

REGULATORY AMENDMENT

TO THE

SHALLOW WATER REEF FISH

FISHERY MANAGEMENT PLAN

(Includes Environmental Assessment
And Regulatory Impact Review)

July 1991

**Caribbean Fishery Management Council
Suite 1108 Banco de Ponce
Hato Rey, PR 00918
(809) 766-5926**

This Regulatory Amendment was developed under the authority of
Public Law 94-265, as amended, the Magnuson Fishery Conservation And Management Act.

1. History of Management

The Shallow-Water Reef Fishery of Puerto Rico and The U.S. Virgin Islands FMP was implemented on September 22, 1985. The implementing regulations, designed to stop the declining trend of stocks, included: (1) a minimum mesh size of 1 1/4 inches for fish traps; (2) requirement of a self-destruct panel and/or a self-destruct door fastening on fish traps; (3) requirement for owners to identify and mark their gear and boats; (4) prohibition of hauling or tampering with another person's traps without owner's written permission; (5) prohibition on the use of poisons, drugs, other chemicals, and explosives for fishing among other management measures; and (6) minimum size limits for yellowtail snapper and Nassau grouper.

In May 1990, the First Amendment to the FMP added a management measure to establish an area closure during the red hind spawning season in the EEZ southwest of St. Thomas; included a provision for the collection of socio-economic data, and modified two of the management measures to: (1) increase the minimum mesh size requirement for fish traps to 2 inches, and (2) prohibit the harvest of Nassau grouper. This action was taken because new information indicated that more stringent management measures were needed to accomplish the objectives of the FMP. Data provided by the local fishery agencies demonstrated that in spite of the management measures implemented so far there is a declining trend in these fisheries, indicated by a shift in species composition and a decrease in volume of landings.

After Hurricane Hugo, a situation developed related to the Council's management measure which required the use of the 2-inch mesh wire in fish traps. The fishermen that lost fishing gear obtained loans from the Small Business Administration and other entities to replace fish traps. However, instead of buying the 2 inches mesh wire they acquired square mesh wire of 1 1/2 inches. If the management measure implementing the 2 inches minimum mesh size requirement on September 14, 1991, is not modified, the fishermen will suffer significant economic hardships. Therefore, after consulting with the fishermen through fact-finding meetings and public hearings, the Council decided to amend the implementing regulations to increase protection of the resource while providing for the use of stockpiled wire.

2. Proposed Action

The Council proposes to modify the minimum mesh size and degradable panel requirements for fish traps. This action proposes minimum allowable mesh sizes for fish traps of (1) 1.5 inches (3.8 centimeters) for hexagonal mesh; (2) 1.5 inches for square mesh through September 13, 1993; and (3) 2.0 inches (5.1 centimeters) for square mesh, effective September 14, 1993. In addition, this regulatory amendment proposes more specific requirements for

degradable panels on fish traps. The intended effect is to reduce adverse economic impacts on the industry while still continuing the stock rebuilding program.

3. Management Objectives and Definition of Overfishing

The original plan objectives addressed by the Shallow-Water Reef Fish FMP 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.

The proposed management measures in this regulatory amendment are directed toward fulfilling these objectives and are in accordance with the FMP overfishing definition.

Overfishing Definition

A reef fish 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 reef fish 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 reef fish 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.

4. Procedures for Adjusting Management Measures as Specified in the FMP

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 report¹ serves as the basis for making adjustments in the management program implemented under the FMP. For the Shallow-Water Reef Fish 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.

5. Status of the Shallow-Water Reef Fish Stock

Certain species of shallow-water reef fish are considered to be overfished. However, given that the Council does not have at present a SAFE Report quantifying the extent of overfishing, it has decided to take prudent actions to protect the resources, before ultimate steps are taken for the benefit of the fishery. These actions include the closure of the fishery for Nassau grouper, which has become a rare event in the landings. Additionally, to

¹The Secretary of Commerce (NMFS) did not have a SAFE report for the shallow-water reef fish fishery at the time this amendment was prepared. The Council will re-examine this issue once the SAFE report is available.

protect the red hind spawning aggregations, a seasonal closed area, Southwest of St. Thomas, was established during December through February of each fishing year. Other spawning aggregation sites will be protected in future amendments to the FMP, once they have been identified.

Since the implementation of the FMP, new information from Puerto Rico's Department of Natural Resources has shown a downward trend in these fisheries, indicated by a shift in species composition and a decrease in volume of the landings. For example, the parrotfish, which were historically considered second and third class in most sectors of this fishery, have become regarded as first class. Parrotfish are now one of the most frequently landed species, displacing the snappers and groupers that are no longer abundant.

6. Management Measures

Preferred Measure

The regulatory amendment proposed by the Council (preferred alternative) contains the following provisions:

1. Traps fabricated of bare hexagonal wire of 1.5 inches in the smallest dimension or wire mesh of 2 inches (bar measure) must have openings (8 x 8 inches) on each of two opposing sides of the trap (excluding the top, bottom and side with funnel opening). The 8 x 8 inches openings must be covered with a panel of wire of a mesh size no less than that of which the trap is constructed and attached with untreated jute of a maximum diameter of 1/8 inch. The access door may serve as one of the panels if it is hinged at the bottom and fastened with 1/8 inch jute at the top so that the door would fall open when the fastener degrades. Jute used to secure the panels may not be wrapped or overlapped to extend degradation time.
2. Traps constructed with square-mesh bare wire of 1.5 x 1.5 inches must have openings of 9 x 9 inches covered with a panel of a mesh of no less than 2-inch square-mesh wire on each of two opposing sides of the trap (excluding the top, bottom and side with funnel opening) and attached as described above. All 1.5-inch square-mesh wire will be disallowed in the fishery beginning September 14, 1993.
3. All wire mesh measurements are from center of strand to center of strand in accordance with manufacturers' specifications.

4. Plastic traps and vinyl-coated wire traps must conform to the same mesh measurements and escape panel requirements for bare wire traps. The dimensions of the mesh openings in plastic and vinyl-coated wire traps must be equivalent to the mesh opening specifications for bare wire traps.

Rationale:

The Council accepted this alternative to minimize negative social and economic impacts, while achieving the objectives of the FMP.

Amendment 1 implemented various management measures designed to accomplish the objectives of the FMP, including an increase in the minimum mesh size for fish traps from 1.25 to 2.0 inches (3.2 to 5.1 centimeters), effective September 14, 1991. After approval of Amendment 1, several representatives of the fishing industry and of the Government of the U.S. Virgin Islands sharply criticized the scheduled increase in minimum mesh size. They also stated that a number of fishermen had stockpiled 1.5 inch (3.8 centimeter) square and hexagonal-mesh wire to replace fish traps lost during Hurricane Hugo. The critics noted that there exist regional food preferences for smaller fish that would be able to escape through the larger mesh, and that implementation of the 2.0-inch mesh size on September 14, 1991, would adversely impact both, the fishing industry and the consumers. It was also noted that the rationale for approval of the 2.0-inch mesh size under Amendment 1 included a study conducted in south Florida that may be inappropriate for the more diverse species composition of Puerto Rico and the U.S. Virgin Islands.

Because of the uncertainty and controversy surrounding the scheduled September 14, 1991, implementation of the 2.0-inch minimum mesh size, the Council has proposed this action under the FMP's framework procedure that would modify the schedule for implementation and, thus, reduce short-term economic impacts on the fish trap fishery. The Council proposes to allow 1.5-inch bare-wire hexagonal mesh or 2.0-inch bare-wire square mesh. However, through September 13, 1993, to accommodate fishermen who had obtained larger quantities of 1.5-inch square-mesh wire, such mesh may be used. The use of 1.5-inch square mesh is authorized only as an interim measure because the Council heard testimony that use of 1.5-inch square-mesh wire was causing excessive fishing mortality and resource waste. The square-mesh wire had even earned the reputation of "killer wire," because it reportedly entraps fish smaller than the 1.5-inch hexagonal wire mesh. The proposed 1.5- or 2.0-inch minimum mesh is an increase over the currently required 1.25-inch mesh and should result in biological benefits to the fishery.

In addition, the Council has proposed action under the FMP's framework procedure that would modify the requirements for escape

panels in fish traps. To provide protection against continued fishing by lost traps (ghost fishing), the regulations currently include a requirement for a single degradable escape panel and authorize an assortment of degradable materials, some of which have an untested or lengthy life expectancy. The Council proposes that two panels be required on each fish trap and that jute with a maximum diameter of 1/8 inch (0.3 centimeter) be the only allowed fastener for the escape panels. The panels must be on opposite sides; may not be on the top, bottom, or side of the trap containing the entrance; and must be of specified size and mesh. These changes will offer greater protection against ghost fishing, thereby reducing fishing mortality from current levels.

From the biological point of view, the preferred management measure is compatible with Amendment 1 of the FMP. Therefore, no significant changes are expected to occur in the fulfillment of the biological considerations of the objectives of this FMP.

7. Regulatory Impact Review and Initial Regulatory Flexibility Analysis

I. 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, and 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 that 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 or 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 serves as the Regulatory Flexibility Analysis (RFA) for the FMP. In addition to analyses conducted for the RIR, the RFA 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. The 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.

II. Problem Statement

The Fishery Management Plan for the Shallow-water Reef Fish 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 program for the shallow-water reef fish 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 reef fish in the Caribbean, about 180 are landed and used in quantity throughout the

region and collectively comprise the most important fishery in the islands. The FMP's management unit includes the 64 major commonly landed species (distributed among 14 families) that compose the bulk of the catch from Puerto Rico and the U.S. Virgin Islands.

The FMP established regulations to rebuild declining reef fish 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 reef fish; 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.

Since the implementation of the FMP, new information indicated that more stringent management measures were needed to accomplish the objectives of the FMP. Data from CODREMAR's Fishery Statistical Project has shown a downward trend in these fisheries indicated by a shift in species composition and a decrease in the volume of landings. For example, the parrotfish, which was historically considered second and third class in most sectors of this fishery, is now to be regarded as first class and has become one of the most frequently landed species, displacing the snappers and groupers that are no longer abundant. This occurred in spite of the management measures implemented in the original FMP.

Amendment 1, implemented on November 29, 1990, contained six actions designed to address these new issues. One of these actions changed the wording of the data collection activities to recognize the need for socio-economic information, while another revised the wording of the habitat section of the FMP. Other actions required self-destruct panels or door fastenings that would degrade in a maximum of 10 days (selection of material deferred until tests are completed), prohibited the take of Nassau grouper and established a December-February spawning closure for red hind off St. Thomas. The sixth action changed the minimum mesh size of traps from 1.25-inches to 2-inches. That particular action also established an effective date of September 14, 1991, to allow the fishermen time to replace existing traps, and represented an attempt to reduce or eliminate a portion of the transition costs to new fishing gear.

Since the implementation of Amendment 1, the Council received public testimony and additional information that the transition costs of changing to the 2 x 2 inch mesh was too high. The fishing industry still maintains a substantial inventory of small-mesh

wire. The initial reduction in catch induced by the larger mesh would have an unacceptable, adverse impact on the industry, even

though this reduction would eventually result in rebuilding the stock and larger future catches.

III. Objectives

The original plan objective addressed by this regulatory amendment is:

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.

IV. Management Measures

Preferred Measure

The regulatory amendment proposed by the Council (preferred alternative) contains the following provisions:

1. Traps fabricated of bare hexagonal wire of 1.5 inches in the smallest dimension or wire mesh of 2 inches (bar measure) must have openings (8 x 8 inches) on each of two opposing sides of the trap (excluding the top, bottom and side with funnel opening). The 8 x 8 inches openings must be covered with a panel of wire of a mesh size no less than that of which the trap is constructed and attached with untreated jute of a maximum diameter of 1/8 inch. The access door may serve as one of the panels if it is hinged at the bottom and fastened with 1/8 inch jute at the top so that the door would fall open when the fastener degrades. Jute used to secure the panels may not be wrapped or overlapped to extend degradation time.

2. Traps constructed with square-mesh bare wire of 1.5 x 1.5 inches must have openings of 9 x 9 inches covered with a panel of a mesh of no less than 2-inch square-mesh wire on each of two opposing sides of the trap (excluding the top, bottom and side with funnel opening) and attached as described above. All 1.5-inch square-mesh wire will be disallowed in the fishery beginning September 14, 1993.

3. All wire mesh measurements are from center of strand to center of strand in accordance with manufacturers' specifications.

4. Plastic traps and vinyl-coated wire traps must conform to the same mesh measurements and escape panel requirements for

bare wire traps. The dimensions of the mesh openings in plastic and vinyl-coated wire traps must be equivalent to the mesh opening specifications for bare wire traps.

Alternative Measure

The alternative measure is to change the mesh size from the status quo of 1.25 inches to a new minimum mesh size of 2 inches. The alternative measure is presently scheduled to become effective on September 14, 1991.

V. Approach to the Analysis

Provisions 1 and 2 of the proposed regulatory amendment, along with the alternative measure, will be the subject of the RIR. Provisions 3 and 4 will not cause economic changes in the fishery and are not discussed further.

The mesh size measures in this proposed regulatory amendment (and any other measures that would mandate a mesh size larger than currently used by a significant portion of the fishermen), are specifically designed to help meet the primary objective of the FMP. That objective is to rebuild the stocks and thus resolve the primary problem of the shallow-water reef fish fishery which can be generally described as biological overfishing. In the case of the shallow-water reef fish stocks the overfishing situation is well documented and is the result of a combination of circumstances that led to the increased levels of fishing effort (refer to Amendment 1 and Chapter 6 of the original FMP for the Shallow-Water Reef Fish Fishery). Given the overfishing situation, it is clear that changes in net economic benefits derived from the fishery depend heavily on the effect that management changes will have on the biological well being of the stocks. In rudimentary terms this is because the status of the stocks determines the fishery yield and a higher yield generally leads to larger economic values. Therefore, the predicted changes in current and future yields, along with factors which are not biological in nature, will be used as the major basis for determining the expected economic outcome, although costs related to management will also be considered.

Rebuilding a fishery stock through management regulations almost always involves the acceptance of short term losses because the effective level of fishing effort usually has to be restricted to allow the stock rebuilding process to occur. After the stocks rebuild, the notion is that greater fishery yields will occur and long term benefits will accrue to the fishery participants and to consumers. It is important to note that the management structure will have been a biological success if the rebuilding process is observed to occur. In contrast, the management structure will have been an economic success only if the economic value of the fishery is greater with versus without management. Therefore, this analysis entails a contrast of short term losses with long term

gains for the status quo (1.25 inch mesh), the preferred alternative (1.5 inch hex or 1.5 inch square) and the rejected alternative (2 inch square).

Net economic impacts (which can be negative or positive) include the sum of expected changes in producer surplus and consumer surplus for landings from the commercial fishery, potential changes in consumer surplus derived from recreational fishing trips and public/private management costs which are associated with or created by the management changes.

The analysis used in this RIR is almost entirely qualitative instead of quantitative. Data on the biology and economics of the fishery are insufficient for analytical purposes even though the biological and economic decline of the fishery is well established (otherwise there would be no need for management measures). In addition, there are no current studies available describing the catches that would occur with the various sizes under consideration. The discussion that follows contains two extremely important assumptions. First, that all the proposed measures will be fully adopted by the governments of Puerto Rico and the Virgin Islands. Second, that the level of compliance with any proposed measure will be large enough so that the potential benefits can actually be achieved. To the extent that one or both of these assumptions are violated, the economic benefits from management will be reduced. In the extreme case of virtually zero compliance with the regulations, the expected outcome of the management action is negative because none of the benefits will be realized, but the costs of management will still be incurred. With that major caveat, the following discussion examines the probable economic consequences of the suggested revision in the current management structure for the shallow-water reef fish complex.

Analysis of the Alternative Measure

The alternative measure is discussed first because it was subjected to analysis as a part of Amendment 1 to the FMP and the results of that analysis can form the basis for a comparison of the preferred measure versus the alternative.

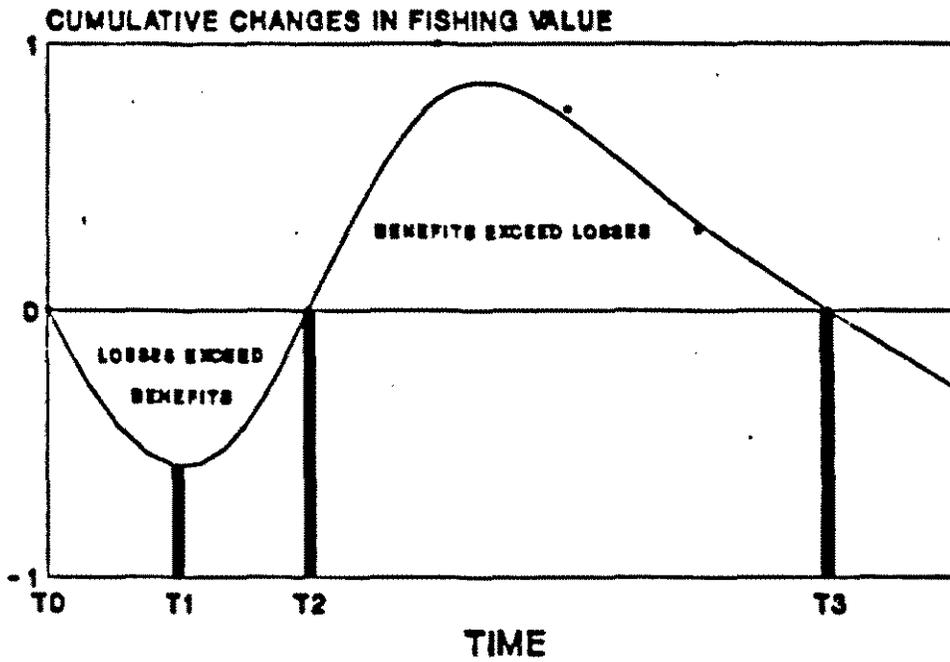
The biological evidence, although not necessarily conclusive, indicates that an enlarged mesh size will eventually lead, to an increase in the total pounds landed of target species and an increase in the average size of the fish landed. The increase in landings probably would not be great enough to materially reduce prices received by fishermen because the area relies heavily on imports and therefore the impact on total fish supplies will not be great. In addition, the expected larger size of the fish could tend to raise the price and thus offset any price decreases due to the increased landings. Finally, if stock rebuilding leads to increased catches of snappers and groupers, this would tend to raise the average price received for the total catch of all species

combined. However, some of these gains will be offset by permanent reductions in the catch of other species which may be able to exit the trap because of their generally smaller sizes. These species have become more prominent in the last decade, possibly because local consumers are switching to these species as their next best alternative. If that is true, then the loss of the landings of these inherently smaller species is not necessarily negative. In summary, the total gross revenue obtained from the resource in the long run (after the stock rebuilding process was underway) would be expected to rise as a result of the alternative management measure. Offsetting this potential gain in revenue will be increased costs associated with a one time switch to traps with a larger mesh size. This negative impact is lessened because of the one year phase-in period which was a part of the original proposal.

The period of time for which the measure is considered to be in effect is critical and choices of different time periods will change the direction of the outcome. To the extent that the measure is effective, increases in long run total net revenue, would occur after a short period of time (probably one or two years) during which net revenues fall because the catch of smaller fish will obviously decline until these fish (less the natural mortality which occurs in the interim) grow large enough to be captured in the new traps which have the larger mesh size. Then for several years following the short term losses, there would be net producer benefits. As the time period is extended, these increased benefits would attract more fishermen, or more effort by existing fishermen, or both, and eventually the benefits would disappear because increased effort means increased costs to catch the larger yield and would eventually lead to a decrease in yield through overfishing of the larger sized fish. Measures of this type can never be expected to provide permanent large increases in fishery values. However, interim steps like this could provide time to take action to restrict the total effort expended in the fishery. It will take the advent of some form of limited entry, and preferably one that contains provisions to allow fishermen to trade or sell their fishing rights, before permanent increases in the value of the shallow-water reef fish fishery will become a reality. Because of this longer term negative or neutral outcome of trap size measures, the assumption is made that the period of analysis will include the time required for some stock rebuilding and some additional years while benefits are derived from the measure. This assumption implies the introduction of a limited entry style of management sometime before all the interim benefits are dissipated by increased fishing effort.

The hypothetical graph in Figure 1 illustrates the nature of expected changes in benefits over time and follows the previous discussion in the text. For the time period T₀-T₁, there will be a decrease in fishery value mainly because the small fish are being excluded and potentially larger fish are not yet being caught. Then for time T₁-T₂ there will be an increase in producer surplus

Figure 1. Short and long term economic effects of an increased mesh size.



that will begin to offset the early losses. At time=T2 the gains will exactly equal the early losses. Then for an additional time from T2-T3 the benefits will exceed the losses but the benefits will be steadily declining. At time=T3 the benefits will have been dissipated by new fishing effort and for all years that follow the overall change in economic value will be negative. As explained in the earlier text, the analysis assumes that the mesh size measure is replaced by limited entry management at some time before time=T3. Following the same basic argument, consumer surplus is also expected to be greater for the T2-T3 time period because there will be a larger poundage of fish purchased at roughly unchanged prices (recall the discussion that supplies are not expected to increase enough to materially affect prices). The consumer surplus from recreational trips is also expected to increase for this time period based on the usual assumption that the catch of larger fish provides increased fisherman satisfaction and therefore larger benefits from any given level of fishing effort. In summary, the 2-inch mesh alternative would, after a short period of time when benefits would be reduced, produces economic benefits relative to the status quo of the 1.25-inch mesh regulation given that the assumption regarding the timely replacement of the measure is valid.

Analysis of the Preferred Measure

The preferred measure, which features the 1.5-inch hex mesh and 1.5-inch square mesh provisions, has biological and economic consequences that are similar to the effects produced by the alternative. Both measures provide for some stock rebuilding upon which the economic gains would be largely based and both would therefore be superior to the status quo that involves a mesh size of 1.25 inches. They differ in the degree and rate of stock rebuilding, and hence in the level of benefits that potentially could be obtained. Based on this consideration only, the alternative measure is expected to produce higher benefits than the preferred measure because the larger mesh size would be expected to result in higher yields and fishery values following some time period when losses would also be higher. However, it should be noted that the preferred measure contains two major provisions which produce differing results. Provision 1 allows the use of 1.5-inch hex mesh which may have similar effects as the 2-inch square mesh because the 1.5-inch dimension refers to the minimum dimension and the larger dimension is 2.25 inches. Therefore, there is some possibility that the 1.5-inch hex mesh may exclude some of the same fish as the 2-inch mesh because of the particular body conformation of certain species while species such as groupers would probably more easily escape the 2-inch square mesh. Unfortunately, such statements are speculative. Although mesh size studies are underway (refer to the main body of the amendment for details), the notion must remain as conjecture while the data is lacking. The requirement of two escape panels (8 x 8 inches) on each of two opposing sides of a trap that are fastened with

degradable material will prevent continued fishing of lost traps. (Note that only one panel was required by the alternative measure.)

Provision 2, which allows a 1.5-inch square mesh, has two important sub-provisions. One of these is that the trap must have two 9-inch square panels made of 2-inch square mesh. This should allow some of the smaller fish to escape, however, of greater importance, it allows the escapement of all fish from traps that are lost. Unfortunately, again the exact fish retention capabilities of this type of "1.5-inch square mesh" trap configuration will be unknown until the appropriate field trials are conducted. The other important sub-provision is that the 1.5-inch square mesh traps have to be phased out by September 14, 1993. What this implies is that to the extent that continued use of the 1.5-inch square mesh traps (with the 9-inch square panel composed of 2-inch square mesh) provides lesser benefits than would the use of traps with larger mesh sizes, this negative outcome would only exist for two years. Therefore it is possible that the potential additional biological damage to the stocks and resulting lower fishery values could turn out to be relatively unimportant.

The transitional costs associated with the preferred and alternative measures have an important bearing on the net economic outcome of the measures. The text of the amendment describes the results of recent fishermen surveys that were conducted to determine, among other things, the amount of wire of various mesh sizes currently possessed by the fishermen. The importance of the results is that if the wire of certain smaller mesh sizes cannot be used by the fishermen before those wire sizes become illegal in the fishery, the value of the wire to the fishermen may drop to virtually zero because the fishermen will have no alternative uses for the wire. Although the surveys did not contain enough information to quantify the effect of the potential problem in dollar terms, clearly such potential losses would increase the transitional cost of the alternative measure versus the preferred measure. Another type of important transitional cost is related to catches that must be foregone to allow the rebuilding process to occur. It is intuitively obvious that the alternative measure involving the larger mesh size will create larger short term losses (transition costs) than the preferred measure that features a smaller mesh size. Again it is difficult to forecast the relative difference in the short term losses for the two measures because of the lack of sufficient data upon which such calculations depend.

While it can be stated with some certainty that the preferred and alternative measures are both superior to the status quo in terms of the value derived from the fishery, the economic preference between these two measures is difficult to ascertain because of the lack of available data. Nonetheless, the potential additional gains in the long term yields and corresponding fishery values from a larger mesh size versus a smaller mesh size (within reasonable bounds) would probably outweigh the additional

transitional costs expected with the larger mesh size. As an illustration of the plausibility of this conclusion, assume that the additional benefits from the larger sized mesh are in the form of a one percent increase in average annual landings over the life of the measure. Since the historical level of landings for the U.S. Virgin Islands and Puerto Rico is about 6 million pounds, this would represent an annual increase of about 60,000 pounds with an annual ex-vessel value of about \$120,000 at current price levels. For this illustration, the increase in ex-vessel value can be considered to be an increase in net income because the increased landings would not involve increased levels of effort or cost relative to the effort or cost incurred in producing a lower level of landings under the other alternative. If the life of the measure is 10 years and a discount rate of 10 percent is used, then the net present value of the increased benefits is about \$370,000. It is difficult to imagine that the one-time additional transition costs would exceed this amount. The benefits resulting from two degradable panels, coupled with the $\frac{1}{4}$ -inch increase in mesh size, may more than offset the increased escapement made possible through implementation of the 2.0-inch mesh size.

Management Costs

The selection of either alternative would involve management costs which should be approximately equal because the measures differ by degree only. The relevant management costs are as follows:

Council costs related to decision-making and document preparation are included in Appendix 1.

NMFS administrative costs of document review and preparation of regulations has been estimated by SERO/NMFS as \$5,000.00

Additional enforcement costs for the U.S. Coast Guard and the NMFS are not expected as a result of this regulatory amendment. Both these agencies provide enforcement under the present regulatory regime, i.e., checking for compliance with fish traps management measures. As this Regulatory Amendment only modifies existing fish-trap regulations no additional enforcement efforts are required.

There should be no public and private costs involved since no additional data collection is mandated.

Additional research costs: None required for this action. However, research needs identified in section 10 are important for this fishery. The cost associated with said research will be determined by NMFS and the Council through the second amendment to this FMP.

TOTAL PUBLIC AND PRIVATE COSTS ASSOCIATED WITH THE AMENDMENT

Council Cost	\$ 18,495.00 .
NMFS Administrative Cost	5,000.00
NMFS Additional Enforcement Cost	-0-
U.S. Coast Guard Additional Enforcement Cost	-0-
Private Cost	<u>-0-</u>
Total Cost	\$ 23,495.00

SUMMARY AND COMPARISON OF NET ECONOMIC BENEFITS

<u>COST OR BENEFIT</u>	<u>PREFERRED MEASURE</u>	<u>ALTERNATIVE MEASURE</u>
Commercial value	fairly large	smaller (positive)
Consumer surplus	positive	smaller (positive)
Recreational value	positive	smaller (positive)
Management costs	(amount from table)	(amount from table)
Transition costs	not as costly	significant negative
Net benefits	significant and positive	smaller (positive)

INITIAL REGULATORY FLEXIBILITY ANALYSIS

8. 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 Reef Fish Fishery, so the "substantial number" criterion will be met. 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. II of the RIR (page 7).

Objectives and Legal Basis for the Rule: Refer to Section IV, C for the 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. V (page 10).

Demographic Analysis: A complete demographic analysis is contained in the Initial Regulatory Flexibility Analysis for Amendment 1 to the FMP and is not repeated here.

Cost Analysis: Refer to Management Cost in the RIR.

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 versus 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 1 to the FMP.

9. Environmental Assessment

Environmental Consequences

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

The September 14, 1991 scheduled implementation of a 2.0-inch minimum mesh size would cause adverse economic impact on the industry, since quantities of smaller wire purchased by fishermen would then be unusable. The amendment, if approved, would replace that schedule, allowing fishermen to utilize stockpiled quantities of smaller size and thereby be benefiting the industry.

The proposed adjustments will benefit the resource by a 1/4-inch increase in the mesh size, thereby increasing escapement of smaller size reef fish. Although the action cannot be quantified, the proposed requirement of two degradable panels, coupled with the increase in mesh size, should more than offset any additional escapement offered by immediate implementation of a 2.0-inch mesh requirement.

Relation of the Recommended Measures to Existing Applicable Laws and Policies

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 fishery 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.

Vessels will not 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 of 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.

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 proposed mesh size will be too small for their escapement.

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

The proposed amendment is not a major action having significant impact on the quality of the marine or human environment of the Caribbean area. The proposed action is an adjustment of the original regulations of the FMP under the framework procedure set forth in Amendment 1 to rebuild overfished

10. Scientific Research and Data Needs

The SAFE report is the most needed scientific document for this fishery. Specific information such are as follows:

Biological Needs

- Develop comprehensive computerized data bases for size frequencies, sex ratios, landings, and other fishery dependent statistic.
- Refine methods used to measure overfishing
- Develop yield per recruit analysis of the major species in the fishery to determine proper harvest levels for optimal yields.
- Improved catch/effort survey design to give more precise estimates if catch and effort by species, gear, geographic distribution, and season.
- Develop/implement fisheries independent survey design.
- Determine size/age structure and natural mortality of the stock.
- Determine spawning aggregation sites and times, as well as more definitive information on recruitment and sources of recruitment.

Socioeconomic Needs

- Identify levels of participation in the shallow-water reef fish fishery.
- Relevant social variables added to the data collection program currently maintained by NMFS and the local governments.
- Special studies to address decision making behavior of user groups regarding various regulatory alternatives for decision makers to consider and implement more palatable regulations.
- Develop socio-cultural characterization of user groups to evaluate catch/effort management strategies.
- Assess economic condition of the fishery
- Promote research to determine ciguatera causes and detection.
- Develop survey of recreational - "part-time" fishing activities to ascertain levels of fishing mortality relative to full-time commercial harvesters.

Social Impact Assessment Needs

The Council has one socio-anthropologist on its SSC to provide advice on social impacts of potential management action. However, his participation cannot and should not be regarded as a substitute for a relevant social impact research program sponsored by the National Marine Fisheries Service.

Social scientists are concerned with knowing about the composition of marine fisheries (recreational and commercial), how they are organized in groups and how they will likely react to proposed changes in the management regime. In addition to demographic characterizations of fisheries, it is important to understand patterns of participation and how proposed changes will impact their livelihood and lifestyle. From a recreational standpoint, we need information on variation in the angler population concerning benefits sought and satisfaction. We need to know the impacts of management on people and their communities over time to understand displacement of user groups and succession in fisheries. By observing and monitoring how segments of the marine fisheries industry differentially cope and adapt to management actions over time, more effective implementation and management is possible.

While the Magnuson Fishery Conservation and Management Act mandates an understanding of the social impacts of fisheries management, little research data is available to managers regarding fisheries in the Caribbean area. There is no social research program in support of fisheries management within NMFS. Furthermore, there is considerable misunderstanding of the social component of marine fisheries management. When decision makers lack a predictive understanding of what is palatable to various segments of the fishery resource protection goals may not be achieved. Without an understanding of management measures suitable to various user groups, scientific assessment committees would be less than effective in providing decision assistance to the Council. Acquisition of appropriate research data will require support on a continuing basis, not as a "single-shot band aid" whenever management decisions reach a crisis level that demands social input.

Social impact assessment information must be collected before crisis conditions developing. Social scientists need feedback regarding likely management needs so appropriate studies can begin now. Research funding support must be made available to achieve the goals specified in the Magnuson Fishery Conservation and Management Act.

LIST OF AGENCIES AND PERSONS CONSULTED

- Caribbean Fishery Management Council
- Shallow-Water Reef Fish FMP Committee
 - Scientific and Statistical Committee
 - Advisory Panel

- National Marine Fisheries Service
- Southeast Regional Office
 - Southeast Fishery Center

LIST OF PREPARERS

Caribbean Fishery Management Council

- Miguel Rolón, Executive Director
- Stephen Meyers, Fishery Statistician
- Carlos A. Ramos, Administrative Officer
- Diana Martino, Clerk Typist

Southeast Regional Office, NMFS

- William R. 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

RESPONSIBLE AGENCIES

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

References:

CFMC - 1985

Fishery Management Plan, Final Environmental Impact Statement and Regulatory Impact Review for the Shallow-Water Reef Fish Fishery of Puerto Rico and the U.S. Virgin Islands. CFMC Publication p.69 (plus appendices).

CFMC - 1990

Amendment Number 1 to the Fishery Management Plan for the Shallow-Water Reef Fish Fishery, Preliminary Environmental Assessment and Regulatory Impact Review. CFMC Publication p.51 (plus appendices).

Gabriel, W.L., W.J. Overholtz, S.A. Murawski and R.K. Mayo. 1984. Spawning stock biomass per recruit analysis for seven Northwest Atlantic demersal finfish species. Spring 1984. NMFS, NEFC, Woods Hole Laboratory Reference Document Number 84-23.

Goodyear, C.P., 1989. LSIM - A length-based fish population simulation model. NOAA Technical Memorandum NMFS-SEFC-219, iii plus 55 pages.

Public Review

A total of four (4) public hearings were held to obtain comments on this regulatory amendment.

The public hearings dates and sites were as follows:

June 10, 1991 - 2:00 p.m.
Club Náutico de Mayaguez
Los Locos Adams
Guanajibo #368
Mayaguez, Puerto Rico 00708

June 11, 1991 - 2:00 p.m.
Rest. El Mesón Criollo
Carr. #937, Las Croabas
Fajardo, Puerto Rico

June 12, 1991 - 7:30 p.m.
Conference Room
Legislature Building
Christiansted
St. Croix, USVI

June 13, 1991 - 7:30 p.m.
Conference Room
Legislature Building
St. Thomas, USVI

**Estimated Cost of the Regulatory Amendment
to the Shallow-Water Reef Fish FMP**

I. CONSIDERATION AT THE COUNCIL MEETINGS

Estimated Compensation Cost of One Council Meeting - Council Members (6 Council Members x 373 x 2 days)	\$ 4,476.00
Estimated Travel Expenses of One Council Meeting - (6 Council Members x \$490.)	\$ <u>2,940.00</u>
Estimated Cost for One Meeting	\$ 7,416.00

Council Meetings are estimated to last 16 hours, of which at least 2 hours have been devoted to the Regulatory Amendment to Shallow-Water Reef Fish FMP during the past three (3) Regular Council Meetings, two (2) Shallow-Water Reef Fish FMP Committee Meetings and one (1) meeting with fishermen in St. Thomas, USVI.

Estimated Cost - \$7,416.00 x 12.5% x 6 meetings

\$ 5,562.00

II. PUBLIC HEARINGS

Estimated Council Members Compensation (one member x one day x 4 hearings)	\$ 1,492.00
Estimated Fringe Benefits (COLA - 11.25% average - FICA 7.65%).....	\$ 294.00
Estimated Travel Expenses (Travel - \$150 + Per Diem \$170 x 4 meetings) ...	\$ 1,280.00
Estimated Conference Room Costs	\$ 400.00
Estimated Cost of Announcements	\$ <u>1,600.00</u>

Estimated Cost of Public Hearings - (4)

\$ 5,066.00

III. TIME DEVOTED BY STAFF

It is estimated that at least two (2) staff members have devoted ten percent (10%) of their time from November 1990 through June 1991, to the Regulatory Amendment to the Shallow-Water Reef Fish FMP.

Salaries for the Period Nov. 1990 to June 1991 (15 Pay Periods x 10%).....	\$ 5,805.00
Estimated Travel Expenses to Meetings and Public Hearings (\$150 x 10)	<u>1,500.00</u>
Estimated Cost	\$ 7,305.00

IV. OTHER EXPENSES

Simultaneous Translation Provided at Council Meetings (\$750/day x 2 days x 3 meetings = \$4,500) (12.5% x \$4,500).....	\$ <u>562.00</u>
Total Estimated Cost	\$ <u>18,495.00</u>