these hearings. The department should acquire the data themselves. One man and a vehicle for two days a month can cover St. Croix. This is small area and true reporting means giving away trade secrets. You are told that your report is confidential, yet when there is an audit though it cannot be used, I.R.S. asks for it.
 - 6) Marketing. In as much as we do not catch enough fish for export, we are left to the commercial market which makes supplies and insurance etc., so expensive it is hard to compete.
- Life's a cycle - we should not take if we are not willing to give. We store up to use later. Turtle, not for commercial purposes, but even one per fisherman a year, make these suggestions work, and we would preserve our shelf. We lost our real estate, let us not lose the sea or else it is Paradise Lost.

About three months ago I attended an Advisory Panel Meeting of which am a member. At this meeting we overwhelmingly adopted the 1-1/2" wire to be used in fish pots instead of the 2 inch, only to find that the counsel is not satisfied, so they return with a public hearing.

Each and every island in the Caribbean has a distinctive difference and must be recognized and treated so. In Puerto Rico they do not eat parrot fish, doctor fish, etc. These fish are cut up and returned to the trap for bait. On St. Thomas and St. John the only specie of grouper that can be eaten without extreme risk of fish poison is the Nassau Grouper, so are many other species like goat fish and some snapper etc.

On St. Croix we market everything we catch. As a matter of fact, the parrot fish, doctor fish and goat fish are the most commonly caught and eaten here. Because there is market for everything we catch we do not target particular species, so we do not have a fish shortage problem. With the construction boom we now have and estimate will last for another six or seven years, fishing has gotten a break. A lot of people are not going fishing now.



Page 4

It is unAmerican to create hardship and burden on a people where it is not necessary. If two inch wire is adopted we would not catch parrot fish, grunts, squirrel, fat pork, butter fish round head snapper, etc. Those are staple food fish here on St. Croix. All fishermen here would go bankrupt and their families starve.

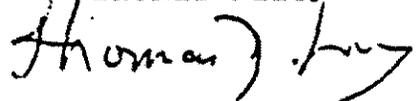
The fishermen of St. Croix are asking the Legislature, the Washington Delegate, and the Governor to petition the counsel and ask that St. Croix be exempted from the counsel's Reef Fish Management Plan. We have suffered from the loss of the entire south side with the Hess Oil Deal.

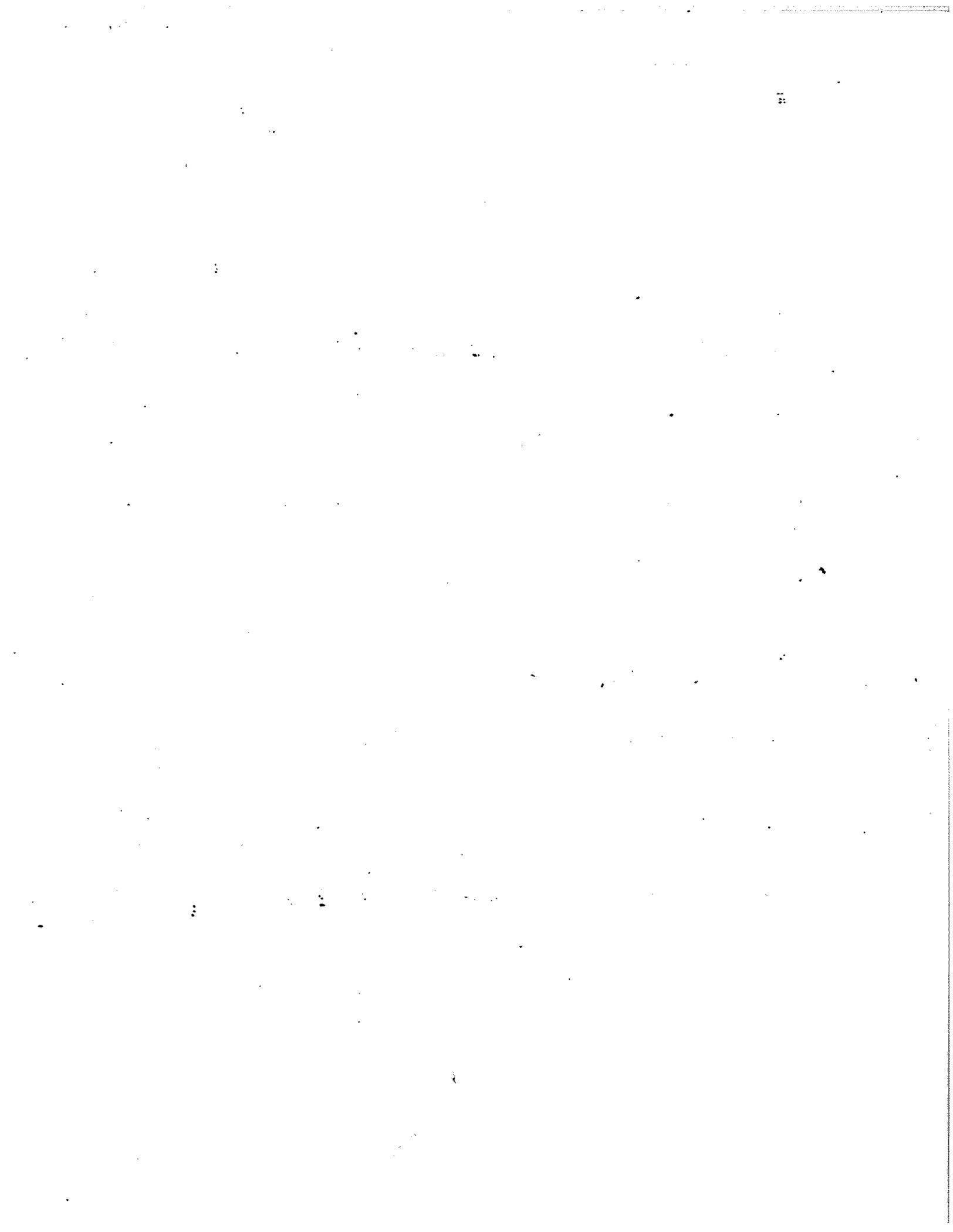
Man has from the beginning of time looked for excuses for the wrongs they do. Fishermen, in this case, are the scapegoat, but it is not so. Environmental impact is each time we build a factory, hotel etc., or any of the monuments we build in the name of progress without the proper planning. The toxic waste sewer, etc. flows to the sea. Just as man cannot live with himself, black, white, rich or poor, so also the fish. Our shorelines are no more places where fish live. Man's progress has driven the fish from our shoreline further to the deep. The more the progress, the further they go. As they move, those on the deep move too. Those on shoreline cannot live with those at the edge. With no place else to go they get up and leave. Remember years ago that large amount of lobster that migrated from some place and were caught in Puerto Rico?

Any group or agency representing fishing in the region that involves a collection of islands has got to know and recognize the difference. Methods, culture and eating habits make it difficult to adopt any one plan to suit all without creating unnecessary hardships on some.

We can have one people with one agency for different islands with different methods, different cultures, with a different contingency plan for each island. This would bring fairness for all.

Thomas Daley





The fishing season for Nassau grouper in waters under federal jurisdiction (now known as the Exclusive Economic Zone) will be closed from 0001 hours January 1, 1987 through 2400 hours March 31, 1987, according to Jack T. Brawner, Director, Southeast Regional Office, National Marine Fisheries Service.

This annual closure is prescribed by the Shallow-Water Reef Fish management plan developed by the Caribbean Fishery Management Council, and is designed to protect spawning aggregations of Nassau grouper. Regulations prohibit the possession or harvest of Nassau grouper in the exclusive economic zone during this period and specify that any Nassau grouper taken during this period must be returned to the sea immediately and with the minimum amount of harm. This three (3) month annual closure during the spawning season, in conjunction with the incremental adjustment to the minimum size limit of one inch per year, is expected to result in rebuilding of the Nassau grouper population in the management area. The current size limit for Nassau grouper is 13 inches in total length and will be increased to 14 inches total length on September 22, 1987.

Violators of these regulations face penalties up to \$25,000.

For further information contact the Caribbean Fishery Management Council, Suite 1108, Banco de Ponce Building, Hato Rey, Puerto Rico 00918-2577; Phone (809) 753-6910.

(Release of National Marine Fisheries Service/News - Southeast Region dated 12/22/86 - NR 86-33 CLOSED SEASON FOR NASSAU GROUPEr)

The following are my comments in response to the above press release.

In meetings with the Council I explained that because of the difference of each island, more studies should be done before a contingency plan can be made for the region. That suggestion was ignored and the contingency plan was made anyway. I am not against conserving, but it must be fair to all.

Puerto Rico fishermen are subsidized and because of the subsidy, Doctor Fish, Blue Fish (Parrot), Squirrel Fish, etc., are considered 'trash fish', so they are cut up and returned to the traps for bait.

St. Thomas, because of high fish poison problems, only certain species of fish are edible without extreme risk. To be precise, the only specie of grouper that can be eaten without extreme risk

- is the Nassau grouper. So, because of subsidy and fish poison, the fishermen in Puerto Rico and St. Thomas, only fish for particular species. So, it is unclear how any of these species can be of an extinct nature.

St. John has that large National Park area and they too are subject to high fish poison risk. St. Croix, with no subsidy and high risk of fish poison, catches and markets every specie of fish caught. As a matter of fact, Parrot Fish and Doctor Fish are the two species of fish mostly caught in St. Croix. Most of the fish caught are marketable. The fishermen in St. Croix do not hunt any particular specie, which makes it hard for any specie to be extinct. St. Croix has only one area that extends out beyond three miles. That is the Long Bank area and our drop-off is so sudden that it is either expensive or impossible to fish. If you try to fish with traps your loss outweighs your profit; by line, it is so sudden. Your line hangs up on the shelf. Because of losses from strong currents and rough seas, the fishermen of St. Croix do not set traps too close to the edge. Because of that, the average fisherman here does not catch more than about 10 groupers a year.

Nassau grouper searches for a habitat that is suitable for spawning and once that is found, they return once or twice a year to the same place and spawn, which makes them vulnerable to line and trap fishermen. There are known spawning areas in St. Thomas and Puerto Rico, but there are no known areas in St. Croix.

I believe in conservation, but it must be fair to fish and fishermen alike. It is either that the Council did not do enough study or they just do not have people on the Council who know most of the traps. Fishermen in the region gather their traps every four to eight days. When a fish goes into a trap, depending on conditions at the bottom of the sea, at the time the fish has been trapped, when that trap is hauled up, depending upon the conditions at the bottom and the pressure of water, it is impossible for that fish to be returned to the water and live because all its' maw or belly fills with air and comes out through its mouth or gill.

Once that happens, there is no way that fish is going to survive. It is unfair for fishermen to watch their catch either floating on top of the water or see it taken away by sharks and barracuda, because there is a law that says we should return them to the sea.

What I think should be done is that this law should be repealed and a better study be made, island by island, with input from the hard-core fishermen; identify the areas where groupers spawn and designate them as such, and then close these areas off from fishing each year from January to March. I think it is un-American to create a burden and hardship on people where it is not necessary.

Instead of spending money writing contingency plans that are no good, money should be spent in teaching our fishermen. Look at what is happening in the Caribbean. For years we thought that our deep seas was just a collection of water used by boats to get from island to island. While our Councils write laws that are unfair, boats come down from the states in large numbers and are landing record catches from right around us, while our Council is asking us to throw away the little we catch or go to jail. Which of the little fishermen around here ever sees \$25,000?

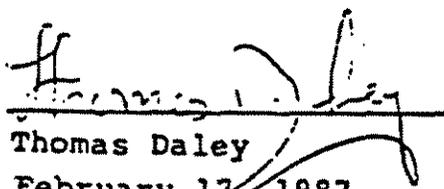
The punishment does not fit the crime. There is no fisherman or woman on St. Croix that leaves his or her home and goes fishing for grouper. How can it be expected that anybody is going to pay \$25,000 for fish you catch only by mistake. How can they ask the fisherman to throw away his children's food, when he knows that the fish will not survive.

If fishermen were more knowledgeable, there would be no need for this particular plan. Where is our Council? The long-liners are causing so much hardships to our small fishermen. Not only that they are flooding the local market with their shark fish, with prices way below the price of the local fishermen, but every now and then they lose their rigging. Can you imagine fifteen to forty miles of line drifting aimlessly with the current until it reaches the shallow and gets hung up, which makes it a nightmare

to small boats when entangled. The line works its way into the cutlass bearing and burns it out, thus causing vibration and sometimes leads to a broken shaft. The end result is costly repairs. The line, because it was designated for use in the deep and not the shallow, when it is lost and reaches the shallow, it is also dangerous to turtle, lobster, etc.

I am suggesting that the Council meet with the heads of government in the region and acquire a boat rigged for long-lines and use it for teaching, and in the meantime, keep all long-liners at least thirty miles from our shores.

We will preserve the sprat if we have a fair shot at the whale.


Thomas Daley
February 17, 1987

TD/1

cc: Regional Council/Puerto Rico
Honorable Alexander Farrelly, Governor
Honorable Ron de Lugo, Delegate
Mr. Toby Tobias, Fish and Wildlife/St. Croix
Mr. Boland, Fish and Wildlife/St. Thomas
Department of Conservation and Cultural Affairs
Honorable John Bell, Senator
Honorable Douglas Canton, Senator
Honorable Alicia Hansen, Senator
Honorable Alicia James, Senator
Honorable Bent Lawaetz, Senator
Honorable Holland Redfield, Senator
Honorable Ruby Rouss, Senator

Mrs. Lillian Greaux
P. O. Box 4642
St. Thomas, V.I. 00803
Telephone (809) 776-7428

Mr. Miguel A. Rolon
Executive Director, CFMC
U. S. Department of Commerce
National Oceanic and Atmospheric Administration
Caribbean Fishery Management Council
Banco de Ponce Bldg.
Hato Rey, P. R. 00918-2577

Dear Sir:

I have read your article dated May 15th together with your Option Paper of March, 1989.

First of all, let me say that I am not a fisherman, but my entire family are fishermen, to include my husband and sons, and on occasion, I also do a little line fishing for pleasure.

I have carefully read every page of the document and I just cannot see how the council can consider taking such measures mentioned in the article. I realize that the stocks need to be rebuilt, but the closure mentioned is just one more attempt to encourage the little men to steal in order to feed their family. Closing off the area from Ram Head to Sail Rock, to me, and I am sure that the majority of the fishermen in French Town would agree with me, is quite unreasonable. Most of the fishermen from French Town have their traps set in the area that you are proposing to close. This means only one thing, between the period of December to February, the fishermen who have their traps set within the proposed closure area, must remove their traps either north or past Ram Head or Sail Rock. This is quite some distance to set traps and very unreasonable for the fishermen with small boats and engines. Most times the weather is so bad that they would just have to leave their traps out there until the weather is better which could be at times a week or maybe longer. Additionally, some fishermen would be forced to set their traps far out, and endanger their lives to raise them in order to make a buck to support their family.

Regarding the matter of the minimum mesh size, I also feel that a minimum mesh size of 2 inches is rather unfair. Have you considered the size fish that can escape from a 2 inch mesh? I attended your last meeting where a few people asked that you consider a 1 1/2 inch mesh. I feel this size is more reasonable because it would allow the fishermen to catch medium size fish which are very much in demand now. I myself prefer to eat a medium-size fish than a larger one. What I would suggest is that the fishermen who catches real small fishes throw them back in the sea. Incidentally, one popular fish, the goat fish, doesn't grow big and all of them would escape from the 2 inch mesh.

The other measure requiring a self-destruct panel for the fish traps, to me, is reasonable. I have no problems with that measure.

The only thing that I can gather from these measures is that the fishermen who have been fishing within your proposed closure area, should just pack up their gears and forget about fishing altogether.

I also must disagree with paragraph two of page three of the Option Paper. You are saying that this measure might reduce the number of part-time fishermen, and in part... "that larger mesh would discourage the use of traps by part-time fishermen because average number of fishes per trap will decrease." Of course, if you pass this measure, the part-time fishermen would have to sell their boats, traps and fishing gears, and join the poverty line. I think this is quite unreasonable because part-time fishermen are doing fishing on a part-time basis mostly because they cannot properly survive and support their family with their present income, so they sacrifice in good and bad weather to catch a few fishes to be able to enjoy some of the good things in life, as are enjoyed by the more fortunate people. By this measure, you are only encouraging more stealing in our community, because the fact is, people cannot survive without money to purchase the necessities, such as food and clothes. Let's face it, life is tough and passing these measures just makes it tougher for a selected few. Before passing such a measure, give a lot of thought to what this proposal would do to the little men; the ones who work so hard to make ends meet honestly, but always get the messy end of the stick. The big time fishermen do not have to worry about anything - they have hugh boats and hundreds of traps and can set them anywhere in the deep seas - they don't have to worry where the next dollar for dinner is coming from. The little men are the ones who will suffer (they always do).

Another thing I want to mention, is that people come from all over the United States with big boats and hundred and hundred of traps and set them way out in the ocean and bring in thousands and thousands of pounds of fish, sell them to the hotels and big restaurants and nothing is said about this. Maybe, just maybe, some of these same people are not even contributing to our resources by paying taxes. At times, too, boats come in from our neighboring islands with their catch and sell them on our waterfront and nothing is said about this practice. Just let one of our fishermen even think of going close to British waters to catch fish or even sell fish, and the Birtish government authorities are ready to arrest them. This practice is also unfair and unjust and should be looked into.

These matters are the things the Council and /or PNR should be looking into, instead of trying to take the bread out of the little fishermen mouth.

I'd like to inject that to stop part-time fishermen, is similar to stopping other part-time workers, for example, part-time taxi drivers, part-time nurses, cashiers, etc., and all other people who take part-time jobs to supplement their already too low salaries.

There is also another item. The proposed closure area would also mean that between December and February, I, along with other women, who go fishing on Sundays and holidays for pleasure, will also have to eliminate this activity, since most women cannot go out too far at sea and usually fish within the shallow waters, for example, Flat Cay, Thatch Cay, and the surrounding waters of Water Island, etc. This is unreal. This could only mean that we women must also give up one of the things we enjoy most - fishing. Please give this matter some serious thought before implementing any of the proposed measures.

On page seven of the Option Paper, paragraph one states "the fishermen are concerned that the fish are getting smaller. They know they are taking too many juveniles and they are trying to protect the resource so they will have something to keep going back to." It makes me wonder which fishermen you are talking about, because most of the fishermen from French Town and the part-time fishermen that I spoke with didn't even know of your last meeting. It was just by chance that someone heard about the meeting, and started calling everyone to attend at the last minute.

I have a few suggestions:

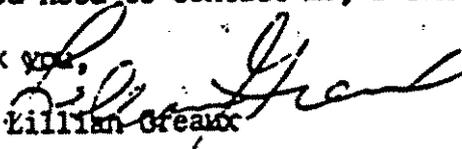
1. When you are having a meeting to discuss important issues as the above, proper notification should be given to the fishermen. It is only fair that they know about something which will affect their livelihood. Notices should be placed at the Fish house in Frenchtown and the grocery stores in that area. Announcements should also be made via radio and tv.
2. Have a talk with all the fishermen, not just a few, before implementing any measures. Remember that these measures will affect a lot of people.

Page 10 of your Option Paper list agencies and persons consulted. None of the fishermen from Frenchtown are listed here. If a law affects certain people, a representative of these people should be consulted and listed. I am asking that you read this presentation at your next public hearing to be held in St. Thomas on June 27th at the V.I. Hotel.

I would appreciate if you can withhold my name, but if this cannot be done, then I request that you read it as is.

If you need to contact me, I can be reached at (809) 776-7428.

Thank you,


Mrs. Lillian Greaves



AMERICAN LITTORAL SOCIETY



CORAL REEF CONSERVATION CENTER

For The Study and Conservation of Marine Life

75 VIRGINIA BEACH DRIVE • KEY BISCAYNE • MIAMI, FLORIDA 33149 • (305) 361-4495

April 3, 1989

Wayne Swingle, Executive Director
Gulf of Mexico Fishery Management Council
5401 W. Kennedy Blvd. -- Suite 881
Tampa, Fla. 33609

re: Reef Fish Fishery Management Plan
Amendment One

Subject: Prohibition on Fishing with Fish Traps
in the Exclusive Economic Zone (EEZ)

Dear Mr. Swingle:

The use of wire-mesh fish traps should be prohibited throughout the EEZ, based on (1) the legislative objectives of the Magnuson Fishery Conservation and Management Act and (2) the management objectives of the 1981 Reef Fish Fishery Management Plan.

Draft regulation 50 CFR 641.7(1) should be adopted as proposed, so that "it is unlawful for any person to fish with fish traps in the Exclusive Economic Zone."

The Council has recognized that many reef fish species are overfished and that a management strategy must be immediately implemented to rebuild the spawning stock of all reef fish species. One key element of this strategy must be to stop fish traps from continuing to kill large numbers of juvenile reef fish before they have had an opportunity to become part of the spawning stock.

The Council has recognized that the reef fish community includes and needs numerous fish species not targeted for commercial harvesting -- but which comprise from 38% to 54% of the average fish trap catch (Sutherland and Harper 1983; Taylor and McMichael 1983)*. This wasteful decimation of species recognized to be integral components of the reef fish community must be halted.

In the best interests of fisheries management and resource conservation, fish traps must be prohibited throughout the EEZ.

Sincerely,

ALEXANDER STONE
Center Director

*Sutherland D. L. and Harper D. E. 1983. The wire-fish trap fishery of Dade and Broward Counties. Fla. Mar. Res. Publ. No. 40.

*Taylor R. G. and McMichael R. H. 1983. The wire-fish trap fishery of Monroe and Collier Counties. Fla. Mar. Res. Publ. No. 39.

AMERICAN LITTORAL SOCIETY

CORAL REEF CONSERVATION CENTER

For The Study and Conservation of Marine Life

75 VIRGINIA BEACH DRIVE • KEY BISCAIYNE • MIAMI, FLORIDA 33149 • (305) 361-4495

April 3, 1989

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

re: Request for Amendment
to Reef Fish Fishery Management Plan
subject: Prohibition on Fishing with Fish Traps
in the Exclusive Economic Zone (EEZ)

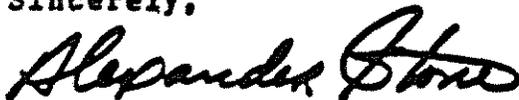
Dear Mr. Munoz-Roure:

The Gulf of Mexico Fishery Management Council is moving to adopt regulatory changes [50 CFR 641.7(1)] to prohibit fishing with fish traps in the portion of the EEZ under GMFMC jurisdiction. We formally request that the Caribbean Fishery Management Council immediately initiate proceedings to adopt the same prohibition within its jurisdiction.

As initial documentation supporting this request, we submit the enclosed American Littoral Society position papers and -- by reference -- the appropriate sections of the GMFMC's February 1989 Environmental Assessment and Regulatory Impact Review prepared as part of Draft Amendment One to the GMFMC Reef Fish Fishery Management Plan.

We request a formal response to this correspondence and appropriate action on our request in accordance with Council operating procedures.

Sincerely,



ALEXANDER STONE
Center Director

AS:hm
enc.

RECEIVED

26 APR 7 - 1989

AMERICAN LITTORAL SOCIETY



CORAL REEF CONSERVATION CENTER

For The Study and Conservation of Marine Life

75 VIRGINIA BEACH DRIVE • KEY BISCAIYNE • MIAMI, FLORIDA 33149 • (305) 361-4495

April 3, 1989

Wayne Swingle, Executive Director
Gulf of Mexico Fishery Management Council
5401 W. Kennedy Blvd. -- Suite 881
Tampa, Fla. 33609

re: Reef Fish Fishery Management Plan
Amendment One
subject: Adverse Fish Trap Impacts
on Reef Fish Populations

Dear Mr. Swingle:

The use of wire-mesh fish traps, as permitted under the Council's 1981 Reef Fish Fishery Management Plan, is incompatible with the maintenance of biological diversity and spawning stock biomass for reef fish communities.

Non-Selectivity of Fish Trap Catches

It is the species composition of fish trap catches that lies at the heart of opposition to their continued use in the reef fish fishery. All the fish trap catch surveys performed by scientific organizations reveal a significant degree of fish trap species non-selectivity.

Fishery biologists from the Florida Bureau of Marine Research (Taylor and McMichael, 1983) have systematically surveyed the catches of 1964 fish trap hauls while under actual operating conditions on-board commercial fishing boats. One-hundred-and-eleven reef fish species were identified among the trapped fish, even though less than 10 species accounted for 50% of the total catch. Fifty-four percent of the 13,337 fish surveyed were tropicals and other non-commercial species.

In a parallel study conducted by the National Marine Fisheries Service (Sutherland and Harper, 1983), comparable results were obtained. In that case, one-hundred-and-four different reef fish species were trapped. Of the 5984 individual fish inspected, 38% were tropicals and other non-target species.

Among the major families of trapped tropicals, there were 17% angelfish, 9% trunkfish, 7% surgeonfish, and 5 to 6% each butterflyfish, parrotfish and wrasses (Taylor and McMichael, 1983).

When all the data from these various South Florida studies is combined, analysis shows that, overall, 49% of 19,321 trapped fish were non-target tropicals.

Fish traps with the federally permitted 1-inch-by-2-inch mesh size catch fish averaging less than one pound (2.2 kg), with half of all trapped fish actually weighing less. Target groupers and snappers are caught while still juveniles. Their future yield and reproductive potential is lost.

Thus, fish traps may seriously reduce larger food-fish stocks due to juvenile removal. They may deplete the population of any commercial or non-commercial reef species that does not move freely from site to site. Therefore, continued use of fish traps in the Exclusive Economic Zone can be expected to have highly negative effects on species diversity and fish biomass of reef fish communities.

Sincerely,



ALEXANDER STONE
Center Director

AS:hm

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Gulf of Mexico Fishery Management Council. 1981. Pages 8:10-11 in Fishery management plan for the reef fish resources of the Gulf of Mexico.

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Taylor, R. G. and R. H. McMichael Jr. 1983. The wire fish-trap fishery in Monroe & Collier Counties. Fla. Mar. Res. Pub. No. 39.



GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

Department of Planning and Natural Resources
Division of Fish and Wildlife
Lagoon Street Complex-Room 203, Frederiksted,
ST. CROIX, U.S. VIRGIN ISLANDS 00840

March 30, 1989

MEMORANDUM

TO: Denton Moore, Director
Division of Fish and Wildlife, St. Thomas

FROM: William Tobias, Fisheries Biologist II
Division of Fish and Wildlife, St. Croix

RE: RED HIND/MUTTON SNAPPER SPAWNING AREAS

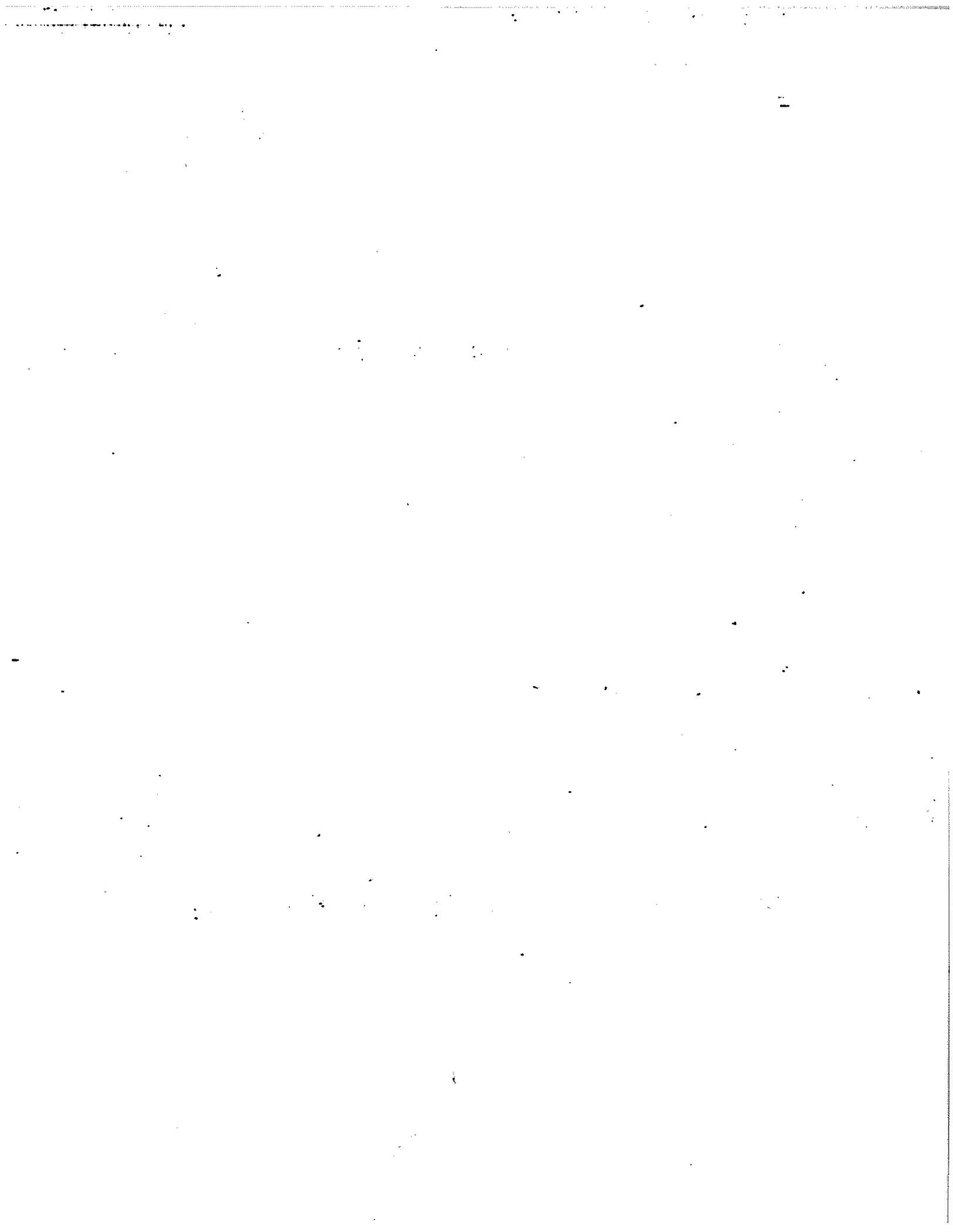
RED HIND AND NASSAU GROUPE

1. Spawning Season Closure for the Months of January, February and March Annually (JANUARY 1 - MARCH 31)
2. Area to be affected - the eastern end of Long Bank (7 N miles east of St. Croix) Beginning at 17° 50' 30" N and 44° 26' 00" W at the northeast corner at the 100 fm contour; thence south 2.6 nautical miles to 17° 48' 20" N and 64° 26' 00" W at the southeast corner; thence west southwest along the 100 fm curve 2.2 N miles to 17° 47' 00" and 64° 26' 00" W at the southwest corner; thence north 3.5 N. miles to 17° 50' 30" N and 64° 26' 00" W at the northwest corner.

The area described is approximately 4.6 sq miles.

MUTTON SNAPPER (aka Virgin Snapper)

1. Spawning Season Closure for the Months of April, May and June Annually (APRIL 1 - JUNE 31).
2. Area to be affected - 3.1 N. Miles southeast of Long Point off the south coast of St. Croix.



RED HIND/MUTTON SNAPPER SPAWNING AREAS continued.

Beginning at 17° 38' 30" N and 64° 51' 00" west at the northeast corner southward to 17° 38' 00" N and 64° 51' 00"; west at the southeast corner to the 100 fm contour; thence westward to 17° 38' 00" N and 64° 53' 00" W along the 100 fm contour to the southwest corner; thence northward to 17° 38' 30" N and 64° 53' 00" W at the northwest corner.

The area described is approximately 1.0 sq miles.

Situation and Need

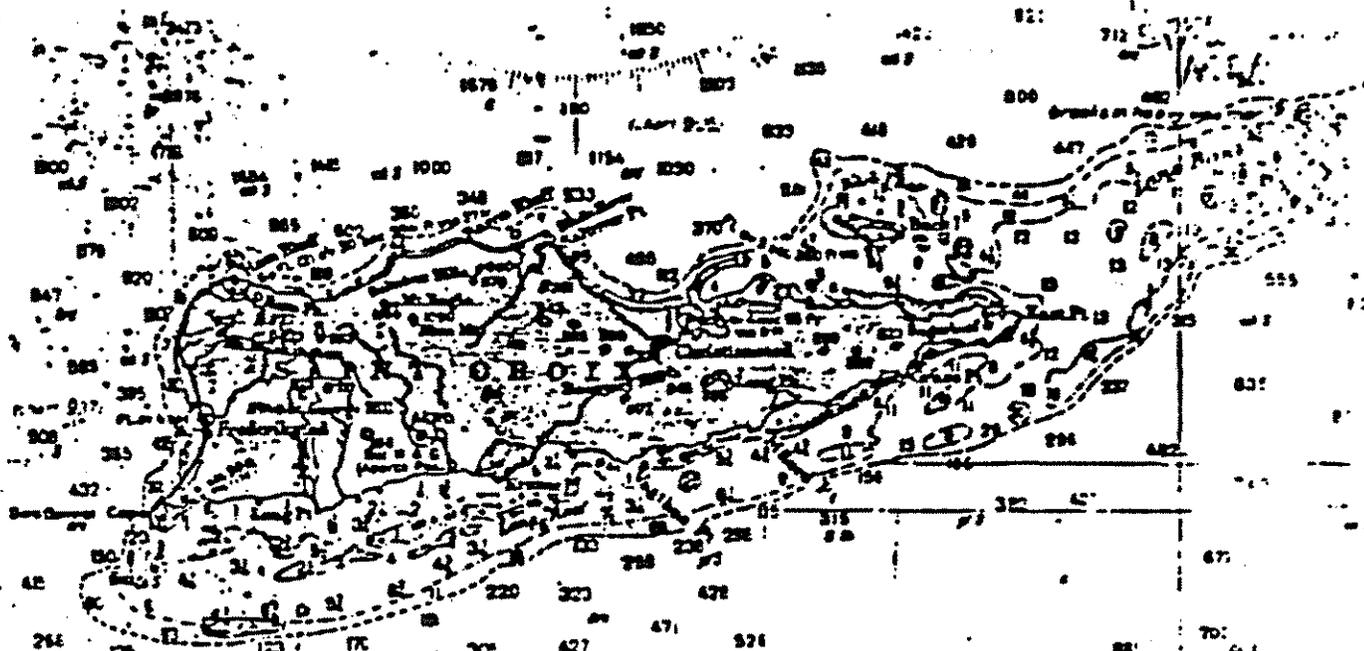
Serranids (grouper) lutjanids (snappers) represent two of the most commercially important reef fish families in the Caribbean (Caribbean Fishery Management Council, 1985). Certain fish species from both families have developed reproductive strategies to increase egg and larval survival by reducing predation (Johannes, 1976); unfortunately, the reproductive behavior of the fishes at this time make them highly vulnerable to fishing pressure. Munroe (1974) reported handline and fish trap catches up to 1000 kg per day by fishermen harvesting a breeding aggregation of Nassau grouper, Epinephelus striatus, off St. Thomas, U.S. Virgin Islands. In addition to Nassau grouper, red hind (E. guttatus) spawning populations have also seriously been depleted around St. Thomas by overfishing (Olsen and LaPlace, 1978).

Mutton snapper (Lutjanus analis), locally called "virgin snapper" are caught in insular shelf waters from 1-50 m in depth by traditional hook and line and fish trap methods. Normal catch rates are low, averaging 1.3% of the total weight of the fish trap catch (Division of Fish and Wildlife, unpublished data).

A spawning aggregation of mutton snapper has been located by fishermen off the south shore of St. Croix and it has been the subject of a small but intensive (handline) fishing effort since 1979. The number of vessels comprising the snapper fleet fluctuates daily, depending on the previous days' catch, local weather conditions and sea state. A maximum of 33 vessels averaging 18 ft in length (66-99 fishermen) have been noted during an evening's snapper fishing (personal communication with Francisco Melendez, commercial fisherman). The fishing effort is concentrated for a 5-7 day period after the full moon, during the months of February through July.

Data obtained from personal contact interviews with fishermen by Division port sampling agents indicated that the mutton snapper spawning aggregation shows signs of overfishing (i.e., fewer number and smaller size fish caught) (Tobias, 1986).





NATIVE MAPPLE
SPINNING AREA

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1530

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1810

1920

1950

1970

E A

2000

2100

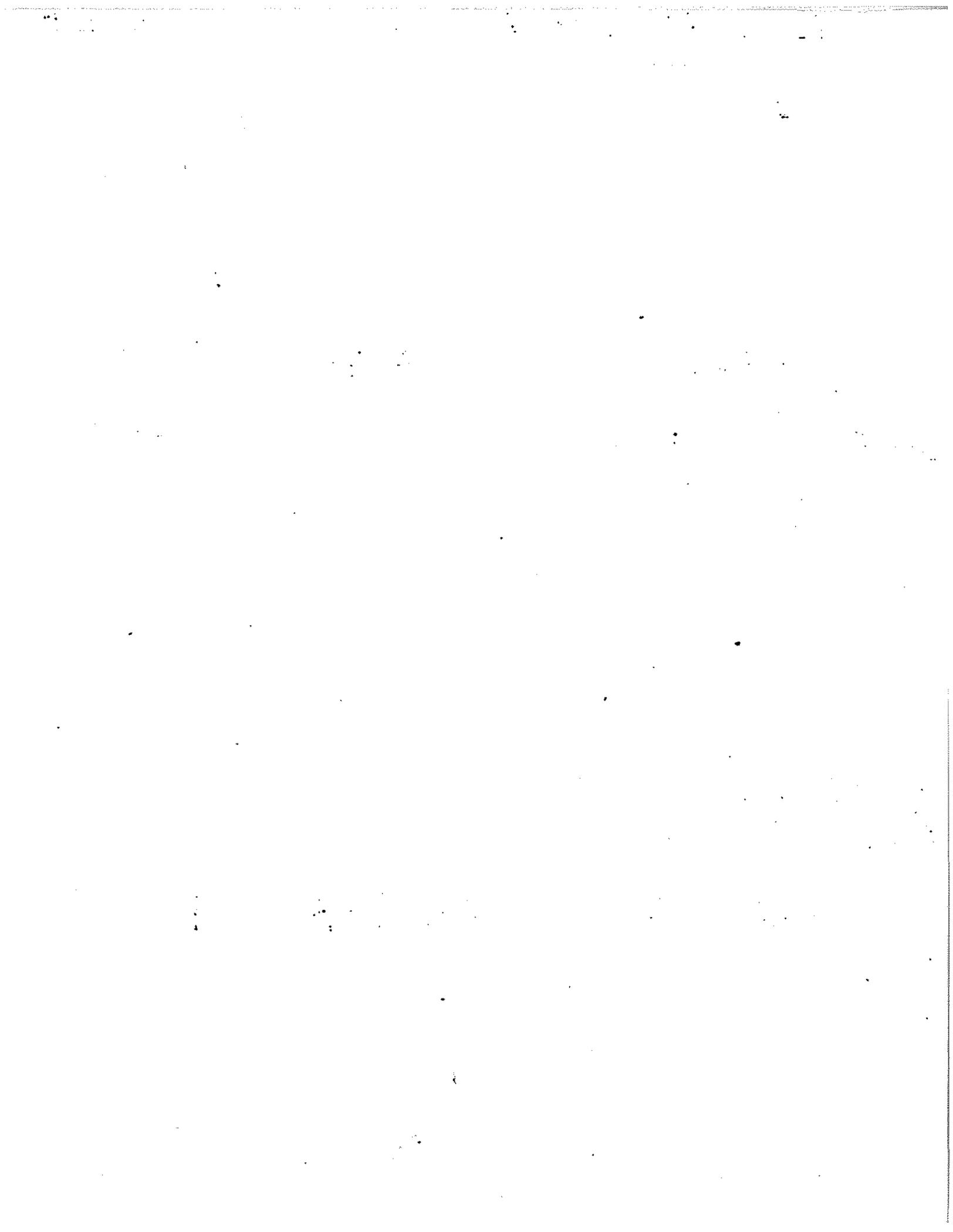
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65° 00'

64°

(Puerto Rico and Virgin Islands)

C. & G. S.



Address all correspondence
to the Executive Director

69 MAY - 5 AM 10 05

May 4, 1989

Mr. Miguel Rolón
Executive Director
Caribbean Fishery Management Council
Suite 1108
Banco de Ponce Building
Hato Rey, P.R. 00918-2577

Dear Mr. Rolón:

The Corporation for the Development and Administration of the Marine, Lacustrine, and Fluvial Resources of Puerto Rico hereby presents its comments on the proposed amendments to the Fishery Management Plan for the Shallow-water Reeffish Fishery of Puerto Rico and the U.S. Virgin Islands (FMP).

- Measure 1. We concur that there is a need to increase the minimum size of the mesh of the fishing pot, "nasa" to 2 inches to allow escapement of juveniles of species of commercial importance as one means of improving the shallow-water fishery of Puerto Rico. Should this measure be incorporated into the FMP, there should be a grace period of two years for all those traps which are composed of plastic-covered wire. The purpose of such grace period is to minimize the economic difficulties on fishermen using this type of wire. A grace period of one year would be appropriate for all other trap types.
- Measure 2. We recognize that an autodestruct panel on fishing posts must be used and that a 10 day period is appropriate.
- Measure 3. We recognize the current poor status of the Nassau grouper (Epinephelus striatus) fishery and support a minimum size of 24" for landed individuals. Since the purpose of the original management measure is to protect juveniles from capture, and since we believe the minimum size regulation will achieve this purpose, we cannot support a total closure of this fishery.

cont..

commonwealth of puerto rico :: corporation for the
development & administration of the marine, lacustrine & fluvial resources of puerto rico
p.o. box: 2629, san juan, p.r., 00903 - 2629
(809) 725-7200



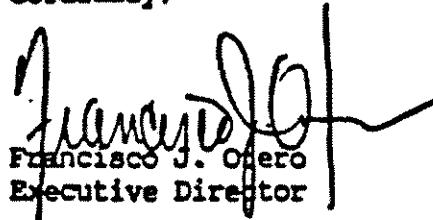
Mr. Miguel Rolón
Page 2

Measure 4. We recognize that socio-economic data are needed and support this measure.

Although not covered by this amendment, we wish to express our concern for the current status of the Red hind (E. guttatus) fishery and believe that management measures need to be taken to protect this resource.

I hope that our comments will be helpful to the Council in determining the implementation of the proposed amendments.

Cordially,



Francisco J. Ojeda
Executive Director

cc Hon. José E. Laborde
Secretary
Department of Natural Resources

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- Caribbean Fishery Management Council. 1985. Fishery management plan, final environmental impact statement and draft regulatory impact review for the shallow-water reef fish fishery of Puerto Rico and the U.S. Virgin Islands. 69p.
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