

FRAMEWORK ADJUSTMENT 27

to the

NORTHEAST MULTISPECIES FISHERY MANAGEMENT PLAN

**To achieve plan objectives in 1999
and implement other measures**

Prepared by

New England Fishery Management Council

in consultation with

National Marine Fisheries Service

Mid-Atlantic Council

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1. INTRODUCTION

1.1 Executive Summary

The New England Fishery Management Council (Council) is taking action to implement measures under an ongoing rebuilding plan for northeast multispecies groundfish stocks. This action is the third iteration of the plan review and adjustment process established by Amendment 7 to the Northeast Multispecies Fishery Management Plan (FMP) to ensure that rebuilding plan goals are met on a continuing basis.

The primary purpose of this action is to reduce or maintain fishing mortality rates of the five critical stocks below rebuilding targets established by Amendment 7 ($F_{0.1}$ for Georges Bank cod, haddock and yellowtail flounder, and Southern New England yellowtail flounder, and F_{MAX} for Gulf of Maine cod). While fishing mortality rates on most of the critical stocks under the Amendment 7 plan are below the targets, the rates on cod stocks are above targets and need to be reduced, by 22 percent for Georges Bank cod and by 56 percent for Gulf of Maine cod from 1997/1998 fishing mortality rates. The Council was unable complete development of measures to reduce fishing mortality rates on Georges Bank cod without risking delay in the implementation of measures to address the more critical Gulf of Maine cod situation, so it is initiating a separate framework adjustment with an initial meeting scheduled for February 24-25 to address this issue.

The regulations governing the annual review and adjustment process require the Multispecies Monitoring Committee (MSMC) to calculate target total allowable catch levels (TACs) for the five key stocks. The TACs enable the Council and National Marine Fisheries Service (NMFS) to monitor the fishery during the year relative to the plan objectives. The TACs for the 1999 fishing year are provided in the following table.

Stock	1999 TAC (metric tons)
Georges Bank cod	5,354
Georges Bank haddock	5,600
Georges Bank yellowtail flounder	2,725
Southern New England yellowtail flounder	1,115
Gulf of Maine cod*	1,340

*NOTE: The plan objectives for Gulf of Maine cod specify that the TAC be based on a fishing mortality rate of F_{MAX} ($F=0.29$), however, scientific advice is that the stock is collapsing. In response to this grave advice, and in consideration of the ineffectiveness of previous actions to achieve the plan target for GOM cod, the Council is taking a precautionary approach. It has drafted measures using a more conservative reference point, $F_{0.1}=0.16$, as a benchmark to significantly increase the likelihood that the plan target will not be exceeded in the upcoming year. The TAC calculated to achieve the more conservative target is 782 metric tons.

This framework adjustment contains the following measures:

- **Gulf of Maine closed areas:** expanded seasonal closed areas and continuation of the year-round closure of the Western Gulf of Maine Closed Area designed to protect aggregations of cod
- **Gulf of Maine cod trip limit:** 200 pounds per day; when 402 metric tons, or 51 percent of the Gulf of Maine cod total allowable catch (TAC) is landed the Regional Administrator will be authorized reduce the trip limit by publication of a notice in the *Federal Register* to an amount in the range of 5-100 pounds depending on an evaluation of the risk of exceeding the TAC.
- **Inshore Gulf of Maine gear restriction:** Otter trawl vessels fishing inshore in the western Gulf of Maine will be limited to a maximum diameter of 12 inches for roller and rockhopper gear.
- **Haddock trip limit adjustment:** 2,000-pound-per-day/20,000-pound-maximum trip limit starting May 1; when the 75 percent of the target TAC is reached, the Regional Administrator could decide to reduce the trip limit to either 1,000 pounds (total possession) or 1,000-pounds-per-day/10,000-pounds-maximum based on a determination of the risk of exceeding the TAC; if, by September 30, the Regional Administrator determines that there is a high probability that landings for the fishing year will be less than 75 percent of the target TAC, then the Regional Administrator would be authorized to increase the trip limit to allow landings to achieve at least 75 percent of the TAC.
- **Clarification of trip limits- weight of fish:** Trip limits are to be based on the weight of whole, whole gutted, and/or gilled fish. Fillets are to be counted against the trip limit at a rate of 3-to-1 (one pound of fillets equates to three pounds against the trip limit).
- **Increase the minimum mesh size for square mesh and eliminate the Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas:** The minimum mesh size for square mesh will be increased to 6.5 inches (from 6 inches) in the Gulf of Maine/Georges Bank and Southern New England Regulated Mesh Areas; the Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas (square mesh areas) will be eliminated.

The Council will continue to monitor the rebuilding plan to insure that its goals are met each year. Additionally, the Council has amended the FMP (Amendment 9 and Amendment 11, Essential Fish Habitat, and Amendment 12, small-mesh species) to bring it into compliance with the new and revised national standards in the Sustainable Fisheries Act. These amendments are in various stages of review and will become effective, pending approval by the Secretary of Commerce, in 1999. The Council has initiated the process to prepare Amendment 13 to implement rebuilding plans for stocks identified as overfished under the new overfishing definitions submitted in Amendment 9 and to make other modifications to the FMP to address issues identified during the scoping process.

1.2 Background

1.2.1 Previous actions

Amendment 7

Amendment 7 established a rebuilding program for Georges Bank (GB) and Gulf of Maine (GOM) cod, GB haddock, and GB and Southern New England (SNE) yellowtail flounder stocks based primarily on days-at-sea (DAS) controls, area closures and minimum mesh size. As early as 1995, during the development of the amendment, the Council recognized issues that would have to be addressed after implementation and as the plan evolved. Foremost of these, as noted in the Final Supplemental Environmental Impact Statement (FSEIS) was the potential for effort shifts between areas or fisheries in response to restrictive DAS allocations and closures of prime fishing grounds on Georges Bank. A second issue recognized by the Council was the relative lack of control of fishing effort of some fleet sectors, particularly gillnet vessels and day boats, which had either been exempt from restrictions, or were not effectively managed under Amendment 5.

Framework 20

During the first annual plan review under Amendment 7, in the Fall of 1996, the Council learned that fishing mortality rates on four of the five principal stocks (except GOM cod) had declined but that effort on GOM cod remained well above the maximum acceptable level set by the plan. That review resulted in Framework 20, which included the establishment of a gillnet gear/effort control program and GOM cod trip limit, as well as incentives to shift effort to other fisheries in the form of an increased haddock trip limit and establishment of several exempted fisheries (non-DAS fisheries with very low groundfish bycatch levels).

Framework 24

Following implementation of Framework 20, the Council learned that the GOM cod trip limit system was not working as effectively as it intended. Reportedly, vessels were landing cod in excess of the per-day limit and keeping their DAS clock running, as required, but were then returning to fish for species other than cod (and perhaps discarding cod). While this practice was within the rules, the Council felt it was a violation of the intent of the trip limit as an effort control mechanism. In response, the Council prepared Framework 24 which requires vessels that exceed their per-day limit of GOM cod to remain in port until sufficient DAS time has elapsed to account for the landings. This system allows vessels to land cod caught in excess of the trip limit (thus avoiding discards) but retains the effectiveness of the effort control system.

Framework 24 also contained exemptions to the regulations so vessels could fish in the areas managed under Northwest Atlantic Fishery Organization (NAFO) and a provision to allow vessels to carryover up to 10 unused DAS to the following fishing year. This framework became effective on April 9, 1998.

Framework 25

In January, 1998, the Council completed the second annual plan review and adjustment procedure established by Amendment 7 and submitted Framework 25 to make the following changes:

- reduce the cod trip limit and expand the use of closed areas (including a year-round closure) in the Gulf of Maine
- increase the haddock trip limit based on three-fold increase in the haddock TAC

- postpone the implementation of electronic vessel monitoring systems (VMS) for one year, and
- require a raised-footrope trawl in Small Mesh Areas 1 and 2 in the Gulf of Maine.

Framework 25 became effective on May 1, 1998. The GOM cod trip limit was initially set at 700 pounds per day, with authority given to the NMFS Regional Administrator to reduce the limit to as low as 400 pounds by notice action when 50 percent of the target TAC was projected to be reached. That reduction took effect on June 25, only two months into the fishing year. The area closures implemented by Framework 25 included a year-round closure of the Western GOM Area (approximately 900 square nautical miles covering parts of Jeffreys Ledge and Stellwagen Bank), and sequential one-month closures of four inshore and one offshore areas (“rolling closures”).

Framework 26

The Council submitted Framework 26 on December 18, 1998 to take action to protect cod during the 1999 spawning season, before more permanent measures contained in the annual adjustment framework would be in effect, in response to scientific advice that the stock is collapsing. Framework 26, which took effect on February 1, 1999, adds closures of seven 30-minute square blocks selected on the basis of their historical cod catch per unit of effort. The blocks that are closed under this action are concentrated in the inshore areas of the Western Gulf of Maine, where cod aggregate to spawn during the late winter and early spring.

1.2.2 Multispecies Monitoring Committee Report

The Council established the MSMC to annually review the rebuilding plan, identify options as needed to achieve plan goals, and to set annual target total allowable catch levels (TACs) for the five focus stocks of cod, haddock and yellowtail flounder. So that sufficient time is available for the Council to develop and submit plan adjustments and for NMFS to review and implement regulations by the May 1 start of the fishing year, the MSMC must begin its review in early Fall. The MSMC met on the following dates in 1998:

- August 26
- October 21 & 27
- November 12-13.

As a result of this timetable, the MSMC must project the impacts of measures in effect for the current fishing year based on data from the first four or five months of the fishing year so that it can estimate the status of the stocks at the end of the year, calculate TACs and develop options to meet plan goals in the following fishing year. The MSMC completed its report on December 2 and formally presented it to the Council and public on December 9. The report is included in this document as Appendix II.

In summary, the MSMC noted the following:

Stock status has improved for the three Georges Bank stocks and Southern New England yellowtail. Calendar year 1998 fishing mortality rates are below the overfishing definitions for these stocks and below the more restrictive Amendment 7 targets for all

but Georges Bank cod. The fishing mortality rate on Georges Bank cod increased slightly to 0.26 in calendar year 1998. Spawning stock biomass has increased for these stocks but, with the exception of Georges Bank yellowtail, remains below the Amendment 7 biomass goals. In general, recruitment (incoming year classes) is below the long-term average with the exception of Georges Bank yellowtail.

*The status of Gulf of Maine cod has continued to deteriorate. The fishing mortality rate is projected to increase slightly to 0.82 in 1998, and remains well above both the overfishing definition ($F_{20\%}=0.37$) and the Amendment 7 mortality target ($F_{Max}=0.29$). Recruitment is at record low levels and spawning stock biomass is projected to decline in 1998 to the lowest level ever observed. Biomass is projected to decline below $\frac{1}{4} B_{MSY}$ in 1999. The proposed control law recommends zero fishing mortality when biomass is below $\frac{1}{4} B_{MSY}$. Given the SARC 27 management advice based on the stock condition, continued high fishing mortality rates, poor recent recruitment and decline in the survival ratios (recruit/spawning stock biomass), the Amendment 7 **objective of F_{max} is no longer appropriate.***

The MSMC also examined the status of the other large mesh regulated species (white hake, pollock, redfish, American plaice, witch flounder, winter flounder, and windowpane flounder) through calendar year 1997 using research trawl survey indices, commercial landings and a relative exploitation index. Survey biomass is low for five stocks (white hake, pollock, American plaice, Southern New England winter flounder, and Southern New England windowpane) and low to medium for three stocks (witch flounder, Gulf of Maine/Georges Bank windowpane and medium for two stocks (Cape Cod yellowtail and redfish). Relative exploitation has declined for all species, except white hake and Southern New England winter flounder. Exploitation has remained remain flat for these species since 1991.

Target total allowable catches (TACs) were calculated for calendar year 1999 (January 1 1999 to December 31, 2000) based on MSMC projected stock sizes for January 1, 1999 and target fishing mortality rates. These target TACs are then assumed to be the target TACs for the fishing year (May 1, 1999 to April 30, 2000). The TACs assume that the 1998 Canadian quota for the three Georges Bank stocks will be carried over in 1999. The assumed Canadian quota was subtracted from the Total TACs for transboundary stocks to obtain the USA target TAC. Target TACs are found in Table 1.

<u>Stock</u>	<u>1998 TAC</u>	<u>1998 landings</u>	<u>Projected 1999 TAC</u>
Georges Bank cod	4700	6348	5354
Georges Bank haddock 4797	3394		5600
Georges Bank yellowtail	2145	1110	2725
SNE yellowtail	814	223	1115
Gulf of Maine cod (F_{MAX})	1783	4075	1340
Gulf of Maine cod ($F_{0.1}$) 1783	4075		782

Table 1 1998 projected landings (calendar year) and TACs for 1998 and 1999 (calendar year applied to fishing year) in metric tons for the 5 major groundfish stocks.

The TAC (for F_{MAX}) for Gulf of Maine cod represents a 67% drop from projected 1998 landings.

2. Purpose and need

2.1 Need for the adjustment

The purpose of the proposed action is to reduce or maintain fishing mortality rates of the five critical stocks below rebuilding targets established by Amendment 7 ($F_{0.1}$ for GB cod, haddock and yellowtail flounder, and SNE yellowtail flounder, and F_{MAX} for GOM cod). While fishing mortality rates on most of the critical stocks under the Amendment 7 plan are below the targets, the rates on both stocks of cod (Georges Bank and Gulf of Maine) are above targets and in need of further action.

Previous MSMC reports provided the earliest indication that GOM cod needed further protection in order to meet those goals. Both the 24th Stock Assessment Workshop (SAW 24, 1997) and the 27th SAW (1998) confirmed the MSMC findings. The 1998 MSMC report (see Section 1.2.2 above) indicates that fishing effort on both cod stocks needs to be reduced, by 22 percent for GB cod and by 56 percent for GOM cod from 1997/1998 fishing mortality rates just to meet plan objectives, but that the GOM target may not be sufficiently low to stop the collapse of the stock.

SAW 27 gave the following advice:

“The stock continues to be over exploited, and biomass has declined to an extremely low level. . . . Fishing mortality has been very high (in excess of $F=0.88$ or 54 % exploitation) between 1983 and 1996), while spawning stock biomass has declined to a new record low in 1997. There is a 90% probability that the 1997 F [$F=0.75$ or 48% exploitation] was greater than 0.57 (40% exploitation), or about 1.5 times greater than the overfishing definition ($F_{20\%} = 0.41$ or 31% exploitation) and twice the rebuilding level ($F_{max} = 0.29$ or 23% exploitation).

*The SARC recommends an immediate reduction in fishing mortality to near zero. Measures should be implemented immediately to cease all directed fishing and minimize bycatch on this stock. Measures implemented in 1998 were only intended to achieve F_{max} . Reductions to F_{max} will be insufficient to promote rebuilding from record low spawning stock biomass. The combined effects of low spawning stock biomass, high fishing mortality, record low recruitment, and record low survival of pre-recruit fish **indicate that the stock is collapsing** [emphasis added].”*

In response to this grave advice, and in consideration of the ineffectiveness of previous actions to achieve the plan target for GOM cod ($F_{MAX}=0.29$), the Council is taking a precautionary approach. It has drafted measures using a more conservative reference point, $F_{0.1}=0.16$, as a benchmark to significantly increase the likelihood that the plan target will not be exceeded in the upcoming year. This framework adjustment does not change the plan target but it contains measures designed to keep the fishing mortality rate well below that target so that the chances of exceeding it are greatly reduced.

The Sustainable Fisheries Act requires the Council's to implement plans to stop overfishing and rebuild overfished stocks. Other stocks identified by NMFS as overfished in 1998 are:

- Gulf of Maine winter flounder
- Southern New England winter flounder
- American Plaice
- Witch flounder
- Windowpane flounder
- White hake (approaching an overfished condition).

While the measures in the Amendment 7 rebuilding plan generally, and this framework adjustment specifically, primarily address cod, haddock and yellowtail flounder targets, they also have an impact on the other overfished stocks. The Council may also implement additional measures as needed to address problems with those other stocks, such as an increase in the minimum mesh size for square mesh which would reduce the catch of juvenile flatfish. This document discusses how the proposed measures affect overfished stocks.

Based on the information provided by the MSMC for the other stocks, the Council considers the current plan to be effective either in reducing fishing effort on those stocks to levels that allow rebuilding within ten years, or in providing a mechanism for implementing needed regulations as new scientific information becomes available. The Council will initiate rebuilding plans for any overfished stocks, when information about their status is updated through the SAW process. For example, the Council received stock assessments for three of the stocks identified as overfished (SNE winter flounder, American Plaice and white hake) as well as Georges Bank winter flounder and Cape Cod yellowtail flounder at its January 27-28 meeting. It is initiating Amendment 13 based on that information to implement a rebuilding plan and remain in compliance with the SFA.

2.2 Publication as a proposed rule

The Council recommends that NMFS publish the proposed adjustments as a proposed rule to provide additional opportunity for public comment. Initially, it considered recommending publication as a final rule, but following discussions at its January 27-28 meeting where it modified the alternatives in the draft framework document to develop the final proposal contained in this document, Council members voted to recommend publication of a final rule.

3. PROPOSED ACTION AND ALTERNATIVES

The Council proposes the measures in Section 3.1 for implementation in this framework. Section 3.2 contains alternatives considered and rejected during the framework development process.

3.1 Proposed action

The Council is considering three primary alternatives to address GOM cod fishing mortality. It is also proposing a backstop system that would authorize the NMFS Regional Administrator to reduce the cod trip limit by notice action to prevent the GOM cod TAC from being exceeded. In addition, the Council is proposing an increase in the minimum size of square mesh codends, a modification to the haddock trip limit, and it is clarifying how the weight of fish is to be measured for compliance with trip limits.

3.1.1 Measures to reduce fishing effort on Gulf of Maine cod

The Council intends to meet the rebuilding goals for cod through a combination of measures: seasonal and year-round area closures, trip limits, and mesh/gear modifications. While the Council is basing these options primarily on their impacts on cod fishing effort, it is considering their impact on all regulated species, including those that are overfished.

3.1.1.1 Closed Areas

Reference maps for block numbers are Figure 1 (GOM) and Figure 2 (Northeast Region). Figure 3 shows the proposed closed areas in this framework. Except as noted, area closures apply to all gear capable of catching regulated species except to those gears that are currently classified as exempted gears. Exempted gear means gear that is deemed to be not capable of catching NE multispecies and includes: pelagic hook and line, pelagic longline, spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dipnets, stop nets, pound nets, pelagic gillnets, pots and traps, purse seines, shrimp trawls (with a properly configured grate), surf clam and ocean quahog dredges, and midwater trawls. Recreational fishing is exempt, however, party/charter vessels fishing while under DAS are considered commercial vessels and are prohibited from fishing in the closed areas.

In addition to the existing list of exempted gears, scallop dredge gear will be exempt from any newly closed areas (in Framework 26 or 27). Two interpretations exist regarding the Council's intent with this exemption and both versions are provided below. The Council will clarify its intent as a comment on the proposed rule. This exemption applies to scallop dredge vessels currently exempt from DAS in the Gulf of Maine (total dredge with 10.5 feet or less) and standard dredges fishing on DAS. On any trip that a scallop dredge vessel fishes in a closed area, for any part of the trip, the vessel may not possess any regulated species. Vessels must comply with the current twine top requirement, 5.5-inch mesh.

Scallop Vessel Exemption Version 1

Newly closed areas (where the scallop dredge exemption applies) are shown as solid shaded areas on the maps in Figure 3, and existing closures are shown as hatched areas. In this version, scallop dredge vessels would be exempt only from the solid shaded areas.

Scallop Vessel Exemption Option 2

Newly closed areas include all closures in the Gulf of Maine except the Western Gulf of Maine Closed Area (year-round closure). Under this version, The Council considers all seasonal or rolling closures to be new closures, regardless of whether parts or all of the areas were already scheduled for closure under Framework 25.

The Council has also stated its intent to develop a process for establishing other closed area exemptions that are based on demonstrated minimal cod bycatch.

- Areas shown in Table 1
- Blocks 124 and 125, October and November
- Western Gulf of Maine, year-round (existing closed area at Jeffreys Ledge)
- Cashes Ledge, July-October, defined by:

N.Lat.	W.Lon.
43°07'	69°02'
42°49.5'	68°46'
42°46.5'	68°50.5'
42°43.5'	68°58.5'
42°42.5'	69°17.5'
42°49.5'	69°26'

		MARCH	APRIL	MAY	JUNE	JULY
GM1	121-125	■	■	■	■	
GM2	129-133		■	■	■	
GM 3a	136-138			■	■	
GM3 b	139-140			■	■	■
GM4	141-147, 152				■	■

Table 1 Rolling Closures.

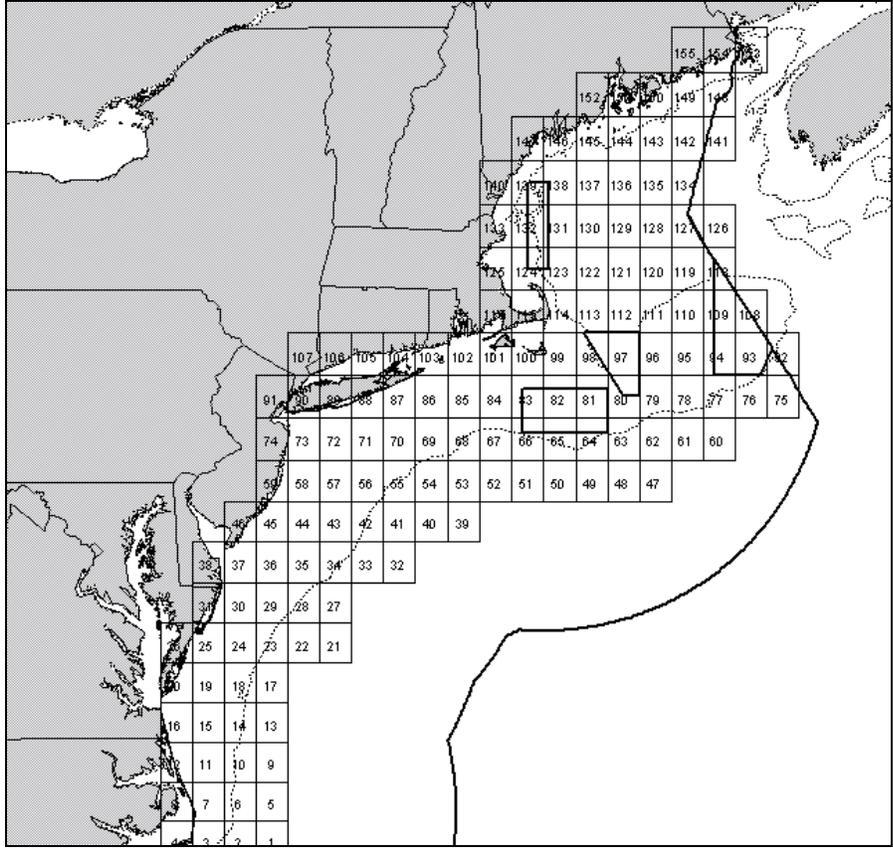


Figure 2 Northeast Region area closure reference blocks

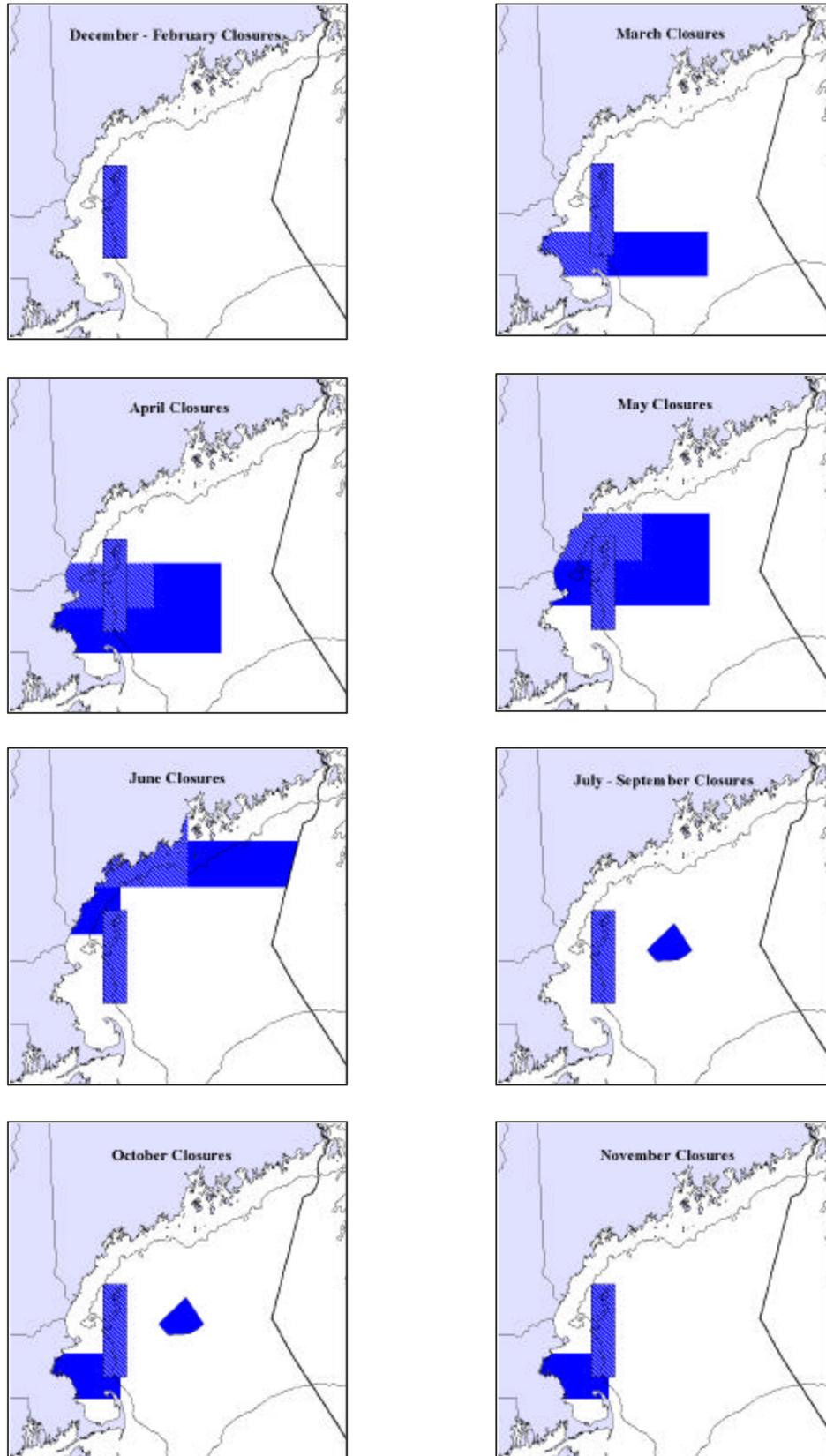


Figure 3 Framework 27 closed areas. Solid shaded areas are newly closed areas, hatched areas are already scheduled for closure prior to Framework 26.

3.1.1.2 Trip limit

Gulf of Maine cod: Vessels not enrolled in the Gulf of Maine Cod Trip Limit Exemption Program are limited to 200 pounds of cod per day or any part of a day. When 402 metric tons, or 51 percent of the Gulf of Maine cod total allowable catch (TAC) is landed the Regional Administrator will be authorized to reduce the trip limit by publication of a notice in the *Federal Register* to an amount in the range of 5-100 pounds depending on an evaluation of the risk of exceeding the TAC. Except for the reduced limit, the trip limit system, including the “running clock” that allows vessels to land, rather than discard overages, remains unchanged.

Discussion: The Council is using low trip limits combined with closed areas targeted on times and areas of cod aggregations to create a bycatch-only cod fishery in the Gulf of Maine. This strategy has been successful in rebuilding Georges Bank haddock. Analysis of the impacts of the area closures indicates that a trip limit of 200 pounds will likely keep landings below the target TAC for GOM cod. However, the Council recognizes that the success of the GOM cod rebuilding program depends on how fishermen respond to the measures, and on their ability to fish in ways, times and areas where cod catch is minimal.

The Council is concerned about the spillover effect on the entire multispecies fishery, and perhaps other fisheries, of future regulations to protect cod if the cod TAC is exceeded in 1999 given the severely depleted stock size and prospects for near-term recruitment. If the plan objectives for cod in 1999 are exceeded, the Council may have to implement more severe restrictions that could impact fisheries over a broader range of species where cod is only caught at minimal levels. The backstop proposal is meant to prevent catches from exceeding the target TAC within the range of management measures available for implementation by notice action.

The FMP does not provide for hard quotas that would shut down the cod fishery when the TAC is reached. The range of options available for implementation by notice action is limited to those available within the framework adjustment process, namely closed areas, DAS reductions, trip limits and gear restrictions. Furthermore, this framework document must discuss the impacts of any measures proposed for notice action. For example, specific closed areas would have to be identified and analyzed to be available for implementation by notice action. Given these constraints, and the time available for the committee or Council to develop specific backstop measures, the Council decided to apply a greatly reduced trip limit. A trip limit of zero pounds is effectively a shut-down of the fishery (quota) and is not an option.

3.1.1.3 Gear restrictions

In addition to the increase in minimum mesh size for square mesh (Section 3.1.4), the Council proposes the following restriction on trawl gear:

Maximum roller gear size : Otter trawl vessels fishing in Blocks 124, 125, 132, 133, 139 and 140, and the parts of Blocks 131 and 123 west of 69°50' will be limited to a maximum diameter of 12 inches for roller and rockhopper gear.

Discussion: The Council proposes this measure in response to requests from inshore fishermen, including the Alliance, to achieve some measure of separation between offshore vessels and inshore vessels in the western Gulf of Maine. The basis for this measure is that when inshore areas are closed, smaller vessels are unable to fish offshore, but when the inshore areas are open, larger mobile gear vessels can fish inshore, putting the smaller vessels at a disadvantage. The limit on roller and rockhopper gear will effectively limit the ability of mobile gear vessels from fishing in the hard bottom areas inshore, where cod and other species aggregate. In the draft framework document, the Council considered a proposed declaration program under which vessels would declare into one of two categories based on areas fished, but it expects that this measure will achieve the same result without creating additional administrative burden.

3.1.2 Haddock trip limit adjustment

The Council proposes a haddock trip limit for 1999 as follows:

- 2,000-pound-per-day/20,000-pound-maximum trip limit starting May 1
- when the 75 percent of the target TAC is reached (at approximately 4,200 metric tons, or 9.3 million pounds), the Regional Administrator could decide to reduce the trip limit to either 1,000 pounds (total possession) or 1,000-pounds-per-day/10,000-pounds-maximum based on a determination of the risk of exceeding the TAC.
- if, by September 30, the Regional Administrator determines that there is a high probability that landings for the fishing year will be less than 75 percent of the target TAC, then the Regional Administrator would be authorized to increase the trip limit to allow landings to achieve at least 75 percent of the TAC.

Discussion: The MSMC projects that vessels will land 71 percent of the target TAC in 1998 under the current trip limit (1,000-pounds-per-day/10,000-pounds-maximum May-August, 3,000-pounds-per-day/30,000-pounds-maximum, September–April, or until 75 percent of the TAC is reached). The current trip limit expires on May 1, and without further action will revert to a 1,000-pound possession limit. Based on comments from the industry and advisors, the Council proposes to maintain a constant trip limit throughout the year, or until 75 percent of the TAC is landed. This change will allow vessels the flexibility to choose when during the year they will target haddock to maximize their economic return, without compromising the conservation impacts of the trip limit or increasing the risk that the TAC will be exceeded.

Also, based on fact that the landings of haddock in the past two years have been well below the TAC, the Council proposes to authorize the Regional Administrator to increase the haddock trip limit if landings are not projected to reach 75 percent of the TAC. This will provide the industry with the ability to maximize yield from the resource within the constraints of the conservation requirements of the

rebuilding plan. Under the increasingly restrictive regulations to protect cod and other species that many vessels will be facing, the Council recognizes the need to provide the greatest opportunity in fisheries where additional effort could be absorbed, provided adequate safeguards are in place.

3.1.3 Clarification of trip limits – Weight of fish

Trip limits are to be based on the weight of whole, whole gutted, and/or gilled fish. Fillets are to be counted against the trip limit at a rate of 3-to-1 (one pound of fillets equates to three pounds against the trip limit). Fillets allowed under the personal consumption provision are counted against the trip limit. (Current rules allow vessels to land fillets as long as the fillets meet minimum fish lengths and also allow fishermen to land up to 25 pounds of fillets each for personal consumption provided those fillets are cut from fish of minimum legal size, even if the fillets themselves are smaller.)

Discussion: Under restrictive trip limits, the ability to count fillets or headed-and-gutted fish as equivalent to whole or whole-gutted fish undermines the effectiveness of the conservation measure. It enables vessels to catch and land more fish per a given trip limit, thereby increasing the incremental fishing mortality impact of a poundage of landings. By providing an equivalency factor, the Council is preserving the opportunity for vessels to land fillets while also achieving the expected conservation impact of the management measures.

3.1.4 Increase minimum mesh size for square mesh and eliminate Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas

3.1.4.1 Minimum mesh size for square mesh

The Council proposes to increase the minimum mesh size for square mesh to 6.5 inches (from 6 inches) in the Gulf of Maine/Georges Bank and Southern New England Regulated Mesh Areas.

Discussion: The Council proposes this increase for three primary reasons: fishermen in the Gulf of Maine who are targeting American plaice and gray sole with square mesh have asked for the increase to reduce juvenile discards; it wants to align the selectivity characteristics of square mesh with those of 6-inch diamond mesh in all flounder fisheries; and it wants to reduce discards of all sub-legal size flatfish, including yellowtail flounder and winter flounder, especially in light of the winter flounder minimum fish size increase to 13 inches contained in Amendment 9.

3.1.4.2 Eliminate the Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas

The Council proposes to eliminate the Stellwagen Bank and Jeffreys Ledge Regulated Mesh (square mesh) Areas.

Discussion: The Council implemented the Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas in 1994, in Amendment 5, in response to industry concerns about the discarding of juvenile cod during the years prior to 1994 when the minimum mesh size was 5.5 inches. Following the increase in mesh size to 6-inch diamond, the industry and NMFS no longer report significant discarding of juvenile cod,

including in areas where the square mesh is not required. In light of this, and the expanded use of closed areas designed to stop fishing in times and areas of cod aggregation, the Council expects that sufficient protection for juvenile cod aggregations will in place to justify eliminating the regulated square mesh areas.

3.2 Alternatives considered and rejected

3.2.1 No action

The Council rejected the no-action alternative because it would not achieve the plan objectives for GOM or GB cod. While this framework does not contain action specific to GB cod, the Council voted to begin a framework adjustment at the February Council meeting to address GB cod.

3.2.2 MSMC Options

The MSMC included four options (1,2,4 and 5 in the MSMC Report, Appendix II) that would reduce DAS. The Council rejected Options 1,4 and 5 primarily because they would have reduced DAS for all vessels, including those that do not fish in the Gulf of Maine. Option 2 would have reduced DAS only on those vessels that fished in the Gulf of Maine (by counting those DAS at a rate of three-to-one). The Council rejected it because, like the other DAS options, it would affect vessels fishing for species other than Gulf of Maine cod, such as flounders, pollock, white hake or other regulated species.

3.2.3 Draft Framework 27 Option 1

This option was proposed by the Gulf of Maine Fishermen's Alliance.

- **Trip limit** - hold trip limits for the entire fishing year
GOM cod: [level not specified (to be determined by analysis of other measures)]
GB cod: 2,000 pounds per day
- **DAS** Reduce DAS by 10 percent for all vessels; eliminate carryover of DAS including those carried over from 1998 to 1999; vessels in the Fleet DAS category would have 79.2 DAS and vessels in the Individual DAS category would have their allocation reduced by 10 percent calculated before any carryover DAS are allotted.
- **Rolling closures** – current one-month rolling closures extending eastward to the Hague Line. (See Table 2) Vessels may not count the rolling closure that encompasses their home port as time credited toward the 20-day block out of the fishery required of all vessels during the March-May spawning season
- **Year-round closures** –
Year 1: Western Gulf of Maine Closed Area
Year 2: Blocks 127, 128 and 129
Year 3: Blocks 118, 119, 120, 121, 122, and 123
- **Inshore/Offshore Category Declaration Program** – One-year declaration;
Category 1: GOM Inshore and GOM Offshore;
Category 2: GOM Offshore and Trip Limit Exemption Area; Category 2 vessels would be credited for steaming time while transiting GOM Inshore Areas; the GOM Inshore Area

comprises Blocks 124, 125, 132, 133, 139 and 140, and the parts of 131 and 123 west of 69°50'.

- As noted above, the Council is also considering the inshore/offshore delineation proposed by the NAMA group which includes Blocks 124, 125, 132, 133, 139 and 140 in the Inshore Area (but does not include western portions of blocks 123 and 131 in the GOMFA proposal);

- **GOM Cod Trip Limit Exemption Area** – boundary moved from 42°20' at the shore to 42°00' then eastward to 68°00' then north to 42°20' and eastward to the Hague Line
- **Closed areas** – include “all directed commercial Gulf of Maine groundfish harvesters”, (includes party/charter vessels)
- **Individual DAS permit category** – reopen Individual DAS allocation application/appeal process
- **Rockhopper/Roller Gear Limitation in Inshore areas** – maximum diameter of 12 inches
- **Optional Day Gillnet Category** –
 - 50 groundfish nets or 100 flounder nets, or any combination of the two;
 - minimum mesh size of 6.5 inches;
 - provide steaming time credit (not on DAS clock) for set days provided all gear is out of the water prior to the set day, verified through the gillnet tag program;
 - 120 days out of the gillnet fishery (current rule) in minimum 36-hour block (current rule is 7-day block) as long as all gear is out of the water prior to the set day, as verified through the gillnet tag program.

		MARCH	APRIL	MAY	JUNE	JULY
GM1	118-125					
GM2	127-133					
GM3	134-140					
GM4	141-147, 152					

Table 2 Option 1 Rolling Closures. This option will extend current groundfish rolling closures to the Hague Line but will retain the current Northeast Closure Area, August 15-September 13.

Discussion: The Gulf of Maine Fishermen’s Alliance (Alliance) developed this option over the past year. The Alliance strategy is achieve the plan objectives while maintaining some opportunity for inshore fishermen to continue fishing by distributing the needed restrictions over a wider range of vessels and areas. The Alliance has been concerned that measures acutely designed to address the GOM cod crisis inshore would have severe economic and social impacts on one sector of the industry, while leaving unaffected other sectors that may also catch cod directly or as a bycatch. In comparison to the other options, this proposal would close larger areas inshore and offshore, for shorter periods of time, and would rotate year-round closures across both inshore and offshore grounds.

Another unique element of this proposal is that offshore and inshore vessels would be separated, either through gear restrictions or the permitting program. The Alliance has stated that the inshore vessels would be more severely impacted by inshore closures because they do not have the physical capability to seek alternative fisheries offshore. Larger vessels displaced from inshore areas, on the other hand, can fish open areas offshore in the GOM or on Georges Bank. The Alliance feels that what limited opportunity there might be to fish in inshore area should be preserved for those vessels that do not also have ability to fish more distant grounds in the GOM Cod Trip Limit Exemption Program area.

While the proposal to separate vessels that elect to fish on Georges Bank from those that fish inshore in the Gulf of Maine, may reduce the large-vessel effort in areas fished by smaller, inshore vessels, it may not have a large impact on overall GOM cod fishing mortality. The large vessels would still be able to fish on GOM cod outside of the inshore zone. The actual impact of this proposal cannot be quantified, therefore, since the behavior or choices of individual operators cannot be predicted.

The Council did not adopt the declaration program primarily because it was concerned about NMFS ability to administer and enforce it. It also felt that the benefits of the program were not clearly evident. However, it did retain the maximum gear limitation which many members of the Alliance indicated would have essentially the same result, namely, to keep the larger offshore gear out of the inshore areas.

The Alliance proposed the optional day-gillnet category, which includes a reduction in the number of nets fished and an exemption from the DAS call-in requirement for days when the vessel is setting out its gear. The rationale for this proposal is that fishermen anticipating storms now have to choose between leaving the gear in the water or taking it out for the duration of the storm. If they leave it in, it will continue to fish while the DAS clock is not running, and when the gear is hauled, much of the catch is discarded because it is not marketable.

On the other hand, if the operator decides to remove the gear from the water, he either has to keep it out for seven days (to get credit against the 120-day requirement for vessels to be out of the fishery), or risk losing revenues from DAS for the first day of the next trip when the gear is set out. These proposed modifications to the gillnet rules would provide an incentive for vessels to remove their gear rather than leaving it in the water for passing storms by reducing the risks and costs of that decision. The impact of this proposal on fishing mortality cannot be quantified, however, the resulting removal of gear combined with the reduced number of nets may have a positive impact. The Council did not adopt this provision because of the its complexity and uncertainty about its efficacy.

To protect other regulated species from potential effort displacement that could jeopardize the rebuilding of those stocks, and to reduce mortality on GB cod, the Alliance proposed a 10-percent reduction in DAS allocated to all vessels, and a 2,000-pound per day GB cod trip limit. Section 4.1 contains an analysis of a range of GB cod trip limits. If a trip limit is applied to GB cod, as proposed, vessels fishing on Georges Bank will operate under two trip limits for species often caught together, cod and haddock. The consequence of this is that vessels may have to discard catches of one species to maintain the balance in allowable landings for the two species. Vessels will likely try to maximize

revenues for the trip, and therefore continue to try and catch the limit of both species, regardless of whether the limit is already reached for one. Alternatively, vessels will have to search for cleaner catches to avoid discarding.

The Council was unable to complete development of measures to reduce effort on GB cod without jeopardizing the timely implementation of measures to stop directed fishing on GOM cod. It has, however, initiated another framework adjustment wherein it will consider alternatives, including those proposed by the Alliance for this framework, to address this stock.

3.2.4 Draft Framework 27 Option 2

This option was proposed by the Maine DMR.

- **Trip limit** – GOM cod: 400 lbs./day; modify the program in three ways:
 - 1) eliminate the running clock;
 - 2) count the limit on an hourly basis (currently on a daily, or part-of-a-day basis);
 - 3) limit cod possession to a percentage (not specified) of all fish on board
- **Year-round closures** –Western Gulf of Maine Closed Area
- **Closed areas** –
 - Blocks 124 & 125: Oct. – April;
 - Blocks 132 & 133: April – June;
 - Blocks 139, 140 & 147: May – June;
 - Blocks 145 & 146: June;
 - Block 158 (see description below): May – Oct.Block 158 includes parts of Cashes Ledge and Fippennies Ledge enclosed by the following points:

<u>N.Lat.</u>	<u>W.Lon.</u>
43°07'	69°02'
42°49.5'	68°46'
42°38'*	68°50.5'
42°43.5'	68°58.5'
42°42.5'	69°17.5'
42°49.5'	69°26'

* Revised. Earlier proposal was 42°46.5'; Both versions are still under consideration.
- **Increase minimum mesh size for square mesh** – from 6 inches to 6.5 inches
- **Georges Bank cod** – closed areas and trip limits based on analysis to reduce fishing mortality approximately 25 percent

The DMR proposal package contained no specific areas or trip limits, however, the Council considered the following proposals developed by the committee and analyzes in the draft framework document.

 - April, May and June closure of the Cultivator Shoal area or the block immediately south of Block 111 (Block 96) abutting Area I

- September closure of the area east of 69°30', north of the Nantucket Lightship Closed Area (Blocks 81 and 98); the committee also suggests that when this area is not closed that it be a square mesh area (similar to Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas)
- February 15 – April 15 (or other appropriate time based on cod landings) closure of the Cape Cod South Closure Area (harbor porpoise area in Southern New England)

Discussion: According to the Maine DMR documents submitted to the Council, the purpose of this proposal is to reduce fishing on GOM cod to very low bycatch levels while maximizing fishing opportunities for other species (including other groundfish species) and minimizing the impacts on groundfish vessels that can successfully target other species. The DMR approach assumes a status quo rate of DAS usage (rather than a decline of 7.4 percent as projected by the MSMC) and does not rely on an assumed linear relationship between nominal effort and landings. By maintaining status quo DAS allocations, the DMR approach would maximize opportunity to fish on other groundfish species.

The DMR strategy is to close areas where and when aggregations of cod are known to occur, and it is based on the assumption that GOM cod will continue to decline and contract to the core of its range. As a result, a larger percentage of the stock will inhabit a smaller percentage of the range, increasing the effectiveness of the closures design based on expected aggregations of fish. With the exception of the Cashes Ledge/Fippennies Ledge closure area, the DMR proposal uses the 30-minute squares by which the landings data are organized. The Cashes Ledge area, was drawn based on input from fishermen about where cod are caught and retaining open surrounding grounds where fishing is predominately for other species.

The Council included some of the proposed closures in the DMR proposal in the final proposed action. For example, it adopted the configuration of the Cashes Ledge Closed Area and the times and areas of some of the inshore closures. It did not adopt the entire package, however, because of public comments and concerns that most of the burden of the rebuilding plan would be placed on the inshore fleet which does not have the ability to fish offshore. Thus, while the DMR strategy was to maximize opportunity to fish on other species, many in the industry felt that the opportunity was not open to them because it was offshore.

The DMR proposal retained the 400-pound per day trip limit for GOM cod in recognition of the fact that even when fishing for other species, vessels will occasionally have a high bycatch of cod. To minimize the incentive that some vessels may have to target cod, even under the 400-pound limit, the DMR also proposed modifications to the trip limit system. At the Council's direction, the PDT conducted an analysis of a range of trip limits in the event that a 400-pound limit in combination with the other measures could not achieve the TAC. Results of that analysis indicated that a trip limit of approximately 150 pounds per day would be required to keep landings below the TAC.

If a trip limit were applied to GB cod, as was proposed, vessels fishing on Georges Bank would operate under two trip limits for species often caught together, cod and haddock. The consequence of

this is that vessels may have to discard catches of one species to maintain the balance in allowable landings for the two species. Vessels will likely try to maximize revenues for the trip, and therefore continue to try and catch the limit of both species, regardless of whether the limit is already reached for one. Alternatively, vessels will have to search for cleaner catches to avoid discarding.

As noted earlier, the Council was unable to complete development of measures to reduce effort on GB cod without jeopardizing the timely implementation of measures to stop directed fishing on GOM cod. It has, however, initiated another framework adjustment wherein it will consider alternatives, including those proposed in the DMR plan for this framework, to address this stock.

The DMR also proposed a one-half-inch increase in the minimum size for square mesh to increase age at entry, reduce discarding of sub-legal size flatfish, and increase SSB/R. The proposal document suggested that this increase would help to equalize the selectivity between the two (diamond and square) mesh regulations. The Council adopted the mesh size increase.

3.2.5 Draft Framework 27 Option 3

This option was proposed by the MSMC with a reduced trip limit based on a 782 metric ton target TAC for GOM cod.

- **Trip Limits** – GOM cod: 200 lbs./day
- **DAS reductions** – reduce DAS by 22 percent overall; Table 3 contains five alternative allocations by permit category that would achieve the 22 percent effective reduction in 1999 DAS based on 1997 usage rates. At the direction of the committee, the staff conducted an analysis of the impact of eliminating the DAS carryover or reducing the total number of DAS carried over on the overall percentage reduction required to meet the $F_{0.1}$ goal for GB cod. Reductions in DAS carried over could be accomplished by allowing a carryover of 10 percent of DAS used, not to exceed 10 DAS, or by allowing a carryover only by vessels that used a certain percentage of their DAS in the preceding year (for example, 70 percent). Analysis results are in Section 4.1.
- **Year-round closures** – retain current closures
Closed Areas – one of three alternatives described in Table 4

FLEET (DAS Allocations)	INDIVIDUAL (% Reduction from 1993 baseline DAS)
57	64
62	67
66	70
71	73
74	74

Table 3 DAS allocations for 1999 by permit category to achieve an effective 22 percent reduction in overall DAS used.

Current closures in the Gulf of Maine	
Blocks	Months
124, 125	March
131, 132, 133	April
138, 139, 140	May
129, 145, 146, 147, 152	June
parts of 144, 149, 150, 151, 154 and 155	August 15 – September 13
156 (Western Gulf of Maine closure)	Year-round

Closure Alternative # 1	
Blocks	Months
124, 125	October-April
131, 132, 133	April-June
129, 130	September-December
138, 139, 140	June
parts of 144, 149, 150, 151, 154 and 155	August 15 – September 13
156 (Western Gulf of Maine closure)	Year-round

Closure Alternative # 2	
Blocks	Months
124, 125	October-April
128, 129, 130	September-December
132, 133	March – June
139, 140	May – June
parts of 144, 149, 150, 151, 154 and 155	August 15 – September 13
156 (Western Gulf of Maine closure)	Year-round

Closure Alternative # 3	
Blocks	Months
125	April-May
133	April-June
139, 140	May-June
124, 127, 128, 129, 130, 131, 132	Year-round
parts of 144, 149, 150, 151, 154 and 155	August 15 – September 13
156 (Western Gulf of Maine closure)	Year-round

Table 4 Current closures in the Gulf of Maine and Option 3 closure Alternatives 1, 2 and 3. Closures replace current closures in Gulf of Maine.

Discussion: The MSMC offered this option as one which would achieve plan objectives for both GOM and GB cod. Since the plan objectives for GOM cod are a fishing mortality target based on F_{MAX} , the MSMC option included a 600-pound GOM cod trip limit. However, the Council decided to base the trip limit on an $F_{0.1}$ target rate for reasons discussed in Section 2, Purpose and Need. The MSMC included three area closure alternatives to help address the issues associated with the distribution of economic impacts across fleet sectors and areas. By reducing DAS to achieve the GB cod objectives, this alternative would also have reduced fishing pressure on other regulated species by eliminating, rather than displacing fishing effort directed on regulated species.

The Council rejected this option primarily because the DAS reduction unnecessarily impacted all groundfish fishermen, including those who are not fishing on the stocks in need of rebuilding. Furthermore, it noted that the potential activation of unused DAS (“latent effort”) could offset the benefits of the DAS reduction, while still imposing the burden on currently active fishermen. While it recognizes that GB cod is in need of a 22 percent reduction in effort to achieve the fishing mortality goals of the plan, it could not develop alternative management measures in the available time. Therefore, it initiated the process of another framework adjustment to address this problem with measures other than DAS reductions.

3.2.6 Recommend publication as a final rule

The Council considered recommending that NMFS publish the proposed adjustments as a final rule. It had given as the justification for the recommendation the following factors as specified in 50 CFR 648.90 (b):

1. timing of the rule
2. opportunity for public comment
3. need for immediate resource protection, and
4. the continuing evaluation of the plan.

These points are discussed in the following paragraphs.

Discussion: Despite the urgency of having the conservation measures in place by the start of the fishing year on May 1, the Council voted to recommend publication of a proposed rule to allow for additional public comment. It felt that the final framework measures during the January 27-28 meeting were sufficiently modified from the three options contained in the draft framework document, that additional public comment was warranted.

3.2.6.1 Timing of the rule

The timing of the rule is relevant to the start date of the fishing year, May 1, and to the urgent need to implement measures to reduce fishing mortality on GOM cod at the earliest possible time. Based on the amount of time NMFS requires to review the framework document to determine that the proposed action meets the FMP objective and is consistent with other applicable law, publication as a proposed

rule would delay effectiveness of the measures beyond the start of the fishing year. The Council is concerned that any delay in the effectiveness of measures to reduce fishing mortality of GOM cod would result in continued stock decline.

The timing of the rule does not depend on the availability of time-critical data, and the Council did not consider data availability in its decision to recommend publishing the adjustments as a final rule.

3.2.6.2 Opportunity for public comment

The Framework 27 development process formally started with the December 9, 1998 Council meeting. At that initial meeting the MSMC gave its report on the status of the rebuilding plan, and the Council identified the basic options it would include in the document for analysis and public comment. Over course of the preceding year, however, the Council, Groundfish Committee and Groundfish Advisory Panel frequently discussed, in public meetings, the status of GOM cod and the potential for additional restrictions to meet plan objectives. In August, SAW 27 advised the Council that directed fishing on GOM cod should be halted, repeating, in a more urgent tone, the advice of the previous year's SAW.

The Council recognized the need to take immediate action to protect cod and initiated Framework 26 to implement measures as early as February, 1999, before the annual adjustment measures would be effective. During discussions on this framework (27), the Council, Groundfish Advisory Panel and public considered the interaction and implications of the Framework 26 on subsequent action in the annual adjustment.

The schedule of meetings for which the public notice included discussion of specific alternatives for this framework is as follows:

DATE	MEETING	AGENDA/DISCUSSION
11/16/98	GF Committee	<ul style="list-style-type: none"> • Update on MSMC report and its implications for management in the 1999 fishing year
12/9-10/98	Council	<ul style="list-style-type: none"> • MSMC Report • Initial meeting for FW 27 • Final meeting for FW 26
12/15/98	GF Advisory Panel	<ul style="list-style-type: none"> • Review and advise on FW 27 options
12/16/98	GF Committee	<ul style="list-style-type: none"> • Review FW 27 options
1/25/99	GF Advisory Panel	<ul style="list-style-type: none"> • Review FW 27 analysis and advise on a preferred alternative
1/26/99	GF Committee	<ul style="list-style-type: none"> • Review FW 27 analysis and recommend a preferred alternative
1/27-28/99	Council	<ul style="list-style-type: none"> • Framework 27 final meeting

The mailing lists for meeting notices contain approximately 900 and 1,600 interested parties for Groundfish Committee and Council meetings, respectively. Notices are mailed at least two weeks in advance of committee meetings and three weeks in advance of Council meetings. Council meeting

notices are also published in the *Federal Register* three weeks ahead of the meeting. Agendas and meeting summaries for the above meetings are available from the Council office.

As noted in Section 2.2, the Council voted to submit this framework as a proposed rule, not as a final rule, to provide additional opportunity for public comment.

3.2.6.3 Need for immediate resource protection

Sections 1.2.2 and 2.1 summarize the most recent information available for stocks in the Northeast Multispecies fishery management unit. GOM cod is collapsing and GB cod is being fished at a higher rate than the plan rebuilding target. While the Council took initial steps in prior framework adjustments to reduce the effort on GOM cod, the stock is still being fished at unacceptably high levels and any delay in implementation of measures contained in this framework poses increased risk to the long-term viability of the stock and the fisheries dependent on it.

3.2.6.4 Continuing evaluation

The regulations require the Council to review the plan annually and make adjustments as necessary to insure that the rebuilding goals are being met (50 CFR 648.90 (a)). The Council is proposing this framework adjustment in accordance with that requirement. Both the Council and NMFS continually monitor catch, effort and resource information and may address problems as needed any time during the year using the framework adjustment procedure, such as they have done with Framework 26.

3.2.7 Target TAC backstop Option 2

In developing a strategy to prevent the TAC for cod from being exceeded, the Groundfish Committee offered two options to the Council in the final framework document. The Council chose to adopt Option 1. Under Option 2, the cod trip limit (either GB cod or GOM cod) would change fishing during the year based on monthly calculations by the Regional Office and would be set at a limit that is projected to keep the catch below the TACs for the year.

Discussion: The Council rejected this option in favor of the proposed measure because it would be relatively more difficult to administer and it would have potentially resulted in frequent trip limit adjustments throughout the fishing year.

3.2.8 Retain Stellwagen Bank/Jeffreys Ledge Regulate Mesh Areas and allow use of a composite net

The Council considered a mesh regulation option that would have retained the Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas under the proposed square mesh size increase. Furthermore, to accommodate vessels fishing both inside and outside the area on the same trip, with 6-inch diamond mesh (outside the area) and 6.5-inch square mesh (inside the area), the Council considered allowing vessels the option to use a composite codend. A composite codend has a square mesh panel in the top part of the net. While this gear has been used successfully in other countries, its efficacy in local fisheries is not proven.

The Council initially implemented these regulated square mesh areas in Amendment 5 to protect aggregations of juvenile cod, and minimize discarding of sub-legal sized fish. Following its decision on the time and area of closures to protect cod aggregations in this framework adjustment, the Council concluded that the need to retain the regulated square-mesh areas no longer existed. Vessels targeting cod in other areas with 6-inch diamond mesh have not reported significant discards of juvenile cod.

3.2.9 Diamond mesh only

The Council considered an alternative that would have allowed only 6-inch diamond mesh, essentially prohibiting the use of square mesh. It decided that by increasing the minimum size of square mesh to where its selectivity characteristics paralleled that of 6-inch diamond mesh, it could preserve the flexibility and choice of having both configurations available, while not compromising the conservation objectives of the plan and still minimize discards. Allowing fishermen to continue to use square mesh also facilitates experimentation, for example, fishermen may develop composite mesh configurations that achieve the selectivity benefits of both meshes.

3.2.10 Other GOM cod proposals

At the initial framework meeting on December 9-10, 1998, the Council considered proposals from Northwest Atlantic Marine Alliance (NAMA) and Council member Erik Anderson, in addition to the six MSMC options, and the Maine DMR and GOM Alliance proposals, for a total of twelve options. Its goal in the first meeting was to reduce the number of alternatives to be analyzed in the final document to three because of the time available to conduct the analysis and prepare final documents, and to facilitate meaningful public review and comment on final options. Fewer options would allow for consolidation of support among industry groups and reduce the number of competing interests in the final meeting. Furthermore, the two rejected proposals contained many elements that also appeared in the more widely supported proposals that it adopted for final consideration.

In the second framework meeting, January 27-28, the Council considered numerous combinations of the basic three options in an attempt to resolve the concerns of its members and members of the public about different aspects of each alternative. In a 14-hour deliberation, before an audience of approximately 300 people, it proposed, discussed and took comment on the different alternatives and variations. The proposed action represents the culmination of this process.

3.2.11 Recreational fishing restrictions

The Council, Groundfish Committee and Advisory Panel discussed, but did not formally consider additional recreational fishing restrictions, including prohibiting recreational or party/charter fishing in closed areas. The MSMC commented that “if proportionality of decline in landings is used as the criterion for imposing further restrictions on the recreational fishery, then the recreational fishery appears to have already reduced to [GOM cod] landings ‘consistent with the F_{MAX} target’”. Based on this observation, the Council did not adopt any additional restrictions on the recreational fishery, but will monitor the situation as new information becomes available and take action as needed. It also considered one option, in the context of the GOM Alliance proposal, that would prohibit party/charter

fishing in closed areas based on the commercial nature (passengers for hire) of that sector, but rejected the proposal on the same grounds as it rejected other recreational and party/charter restrictions.

4. Analysis of impacts

4.1 Biological impacts

4.1.1 Impacts on regulated species

The proposed action is designed primarily for its impact on GOM cod, which continues to be fished at rates well above the plan objectives. The measures in this framework, however, will also impact the other primary species, haddock and yellowtail flounder, as well as other stocks in the fishery management unit. The impact on the other stocks is not expected to be directly proportional to the impacts on cod because of the different spatial and temporal distribution of fisheries directed on those other stocks. For example, stocks outside of the Gulf of Maine, will only be indirectly impacted by area closures designed to rebuild GOM cod, primarily through effort displacement effects.

In developing the proposed action, the Council considered three main options. Based on its deliberations and the extensive public comment at the final framework meeting, the Council crafted the final proposed measures. To provide some perspective on the analysis results for the final measures, the following discussion also retains analysis results for the options considered in the draft framework document.

Analysis of Framework 27 Proposed Measures

Assumptions

Each of the proposals was analyzed using a common data set derived from the 1997 Vessel Trip Report (VTR) data. The 1997 data represent the most recent complete set of VTR data and the most recent year in which fishing occurred without the imposition of trip limits and area closures in the Gulf of Maine. That the data represent unrestricted fishing activity is necessary to evaluate the potential impacts of future closures and trip limits.

Two fundamental assumptions were incorporated into the analysis of each of the three draft proposals and the final proposal. The first assumption is a 37% decrease in exploitable biomass for Gulf of Maine cod between 1997 and 1999, as indicated by the 1998 assessment. This decrease was incorporated directly into the trip limit analysis conducted for Gulf of Maine cod. As well, increases in Georges Bank cod exploitable biomass of 11%, and in Georges Bank haddock exploitable biomass of 31% were incorporated directly into the trip limit analyses conducted for these stocks. If the decrease is less than 37 percent as assumed then the trip limit will be more effective and fishing mortality would be lower than projected, although discards would increase for a given trip limit level.

The second assumption is a 7.4% decrease in expected days at sea usage in 1999 compared to 1997 based on several factors, including vessels leaving the fishery (for example, buyback or retirement) and

changes in DAS usage for each permitted vessel in 1998 relative to 1997. This adjustment was incorporated into the final analysis of each of the 3 proposals.

Combining Percentages

Each of the proposals contains several distinct measures by which the proposed reductions in landings are to be achieved. Each specific measure that could be quantified within each proposal was incorporated based on the percentage reduction in landings derived for that measure. Measures that could not be incorporated into the quantitative analysis are discussed in Section 3.1 under each option. Estimated reductions common to all proposals have also been incorporated into the final analysis. In each case it was necessary to combine two or more percentages to be expressed as a single overall percentage change in projected landings.

In the following example, we illustrate how percentages are combined to produce a single overall percentage change. We illustrate with examples derived from current analyses. The most important point to illustrate is that percentages are not additive. In this example, we derive 3 percentage reductions: 1) -37% due to biomass change, 2) -10% due to days at sea reduction, and 3) -13% due to area closures. Although, in reality, some of these measure will interact, and the overall effects will be less than those produced by combination of the individual measures, we have no basis to determine the extent of the interaction. To combine the three percentages, we first derive the adjustment factor, defined as:

$$1 - (\%/100).$$

The three values in the example above convert as follows:

$$\begin{aligned} 37\% &= 1-(37/100) = 1 - 0.37 = 0.63, \\ 10\% &= 1-(10/100) = 1 - 0.10 = 0.90, \text{ and} \\ 13\% &= 1-(13/100) = 1 - 0.13 = 0.87. \end{aligned}$$

Thus, the adjustment factor for the combined effect of applying these 3 measures, without accounting for interaction of the measures is:

$$0.63 \times 0.90 \times 0.87 = 0.493.$$

If the percentages were added, the resulting combined adjustment factor would have been calculated as: $37+10+13 = 60\%$; $1-(60/100) = 1 - 0.60 = 0.40$. Thus, the impact attributed to the combined measures, would have been overestimated had the percentages been added.

Aside from the specific area closure impacts and the adjustments due to changes in biomass incorporated into the trip limit analyses, each proposal contains adjustments due to days at sea usage and/or proposed reductions. The following is a summary of the percentage change in expected landings of Gulf of Maine cod between 1997 and 1999, due to the DAS adjustments.

The proposed action contains no nominal DAS reductions and thus corresponds to Option 2 below:

Option	DAS Usage	DAS Reduction		Combined
		Nominal	Effective	Factor
Option 1	-7.4% (0.926)	-10%(0.90)	-2.8%(0.972)	0.900
Option 2	-7.4% (0.926)	n/a	n/a	0.926
Option 3	-7.4% (0.926)	-22%(0.78)	-15.8%(0.842)	0.780

The lowest combined factor will have the greatest expected reduction in landings. The two proposed reductions in days at sea (-10 percent, Option 1; -22 percent, Option 3) were adjusted from nominal to effective by taking account of the DAS usage reductions. It is assumed that the proposed 10 percent and 22 percent reductions in DAS would occur within the context of the 7.4 percent reduction which has already occurred. Therefore, the adjustment factor for the 7.4 percent DAS usage was factored out of the nominal DAS reduction adjustment factor by dividing the nominal adjustment factors by the DAS usage adjustment factor (0.926).

Put another way, the 7.4% DAS usage factor is totally subsumed within the proposed DAS reductions in the Options 1 and 3. Because 1997 was the base year used, the estimates of DAS reductions for all options include the status quo reduction of 7.4 percent. The combined DAS adjustment factors from the above table will be incorporated with the area closure adjustment factors derived for each option and applied to the trip limit analysis results to generate the expected 1999 landings corresponding to each option. Nevertheless, in the final action, the Council did not adopt a DAS reduction.

Elimination of the carryover DAS

In the draft framework document Option 1 and Option 3, which included DAS reductions, the Council considered eliminating the carryover DAS provision that it included in the FMP in Framework 24. However, in this final action the Council did not eliminate the measure because it would have eliminated an important safety provision while not achieving a significant biological impact.

To analyze the impact of this proposal, 1997 DAS were applied to 1999 to simulate the potential loss of carry over days. It was not possible to estimate how many carry over days would be allocated in 1999, based on the projected days used in 1998, due to peculiarities in the allocation of carry forward days for the 1998 fishing year. These peculiarities included changes in permit categories (e.g. a vessel being re-assigned to the large mesh fleet category) and transfers of permits to new vessels which were then assigned new permit numbers that did not match a multispecies permit number in 1997.

If the permit category for a vessel changed, the 1998 allocations were assumed for that vessel in 1999. If there was no match in permit numbers (63 cases), the 1998 allocation DAS allocation was assumed for those vessels in 1999. Furthermore, the 1998 fishing year is not complete and anticipation of, or reaction to Framework 26 may influence operators' decisions on DAS usage that greatly increases the

uncertainty of any projection of DAS usage. Table 5 summarizes the change in day-at-sea allocations between 1997 and 1998, after taking into account permit changes that occurred during 1998.

The impact of the carry forward provision on days used only produces quantitative impacts for vessels with individual days-at-sea permits. This result occurs because no vessels in the fleet category went over their 1997 day-at-sea allocation, while there were some individual day-at-sea vessels that did. Also, since the baseline for these estimates is 1997 fishing activity, the projection of day-at-sea usage in 1998 becomes irrelevant. Under the 10-percent reduction in allocated DAS proposed in Option 1, the elimination of the carryover days will increase the effective reduction in DAS usage from 1997 to 1999 by 1.7 percent for the Individual DAS category, and by 0.5 percent overall.

'Outliers' or anomalies made it impossible to adjust the 1998 days-at-sea allocations to account for the potential loss of carry forward days. Almost all vessels received carry forward days that ranged from 0 to 10 days, consistent with the regulations. Over half (668) of the fleet vessels received 10 carry forward days. One fleet vessel received 69 more days than it did in 1997, without a change in permit category. This could be a data entry error for the vessel identification or the change in permit category was not recognized in the data. Eight fleet vessels received fewer days, possibly due to permit sanctions or due to overages from the prior year's day-at-sea allocation. Three individual days-at-sea vessels received more than 10 carry forward days in 1998, ranging from 12 to 31 more days. Likewise, there were seven large mesh fleet vessels that received more than 10 carry forward days for unknown reasons, ranging from 32 to 42 days.

Change in DAS allocation	Permit category					All
	Individual	Fleet	Hook	Combination	Large Mesh Fleet	
-88		1				1
-28		1				1
-25		1				1
-22		1				1
-11		1				1
-6	1					1
-4		1				1
-3		2				2
0	11	388	65	28	2	494
1	22	11		3		36
2	12	3			1	16
3	11	4				15
4	6	6				12
5	10	10				20
6	6	6				12
7	1	6				7
8	6	5				11
9	1	8				9
10	39	668	92	11	7	817
12	1					1
29	1					1
31	1					1
32					1	1
38					1	1
41					1	1
42					4	4
69		1				1
No match	1	38	21	2	1	63
Total	130	1,162	178	44	18	1,532

Table 5 Change in allocation of multispecies days by permit category between 1997 and 1998.

4.1.1.1 Trip Limit Analyses

Gulf of Maine cod

Trip limit regulations have been used for the past two years to reduce targeting of Gulf of Maine cod stocks in an effort to reduce fishing mortality and to promote stock rebuilding. Regulations in effect during calendar year 1998 included a 1000 pound/day absent trip limit from January through April, a 700 pound/day trip limit from May 1 until June 24, 1998, and a 400 pound trip limit for the remainder of the year. The reduction from 1000 pounds/day to 700 pounds/day on May 1, 1998 resulted from implementation of the annual framework reduction at the beginning of the new fishing year. The reduction from 700 pounds/day to 400 pounds/day on June 24, 1998 occurred after less than 2 months of fishing when the cod landings reached 50 percent of the target TAC was reached, triggering a notice action by the Regional Administrator as authorized under Framework 25.

A bag limit analysis was used to evaluate the potential effects of trip limit regulations for cod in the Gulf of Maine. A trip-by-trip analysis of the distribution of cod landings in the Gulf of Maine during calendar year 1997 was used to evaluate the potential effects of trip limit regulations during the 1999-2000 fishing year. There were 15,871 trips reported in the 1997 Vessel Trip Record (logbook) data base that caught (landed or discarded) at least one pound of cod on a trip occurring in the Gulf of Maine (statistical areas 464, 465, 511, 512, 513, 514, 515).

Days absent were estimated relative to the current trip limit regulations, which allow one day of trip limit for each whole or partial day fished. For example, a vessel on a day trip fishing for up to 24 hours is permitted one day of trip limit, while a vessel fishing for 24 hours and 1 minute is permitted 2 days of trip limit (1 whole day and one partial day). In addition, operators may land in excess of the trip limit by calling a special hail line, and leaving their DAS clock running for that trip until an appropriate amount of time has expired to justify excess landings. No effort was made to model this provision, and unless days at sea are limiting to individual vessels, this provision provides for a significant level of liberalization relative to current trip limits.

The use of the 1997 calendar year data to estimate the effectiveness of trip limit regulations during the 1999-2000 fishing year require that the 1997 trips be scaled to account for the projected decline in exploitable stock biomass that occurred between 1997 and 1999/2000. As stock biomass declines, a given trip limit regulation becomes relatively less effective because catch rates decline as a function of stock size. Projections for the Gulf of Maine cod stock indicate a 37 percent decline in stock biomass between 1997 and 1999. The exact relationship between commercial LPUE and stock size is unknown, but it was assumed that LPUE would decline as a linear function of stock size. Therefore, Gulf of Maine cod catch rates (catch/day) were reduced by 37 percent (adjustment factor = 0.63) to account for the expected reduction in catch rates due to the anticipated decline in stock size. To the extent that LPUE remains higher than that expected from this linear relationship, the reductions in landings projected from the trip limit analyses will be overstated. Such a deviation may explain why

1998 landings of Gulf of Maine cod remained relatively high in 1998 despite the imposition of trip limits and closed areas.

Projected landings were determined by summing the minimum of actual catch and the calculated trip limit (trip length (days) * trip limit/day) from each trip during the year. For trips with catch rates below the trip limit maximum, all catch was assumed to be landed. For trips with catch rates exceeding the trip limit, landings were assumed to be the maximum level allowed under the trip limit regulation being modeled.

Landings within each trip limit interval were then summed over all trips in the VTR database. Because logbook landings represent a subset of the total reported (dealer) landings, the VTR landings were adjusted proportionately to equal the total reported landings of Gulf of Maine cod. The expected landings of Gulf of Maine cod were estimated for trip limits ranging from 100 pounds/day to 1,000 pounds/day in 100-pound increments. Table 6 provides estimates of projected 1999 landings under various trip limit scenarios.

Trip Limit (Pounds/ Day Absent)	100	200	300	400	500	600	700	800	900	1000	No Trip Limit
Landings (mt)	828	1345	1717	1990	2194	2344	2444	2513	2564	2603	2854

Table 6 Projected landings (mt) of GOM cod estimated under trip limit regulations ranging from 100 pounds/day to 1,000 pounds/day during the 1999/2000 fishing year. During calendar year 1998, the trip limit was 1000 pounds/day from January 1 to April 30, 700 pounds/day from May 1 to June 29, and 400 pounds per day from June 30 to December 31.

Gulf of Maine Cod: Application of Trip Limit on an Hourly Basis

As contained in draft framework Option 2, the DMR proposal, a trip limit analysis was performed where the basis for the possession limit was on a finer scale than is currently regulated. While this modification produced measurable positive results, the Council did not adopt it in the final framework provisions because it would have raised compliance and enforcement problems.

The analysis was performed for a trip limit counted on an hourly basis. For example, a trip lasting 8 hours would be able to retain one day of trip limit under current regulations. A trip lasting 25 hours would be able to retain two days of trip limit under current regulations. Under the hourly limit, these trips would be able to retain only 8/24's and 25/24's of the daily trip limit, respectively. Another way to look at this proposal is that a 400 pound/day trip limit would be functionally equal to a 16.67 pound/hour trip limit. In other words, the trip limit would be tied to the actual hours absent instead of rounded up to the nearest whole day.

The request, in an hourly basis format, proved computationally challenging, given the current format of the VTR database. To approximate this effect, the time sailed and time landed fields in the VTR database were rounded to whole hours and the total time was divided by 24 to produce fractions of days fished (to two decimal places). By definition, the time absent field was always less than the days absent field used to determine current trip limits. This resulted in more restrictive regulation criteria being applied to every trip analyzed during 1997. Trips were only affected by the change in the format of the regulation if they were either close to, or exceeded the trip limit.

It may be expected that the results from this change in format to the trip limit regulation would be sensitive in fisheries where short trips account for a significant proportion of the landings. The Gulf of Maine fishery has this characteristic. Table 7 contains the results of the revised format trip limit analysis. By comparing Table 6 and Table 7, it is evident trip limits imposed on an hourly basis would be more restrictive than the current daily basis at all trip limit levels.

Trip Limit (Pounds/Day Absent)	100	200	300	400	500	600	700	800	900	1000	No Trip Limit
Landings (mt)	613	1025	1340	1588	1785	1943	2070	2171	2249	2307	2854

Table 7 Results for the trip limit analysis summarized in Table 6 using the revised format for the trip limit regulation as outlined in the Maine DMR/Portland proposal. The revised trip limit regulation would apply trip limits on the basis of exact hours absent instead of the current regulation that rounds partial days absent up to the next full day for the purpose of determining the trip limit. In all cases, the revised regulation would be more conservative than the current trip limit regulation.

This revision to the format of the trip limit regulation has significant implications in terms of which sectors of the groundfish fleet are most effected. Day boats and boats fishing shorter trips will be more severely impacted by the revision to the regulation than vessels on longer trips. For example, a day boat fishing an average of 12 hours would lose 50 percent of its potential to land cod, while a vessel fishing 5 - 6 day trips would lose approximately 10% percent.

Gulf of Maine Cod: Elimination of the running clock

The Council also considered a proposal to eliminate the running clock but did not adopt this in the final proposal because it was concerned for the impact on discards and safety. The running clock lowers the cost and/or risk for fishermen who must decide whether to discard trip limit overages, remain at sea and continue fishing to account for the overages, or return to port and allow the DAS clock to run. Option 2 included a proposal to eliminate the running clock on the GOM cod trip limit. The running clock was first proposed in Framework Adjustment 20 to allow vessels to land cod in excess of the trip limit and minimize the potential for discard associated with the GOM cod trip limit. The vessel's DAS allocation is reduced by the amount of time required to account for the trip's excess cod landings. Framework 24

adjusted the running clock by mandating that vessels reporting an excess landings of cod remain in port until the sufficient DAS have passed to equate to the cod landings. Framework 24 also required a 14 day call-in for vessels not in the GOM trip limit exemption program. Framework 24 closed a loophole that potentially allowed vessels to direct effort on cod and while the DAS clock continued to run to account for the excess cod, continue to fish for other species.

The running clock was considered conservation neutral because the intent was to change discard of legal size cod into yield (no increase in mortality) while accounting for excess cod landings. The conservation neutral aspect of this measure was predicated on the assumption that fishermen would use the running clock to land excess cod overages and not use the running clock to direct on GOM cod. The trip limit was 1,000 lbs. per day for the first four days and 1,500 lbs. per day thereafter for vessels not enrolled in the cod trip limit exemption program. An analysis by the MSMC (1997) showed that only 8% of the cod trips in the Gulf of Maine would have exceeded these limits in May-August 1996, if they had been in place. These relatively high trip limits appeared to provide little incentive for behavioral shifts that would increase mortality on GOM cod by combining the running clock with an increased utilization of latent effort to direct on cod.

Framework 25 lowered the GOM cod trip limit to 700 lbs. per day until 50% of the Gulf of Maine cod TAC was taken, at which time the Regional Administrator could reduce the trip limit to between 400 and 700 lbs. The 700 lbs. trip limit went in effect on May 1, 1998 and was subsequently reduced to 400 lbs. on June 25, 1998. An MSMC analysis indicated that the 23 percent of trips of 1997 cod trips in the Gulf of Maine would have exceeded these limits in June 25 through August, 1997 if they had been in place rather than the 1000/1,500 lbs. trip limit with the running clock. These more restrictive trip limits may have provided more incentive to use the running clock to target cod. Some vessels were reportedly utilizing the running clock to target cod.

The MSMC (1998) examined the impact of a 400 lbs. possession limit and running clock on cod landings from June 25, 1998 through August 1998. The analysis covered a range of options from totally eliminating the running clock to capping a trip limit at 10 times the daily trip limit (4,000 lbs. per trip for a 400 lbs. per day possession limit) but did not make any assumptions about discarding. Possession limits of 400 lbs. (no running clock) yielded 15.8% reduction in cod landings and the 4,000 lbs trip limit yielded only a 1.4% reduction in landings.

The effectiveness of trip limits and running clock is predicated on behavior response of the fishermen. Excess catch may not be caught if operators move away from areas with high concentrations (avoidance behavior) or shift to other fisheries with little cod bycatch (displacement). The running clock may be used to retain excess catch (conservation neutral by converting discard into yield). However, the running clock can also be combined with latent effort (unused DAS) to maintain or increase effort on cod (maintains or increases mortality on cod). Eliminating the running clock would prevent this from occurring.

At the vessel level, there are two basic responses to exceeding the trip limit without the running clock: extend the trip and fish for other species, or discard cod. Discarding excess cod catch negates the effectiveness of the trip limit and/or eliminating running clock. However, the proposed area closures are designed to close areas during times of high cod catch. This should reduce the opportunities for catches to exceed the 400 lbs. possession limit and reduce the need to discard cod. Deciding to extend the trip to account for the cod overages rather than discard, on the other hand, raises safety concerns.

Given the uncertainty about the impacts of eliminating the running clock described above, primarily because at low trip limit levels it would probably convert landings to discards, it was not incorporated into the overall analysis of Option 2.

Georges Bank Cod Trip Limits

A similar bag limit analysis was used to evaluate the potential effects of trip limit regulations for cod in the Georges Bank stock area. The Council did not adopt a GB cod trip limit in this framework, although it is initiating another framework adjustment in which it may consider trip limits. Nevertheless, the analysis results for the proposed trip limit is retained in this document for reference.

A trip-by-trip analysis of the distribution of cod landings from Georges Bank occurring during calendar year 1997 was conducted to evaluate the potential effects of trip limit regulations during the 1999-2000 fishing year. There were 9,076 trips reported in the 1997 VTR (logbook) data base that caught (landed or discarded) at least one pound of cod on a trip occurring in the Georges Bank stock area (statistical areas 521, 522, 525, 526, 561, 562). As for Gulf of Maine cod, days absent was estimated relative to the current trip limit regulations, which permit one day of trip limit for each whole or partial day fished.

The use of the 1997 calendar year data to estimate the effectiveness of trip limit regulations during the 1999-2000 fishing year required that the 1997 trips be scaled to account for the projected increase in stock biomass that occurred between 1997 and 1999/2000. As stock biomass increases or declines, a given trip limit regulation becomes relatively more or less effective because catch rates change as some function of stock size. Projections for the Georges Bank cod stock contained in the MMC report project an 11 percent increase in exploitable biomass between 1997 and 1999 (compared to a 37 percent decline for GOM cod). As for GOM cod, the relationship between LPUE and stock size is unknown, but it was assumed that LPUE would increase as a linear function of stock size. Therefore, cod catch rates (catch/day) were increased by 11 percent (adjustment factor = 1.11) to account for the expected increase in catch rates due to the projected increase in stock size.

Landings were determined by summing the minimum of actual landings and the calculated trip limit (trip length (days) * trip limit/day) from each trip during the year. For trips with landing rates below the trip limit regulation, all catch was assumed to be landed. For trips with landing rates exceeding the trip limit, landings were assumed to be the maximum level allowed under the trip limit regulation being modeled. Landings within each trip limit interval were then summed over all trips in the VTR database. Because logbook landings represent a subset of the total reported (dealer) landings, the VTR landings were adjusted proportionately to equal the total reported landings of Georges Bank cod.

The expected landings were estimated for trip limits ranging from 500 pounds/day to 5,000 pounds/day in 500-pound increments. Table 8 provides estimates of projected 1999 landings of Georges Bank cod under various trip limit scenarios.

Analyses of the proposed seasonal area closures contained in the DMR proposal indicated no significant impacts on the projected landings (less than a 2 percent change). Therefore, no adjustments to the projected landings derived from the trip limit analysis were applied.

Trip Limit (Pounds/Day Absent)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	No Trip Limit
Landings (mt)	3958	5891	6955	7528	7854	8038	8156	8234	8285	8312	8366

Table 8 Projected landings (mt) of GB cod estimated under trip limit regulations ranging from 500 pounds/day to 5000 pounds/day during the 1999/2000 fishing year.

Vessels fishing on GB cod under a trip limit will also be fishing under the haddock trip limit. Having two limits on a vessel catching both species, often simultaneously, creates a dilemma for the operator who must decide to stop fishing when the first limit is reached or continue fishing to catch the allowable limit of both species, discarding the one that is reached first. Even if the operator moves to a different location, there is no assurance that additional cod (or haddock, as the case may be) would not be caught.

Haddock trip limit adjustment

A bag limit analysis was performed to evaluate the effectiveness of haddock trip limits ranging from 1,000 to 3,000 pounds per day in 1,000 pound/day increments. It was not possible to analyze the proposed haddock trip limits at 2,000 and 3,000 pounds per day using the recent data that exists in the vessel trip report database for the following reasons:

1. Fishery operators do not consistently report discards in the vessel trip report database, so it is not possible to estimate the total catch (landings & discards) of haddock for trips in the 1997 database. All of these trips were landed during a period of restrictive trip limit regulations.
2. Operators fishing under prevailing trip limit regulations may still be avoiding high catch rate areas for haddock. Behavioral change triggered by more liberal trip limit regulations resulting in operators increasing their effort in areas with high haddock catch rates cannot be accurately predicted based on available data.

To accurately project the potential effects of a more liberal trip limit regulation, data must be present to represent trips with catch rates higher than the current trip limit. These trips have not existed in the VTR

database since 1994 because the trip limit has always been more conservative than the trip limits proposed for the 1999/2000 fishing season.

It was possible to analyze the percent reduction in the trip limit resulting from a reduction to 1000 pounds/day or maintenance of the status quo regulations (1000 pounds/day from May 1 - August 30; 3000 pounds/day from September 1 to April 30). It was not possible to analyze either the 2,000 or 3,000 pound/day limits because landings greater than 1,000 pounds per day have been prohibited for the period May 1 - August 30 since 1994.

It was possible to estimate the landings occurring under a 1,000 pound/day and a 1,000/3,000 pound/day seasonal regulation. To estimate landings under these regulations, it was assumed that landings rates would increase in proportion to the projected increase in spawning stock biomass. According to the latest assessment and MMC projections, the Georges Bank haddock stock biomass is projected to increase by 31% between 1997 and 1999. Therefore, catch rates of each trip were also increased by this percentage. Results of the trip limit analysis for Georges Bank haddock are shown in Table 9.

Under either trip limit scenario, landings of Georges Bank haddock in 1999 are projected at around 1,100 to 1,200 mt. This represents an approximate 30% increase over the 1997 USA landings, but is less than the landings estimated for 1998. The increase in 1998 USA landings compared to 1997 may reflect several factors related to the spatial distribution of the 1998 fishery not taken into account in the trip limit analyses which were based on 1997 VTR data. However, the PDT does not have available any more recent data which would be unaffected by existing trip limit regulations upon which further analyses may be based.

Trip Limit (Pounds/Day Absent)	1000 lbs/day	1998 Regulations 1000/3000 lbs/day
Landings (mt)	1082	1163

Table 9 Projected landings (mt) of Georges Bank haddock. The status quo regulations in 1998 were 1,000 lbs/day from May 1 - August 30th and 3,000 lbs/day for other times of the year.

The proposed action is designed to allow vessels to land at least 75 percent of the TAC while at the same time providing protection, in the way of notice action authority to the Regional Administrator, from exceeding the TAC.

4.1.1.2 Area closure analysis

Each of the area closure configurations corresponding to the three draft framework options and the final proposal was analyzed using the 2-bin LPUE model utilizing 1997 VTR data. This model accumulates the landings and effort (days absent) associated with each month-block combination specified in each area closure proposal to form a single closure (bin 1). The landings and effort associated with the remaining month-blocks are then accumulated to form a single open area (bin 2). The LPUE corresponding to the open area is then applied to the total effort in the system to compute the expected landings under the specified closure scheme. In effect, the 2-bin model retains all of the effort in the system, and the expected landings are the product of the total system effort and the LPUE from all of the open month-block combinations. In other words, the analytical model assumes that all of the effort displaced by closing areas continues to fish in the open areas at the average catch rate for the entire open area.

The area closure analysis was applied to the three main options under consideration by the Council and to the final proposal. Option 2 contained a provision for a seasonal closure of a portion of the central Gulf of Maine in the vicinity of Cashes and Fippenies Ledges which was adopted in the final proposal. As the proposed boundaries of this area are extremely irregular, the PDT agreed that the boundary could be approximated by defining this area as ½ of blocks 129 and 130.

Option 3 in the draft document had three area closure alternatives, yielding 3 separate analyses for this proposal, resulting in a total of five different area closure configurations for analysis. For each of the five area closure configurations and for the final proposal, the percent reduction in landings was then calculated from the difference between the observed 1997 landings and the landings computed from the 2-bin model. These percent reductions were converted to adjustment factors as previously described and, in combination with the DAS adjustment factors, applied to the results from the trip limit analysis on the basis of pounds per day absent as presented above for each of the 100 pound/day increments.

Results derived from the trip limit analysis based on hourly limits were also used in the final analysis of combined measures for the DMR proposal (Option 2), and are presented as a Option 2-b; results from both alternatives are presented to allow consistent interpretation among proposals. Results for each of the 5 closure schemes in the draft framework document are given in Table 10. Results for the final proposed measure are given in Table 11.

If, in contrast to the analysis assumptions, all effort is not displaced to open areas or does not catch cod at the average rate for the open areas, the calculated landings for a given trip limit would be lower. Put another way, a higher trip limit would achieve the goals. Furthermore, the lower the trip limit is, the greater likelihood is that discards will replace landings, and the result (in fishing mortality) will not be as low as expected. Modeling these two contingencies, however, involves highly subjective assumptions about behavior, such as predicting the point at which individual fishermen will stop fishing rather than discarding cod, or predicting how fishermen will redirect effort displaced from closed areas. The PDT

did not make any of these assumptions in analyzing the biological impact of the proposed measures but instead adopted the most risk-averse set of assumptions.

Trip Limit (Pounds/Day Absent)	Landings (metric tons)										
	100	200	300	400	500	600	700	800	900	1000	No Trip Limit
Option 1	711	1155	1474	1708	1883	2013	2098	2158	2201	2235	2450
Option 2-a	609	989	1262	1463	1613	1724	1797	1848	1885	1914	2098
Option 2-b	451	754	985	1167	1312	1429	1522	1596	1653	1696	2098
Option 3-a	444	722	922	1068	1178	1258	1312	1349	1376	1398	1532
Option 3-b	443	719	918	1064	1173	1254	1307	1344	1371	1392	1526
Option 3-c	436	708	903	1047	1154	1233	1286	1322	1349	1370	1501

Table 10 Projected landings (mt) of Gulf of Maine cod derived by applying DAS reduction and area closure adjustments to results of trip limit analyses presented in Table 6. The DMR proposal (Option 2) was analyzed under two alternatives: Option 2-a is based on the standard trip limit analysis (daily limits), and Option 2-b is based on the proposed hourly trip limit scheme. The MSMC proposal (Option 3) contains three alternative area closure schemes.

	100	200	300	400	500	600	700	800	900	1000
Landings (mt)	585	951	1214	1407	1551	1657	1728	1777	1813	1841

Table 11 Projected landings (mt) of Gulf of Maine cod derived by applying DAS reduction and final proposed area closure adjustments to results of trip limit analyses presented in Table 6.

The analysis results project landings of 951 metric tons with a 200-pound per day trip limit, which is approximately 22 percent over the 782 mt TAC based on an $F_{0.1}$ objective. Nevertheless, the Council recognizes that the model is conservative in some assumptions, particularly regarding effort displacement, and optimistic in others. It also recognizes the difficulty in predicting behavior of fishermen, particularly under unprecedented restrictions. For these reasons, it also adopted a backstop provision to prevent the TAC from being exceeded, based on a severely reduced trip limit.

4.1.1.3 Other impacts on regulated species

In addition to the projected direct impacts on cod and haddock described in the previous section, the measures proposed in this framework will directly and indirectly effect other regulated species. While the Council focused Amendment 7 on cod, haddock and yellowtail flounder, it also must stop overfishing and rebuild other species in the multispecies fishery. The following discussion outlines some

of the expected impacts of proposed measures on those species, including qualitative impacts not addressed in the previous section. The discussion includes analysis results for alternatives considered in the draft framework document as well as analysis of the proposed action.

In the draft framework document, the Council considered a DAS reduction, which would have provided some additional protection for cod, haddock, yellowtail flounder, proportional to the effectiveness of the reduction on total effort as modified by any redirection of effort, as would other stocks in the fishery management unit. These stocks may otherwise be negatively impacted by any effort shifts resulting from measures (area closures, trip limits) designed to reduce fishing on cod.

The effect of proposed actions on haddock results from changes to the trip limit as described in the previous section, as well as the impact measures focused on restricting cod fisheries. However, the existing, and continuing, provision that authorizes the Regional Administrator to reduce the trip limit based on an ongoing evaluation of the risk of exceeding the target TAC provides protection from fishing mortality rates on haddock exceeding the plan targets. The proposed action is designed to enable the industry to catch at least 75 percent of the TAC but not to exceed the TAC.

Projections of haddock rebuilding by SAW 27 indicate that if 1997 fishing mortality rates continue in 1998 and 1999-2000, SSB will increase from 40,500 mt in 1997 to 57,400 mt in 1999 and then decline slightly to 56,900 mt in 2000 based on estimates of incoming year-class size. If fishing mortality rates increase in 1999-2000 to plan target levels (from $F=0.11$ to $F=0.26$), SSB will increase to 55,600 mt in 1999 then decline to 49,200 mt in 2000. At status quo F levels, estimated landings in 1999 will be 4,600 mt, and at the plan target F level, would be 10,100 mt (combined U.S. and Canada; U.S. TAC is 5,600 mt).

The Cape Cod yellowtail stock could also benefit from area closures designed to protect cod in the Massachusetts Bay/Stellwagen Bank area. Additionally, the increase in the minimum size of square mesh to 6.5 inches, will increase age-at-entry and spawning stock biomass per recruit (SSB/R), dependent on how the change in selectivity of the larger mesh translates into a shift in exploitation pattern. Projections of the impact on the L_{50} (size of fish at which 50 percent are retained by the mesh) indicate that the L_{50} will increase from 12.1 inches to 13.1 inches, the minimum legal size, which represents 4.4 months' growth averaged over all yellowtail stocks (see Appendix III). This change will also likely reduce discards, projected by SAW 27 to be 29 and 30 mt for SNE and GB, respectively, at status quo F in 1999.

For winter flounder stocks (GOM, GB and SNE/MA), the impacts of the proposed action are likely to be similar to those described for yellowtail flounder, namely:

- protection resulting from area closures in the Gulf of Maine
- increased mortality from effort shifting out of other restricted fisheries, and
- increased yield per recruit and SSB/R because of delayed age at entry resulting from the square mesh size increase.

Discussion in Appendix III indicates that the L_{50} for winter flounder will increase from 11.5 to 12.5 inches with an increase in the square mesh to 6.5 inches. In Amendment 9, which is pending NMFS approval, the Council increased the minimum fish size of winter flounder to 13 inches. The square mesh size increase aligns the selectivity of available mesh configurations with the increased minimum fish size, thereby reducing discards.

Appendix IV consists of two memorandums from the chairman of the ASMFC Winter Flounder Technical Committee on the effect of the minimum fish size increase on yield. Delayed age at entry resulting from the increased mesh size will have positive impacts on yield and SSB/R. However, increasing commercial size selection under this FMP will not produce the yield results projected in the memos for the entire SNE/MA stock because of differential minimum fish and mesh sizes in some state waters and Mid-Atlantic commercial and recreational fisheries. These memos also observe that fishing mortality on fish less than 13 inches will not be reduced unless the minimum mesh size is increased to 6-inch diamond or 6.5-inch square. Furthermore, the reduced discards with the larger mesh will result in increased yield and SSB/R because of the delayed age at entry.

Appendix V contains a proposal for a comparative mesh selectivity study on vessels fishing for winter flounder in Southern New England. Background information for the proposal includes a review of catch data on the same vessels collected under commercial conditions by the fishermen. Analysis of these data indicates that while up to 45 percent of the present catch would be foregone, most of the loss would be made up on 4 months as the escaped fish grew to a size where they would be susceptible to capture in the larger mesh. Other background information in Appendix V supports the benefits of increasing the minimum mesh size, especially in conjunction with the 13-inch minimum size, in terms of increasing SSB and yield per recruit.

The impacts of the proposed measures on other regulated species are expected to be consistent with those described in the preceding paragraphs for haddock, yellowtail flounder and winter flounder. However, the PDT conducted a comparative analysis of closed area configurations for GOM cod, white hake and American plaice which provides additional insight into the effects of the proposed closed areas on these species. The following discussion includes the analysis of the alternatives contained in the draft framework document as well as a revised analysis showing the projected impacts of the proposed action.

The area closure configurations were evaluated on a relative basis in the absence of any additional measures using the 2-bin model to compare the conservation benefits across species. The month-block configurations specified in each proposal were applied independently to white hake and American plaice in the same manner as for GOM cod. Results from these analyses, along with those corresponding to the Framework 25 (“current closures”) area closure configuration, are presented in the following table.

	<u>Percent Reduction in Landings</u>		
	Gulf of Maine Cod	White Hake	Am. Plaice
Current Closures	- 13.26 %	+ 3.09 %	+ 2.18 %
MMC Option 5, Alt 1	- 31.18 %	+ 2.56 %	+ 2.41 %
MMC Option 5, Alt 2	- 31.44 %	+ 2.33 %	+ 3.20 %
MMC Option 5, Alt 3	- 32.55 %	+ 11.32 %	+ 17.13 %
DMR	- 20.60 %	+ 6.71 %	+ 7.93 %
GoMFA	- 4.61 %	- 1.73 %	+ 4.89 %

Table 12 Comparison of closed area configurations from three draft framework document proposals for cod, white hake and American plaice derived from 2-bin model results, presented as percent reductions in landings compared to no closure.

All of the options in the draft framework document exhibited landings reductions (negative percentages) for Gulf of Maine cod. The MMC options produce the greatest expected reductions in cod landings while the GOMFA proposal produced the least. Within the MMC option, each of the 3 alternative closure configurations were estimated to produce approximately the same results for Gulf of Maine cod. The estimated impacts on white hake and American plaice, however, were almost always in the direction of lowered conservation benefits (positive percentages) compared to no closure, ranging up to a 17% increase for American plaice.

The poorest performing schemes are those which concentrate most of the additional seasonal closures in the spring months. This is illustrated by the differences between MMC alternatives 1 and 2 and alternative 3. Aside from the Western Gulf of Maine annual closure, MMC alternatives 1 and 2 encompass substantial seasonal closure periods during the autumn and winter months, while the alternative 3 seasonal closures are concentrated during spring months. In overall performance with respect to expected conservation benefits, MMC alternatives 1 and 2 provide substantial benefits to Gulf of Maine cod, while minimizing potential increases in landings of white hake and American plaice.

The adopted area closure configuration was evaluated on a relative basis in the absence of any additional measures using the 2-bin model to compare potential changes in expected landings. The month-block configurations specified in the adopted proposal were applied independently to white hake and American plaice in the same manner as for Gulf of Maine cod. Results from these analyses are presented in the following table.

	<u>Percent Reduction in Landings</u>		
	Gulf of Maine Cod	White Hake	Am. Plaice
Adopted	- 23.65 %	+ 5.01 %	+ 2.65 %

Table 13 Comparison of proposed closed area configurations to no closure for cod, white hake and American plaice derived from 2-bin model results, presented as percent reductions in landings.

The analysis indicates that the proposed area closures will contribute a reduction in landings (negative percentage) for Gulf of Maine cod of 23.65% in comparison to a no-closure scenario. The estimated impacts on white hake and American plaice, however, are opposite (positive percentages) compared to no closure, ranging between 2.65% for American plaice and 5.01% for white hake. This may be attributed to the concentration of most of the seasonal closures in the spring months when the fishery is targeting cod compared to summer and autumn when more of the effort is directed at American plaice and white hake. This analysis assumes full effort displacement from closed areas to open areas, and does not take into consideration any impact of other measures, particularly the increase in square mesh minimum size.

On January 29, SAW 28 presented updated assessments of two winter flounder stocks (GB and SNE/MA), Cape Cod yellowtail flounder, white hake and American plaice. The Council will consider the impacts of the proposed action on each of these stocks in greater detail as it develops Amendment 13, containing measures to stop overfishing and rebuild the stocks as needed under the new overfishing definitions.

4.1.2 Impacts on other species

4.1.2.1 Impacts on whiting and red hake fisheries

In the Gulf of Maine, fisheries in Small Mesh Areas 1 and 2 are the primary source of direct effort on whiting and red hake under established fisheries that would be affected by proposed actions. Other sources of mortality on these species, include the shrimp fishery (exempt from closed areas), experimental fisheries, and bycatch in other fisheries, much of which may not be landed or reported. From 1995 – 1997, Small Mesh Area 2 was a substantially less productive fishery in terms of whiting and red hake than Small Mesh Area 1. However, small mesh fishing does occur in Small Mesh Area 2 during the season, and species other than whiting and red hake are targeted as well (herring, for example).

The following paragraphs contain a discussion of the impacts on small mesh species under the three options that were under consideration in the draft framework document, focusing on how they would reduce the time and area available for small-mesh otter trawls in the Gulf of Maine. How the reduced

fishery would impact the whiting and red hake resource, however, under these alternatives or the proposed action cannot be determined because only parts of the small mesh areas are affected during any given time. If vessels move to the open areas and continue fishing, the biological impacts would be insignificant.

Areas under consideration for closure under Option 2 to protect GB cod also had a potential impact on whiting in the Cultivator Shoal. However, since the proposal would have closed part or all of the Cultivator Shoal Exemption area for only 15 days (June 15, the start of the fishery season, to June 30, the end of the proposed closure period), the impact on the whiting resource would probably be minimal.

In general, the current year-round western Gulf of Maine area closure, which is retained in some of the Framework 27 alternatives, including the proposed action, eliminates the western portion of Small Mesh Area 2. About ¼ of the area contained in Small Mesh Area 2 is eliminated. In addition, the current “rolling” closures (Framework 25) in the western Gulf of Maine eliminate the southern ½ of Small Mesh Area 2 during April and the northern ½ of Small Mesh Area 2 during May. In addition to current rolling closures, the proposed action will close the southern ½ of Small Mesh Area 2 in May. The closures proposed in the Framework 27 alternatives that were not adopted would have had impacted the Small Mesh Areas in the following manner:

Option 1

- The western Gulf of Maine year-round closure is only for Year 1 (already past), and the Year 2 and Year 3 year-round closures have no effect.
- The closure of Blocks 127 – 133 during the month of April would eliminate the southern ½ of Small Mesh Area 2 in April (same as current).
- The closure of Blocks 134 – 140 during the month of May would eliminate the northern ½ of Small Mesh Area 2 in May (same as current).

Option 2

- The Maine DMR proposal retains the western Gulf of Maine year-round area closure, thus eliminating about ¼ of the area contained in Small Mesh Area 2.
- The proposed rolling closures have no effect on either Small Mesh Area.

The proposed April, May, and June closure of either the Cultivator Shoal Whiting Fishery area or Block 96 would have consequences on the Cultivator Shoal Whiting Fishery season. Once Amendment 12 is implemented (October 1999), the Cultivator Shoal Whiting Fishery season will run from June 15 – September 30 (the month of October was eliminated). Due to the timing of submission for Amendment 12, this will most likely not affect the Cultivator Shoal season for 1999. Closure of the Cultivator Shoal area during June would completely eliminate the first two weeks of the season. Closure of Block 96 during the month of June would eliminate the southern 1/3 of the Cultivator Shoal Whiting Fishery area for the first two weeks of the season. It is important to note that the Whiting Committee considered eliminating the month of June from the Cultivator Shoal Whiting Fishery season, but chose to retain the first two weeks of the season because the majority of comments from the industry as well as the

Advisory Panel implied that June 15 – 30 is an extremely important time for whiting fishing on the Cultivator Shoal.

Option 3

This option retains the current western Gulf of Maine area closure on a year-round basis, no matter what closure alternative is selected. This eliminates the western ¼ of Small Mesh Area 2.

Closure Alternative 1: (This alternative has the most effect on the Small Mesh Areas.)

- The closure of Blocks 131 – 133 from April – June eliminates the southern ½ of Small Mesh Area 2 from April – June, all three months (the season is open January – June). Without considering where effort is directed or where landings come from within Small Mesh Area 2, this closure alone removes ¼ of the opportunity to fish in Small Mesh Area 2 (it closes ½ of the area for ½ of the season).
- The closure of Blocks 138 – 140 during the month of June eliminates the northern ½ of Small Mesh Area 2 during the month of June. When combined with the closure mentioned above, this completely eliminates the month of June from the Small Mesh Area 2 season. There would no longer be an opportunity to fish with small mesh in the Gulf of Maine during June.

Closure Alternative 2:

- The rolling closures proposed in Alternative 2 would have no effect on either Small Mesh Area. Only the year-round western Gulf of Maine closure would affect Small Mesh Area 2.

Closure Alternative 3:

- The year-round closure of Block 131 would eliminate the southern ½ of Small Mesh Area 2 for the entire season.

4.1.2.2 Other species

Other major fisheries that are potentially affected by actions in this FMP because of geographical co-occurrence or use of similar fishing gear include sea scallops, monkfish, dogfish, herring, shrimp, lobsters, and pelagic hook (primarily tuna), and summer flounder fisheries. Since the fisheries for herring, shrimp, lobsters and tuna are conducted under a gear exemption that would not restrict them from fishing in closed areas, they would not be restricted by the proposed action. Therefore, there would be no direct biological impact. Effort increases in these fisheries resulting from displaced groundfish effort, particularly lobsters, shrimp and tuna, however, may have a biological impact, although the magnitude and direction of effort shifts cannot be predicted. Nevertheless, the fishery management plans for these species are based on biological reference points and contain provisions to control effort that would otherwise compromise their conservation goals.

The small-mesh otter trawl fishery that also catches herring, discussed in the previous section, is not conducted under the exempted gear provision, but under a defined exempted fishery based on low observed regulated species bycatch rates. In 1997, ten vessels reported landing a total of 230 metric tons of herring in this fishery. Since the GOM herring fishery lands 70,000 – 80,000 metric tons per year, any impact of proposed regulations on the inshore bottom trawl fishery would have negligible biological impact.

The fisheries for sea scallops, monkfish, summer flounder and dogfish are managed under existing or pending FMPs that are designed to control fishing mortality rates at levels that will achieve rebuilding or maximum sustainable yield. It is not possible to predict the full quantitative impact of the measures proposed in this action on all of these fisheries, considering both direct and indirect effect of each option and the changing regulatory environment for those fisheries. Qualitatively, the measures will have both positive and negative impacts depending on:

- the amount of effort that shifts into or out of those fisheries in response to their respective FMPs
- the amount of effort that shifts out of the groundfish fishery in response to these proposed measures
- the limitations on or opportunity for entry to these fisheries for displaced vessels (permit restrictions)
- the protection to those stocks within area closures or increased susceptibility to capture from increase effort outside the closures
- reduction in the amounts of overall bycatch due to DAS reduction, and
- reduction in bycatch resulting from the square-mesh size increase
- individual choices by fishermen about how and where to direct their fishing effort.

In the case of monkfish, one of the major ways, especially in the Gulf of Maine, that the Monkfish FMP is anticipated to achieve the required mortality reduction is that it relies on the choice of using up to 40 multispecies days-at-sea to target monkfish. According to the Monkfish FMP, there are about 600 multispecies vessels with days-at-sea allocations that could use up to 40 multispecies days-at-sea to target monkfish. The success of the plan depends on how many of these vessels will not target monkfish for the entire 40 days, because they need those days to target groundfish. The measures proposed for Framework 27, however, jeopardize the desired mortality reduction for monkfish because the proposed multispecies measures make targeting groundfish on a day-at-sea more uneconomic, relative to the revenue that could be generated by targeting monkfish.

Since the more active monkfish vessels that also have multispecies permits now target monkfish when they are not on a multispecies days-at-sea, the Monkfish FMP would force them to choose between targeting monkfish or groundfish on a multispecies day-at-sea. This choice that vessels would have to make is intended to be a major contributor to monkfish mortality reduction, primarily in the Gulf of Maine. In Southern New England and the Mid-Atlantic, there are other measures (larger size limits, fewer nets, more vessels without multispecies days-at-sea permits) that will produce the monkfish mortality reductions.

Monkfish frequently spawn in June and early July in the Gulf of Maine, times when the Framework 27 area closures are fewer. When monkfish spawn, they often migrate to shallow banks where their movement and location makes them vulnerable to gillnet fishing gear. Prime spawning areas include Fippennies and Cashes Ledges, within blocks 129 and 130, which are closed in April and May (entire blocks) and July (Cashes Ledge and Fippennies Ledge only) under the proposed action. At other times

of the year, monkfish tend to inhabit the deeper water in the Gulf of Maine and co-occur in the catch with flatfish, white hake, and cusk. These species are targeted by groundfish trawlers when they are not targeting cod and haddock.

4.1.3 Impacts marine mammals and protected species

Background

A number of endangered and other protected species inhabit the area affected by the action proposed in Framework Adjustment 27. See Volume I, FSEIS for Amendment 5 to the Northeast Multispecies FMP (Section E.6.3) for a list of threatened, endangered and other marine mammal species that are likely to occur within the waters governed by the FMP, and the National Marine Fisheries Service Biological Opinion issued on November 30, 1993; also see Volume I, FSEIS for Amendment 7 to the FMP (Section E.6.3.4), the associated Biological Opinion issued by NMFS on February 16, 1996 and the Biological Opinion issued on December 13, 1996 following an unusual right whale mortality event earlier in that year.

Relative to the Multispecies Plan, the fishery of greatest concern with respect to threatened and endangered species, as well as other marine mammals, is the multispecies sink gillnet fishery, which comprises the majority of gillnet activity in the Northeast. A detailed description of the fishery and gear is provided in Amendments 5 and 7 to the FMP.

As part of the Multispecies Plan management unit, the impacts of the gillnet fishery were considered in formal consultations pursuant to Section 7 of the Endangered Species Act (ESA) for Amendment 5 in 1993 and Amendment 7 in 1996. Both Biological Opinions concluded that existing fishing activities and related management measures proposed under these amendments may affect, but were not likely to jeopardize, the continued existence of any endangered or threatened species under NMFS jurisdiction.

Recent Protected Species Management Actions Affecting the Multispecies FMP

Following an unprecedented number of northern right whale deaths in 1996, consultation was reinitiated for the Multispecies FMP. At that time NMFS determined that the continued operation of fishing under the FMP was likely to jeopardize the continued existence of the right whale. To remove the threat of jeopardy, the Council adopted the reasonable and prudent alternative provided by NMFS in the December 13, 1996 Biological Opinion. The action was implemented as Framework 23 to the Northeast Multispecies FMP and closed right whale critical habitat in Cape Cod Bay and the Great South Channel to sink gillnet gear during times of peak whale abundance.

In July, 1997, NMFS published the interim rule for the Atlantic Large Whale Take Reduction Plan (ALWTRP), a program to reduce takes of right, humpback fin and minke whales in four east coast fisheries, including the multispecies sink gillnet fishery. Accordingly, consultation was reinitiated again in 1997 to consider the ALWTRP and the operation of the sink gillnet fishery, among others. With the conclusion that the fishery may affect but would not jeopardize the continued existence of any listed species of whale or turtle under NMFS jurisdiction, the ALWTRP was substituted as an expanded

reasonable and prudent alternative. It is anticipated that implementation of the ALWTRP in November, 1997, in concert with other recovery efforts by NMFS and other agencies, will remove the threat of jeopardy to the northern right whale represented by the multispecies fishery.

Although NMFS has made a final determination that listing the Gulf of Maine/Bay of Fundy population of harbor porpoise as threatened under the Endangered Species Act is not warranted at this time, concerns remain because of the high level of bycatch in the multispecies (and monkfish) sink gillnet as well as several other fisheries. Because of this concern, a number of framework adjustments to the Multispecies FMP (4, 12, 14, 16 and 19) were proposed by the Council and implemented specifically to protect harbor porpoise beginning in 1994. Building on several of the time/area closures implemented under the Northeast Multispecies FMP, NMFS published a Harbor Porpoise Take Reduction Plan (HPTRP) for the Gulf of Maine and mid-Atlantic waters in December 1998. The plan is intended to meet the potential Biological Removal level of 483 animals established for this species by requiring the expanded use of acoustic deterrents, in addition to time and area closures. The effect of HPTRP is further enhanced by the implementation of Framework Adjustments 25 and 26 to Multispecies FMP, actions that reduce catches of Gulf of Maine cod and protect the stock during the spring spawning season. Coupled with the HPTRP, these closures of additional areas to all gear capable of catching groundfish provide more protection for harbor porpoise as well as endangered whales and other protected species by reducing the risk of entanglement in gillnets as well as other gears used in the multispecies fishery.

Endangered Species

Of the species expected to be present in the action area, only right, humpback, humpback and fin whales, loggerhead, green, Kemp's ridley and leatherback sea turtles, and shortnose sturgeon are known to become entangled in gillnet gear. The species known to interact with bottom trawl gear, the other predominant gear type used in the multispecies fishery include humpback whales and loggerhead, Kemp's ridley, leatherback and green turtles. Encounters with bottom trawl gear, however, appear to be infrequent, particularly in view of the prevalence of the gear in the Northeast. Because of their extremely low stock status, right whales are a species of particular concern.

Harbor Porpoise

Although other marine mammals may be affected by the action proposed, harbor porpoise are most vulnerable to interactions with the multispecies fishery, given that their distribution overlaps in time and area with the gillnet activity and that fixed gear is used extensively throughout the action area. Porpoise also remain a species of concern because of their continued high level of bycatch in the gillnet fishery, both in the Northeast and the mid-Atlantic area.

Impacts of the Proposed Action

Details concerning the need for action and the Council's rationale are discussed in section 2.0 of this document. The management measures proposed are discussed in section 3.0

Time and area closures to protect harbor porpoise and whales, as well as the TRPs currently in place, will not be affected by the Framework 27 closures, except that their effectiveness may be enhanced by the closure of additional areas to all gear capable of taking groundfish, as defined in the Multispecies FMP. Additional areas (blocks 121, 122 and 123) will effectively extend the existing Mass. Bay Closure in the HPTRP eastward. Greater porpoise protection also will be provided in April and May both east and north of the current areas in which pingers are allowed by the elimination of groundfish gear. Although it does not occur during a marine mammal high use period, additional benefits may accrue from the July through October closure of an area in the Cashes Ledge region. The extension of closures in June may benefit sea turtles.

Along with the year-round Western Gulf of Maine Closed Area, which includes parts of Jeffreys Ledge, Tillies Bank, Stellwagen Bank and Wildcat Knoll, the Framework 27 measures should provide added protection in areas that represent important habitat to right whales. Critical habitat should not be affected by the proposed action.

The Gulf of Maine cod trip limits, coupled with the area closures, may cause a significant number of vessel operations to become uneconomic to the point that they exit the fishery entirely. The Framework 27 RFA estimates that 186 vessels would experience a revenue loss in excess of 50 percent, and of these, revenues were estimated to decline 100 percent for 51 vessels because their 1997 fishing activities took place in the Framework 27 closed areas. As yet unregulated fisheries could absorb some effort, but, at least in the case of monkfish and spiny dogfish, fishery management plans have either been completed and are not yet implemented, or are in the final stages of development. As stated in previous actions of this nature, effort shifts may or may not be problematic, but remain difficult to predict.

The gear restrictions implemented in Framework 27 and the elimination of the Stellwagen Bank and Jeffreys Ledge Regulated Mesh Areas will impose additional costs to those operating vessels in the affected areas, but are unlikely to affect the status of protected species.

Impacts of the Alternatives to the Proposed Action

Option 1 - The most important aspect of Option 1, relative to protected species is the fact that a greater percentage of inshore areas remain open to fishing for longer periods of time. Given that this proposal also includes an inshore/offshore delineation, effort by smaller vessels could increase inshore, particularly during the open months. This scenario could potentially create a situation where protected species might be more vulnerable during the open periods, although this effect could be partially mitigated by the TRPs now in place and by retaining the year-round closures in the Western Gulf of Maine. A reduction in the number of gillnets also could provide additional benefits.

Option 2 – Because of the lengthy closures of inshore areas, Option 2 provides a great deal of protection for endangered species, including sea turtles, and other marine mammals, but raises concerns about effort displacement. Public comment on Framework 27, however, indicated that the inshore fleet and its associated fishing effort would be all but eliminated by this proposal. If this were the case, such concerns could be moot. The proposal retains the year-round Western Gulf of Maine closure.

Option 3 – The Multispecies Monitoring Committee option is the only proposal that significantly reduces days-at-sea, while retaining the trip limit and area closure features of Options 1 and 2. An effective reduction in days based on 1997 usage rates would reduce fishing effort in the Gulf of Maine, with the result that marine mammals would benefit from the associated reduction in entanglement risk. Option 3 contains three alternative area closure scenarios that would also reduce entanglements because, in most cases, multiple blocks would be closed for periods of several months.

Conclusion

Overall, the management measures contained in Framework 27 should not diminish, and will likely enhance the conservation benefits discussed in the Framework 25 and 26 consultations on endangered species. In addition, because of the expected reductions in fishing effort that may be associated with this particular action, given its timing and location, the adjustment should benefit those species by reducing entanglement risk.

4.1.4 Impacts on habitat

A comprehensive description of the physical environment and assessment of the impacts to habitat resulting from fishing practices is presented in Amendment 11 to the Northeast Multispecies Fishery Management Plan. The alternatives and actions proposed in this framework adjustment will not increase any adverse impacts on essential fish habitat (EFH) resulting from fishing activity.

Options to Reduce Fishing Effort on Cod

All proposed measures are intended to reduce fishing effort, primarily in the Gulf of Maine region. Reductions in fishing effort are one mechanism known to minimize the adverse impacts on habitat associated with fishing practices by reducing the frequency and intensity of fishing gear use. Ideally, these reductions will be focused on the sensitive habitats of the Gulf of Maine that have been designated as EFH by the Council. Measures that do not directly reduce fishing effort, but rather manage how the effort is distributed among the fishing industry or the size class of fish targeted by the industry, such as permit declarations or mesh size restrictions, are not expected to have a direct effect on the habitat of the region.

Closed Areas:

The increase in areas closed temporarily to certain types of bottom-tending mobile fishing gear and other fishing gear capable of catching groundfish will reduce some of the adverse impacts associated with these fishing gears within the boundaries of the areas closed to fishing. The short duration of the rolling closures makes it unlikely, however, that this would be enough to allow degraded habitat to recover. While surrounding areas may face an increase in fishing activity due to effort displacement, insufficient data prevent a quantitative analysis of the habitat impacts of effort displacement associated with the actions proposed. If a fraction of the fishing effort within the proposed closed areas is not displaced to other areas or seasons, the proposed closures may decrease the impacts on habitat, especially that habitat preferred by cod. A more detailed description of the potential impacts on habitat is provided in Section 4.11 of Amendment 11, which specifically discusses the effects of effort

displacement. It is also possible that concentrating fishing effort into smaller areas that remain open may have the unintended effect of increasing impacts on EFH for other species.

Trip Limits:

Implementation of trip limits would not be expected to have a direct effect on the habitat of the region. The reduction of the Gulf of Maine cod trip limit to 200 pounds per day could have an indirect effect on the habitat of the region by reducing the effort associated with each DAS, assuming that fishing effort ceases as soon as the trip limit is reached and does not continue with the intent of "highgrading."

Gear restrictions:

Limiting the maximum diameter of roller and rockhopper gear on otter trawl vessels fishing in certain areas (Blocks 124, 125, 132, 133, 139, and 140, and the parts of Blocks 131 and 123 west of 69° 50') could reduce the adverse impacts on habitat associated with using roller and rockhopper gear of greater diameter. Within Massachusetts state waters, there is an existing restriction on discs, rollers, and rockhoppers greater than eighteen inches in diameter, so this restriction would be reduced even further for federal permit holders, with an additional restriction in areas outside of state waters as well.

Roller and rockhopper gear allow otter trawl vessels to fish in areas where they would otherwise not be able without significant risk to their gear from hangs and tears. Implementing a maximum allowable diameter for this gear will still allow trawlers to fish on rough bottom, but the restriction should reduce fishing on very rough bottom by effectively preventing otter trawl vessels from fishing in areas where roller and rockhopper gear of a diameter greater than the maximum would be required to fish efficiently. These areas would then be protected from any adverse impacts to habitat associated with this type of bottom-tending mobile fishing gear. The actual benefits to habitat from this measure may be reduced somewhat because the existing state restrictions cover most of the very rough bottom in the areas affected by this proposed measure.

Alternatives Considered But Not Selected

Option 1

There were four proposed measures which could have been expected to provide some benefit to the habitat of the region by directly reducing fishing effort: days-at-sea (DAS) reductions, gear restrictions, temporary (rolling) fishing closures, and year-round fishing closures. The other measures proposed in this option were not expected to have any effect on habitat.

This option proposed to reduce DAS for all vessels by 10 percent, providing a direct overall reduction of fishing effort. This reduction would have lessened the fishing pressure on the habitat of the region, although it is unlikely that this would have been enough to allow degraded habitat to recover. By limiting rockhopper and/or roller gear in inshore areas, fishing pressure in certain areas and habitats should have been reduced, and this reduction of fishing pressure, if long-term, would have allowed some recovery of degraded habitats within these areas.

Please refer to the analysis of the proposed measures for a description of how the fishing closures proposed in this option may have provided a benefit to the habitat of the region.

Option 2

There were two proposed measures which may have provided some benefit to the habitat of the region: temporary (rolling) fishing closures, and year-round fishing closures. The other measures proposed in this option were not expected to have any effect on habitat. Please refer to the analysis of Option 1 for a description of how the fishing closures proposed in this option may have provided a benefit to the habitat of the region.

Option 3

There were three proposed measures which may have provided some benefit to the habitat of the region: DAS reductions, temporary (rolling) fishing closures, and year-round fishing closures. The other measures proposed in this option were not expected to have any effect on habitat. This option proposed to reduce DAS for all vessels by 22 percent, providing a direct overall reduction of fishing effort. This reduction would have lessened the fishing pressure on the habitat of the region, although it is unlikely that this would have been enough to allow degraded habitat to recover. Please refer to the analysis of Option 1 for a description of how the fishing closures proposed in this option may have provided a benefit to the habitat of the region.

Haddock Trip Limit Adjustment, Clarification of Trip Limits, Target TAC Backstop Mechanism

These proposed measures are not expected to have a direct effect on the habitat of the region.

4.1.5 Impact of taking no action

Taking no action would result in continued overfishing and biomass decline in the GOM cod stock. Scientific advice from SAW 27, repeated in the MSMC Report, is that directed fishing on this stock must be halted, and bycatch reduced to minimal levels. Failing to take action will likely cause further collapse of this resource, greatly reducing the probability that the stock will rebuild in ten years or less.

While GB cod is rebuilding, fishing mortality rates under the status quo are above plan objectives. Taking no action would delay rebuilding and raise the likelihood that more restrictive measures would need to be imposed in the future. Rather than risk delay in implementation of measures to stop overfishing on GOM cod, however, the Council decided to proceed with this framework without specific measures to address GB cod fishing effort. It has initiated another framework adjustment focused on reducing GB cod by the 22 percent needed to stay below the Amendment 7 fishing mortality objective.

Allowing continued use of 6-inch square mesh in the flounder fisheries will delay rebuilding of those stocks and will maintain unacceptable levels of discarding that fishermen have reported to the Council.

Delaying age at entry is an important first step in a rebuilding program because it results in a short-term increase in SSB/R, increasing the chances for improved recruitment early in the rebuilding program.

4.2 Economic impacts

4.2.1 Introduction

Framework 27 proposes a combination of measures including time-area closures, trip limits and gear restrictions to reduce the Gulf of Maine cod mortality. These measures will also indirectly impact the landings and revenues of other species depending on the degree of effort displacement and revenue recovery from other areas and species. They may also affect other entities that while not directly regulated, may be indirectly affected through a reduction in the supply of seafood products (seafood dealers and processors). The aggregate economic impacts of these measures on all vessels fishing in the proposed closure areas and/or landings cod are examined in Section 4.2.2. The impacts on the revenues and profitability of the vessels are analyzed in Section 4.2.3 on a vessel-by-vessel basis from the perspective of the Regulatory Flexibility Act (RFA) requirements. Economic impacts of the gear restrictions are discussed in Section 4.2.4, and impacts on dealers and processors are examined in Section 4.2.5. Wherever possible quantitative analyses are used. Where quantitative data are not available a qualitative approach was adopted.

4.2.2 Aggregate Economic Impacts of the Proposed Action and the Non-selected alternatives

The economic analysis in this section shows the impacts on total revenues of the fishing vessels that will be affected by the proposed action and the non-preferred alternatives. These impacts are examined subject to availability of data, and relative to taking no action to modify the current measures, that is, those determined by Framework 25 (Table 14). In other words, the comparative economic impacts of the proposed action and the non-preferred alternatives are estimated relative to status quo, which assumes the continuation of the Framework 25 closures. The cumulative impacts of the proposed action as compared to the 1997 baseline itself are also examined in Table 15 below.

The potential impacts are estimated using the information on landings, revenues, and effort in 1997 in the proposed closure areas under the various assumptions regarding effort displacement:

1. No effort displacement
2. Total Displacement
3. Partial effort displacement
 - at the same catch per unit effort
 - at a reduced catch per unit effort

The first model assumes that the vessels do not fish in other areas and/or increase their fishing effort in the closure areas in other months so that the revenues and landings from a closed block-month are lost and can not be recovered from other areas. The second model assumes that there will be no reduction in total effort with closures and distributes effort from a closed area uniformly throughout the remaining

open areas using a two-bin approach (for a further discussion of these models see the Section 4.1, the biological impacts). The actual impacts are expected to lie between the range of impacts of the no effort displacement and total displacement scenarios. The scenarios with partial effort displacement provide some examples of the likely impacts if only 50 percent of the effort from the closed areas was directed to the open areas. The impacts are examined separately for each type of gear in Table 14.

The Framework 27 proposed action and non-preferred options also include trip limits for Gulf of Maine cod. For the 1998 fishing year the daily limit was 700 pounds per DAS from May to June, and 400 pounds per DAS from June 25 to the end of the year. The proposed action includes a 200 pound/ day trip limit. The impacts of the cod limits and the DAS reductions are included in the analysis to estimate total economic impacts (Table 14). Framework 25 closures are assumed to be implemented under status quo unless modified by the proposed action. In addition to the specific time-area closures, each option reflects the following assumptions:

Status quo assumptions:

- 440 lb/day trip limit (to reflect an average trip limit for the year based on 700 pounds of trip limit for 7 weeks and 400 for the rest of the year similar to what was experienced in 1998).
- Groundfish DAY-AT-SEA, i.e., effective effort, is reduced by 7.4 percent.
- Scallop DAY-AT-SEA, i.e., effective effort, is reduced by 8.4 percent.

Proposed Action assumptions:

- 200 lb/day trip limit
- Groundfish DAY-AT-SEA, i.e., effective effort, is reduced by 7.4 percent.
- Scallop DAY-AT-SEA, i.e., effective effort, is reduced by 8.4 percent.

Non-preferred Alternatives:

Option 1 (Gulf of Maine Alliance) assumptions:

- 150 lb/day trip limit
- Groundfish DAY-AT-SEA, i.e., effective effort, is reduced by 10 percent.
- Scallop DAY-AT-SEA, i.e., effective effort, is reduced by 8.4 percent.

Option 2 (Maine DMR proposal) assumptions:

Gulf of Maine measures:

- 150 lb/day trip limit
- Groundfish DAY-AT-SEA, i.e., effective effort, is reduced by 7.4 percent.
- Scallop DAY-AT-SEA, i.e., effective effort, is reduced by 8.4 percent.

Georges Bank measures:

- No trip limit is assumed.
- Same effort reduction assumptions are applied, i.e., 7.4 percent for groundfish DAS and 8.4 percent for scallop DAS.

Option 3 (MMC) assumptions:

- 200 lb/day trip limit
- Groundfish DAY-AT-SEA, i.e., effective effort, is reduced by 22 percent.
- Scallop DAY-AT-SEA, i.e., effective effort, is reduced by 8.4 percent

1) No Effort Displacement

Although the assumption of no effort displacement results in an unrealistically high estimate of the negative impacts, it is employed here to show the maximum loss in revenues from the proposed closures. It should be emphasized that in Table 14 the impacts show the net change, or incremental impacts, compared to the status quo option which assumes the continuation of Framework 25 closures. The impacts of the proposed action, however, are also estimated in Table 15 compared to the 1997 baseline to measure the absolute impacts.

The impacts on total revenues are shown by gear type in Table 14. If the vessels are not able to recover their losses by shifting effort to other times or areas, the decline in total revenues would range between \$3.8 million (option 1) to \$24.2 million (option 3c) excluding the impacts on dredges. The reduction in total revenues will be \$7.3 million under the proposed action, larger as compared to the impact of the non-preferred option 1 (Gulf of Maine Alliance option) but smaller than the impacts of the non-preferred options 2 and 3. The impacts on net revenues (i.e., revenues minus costs), however, will be less than these levels since the operating costs will also decline as effort is reduced by the closures under the no effort-displacement scenario. Under option 2, with Georges Bank closures, the short-term economic impacts will be greater if a cod trip limit is imposed.

Option 3c would produce the largest impact, a \$24.2 million loss, because of the year-round closure of blocks 124, and 127 to 132 coupled with a 22 percent reduction in DAS. The closures would have the largest revenue impacts on the trawl fleet in absolute value, ranging from \$3.3 million total revenue loss under option 1 to \$15.4 million for option 3c. The proposed action is estimated to reduce the revenues of the trawl fleet by \$5.9 million. The impacts of options 2, 3a and 3b lie within this range of impacts, option 3b producing the second largest, and option 3a the third largest impact on trawl revenues from all species.

The revenues of the gillnet fleet are estimated to decline the least under option 1 by \$0.5 million and the most under option 3c by \$ 4.6 million. Under the proposed option, the decline will be around \$1 million, again less compared to other options except the non-preferred option 1.

The proposed option is estimated to reduce the revenues of the hook fleet by about \$260,687. The option 1, would have resulted in a slight increase in total revenues compared to the status quo (Framework 25 closures), by \$46,950 for the whole hook fleet. Again option 3c produces the largest impacts with a \$4.2 million loss, and option 2 results in a \$2.4 million loss for the hook fishery.

The proposed action exempts the dredges from the proposed closures. The impacts on total revenues would be larger if the dredges were prohibited from fishing in the closure areas. The majority of the dredges fishing in these areas are scallop dredges, therefore, the closures would have negative impacts on scallop revenues. Among the non-preferred alternatives, option 3c would have the largest negative impact on dredges with a \$2.8 million expected reduction in their total revenues, followed by option 2 with a \$1.9 million revenue loss.

Sources of uncertainty in the analysis

These results should be interpreted with caution for the following reasons:

- ex-vessel prices of fish are assumed to stay constant after the closures
- The variable cost savings associated with the reduced effort are not taken into account
- The estimates only reflect the maximum revenue and landings losses under the proposed closures with no effort displacement to other areas and months.

Options	Geartype	No Displacement	Partial Effort Displacement	
			Scenario 1: 50% Displacement at 50% of RPUE*	Scenario 2: 50% Displacement at the same of RPUE*
Proposed Action				
Proposed Option	gillnet	-1,088,836	-927,125	-765,414
	hook	-260,687	-111,312	38,063
	trawl	-5,969,471	-4,456,481	-2,943,491
	Total	-7,318,994	-5,494,918	-3,670,842
Non-Preferred Options				
Option 1 Gulf of Maine Alliance	dredge	-166,562	-205,103	-243,644
	gillnet	-535,057	-596,099	-657,141
	hook	46,950	-83,184	-213,316
	trawl	-3,297,588	-3,152,587	-3,007,587
	Total including dredges	-3,952,257	-4,036,973	-4,121,688
	Total without dredges	-3,785,695	-3,831,870	-3,878,044
Option 2 (Maine DMR) Gulf of Maine Measures	dredge	-1,933,042	-1,223,775	-514,507
	gillnet	-2,731,091	-2,141,266	-1,551,441
	hook	-2,167,069	-1,823,231	-1,507,725
	trawl	-5,036,915	-3,652,663	-2,268,413
	Total including dredges	-11,868,117	-8,840,935	-5,842,086
	Total without dredges	-9,935,075	-7,617,160	-5,327,579
Option 2 (Maine DM R) Georges Bank Measures**	dredge	-1,074,842	-856,690	-638,537
	gillnet	-6,480	4,652	15,785
	hook	-263,653	-191,966	-120,279
	trawl	-3,463,254	-2,642,164	-1,821,074
	Total including dredges	-4,808,229	-3,686,168	-2,564,105
	Total without dredges	-3,733,387	-2,829,478	-1,925,568
Option 2 total	dredge	-3,007,884	-2,080,465	-1,153,044
	gillnet	-2,737,571	-2,136,614	-1,535,656
	hook	-2,430,722	-2,015,197	-1,628,004
	trawl	-8,500,169	-6,294,827	-4,089,487
	Total including dredges	-16,676,346	-12,527,103	-8,406,191
	Total without dredges	-13,668,462	-10,446,638	-7,253,147
Option 3a (MMC)	dredge	-1,347,448	-945,665	-543,884
	gillnet	-2,705,021	-2,541,570	-2,378,121
	hook	-1,329,753	-1,179,206	-1,028,660
	trawl	-10,454,945	-9,649,647	-8,844,351
	Total including dredges	-15,837,167	-14,316,088	-12,795,015
	Total without dredges	-14,489,719	-13,370,423	-12,251,132
Option 3b (MMC)	dredge	-1,653,426	-1,106,133	-558,841
	gillnet	-2,614,369	-2,427,641	-2,240,913

	hook	-1,341,463	-1,165,368	-989,274
	trawl	-10,741,299	-9,817,507	-8,893,717
	Total including dredges	-16,350,557	-14,516,649	-12,682,746
	Total without dredges	-14,697,131	-13,410,516	-12,123,905
Option 3c (MMC)				
	dredge	-2,827,907	-1,905,883	-983,859
	gillnet	-4,649,275	-4,193,720	-3,738,166
	hook	-4,187,693	-3,753,941	-3,320,191
	trawl	-15,370,759	-13,376,121	-11,381,485
	Total including dredges	-27,035,634	-23,229,665	-19,423,701
	Total without dredges	-24,207,727	-21,323,782	-18,439,842

Notes to Table 14

This is the revised Table 12 as distributed during the Council meeting on January 28, 1999.

*RPUE= Total revenue per unit effort, i.e., per DAS.

** Under status-quo, all areas in Georges Bank are assumed to be open. Includes no trip limits.

Table 14. Change in total fleet revenues by gear under the proposed alternatives compared to status quo (Framework 25 level, in dollars)

2) Effort displacement

If all the vessels could shift their effort to open areas and if their landings and revenues per DAS average the same level prior to the closures, then the proposed closures would have little impact on their revenues. It is highly unlikely, however, for vessels to recover fully the revenue loss from the closed areas by fishing in the open areas. First of all, the size and horse power of some vessels may restrict their ability to fish in distant off-shore areas, so that not all effort can actually shift to open areas. In addition, the crowding-out impacts of many vessels fishing in the open areas would reduce the catch per unit effort from these areas. For these reasons, the results of the scenario with total displacement at the constant revenue per DAS are not shown in Table 14. A more realistic scenario with the effort displacement is to assume that the vessels may be able to shift their effort to other areas/periods only partially.

Table 14 provides a range of impacts assuming that only 50 percent of the displaced effort may shift to other areas/times. Scenario-1, shows the impacts of proposed closures on the revenues from all species assuming extra effort can generate only half as much revenue per DAS, and scenario-2 shows the impacts assuming that the revenue per DAS stays constant at the level prior to the closures. Based on these two scenarios, the revenue recovered from the open areas was estimated by multiplying the displaced effort (total DAS in the closed areas by gear type) with the average revenue per DAS (by gear type) at the reduced rate under scenario 1, and at the constant rate under scenario 2. In this way the effort displacement model takes into account the differences of the DAY-AT-SEA used and the revenue-per-day of a trawl from a dredge, hook or gillnet vessel, and vice versa.

Scenario-1, probably portrays a more realistic outcome in terms of the impacts of the proposed closures. Under this scenario and the proposed action, the revenue loss for the fleet as a whole is estimated to be \$5.5 million, but could reach between \$21.3 to \$23.2 million under alternative 3c (depending on the exclusion from or inclusion of the scallop dredges in closures). Scenario-2, on the other hand, represents a more optimistic case, under which vessels can recover at least half of their revenue losses from closed areas by fishing in the open areas. Under this scenario and proposed action, the net losses are expected to be \$3.7 million. Again the revenue reduction could reach \$18.4 million under option 3c, and about \$3.8 million to \$12.2 million under the other options with the impacts on dredges excluded.

The actual losses under all the alternatives, however, will probably lower than these for the following reasons:

- The results are based on the 1997 prices that may change in year 1999. The reduction in landings will probably increase the price of cod and other species affected by the area closures. The increase in prices will partly offset the revenue loss from the reduced landings depending on the price elasticity of the demand for fish, availability of imports and the availability of other substitutes.

- The impacts on net revenues and the producer surplus will also be less than these estimates because of the cost savings from reduced effort under the no-displacement and partial displacement models.

The economic impacts compared to 1997 baseline

The economic analysis presented above showed the net or incremental impacts of the proposed action and the non-preferred alternatives relative to the impacts of the current closures implemented under Framework 25. The impact of the Framework 27 proposed action from the 1997 levels is also calculated here to show the magnitude of revenue reduction in the absence of any closures. Since the incremental changes from Framework 25 baseline were sufficient to compare the impacts of the proposed action with that of the non-preferred options, the impacts of these alternatives compared to 1997 baseline are not estimated separately. Although the impacts compared to the 1997 baseline would be larger than the incremental impacts shown in Table 14, the ranking of the proposed and the non-preferred alternatives in terms of their revenue impacts would stay the same if they were measured against the 1997 levels.

Options	Geartype	No Displacement	Partial Effort Displacement	
			Scenario 1: 50% Displacement at 50% of RPUE*	Scenario 2: 50% Displacement at the same of RPUE*
Proposed Option				
	gillnet	-3,871,824	-3,268,659	-2,665,496
	hook	-1,327,088	-700,984	-74,880
	trawl	-11,303,741	-8,487,814	-5,671,886
	Total	-16,502,653	-12,457,457	-8,412,262

Table 15. Change in total fleet revenues by gear under the proposed Framework 27 Action compared to 1997 baseline (U.S. dollars)

As Table 15 shows the absolute impacts of the proposed action, a \$16 million revenue loss under the no-effort displacement scenario, will be larger than incremental impacts of \$7.3 million loss (Table 15). The vessel-by-vessel impact analysis presented in Section 4.2.3 also uses 1997 activity level under the no-effort displacement scenario as the baseline to provide an assessment of the impacts on the small business entities within the context of the Regulatory Flexibility Act.

The absolute revenue impacts under the partial effort displacement scenarios will be less than the loss under the no-effort displacement scenario with

- a \$12.5 million loss (Scenario 1) if they able shift 50 percent of their effort to open areas but only derive half as much revenue-per-DAS for their additional activity from these areas, or with
- a \$8.4 million loss if the vessels can recover half of their revenues from the open areas (Scenario 2).

Again, the same uncertainties and cautions are valid for the interpretation of results, that is the actual losses will probably be lower than estimated in Table 15 for the following reasons:

- The reduction in landings may increase the price of cod and other species affected by the area closures. The increase in prices would partly offset the revenue loss from the reduced landings depending on the price elasticity of the demand for fish, availability of imports and the availability of other substitutes.
- The impacts on net revenues and the producer surplus will also be less than these estimates because of the cost savings from reduced effort under the no-displacement and partial displacement models.

Finally, the economic impacts represent only short-term losses from the proposed options and Table 16 provides a qualitative analysis of these short-term impacts on prices, consumer and producer surpluses and net economic benefits. As stated in FSEIS of Amendment 7, the rebuilding measures will have negative impacts on revenues, producer and consumer surpluses in the short-term, but will increase fleet profits, crew shares, and consumer benefits over the long-term by increasing the stock size and therefore, landings of the regulated species.

The Impacts of Haddock Trip limits

The increase in haddock trip limits will produce positive impacts on the revenues of vessels in that fishery if there are successful in inducing the vessels to increase haddock landings from the 1998 levels. An increase in haddock landings and revenues will in part offset the losses expected under the GOM cod management measures. The short-term net benefits of the haddock trip limit and TAC adjustment, i.e., the impacts on the producer surplus, profits and on the consumer surplus are expected to be positive (see Table 16).

SHORT TERM ECONOMIC COSTS AND BENEFITS OF FRAMEWORK 26								
	Effort Displacement	Impact on prices	Impact on Landings	Impact on Gross Revenues	Impact on Consumer Surplus	Impact on Operating Expenses	Impact on Producer Surplus	Net Benefits
Cod trip limit		Increase	Decrease	Decrease	Decrease	Increase	Negative	Short-term Negative
Haddock trip limit	Decrease	Increase	Positive	Positive	Decrease	Neutral	Positive	Short-term Positive
Area Closures	Zero or partial Displacement of Effort	Increase	Decrease	Decrease	Decrease	Decrease	Negative	Short-term Negative
Area Closures	Displacement of Effort fully to other areas/months.	No or negligible impacts	No or negligible impacts Decrease	No or negligible impacts Decrease	No or negligible impacts Decrease	Increase or negligible	Negative or negligible	Short-term Negative or negligible

Table 16. Economic Costs of Benefits of Framework 27

4.2.3 The economic impacts on vessels

This section discusses the impacts on the affected vessels within the context of the requirements of the Regulatory Flexibility Act. All vessels that possess a limited access or open access multispecies permit will be subject to the proposed measures. However, not all vessels will actually be affected by the measures either because they do not fish in the closed areas, their current activity already complies with the new regulations, or they do not participate in the groundfish fishery even though they possess a permit to do so. For purposes of analysis, economic impact estimates are based upon data from vessels that demonstrated some level of participation in the groundfish fishery and whose activity would be affected by one or more of the proposed regulations.

Vessel activity data for the analysis was based upon combined logbook and dealer data for the 1997 calendar year. These data were used because final 1998 data were not yet available. The economic impacts of Frameworks 25 and 26 are uncertain because the fishing year over which these actions were implemented has not yet been completed. The analyses presented herein attempt to assess the cumulative impacts of Frameworks 25, 26, and 27 relative to calendar year 1997. Permit data were based upon permits issued during the 1997 multispecies fishing year (May 1, 1997 to April 30, 1998). The permit data is used for descriptive purposes only and does not affect the impact analysis. Since only limited switching between limited access permit categories occurs, the 1997 permit data is likely to reflect the type of permit that was actually held during the 1997 calendar year.

The total number of vessels that held a multispecies permit during 1997 is reported in Table 17 by permit category. There were a total of 3,736 vessels that held one or more (i.e., vessels that do not possess a limited access permit can have more than one open access permit category) multispecies permits during the 1997 multispecies fishing year. The data reported in Table 17 exclude vessels that were removed through the buyout. Of the 3,736 vessels 1,729 held a limited access permit and 2,007 held at least one open access permit. Based on the size standards established for the commercial fishing sector (\$3 million in gross sales) by the SBA, all of these vessels would be classified as being small for purposes of the RFA.

Permit Category	Number of Vessels
Individual DAS	140
Fleet DAS	1312
Small Vessel Exempt	15
Hook Gear	203
Large Mesh DAS	16
Combination	43
Open Access Hand Gear	941
Open Access Charter/Party	450
Open Access Scallop	179
Open Access Non-Regulated	437
Total Multispecies Vessels	3736

Table 17. Number of Multispecies Vessels by Permit Category

In principal, every one of the 3,736 vessels will have to comply with the regulations proposed under Framework 27. In practice, only those vessels that actually decide to participate in the groundfish

fishery may be affected. Based upon dealer reports, a total of 1,958 vessels recorded having landed one pound or more of any species in the Northeast region (Table 18). Of the vessels that reported some activity, 671 did not report having landed any one of the 13 species managed under the Multispecies plan. This leaves a pool of 1,287 vessels that both held a multispecies permit and participated in the multispecies fishery during calendar year 1997. These participating vessels were considered to be the universe for purposes of estimating the economic impacts of one or more of the Framework 27 measures.

Multispecies Category	Landed Species Regulated under Multispecies and Other FMP's	Landed Only Species Not Regulated under Multispecies FMP	Only Landed Species Regulated under Multispecies FMP	No Reported Activity	Total Permits
Individual DAS	128	2	0	10	140
Fleet DAS	791	194	12	315	1312
Small Vessel Exempt	4	4	0	7	15
Hook Gear	61	42	12	88	203
Large Mesh DAS	9	4	0	3	16
Combination	31	7	0	5	43
Open Access	225	418	14	1350	2007
Totals	1249	671	38	1778	3736

Table 18. The number of vessels according to their reported activity during calendar year 1997 by permit category

State	Ton Class 1	Ton Class 2	Ton Class 3	Ton Class 4	Total
Massachusetts	15	263	100	26	404
Maine	5	90	15	1	111
New Hampshire	6	32	1	0	39
New York	0	7	5	0	12
Rhode Island	0	4	2	3	9
Other	0	12	9	5	26
Total	26	408	132	35	601

Table 19. Summary of size and home state for vessels that fished in proposed rolling closure areas during calendar year 1997 and the vessels that will be affected by the cod trip limits

Economic Impacts of Trip Limits and Area Closures

Based upon calendar year 1997 data there were a total of 601 vessels that were found to have fished within one or more of the rolling closures and/or would be affected by one or more of the proposed trip limits. The majority of these vessels (434) were less than 50 gross registered tons in size and/or listed a Massachusetts homeport (404) on their 1997 permit application (Table 19). The economic impacts of the proposed closures and trip limits were analyzed in terms of reduced revenues. Additional analyses were undertaken to examine the economic impacts by home state and homeport. Last, a supplemental

analysis of the cumulative economic impacts of the regulatory changes in the multispecies fishery since the 1997 fishing year was also conducted.

Gross revenue impacts were estimated by combining dealer and logbook data to construct a complete record of activity (effort, landings, and value) by gear and area (i.e., blocks) fished for each vessel during calendar year 1997. The 1997 data formed a baseline from which results of subsequent analyses were compared. The rolling area closures and trip limits as defined by Framework 27 were applied to the data to estimate changes in gross revenues by vessel. Vessels were not assumed to adapt to the management measures by seeking alternative areas or fisheries to prosecute. In this manner, the analysis yields a “worst case” scenario of reductions in gross revenues. For comparative purposes, the management measures as they were developed for Frameworks 25 and 26 were also evaluated. The estimated total revenues for the 1997 calendar years and for the scenarios Framework 25&26 and Framework 27 are reported in Table 20.

Descriptive Statistic	1997 Gross Revenue	Gross Revenue: Frameworks 25&26	Gross Revenue: Framework 27
Average	115,379	89,849	83,111
10 th Percentile	3,976	343	165
25 th Percentile	14,499	8,158	7,222
Median	55,159	35,323	28,650
75 th Percentile	145,454	102,811	89,991
90 th Percentile	316,012	255,956	236,037

Table 20. Estimated gross revenues for 1997 calendar year and estimated revenues under Frameworks 25&26 and Framework 27

The gross revenues for the average vessel were \$115,379 in during calendar year 1997 while the median vessel earned \$55,159. Vessels earnings at the 90th percentile were \$316,012. By contrast, earnings at the 10th percentile were \$3,976. Compared to 1997 gross revenues, proportional reductions in estimated gross revenues for the combined effects of Frameworks 25&26 were not uniform across all vessels. At the 90th percentile, revenues were estimated to decline 19.0 percent from \$316,012 to \$255,956. The proportional reduction in gross revenues increases at lower percentiles of the distribution of estimated revenues. For example, median revenues were estimated to decline 36.0 percent while revenues at the 25th percentile were estimated to decline by 43.7 percent.

The estimated impacts of the Framework 27 measures follows a pattern similar to that of the combined effects of Frameworks 25&26 except that the proportional reductions compared to the 1997 baseline are greater. For example, the average vessel was estimated to earn \$83,111 under Framework 27; a reduction in gross revenues of 28.0 percent.

The proportional reduction in gross revenues for the incremental change from Framework 25&26 to Framework 27 are reported in Table 21. Results of this analysis show that a total of 223 vessels were estimated to experience revenue losses in excess of 5 percent. However, these incremental losses will underestimate the cumulative losses incurred by vessels since the implementation of Framework 25 measures. The incremental difference between Frameworks 25&26 and Framework 27 may not be large. For example, the incremental effect on a vessel whose fishing activity was wholly within the Framework 25&26 and Framework 27 area closures would be zero. Even though the additional impact of Framework 27 on a vessel's revenues may be zero, the proposed action would still have an impact on that vessel equivalent to the impact of Frameworks 25&26. For these reasons, the remaining analyses estimate the cumulative impacts of the proposed action on individual vessels relative to the 1997 baseline.

Percent Reduction in Gross Revenues from Frameworks 25&26	The Number of Vessels
Less than 5%	378
5% to less than 9%	43
10% to less than 20%	66
20% to less than 30%	48
30% to less than 40%	17
40% to less than 50%	20
50% or more	29

Table 21. Summary of incremental proportional reductions in gross revenues and number of vessels

Percent Reduction in Gross Revenues	The number of affected vessels under Framework 25&26	The number of affected vessels under Framework 27
Less than 5%	177	145
5% to less than 9%	43	35
10% to less than 20%	85	60
20% to less than 30%	65	73
30% to less than 40%	50	52
40% to less than 50%	34	50
50% or more	147	186

Table 22. Summary of proportional reductions in gross revenues and number of vessels

The estimated proportional reductions in gross revenues from the 1997 baseline for the Framework 25&26 and Framework 27 measures are reported in Table 22. Of the 601 vessels that were estimated to be affected by the Framework 27 measures, there were 456 vessels that would be affected a reduction in gross revenues of more than 5 percent. Compared to the Framework 25&26 measures

this represents an increase of 32 more impacted vessels. Of the 456 vessels impacted under Framework 27, 186 were estimated to experience a revenue loss in excess of 50 percent and, of these, revenues were estimated to decline 100 percent for 51 vessels because their 1997 activity was found to be wholly within the areas and times that will be closed under Framework 27. Thus, under the assumption that vessels will not or cannot seek alternative fishing areas, the Framework 27 measures could completely displace 8.5 percent of the affected vessels.

The impacted vessels are summarized by home state in Table 23. In terms of absolute numbers, the Framework 27 measures impacted the most vessels in Massachusetts (317) followed by Maine (82), New Hampshire (35), New York (7), and Rhode Island (1). As a proportion of total vessels in a state, New Hampshire had the highest proportion (90 percent) of impacted vessels followed by Massachusetts (79 percent) and Maine (74 percent).

Percent Reduction in Gross Revenues	MA	ME	NH	NY	RI	Other
Framework 27						
Less than 5%	87	29	4	5	8	12
5% to less than 9%	20	9	1	2	1	2
10% to less than 20%	37	15	3	1	0	4
20% to less than 30%	42	19	8	1	0	3
30% to less than 40%	35	12	3	1	0	1
40% to less than 50%	34	7	6	1	0	2
50% or more	149	20	14	1	0	2
Frameworks 25&26						
Less than 5%	105	39	6	6	9	12
5% to less than 9%	25	11	2	2	0	3
10% to less than 20%	51	18	9	1	0	6
20% to less than 30%	40	15	6	1	0	3
30% to less than 40%	37	8	3	1	0	1
40% to less than 50%	25	7	2	0	0	0
50% or more	121	13	11	1	0	1

Table 23. Summary of impacted vessels by home state

Table 24 shows the number of vessels by home port impacted by at least 5% by the combined Framework 25&26 actions. If the home port of the vessel was either Massachusetts or Maine, those home ports were assigned to a region within their corresponding state. Northern Maine consists of those ports above Portland, Maine. Southern Maine consists of Portland and points south. Northern Massachusetts consists of home ports of Gloucester and Boston, south to Scituate, Mass. Central Massachusetts consists of home ports south of Scituate, including Cape Cod and the islands. Southern Massachusetts consists of New Bedford and the southern coast.

Home Port	Number of Vessels Not Affected	Number of Vessels Affected	Total
Northern Maine	29	36	65
Southern Maine	10	36	46
New Hampshire	6	33	39
Northern Mass	65	239	304
Central Mass	16	30	46
Southern Mass	24	30	54
RI	9	0	9
Other	18	20	38
Total	177	424	601

Table 24. Ports affected by the combined framework 25&26 actions

Certain ports stand out as being impacted more than others. For example, 131 out of 184 vessels (71%) listing Boston as their home port, would be impacted by at least 5% of their revenue. Also, 68 of the 73 vessels (93%) whose home port is Gloucester would be impacted by at least 5% of revenue. And, 19 of the 38 vessels (50%) from New Bedford would be impacted. In Maine, 16 of the 19 vessels (84%) from Portland would be impacted.

Table 25 shows the number of vessels impacted by at least 5% by the Framework 27 action. The same regions were used as in the previous table. As in the above description, certain ports stand out as being impacted more than others. In Massachusetts, 77% (141 out of 184) of vessels listing Boston as their home port, would be impacted by at least 5% of their revenue. Also, 69 of the 73 vessels (95%) whose home port was Gloucester would be impacted by at least 5% of revenue. And, 22 of the 38 vessels (58%) from New Bedford would be impacted. In Maine, 17 of the 19 vessels (89%) from Portland would be impacted.

Home Port	Number of Vessels Not Affected	Number of Vessels Affected	Total
Northern Maine	21	43	65
Southern Maine	8	39	46
New Hampshire	4	35	39
Northern Mass	53	251	304
Central Mass	14	32	46
Southern Mass	20	34	54
RI	8	1	9
Other	17	21	38
Total	145	456	601

Table 25. Ports affected by the proposed Framework 27 action

Impacts on revenues do not capture the full effect of management measures enacted over time. In order to continue operating vessels must be able to cover all costs. The cumulative effect on vessel profitability may be compromised by increasingly restrictive measures enacted under Frameworks 25&26 and Framework 27. To examine these effects, vessel profitability was assessed over a simulated three year period using with observed 1997 data and simulated profitability (1998 and 1999) for consecutive years under Framework 25&26 and Framework 27.

Baseline profitability for 1997 was constructed in the following manner. Available cost data from the CCF, and past and on-going cost surveys in the Northeast region were used to estimate average operating, fixed, and crew costs as a proportion of gross revenues. These proportions were then

applied to the 1997 gross revenues for the 601 affected vessels. Since the average cost proportions from survey data did not sum to one, this is equivalent to assuming that all vessels are operating at some positive profit for the baseline period (calendar year 1997). Given the combined effects of the management measures implemented under Amendment 7 it is likely that some portion of the multispecies fleet operated at a net loss in 1997. However, the objective is to ascertain relative profitability changes since the second year of Amendment 7 (i.e., from Framework 24 onward).

Once the cost proportions were applied to 1997 data, the estimated fixed and operating costs per days absent were held constant in each subsequent year. In this manner fixed costs were not allowed to vary while operating costs were allowed to vary with days absent and payments to crew were allowed to vary with revenue. In any given year negative returns were carried forward to the following year. Net return at the end of the simulated third year of the analysis provides an estimate of cumulative impacts. The results of the cumulative profitability analysis are reported in Table 26.

Descriptive Statistic	Estimated 1997 Profit	Cumulative Profit Framework 27 (\$)
Average	47,871	26,452
10 th Percentile	1,654	-7,323
25 th Percentile	6,092	-71
Median	21,409	7,282
75 th Percentile	57,793	29,816
90 th Percentile	141,305	93,535

Table 26. Estimated simulated 1997-99 cumulative profitability

Compared to the 1997 baseline, the cumulative profitability for the median vessel was estimated to decline 66.0 percent from \$21,409 to 7,282. A total of 115 vessels were found to be operating below break-even (i.e., zero profit) as a result of the combined Frameworks 25&26. Carrying these losses forward into Framework 27 and adding the accumulated debt under Frameworks 25, 26, and 27 results in a total of 155 vessels that were estimated to be below break-even profit.

Of the 155 vessels that were estimated to operate at negative profit, 133 were vessels less than 50 gross registered tons. The number Massachusetts vessels operating below break-even was 122 while the Maine and New Hampshire had 19 and 12 vessels respectively that were projected to operate below break-even profit.

Figure 5 shows the where vessels caught cod in 1997, an indication of the areas most likely to be affected under actions to protect cod. For comparison, Figure 6 shows where total revenues from all species (all trips) were generated on vessels that landed regulated species at least once in the year. When these two maps are compared, many of the areas that produced high cod landings are also areas

that produce the most revenues on groundfish vessels. Vessels that fish in these areas may be affected, depending on the species targeted or gear used. If, a vessel's total revenues consists primarily of regulated species, that vessel would be more impacted than another vessel that gets some significant portion of its annual revenues from the same area but from other species, such as tuna, northern shrimp, or herring which are caught with exempted gears.

Furthermore, a number of areas of high revenues do not overlap the high cod areas, suggesting that there are significant alternative fisheries for many vessels, or that regulated species revenues do not make up a majority of total revenues for many vessels. These are generalized conclusions, and further analysis to be contained in the Regulatory Impact Review (Section 5.3) will examine the impacts on the vessel class level.

Additional information describing vessel size and gear categories that catch cod is found in Section 4.3, Social and Community Impacts, especially Table 32 and Table 33.

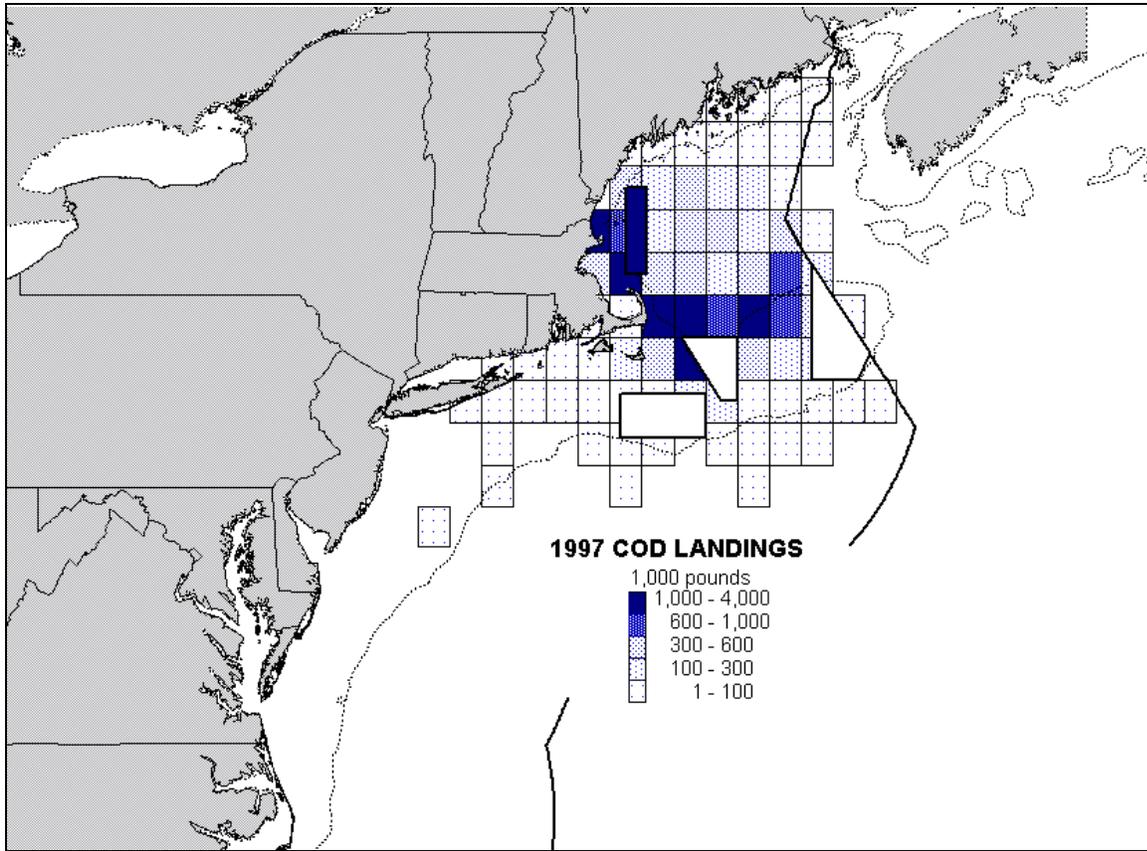


Figure 5 Area distribution of cod landings in 1997.

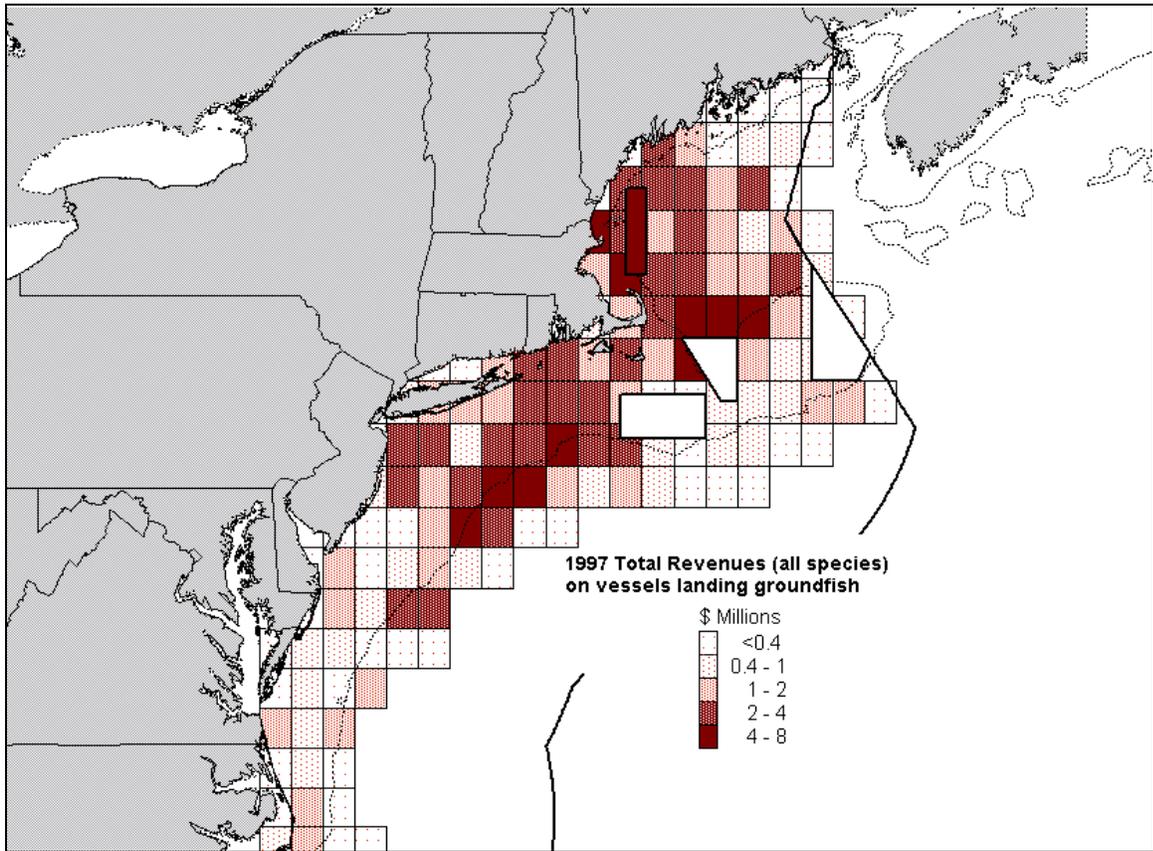


Figure 6 Area distribution of total revenues from all species (all trips) on vessels landing groundfish at least once in 1997.

If the trip limit for cod is reduced below 300 pounds, vessels in the Open Access Handgear permit category (category H) and Limited Access Sea Scallop permit category (category J) could be affected. Category H vessels are limited to 300 pounds possession of cod and haddock, combined, while Category J vessels are limited to 300 pounds possession of all regulated species while fishing on a scallop DAS. Table 27 and Table 28 show the distribution of cod landings on Category H and Category J trips, respectively.

Pounds of Cod Landed	Number of Trips	%
1 - 100 lbs.	795	67
101 - 200 lbs.	178	15
201 - 300 lbs.	173	15
> 300 lbs.	40	3
	1198	100

1. Entire Northeast Cod Fishery included
2. Source: Fishing Vessel Trip Reports
3. The above trips were a mix of Commercial and Recreational. All trips reported using handgear.

Table 27 Trip Frequency of Cod Landings Multispecies Category H (Open Access Handgear) May 1997 - April 1998 Fishing Year

Pounds of Cod Landed	Number of Trips	%
1 - 100 lbs.	48	86
101 - 200 lbs.	7	13
201 - 300 lbs.	0	0
> 300 lbs.	1	1
	56	100

1. Entire Northeast Cod Fishery included
2. Source: Fishing Vessel Trip Reports
3. All trips were fishing under a Scallop DAS

Table 28 Trip Frequency of Cod Landings Multispecies Category J (Scallop Multispecies Possession Limit) May 1997 - April 1998 Fishing Year

4.2.4 Economic Impacts of Gear Restrictions

Increase To 6.5-Inch Square Mesh

Upon implementation of Framework 27 any vessels fishing with square mesh in the Gulf of Maine/Georges Bank and Southern New England regulated mesh areas will have to conform to 6.5-inch mesh in the codend as defined in the regulation. Based on 1997 dealer records of participating multispecies vessels, there were a total of 688 vessels that landed groundfish fished within the designated regulated mesh areas while using otter trawl gear. It is not known how many of these vessels used square or diamond mesh. However, the economic impacts of the increase in square-mesh size are

expected to be small because with the elimination of the Stellwagen Bank and Jeffrey's Ledge regulated mesh areas, vessels will still be able to use existing 6-inch diamond mesh wherever they fish and the cost of 6.5-inch square mesh is likely to be similar to that of 6-inch mesh.

Vessels that fish in the Stellwagen Bank and Jeffrey's Ledge regulated mesh areas or that specialized in flatfish would be most likely to have used square mesh for the majority of trips taken during 1997. However, it is likely that even these vessels would have used 6-inch diamond mesh for some of their trips and would have that mesh available upon implementation of Framework 27. Vessels that wanted to use square-mesh would be able to replace existing nets with conforming square mesh as part of their normal gear replacement without incurring any added costs beyond normal gear replacement and repair expenses (i.e., the estimated average cost of a new 6-inch square mesh codend was \$500-\$800 and was expected to be approximately the same for 6.5-inch mesh). By contrast, any vessel that fished exclusively with 6-inch square mesh would be faced with the need to replace existing gear with 6.5-inch mesh immediately; assuming that 6.5-inch mesh were available in time for implementation of Framework 27. Vessels in this situation may be faced with the requirement to replace at least one set of gear prior to its normal replacement schedule and, if 6.5-inch square mesh were not available, may have to purchase a diamond mesh codend to use until the 6.5-inch square mesh does become available. In this instance the cost of complying with the regulation could be approximately \$1,800 (i.e., the cost of a new diamond mesh codend estimated at \$1000 plus the \$800 cost of replacing the diamond mesh with 6.5-inch square mesh).

Restrictions On Rock-Hopper And Roller Gear

Framework 27 proposes to set a maximum diameter of 12 inches for roller and rockhopper gear on otter trawl vessels fishing in certain inshore areas in the Gulf of Maine. Depending on current gear usage and fishing patterns, this requirement may result in vessels spending money on gear changes. The cost of these gear changes is difficult to estimate since gear configurations vary by vessel and existing data is not adequate to determine gear usage at such a fine degree of resolution. Generally, the cost to change roller size is higher than simply the difference in cost between larger roller gear and rollers less than 12". To change rollers the footrope has to be cut in order to remove the rollers. The variation in footrope lengths and number of rollers makes it difficult to estimate an average cost of conversion. One gear manufacturer recently made a 116 foot footrope with rollers for about \$1,100 but said that the cost could be as high as \$2,500.

Since roller size information is not available, fishing location was used to distinguish between vessels that might be expected to use roller gear greater than 12" in diameter from those with rollers less than 12" in diameter. The following discussion assumes that, in general, inshore fishing is done with small rollers and offshore fishing is done with large rollers.

There were a total of 173 bottom trawl vessels identified as having fished within one or more of the designated inshore blocks during calendar year 1997. Of these vessels, 10 vessels fished exclusively in the inshore blocks. Under the assumption that these vessels currently fish with conforming roller gear,

they will not be impacted by the gear restriction. It is also assumed that since these vessels chose to stay inshore in the recent past (because of vessel size, etc.), that they will continue to do so. If there are some vessels in this group with the ability to fish offshore, they may be impacted because they may have to own two sets of trawls, one for inshore fishing and one for offshore fishing. The average revenue, from all species, for inshore vessels was \$7,900 (\$26 to \$24,900). The average length was 45 feet (34 feet to 58 feet) and the average gross tons were 23 gross tons (2 gross tons to 49 gross tons).

There were 36 vessels that fished exclusively in offshore areas. If these vessels continue to concentrate their activity in offshore areas they will not be affected by the inshore prohibition on roller gear. On the other hand, changing resource or economic conditions these vessels may decide to switch to inshore fisheries. Assuming that these vessels also exclusively use roller gear in excess of 12 inches then the gear restriction may make such an action cost-prohibitive. If any such vessel does decide to refit in order to fish inshore as well as continue to work offshore it would need to own two types of trawls, one for inshore fishing and one for offshore fishing, or convert their large rollers to small if small rollers are sufficient for all their planned trawling activity. The average revenue, from all species, for offshore vessels is \$58,500 (\$477 to \$256,700). The average length is 45 feet (32 feet to 83 feet) and the average gross tons is 37 gross tons (5 gross tons to 184 gross tons).

There were 127 vessels that fished, to varying degrees, in both inshore and offshore areas. Clearly, those with rollers less than 12" will not be impacted. The decision facing the vessels with rollers 12" and greater will be whether or not their inshore activity warrants the cost of 1) converting existing nets to smaller rollers or 2) buying an additional net with small rollers for their inshore activity. The average revenue, \$111,900 (\$1,250 to \$643,300) from all species, for combination vessels is significantly higher than the exclusively inshore and offshore vessels described above. These vessels were also larger on average. The average length was 58 feet (36 feet to 97 feet) and the average gross tons was 69 gross tons (4 gross tons to 199 gross tons).

36 of the 127 inshore/offshore vessels received 75% or more of their Gulf of Maine revenue from offshore areas and were assumed to use larger roller gear. Assuming that the revenue earned in inshore areas was sufficient to cover the added cost of conversion, then these vessels may chose to so. Alternatively, these vessels may switch to other offshore areas to make up for the lost inshore revenue.

For the remaining 91 inshore/offshore vessels that relied on inshore fishing for at least 25% of gross revenues, it is unclear how they might be impacted. An unknown proportion of these vessels may already be using conforming gear and would not be impacted. However, the remaining vessels will be faced with a choice of refitting their gear or shifting their activity away from inshore to offshore areas.

4.2.5 Impacts on dealers and processors

Unlike multispecies vessels, Framework 27 does not include any new regulations that will apply to seafood dealers. Nevertheless, reductions in supplies of seafood products may have an economic

impact on dealers. There were a total of 466 dealers with Federal multispecies dealer permits in 1997. The number of dealer permits by state are reported in Table 29.

State	Number of Dealers
Connecticut	5
Delaware	5
Massachusetts	150
Maryland	8
Maine	88
North Carolina	25
New Hampshire	14
New Jersey	33
New York	72
Rhode Island	47
Virginia	16
Other	3

Table 29. Dealers with federal multispecies permits by state

Unlike fishing vessels, the Small Business Administration's size definition for purposes of designation of a small entity for entities engaged in the seafood wholesale trade sector (SIC code 5146) is 100 or fewer employees. Federally permitted seafood dealers are not required to report numbers of employees. However, 1996 County Business Pattern data reported by the Census Bureau indicate that there were only 3 wholesale seafood dealers that employed more than 100 employees across all states in the Northeast region (Maine to North Carolina). Therefore, it is likely that all of the Federally permitted dealers are small entities. Available data includes only transactions between dealers and vessels at the dockside level. These transactions are revenues to vessels but are input costs to dealers. Nevertheless, if dealers operate on relatively stable marketing margins then changes in gross sales will be roughly proportional to changes in dockside purchases.

Of the 466 dealers, a total of 334 reported having purchased some quantity of seafood products during calendar year 1997 (i.e., a total of 132 dealers had no documented purchases of seafood products in the Northeast region). Seafood purchases by all dealers with Federal multispecies permits averaged \$1.2 million and ranged from a low of \$170 to a high of \$25 million. Of the active dealers (dealers with documented purchases of seafood), there were a total of 131 that did not purchase any of the 13 species regulated under the Multispecies plan leaving a total of 203 entities that held a multispecies dealer permit and purchased multispecies during 1997.

Impacts on dealers were estimated by calculating the reduction in gross purchases by dealers that purchased seafood products from on or more of the 601 affected multispecies vessels. The 601 affected vessels sold seafood products to a total of 186 Federally permitted seafood dealers during calendar year 1997. Since dealers often purchase from many different vessels, the transactions between the identified dealers and the affected vessels is likely to represent only a portion of the dealer's total business. On average, purchases by the identified dealers from the affected vessels represented 15.7 percent of the dealer's total business activity. Further, there are no moratoria on dealer permits so

dealers have some flexibility in terms of getting into alternative product lines or in sourcing product. The proportional reductions in dealer purchases are reported in Table 30.

Percent Reduction in Gross Purchases	Number of dealers affected under Framework 25&26	Number of dealers affected under Framework 27
Less than 5%	113	109
5% to less than 9%	22	15
10% to less than 20%	18	25
20% to less than 30%	17	9
30% to less than 40%	6	11
40% to less than 50%	3	8
50% or more	7	9

Table 30. Proportional reductions in gross purchases by dealers and the number of dealers

Compared to the 1997 baseline the combined effects of Frameworks 25&26 were estimated to result in a reduction in total purchases in excess of 5 percent for 73 of the 186 identified dealers (Table 30). Of these impacted dealers, 40 were estimated to have reduced purchases up to 20 percent and 33 were estimated to experience reduced purchases of more than 20 percent.

Compared to the 1997 baseline the effects of Frameworks 27 were estimated to result in a reduction in total dealer purchases in excess of 5 percent for 77 of the 186 identified dealers (Table 30). Of these impacted dealers, 40 were estimated to have reduced purchases up to 20 percent and 33 were estimated to experience reduced purchases of more than 20 percent.

Impacts on Processors

The impacts of the measures proposed in Framework 27 on processors are difficult to predict. In 1997, 52 firms reported processing fresh or frozen cod and haddock in Maine, Massachusetts and New Hampshire (NMFS Processed Products Survey; Table 31). A total of 1,622 employees in these states processed 41 million pounds of fresh and frozen cod and haddock for a combined 107 million in total revenue. The percent of gross revenues that these processors derive from imports, however, particularly Pacific, Canadian, Alaskan, and Icelandic cod, is not collected as part of the Processed Product Survey. This anomaly in the data, makes it nearly impossible to predict revenue losses attributable to the proposed management measures. Further, the extent to which domestic and foreign imports can adequately offset local supply shortages is also unknown. In combination, these data limitations prevent the ability to conduct a quantitative impact assessment. Nonetheless, processors in Maine, Massachusetts and New Hampshire that rely on a stable supply of fresh groundfish to meet demands (mainly cod and haddock), will likely be disproportionately affected by the proposed regulatory action.

In Cumberland, ME, for example, 6 firms reported processing fresh or frozen cod and haddock in 1997. Of the total cod and haddock pounds processed, 94.1% was derived from fresh product (Table 31). Although the extent to which imports contributed to the fresh supply in this county is unknown, it is likely that a significant portion of fresh cod and haddock were obtained from local suppliers. Therefore, these processors may be disproportionately impacted by the proposed regulatory action. A substantial portion of processed frozen cod and haddock may also be acquired from local suppliers in many counties in Maine, Massachusetts and New Hampshire. Processors who rely on a local supply of both fresh and frozen product, will likely be faced with severe shortages, resulting in an increased dependence on imports or a switch to alternative species to offset losses. Processors who derive a substantial portion of their total revenue from cod and haddock can be found in Cumberland, ME (42.8%), Lincoln, Sagadahoc, and York, ME (49.0%), Barnstable, MA (82.6%), Essex, MA (42.0%), Suffolk, MA (50.5%), and Hampden, Middlesex, MA, and Hillsborough, NH (56.5%). However, in terms of total pounds processed, almost all of the production occurs in three Massachusetts counties (Bristol, Essex, and Suffolk; 93.6%)

For purposes of the RFA, all of the firms that reported processing fresh or frozen cod and haddock in Maine, Massachusetts and New Hampshire would be considered a small business. The Small Business Administration (SBA) considers any business involved in canned and cured fish and seafood or prepared fish or frozen seafoods to be a small business if it employs 500 employees or less. The average number of employees per firm in 1997 ranged from a low of 8 in Barnstable, MA to a high of 52 in Essex, MA.

Although the actual impacts of this regulatory action on processors is unknown, clearly there are several counties in Maine, Massachusetts and New Hampshire that are substantially dependent upon a stable supply of fresh and frozen cod and haddock, and will be disproportionately affected by the measures. A preliminary report prepared by Georgianna and Dirlam on Northeast processors indicates that any further declines in groundfish landings will obviously put more pressure on the fresh groundfish processing sector throughout New England, especially in Portland. Some firms will find a survival strategy to allow them to continue in business, and some will not. Georgianna and Dirlam also contend that demand for fresh fish products remains high, and innovative processors will find a way to satisfy that demand. However, they continue by indicating that most survival strategies favor Boston firms because access to Logan Airport for imports and to the New England regional food wholesaling system in Boston give them an advantage over processing firms in ports where landings have declined. Georgianna and Dirlam believe that without local product, most processors in Maine, particularly Portland, will disappear.

State	County	Number of Firms	Average Number of Employees Per Firm	Total Employment	Processed Pounds	Total Revenue (\$'s)	Average Percent of Fresh Cod and Haddock Pounds to Total Cod and Haddock Pounds	Average Percent of Cod and Haddock Pounds to Total Pounds (all species)	Average Percent of Cod and Haddock Revenue to Total Revenue (all species)
ME	Cumberland	6	15	90	773,735	2,199,414	94.1	56.3	42.8
	Lincoln, Sagadahoc, York	3	11	33	432,620	833,022	100.0	60.7	49.0
MA	Barnstable	5	8	40	207,700	836,475	100.0	87.1	82.6
	Bristol	11	48	528	13,603,439	35,880,737	45.8	27.6	29.4
	Essex	10	58	580	13,192,852	22,468,843	11.6	42.1	42.0
	Suffolk	14	26	264	11,681,716	41,719,703	83.3	55.7	50.5
MA, NH	Hampden, Middlesex, Hillsborough	3	29	87	1,215,900	3,262,035	27.8	57.0	56.5
	Total	52	28	1,622	41,107,962	107,200,229	66.09	55.2	50.4

^a If less than 3 firms data were aggregated across counties

Table 31. 1997 Processed Products: Production and Employment of Fresh and Frozen Cod and Haddock, by State and County^a

4.3 Social impacts and impacts on communities

When the Council implemented the stock rebuilding plan in Amendment 7, it recognized that the measures required to achieve the plan objectives would have significant social and community impacts. It stated that the breadth and scope of those measures would likely cause some social change proportional to the individual or community dependence on the affected stocks. It also noted that the social impacts are largely related to the economic impacts, and as such would be negative in the short term and positive in the long term, although some fundamental changes would probably occur for which a value cannot be assessed. Some of the expected impacts are already manifested in changes at the vessel and community level. Such changes include ways of adding value to landed species through the establishment of display auctions in some of the major groundfish ports and the growth of the live-cod market. Communities have also evolved to support redirection of effort to other fisheries (including establishment or expansion of shoreside infrastructure to support those fisheries, such as herring).

A fundamental problem exists, however, in attributing social change to specific factors such as management regulations when the communities or other societal groups are constantly evolving in response to numerous external factors, such as market conditions or technology. Certainly, management regulations influence the direction and magnitude of social change, but attribution is difficult with the tools and data available. Attribution is particularly difficult considering the dynamic nature of fishing communities and other social groupings of individuals in the industry, and in comparison to the no-action alternative in the context of a declining or collapsing resource. In recognition of this problem, the Council has convened a Social Sciences Advisory Committee to improve the methods and results of the social impact analysis of proposed management actions.

Nevertheless, the following discussion provides some insight into the potential impacts at the vessel-class and community level based on available data. Since GB and GOM cod stocks are driving the measures proposed for this framework, the analysis focuses on vessel classes and communities dependent on the cod fisheries. Table 32 and Table 33 show the distribution of vessels landing GOM and GB cod, respectively, during the 1997-98 fishing year by port of landing and vessel class (ton class and gear sector). Table 34 and Table 35 show the distribution of GOM and GB cod landings, respectively, during the 1997-98 fishing year by port of landing and vessel class (ton class and gear sector).

The direct social impacts of proposed actions to reduce cod landings will be proportional to the dependence of each community or vessel class on the cod landings. Furthermore, as noted above, the magnitude of the impacts are related, and perhaps proportional to the economic impacts. Sections 4.2.3-4.2.5, discuss the impacts of the proposed action on vessels, ports, and states, as well as on processing and dealer sectors.

GEAR SECTOR & VESSEL CLASS	MAINE			NEW HAMPSHIRE	MASSACHUSETTS					RHODE ISLAND			OTHER NORTH EAST	TOTAL	
	Portland	Other	Total		Boston	Gloucester	New Bedford	Other	Total	Pt. Judith	Other	Total		#Vessels *	% of total

Otter Trawl Sector:

<51 GRT	33	73	106	36	7	40	1	57	105	0	0	0	1	248	30.02
51-150 GRT	44	16	60	1	9	35	24	13	81	2	1	3	0	145	17.55
>150 GRT	8	0	8	0	7	12	4	0	23	0	0	0	0	31	3.75
SUM	85	89	174	37	23	87	29	70	209	2	1	3	1	424	51.33

Gillnet Sector:

<51 GRT	13	14	27	26	0	44	1	42	87	0	0	0	1	141	17.07
51-150 GRT	1	0	1	1	0	2	0	0	2	0	0	0	0	4	0.48
>150 GRT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
SUM	14	14	28	27	0	46	1	42	89	0	0	0	1	145	17.55

Hook Sector:

<51 GRT	6	7	13	1	4	21	1	31	57	0	0	0	0	71	8.60
51-150 GRT	2	0	2	0	0	0	0	1	1	0	0	0	0	3	0.36
>150 GRT	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0.12
SUM	9	7	16	1	4	21	1	32	58	0	0	0	0	75	9.08

Other Gears:

<51 GRT	3	27	30	15	1	44	0	86	131	0	0	0	0	176	21.31
51-150 GRT	0	1	1	0	0	1	1	2	4	0	0	0	0	5	0.61
>150 GRT	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0.12
SUM	3	28	31	15	1	45	2	88	136	0	0	0	0	182	22.03

Total of All Gear

Sectors:

<51 GRT	55	121	176	78	12	149	3	216	380	0	0	0	2	636	77.00
51-150 GRT	47	17	64	2	9	38	25	16	88	2	1	3	0	157	19.01
>150 GRT	9	0	9	0	7	12	5	0	24	0	0	0	0	33	4.00
SUM	111	138	249	80	28	199	33	232	492	2	1	3	2	826	100.00

Source: Fishing Vessel Trip Reports

* This number represents a certain amount of double counting because vessels may land at different ports and use different gears within a fishing year. The unique count of vessels for all gears was 677 vessels for the 97-98 fishing year.

Table 32 Number of Vessels*in the Gulf of Maine Cod Fishery by Gear Sector and Vessel Class May 97 - April 98 Fishing Year

GEAR SECTOR & VESSEL CLASS	MAINE			NEW HAMPSHIRE	MASSACHUSETTS					RHODE ISLAND			OTHER NORTH EAST	TOTAL	
	Portland	Other	Total		Boston	Gloucester	New Bedford	Other	Total	Pt. Judith	Other	Total		#Vessels *	% of total

Otter Trawl Sector:

<51 GRT	3	3	6	1	2	4	2	13	21	15	6	21	26	75	9
51-150 GRT	16	0	16	0	7	12	102	29	150	22	14	36	30	232	28
>150 GRT	10	0	10	0	10	10	31	7	58	9	4	13	2	83	10
SUM	29	3	32	1	19	26	135	49	229	46	24	70	58	390	47

Gillnet Sector:

<51 GRT	3	2	5	2	0	12	5	34	51	1	10	11	8	77	9
51-150 GRT	0	0	0	0	0	0	1	2	3	0	0	0	0	3	0
>150 GRT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUM	3	2	5	2	0	12	6	36	54	1	10	11	8	80	10

Hook Sector:

<51 GRT	1	0	1	0	0	1	1	36	38	0	0	0	4	43	5
51-150 GRT	2	1	3	0	0	0	0	1	1	1	0	1	0	5	1
>150 GRT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUM	3	1	4	0	0	1	1	37	39	1	0	1	4	48	6

Other Gears:

<51 GRT	0	0	0	0	1	1	2	152	156	27	10	37	65	258	31
51-150 GRT	0	1	1	0	0	1	7	2	10	3	4	7	4	22	3
>150 GRT	0	0	0	0	0	0	22	1	23	0	1	1	3	27	3
SUM	0	1	1	0	1	2	31	155	189	30	15	45	72	307	37

Total of All Gear

Sectors:

<51 GRT	7	5	12	3	3	18	10	235	266	43	26	69	103	453	55
51-150 GRT	18	2	20	0	7	13	110	34	164	26	18	44	34	262	32
>150 GRT	10	0	10	0	10	10	53	8	81	9	5	14	5	110	13
SUM	35	7	42	3	20	41	173	277	511	78	49	127	142	825	100

Source: Fishing Vessel Trip Reports

* This number represents a certain amount of double counting because vessels may land at different ports and use different gears within a fishing year.

The unique count of vessels for all gears was 707 vessels for the 97-98 fishing year.

Table 33 Number of Vessels* in the George's Bank Cod Fishery by Gear Sector and Vessel Class May 97 - April 98 Fishing Year

GEAR SECTOR & VESSEL CLASS	MAINE			NEW HAMPSHIRE	MASSACHUSETTS					RHODE ISLAND			OTHER NORTH EAST	TOTAL	
	Portland	Other	Total		Boston	Gloucester	New Bedford	Other	Total	Pt. Judith	Other	Total		1,000 lbs.	% of total
Otter Trawl Sector:															
<51 GRT	250	420	670	533	112	514	1	497	1,124	0	0	0	0	2,327	19.90
51-150 GRT	1,120	98	1,218	15	165	1,299	158	245	1,867	3	2	5	0	3,105	26.56
>150 GRT	282	0	282	0	114	496	68	0	678	0	0	0	0	960	8.21
SUM	1,652	518	2,170	548	391	2,309	227	742	3,669	3	2	5	0	6,392	54.67
Gillnet Sector:															
<51 GRT	341	404	745	1,379	0	1,295	0	431	1,726	0	0	0	2	3,852	32.95
51-150 GRT	71	0	71	124	0	216	0	0	216	0	0	0	0	411	3.52
>150 GRT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
SUM	412	404	816	1,503	0	1,511	0	431	1,942	0	0	0	2	4,263	36.46
Hook Sector:															
<51 GRT	22	3	25	9	16	362	0	253	631	0	0	0	0	665	5.69
51-150 GRT	27	0	27	0	0	0	0	0	0	0	0	0	0	27	0.23
>150 GRT	39	0	39	0	0	0	0	0	0	0	0	0	0	39	0.33
SUM	88	3	91	9	16	362	0	253	631	0	0	0	0	731	6.25
Other Gears:															
<51 GRT	0	19	19	9	0	95	0	150	245	0	0	0	0	273	2.34
51-150 GRT	0	5	5	0	0	26	0	1	27	0	0	0	0	32	0.27
>150 GRT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
SUM	0	24	24	9	0	121	0	151	272	0	0	0	0	305	2.61
Total of All Gear Sectors:															
<51 GRT	613	846	1,459	1,930	128	2,266	1	1,331	3,726	0	0	0	2	7,117	60.88
51-150 GRT	1,218	103	1,321	139	165	1,541	158	246	2,110	3	2	5	0	3,575	30.58
>150 GRT	321	0	321	0	114	496	68	0	678	0	0	0	0	999	8.55
SUM	2,152	949	3,101	2,069	407	4,303	227	1,577	6,514	3	2	5	2	11,691	100.00

Source: Vessel Trip Reports and Dealer Database

* Landed Weight

Table 34 Gulf of Maine Cod Landings in thousands of lbs.* by Gear Sector and Vessel Class May 97 - April 98 Fishing Year

GEAR SECTOR & VESSEL CLASS	MAINE			NEW HAMPSHIRE	MASSACHUSETTS					RHODE ISLAND			OTHER NORTH EAST	TOTAL	
	Portland	Other	Total		Boston	Gloucester	New Bedford	Other	Total	Pt. Judith	Other	Total		1,000 lbs.	% of total
Otter Trawl Sector:															
<51 GRT	6	3	9	<1	17	2	<1	31	50	12	1	13	3	75	<1
51-150 GRT	206	0	206	0	491	432	3,660	166	4,749	92	175	267	86	5,308	32
>150 GRT	560	0	560	0	1,360	704	1,947	19	4,030	43	40	83	21	4,694	28
SUM	772	3	775	<1	1,868	1,138	5,607	216	8,829	147	216	363	110	10,077	60
Gillnet Sector:															
<51 GRT	78	3	81	3	0	98	1	2,553	2,652	20	30	50	4	2,790	17
51-150 GRT	0	0	0	0	0	0	3	299	302	0	0	0	0	302	2
>150 GRT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUM	78	3	81	3	0	98	4	2,852	2,954	20	30	50	4	3,092	18
Hook Sector:															
<51 GRT	<1	0	<1	0	0	247	<1	1,942	2,189	0	0	0	14	2,203	13
51-150 GRT	9	<1	9	0	0	0	0	10	10	<1	0	<1	0	19	<1
>150 GRT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUM	9	<1	9	0	0	247	<1	1,952	2,199	<1	0	<1	14	2,222	13
Other Gears:															
<51 GRT	0	0	0	0	1	1	2	1,296	1,300	10	1	11	38	1,349	8
51-150 GRT	0	<1	<1	0	0	<1	10	13	23	8	1	9	<1	32	<1
>150 GRT	0	0	0	0	0	0	3	<1	3	0	<1	<1	<1	3	<1
SUM	0	<1	<1	0	1	1	15	1,309	1,326	18	2	20	38	1,384	8
Total of All Gear Sectors:															
<51 GRT	84	6	90	3	18	348	3	5,822	6,191	42	32	74	59	6,417	38
51-150 GRT	215	<1	215	0	491	432	3,673	488	5,084	100	176	276	86	5,661	34
>150 GRT	560	0	560	0	1,360	704	1,950	19	4,033	43	40	83	21	4,697	28
SUM	859	6	865	3	1,869	1,484	5,626	6,329	15,308	185	248	433	166	16,775	100

Source: Vessel Trip Reports and Dealer Database

1. Landed Weight

2. Vessel Trip Report (VTR) data were used as a sample to prorate NMFS dealer weighout landing data. As VTR data do not include data from some state licensed vessels, small vessel data may be under represented in the VTR system. As a result, the landings of small vessels may be under estimated.

Table 35 George's Bank Cod Landings in thousands of pounds* by Gear Sector and Vessel Class May 97 - April 98 Fishing Year

The proposed measures will require fishermen and their communities to adjust to the restrictions and changes contained in this framework. How those adjustments will affect individuals, their families or communities varies with a number of factors, such as their dependence on GOM cod and their ability to increase the value of the reduced catch or to shift effort to other fisheries to maintain a stream of revenues. These impacts, however, need to be considered in the context of the no-action alternative where the GOM cod fishery is projected to collapse. Further declines in stock levels resulting from no-action, or insufficient action, would lengthen the recovery periods and, therefore, the period over which there would be negative social and community impacts.

Much of the Council's extensive deliberations on this framework, including preliminary discussions throughout the past several years, focus on the distribution and magnitude of impacts of alternatives designed to protect GOM cod, which is primarily an inshore stock. Input to this discussion includes hours of public comment about qualitative impacts on communities, families, individuals and industry sectors. These comments have had a significant influence on the Council's selection of final measures.

Qualitatively, therefore, the Council recognizes that there may be short-term social hardships resulting from the action, but it notes that these impacts are not significantly different from what was predicted in Amendment 7. Long-term, the Council expects that any social impacts will be positive in comparison to taking no action because of the benefits of rebuilding the resource base of the fishery.

5. Applicable law

5.1 Magnuson-Stevens Act (FCMA)

5.1.1 Consistency with National Standards

Section 301 of the Magnuson-Stevens Act requires that regulations implementing any fishery management plan or amendment be consistent with the ten national standards listed below.

1. *Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.* The proposed action is designed primarily to rebuild GOM cod by stopping all directed fishing on that stock. The proposed action also contains a mesh size increase designed to reduce the catch of juvenile flatfish and increase the yield per recruit and spawning stock biomass per recruit. The modifications to the haddock trip limit will enable the industry to land at least 75 percent of the TAC while limiting the risk of exceeding it. All of these factors contribute to achieving optimum yield from the fishery. To the extent that the target TACs for cod, haddock and yellowtail flounder stocks represent specification of optimum yield, the measures directly address this standard.

The Council recognizes that additional conservation measures are needed to rebuild other stocks in the fishery management under the new overfishing definitions submitted in Amendment 9. It is initiating a process to develop and implement those changes through a plan amendment. However, it did not want to delay implementation of measures to stop overfishing of GOM cod while it worked

on the measures for the other stocks.

2. *Conservation and management measures shall be based on the best scientific information.* NMFS, through the Stock Assessment Workshop (SAW 27) process, provided peer-reviewed stock status information for 1998 for the principal stocks managed under the Amendment 7 rebuilding plan. The independent Multispecies Monitoring Committee, updated the stock status information used in the development of management measures in this framework, including projections through the end of the 1998-99 fishing year, based on fishery information through September, 1998. As new information becomes available about other stocks in the fishery management unit, the Council has a process in place to make timely adjustments as needed.
3. *To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.* This framework contains both measures that are stock specific, such as the measures designed to protect and rebuild Gulf of Maine cod, and the haddock trip limit adjustments, and those that are designed to have an impact on a broader grouping of related stocks, namely the increase in square mesh minimum size designed to protect flounders. This approach is consistent with the Amendment 7 strategy of applying an overall multispecies program with measures designed to address specific stocks in need of special attention.

The Council deliberated extensively about the management of the boundary area between the Georges Bank and Gulf of Maine cod stocks. It recognizes that there is mixing between the two stocks and that landings attributed to one stock may actually be fish that spawn in a different stock area. Since the two stocks exhibit different dynamics and biological characteristics (for example, growth and maturity rates), the Council has retained the distinction, although it supports scientific research that will improve the stock delineation for management purposes.

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

The proposed measures do not discriminate between residents of different states. The Council recognizes, however, that measures to conserve stocks that are distributed predominantly inshore may have a greater impact on inshore vessels and the ports bordering the affected areas. While vessels that have depended on the stocks in need of rebuilding, will be most affected by the conservation measures, the Council does not consider the differential impact to be the result of an allocation of fishing privileges by the management plan, but the consequence of individual circumstances. It has worked closely with the affected public to develop a set of measures that fairly and equitably distributes the burden of the rebuilding program across a broad segment of the

industry while still achieving the needed conservation.

5. *Conservation and management measures shall, where practicable consider efficiency in the utilization of fishery resources; except that not such measure shall have economic allocation as its sole purpose.*

One of the Council's most important considerations in developing the measures in this framework has been to provide opportunity to the widest range of affected vessels to continue to fish without compromising the conservation goals of the plan. For example, it did not adopt the alternatives that would have reduced days at sea, primarily because it would have unnecessarily placed some of the cost of rebuilding on vessels that are not fishing on the stocks in need of immediate conservation.

In the case of the Gulf of Maine cod rebuilding program, the Council has sought to apply the narrowest array (smallest area and shortest duration) of closures that achieves the conservation goals and, at the same time, has the fairest distribution of impacts on vessels and affected communities. This selection process involved extensive public input about maximizing opportunity in affected fisheries that are not the target of the management action. The Council included an exemption for scallop dredge vessels, for example, and has started to develop a process for considering other exemptions to the closed areas.

Other measures in the plan also promote efficiency. In the case of the haddock trip limit, it includes a mechanism to enable the industry to catch at least 75 percent of the TAC without risk of exceeding it. The increase in the minimum size of square mesh will align the selection characteristics with 6-inch diamond mesh. This measure will promote efficiency by reducing discards of flounders and increasing yield per recruit.

6. *Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.*

The Council has considered extensive public input about different affected fisheries in its development of the proposed action. Where possible within the conservation program, it has sought ways to allow as much opportunity to engage in other fisheries. It has taken into account the different characteristics of inshore and offshore vessels, different gear types and different fishing strategies. The ubiquitous nature of cod in the Gulf of Maine makes the task of reducing the diversity of gears and fisheries that catch cod to bycatch-only status extremely difficult. The Council has allowed one exception to the closed areas, for scallop dredge vessels, and has indicated that it will develop a process to closely examine other potential exceptions. It also continues the exception for recreational and party/charter vessels out of a consideration of the reductions in fishing effort already evident for that sector.

7. *Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.*

The Council considered the costs and benefits of a range of alternatives that would achieve the conservation goals of the plan. It considered costs to the industry, particularly in terms of foregone

revenues and costs of compliance, as well as enforcement and administrative costs in selecting the proposed action. It seeks to avoid unnecessary duplication by considering the impacts of proposed measures on all stocks in the multispecies complex that are in need of rebuilding. In other words, the Council chose specific closed areas, for example, not only for their benefit to Gulf of Maine cod, but also because of collateral benefits for other stocks. As it addresses stock-specific management needs, it considers the impacts of existing measures, designed to protect or rebuild other stocks, on the stock in question.

8. *Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse impacts on such communities.*

In developing the proposed action, the Council, and its Groundfish Committee, deliberated extensively about the impact various alternatives, particularly various inshore closure configurations, would have on different communities. It selected for submission the measures that it determined would have the fairest distribution of impacts while achieving the conservation goals of the plan. The Council also recognizes that some fishing communities comprise predominantly small vessels with few alternatives when the area off their home port is closed, and it is seeking ways to enable vessels to pursue alternative fisheries within the closed areas, provided the exceptions do not adversely affect the rebuilding plan.

9. *Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.*

The main measures that address this national standard are the increased mesh size for square mesh, the increased haddock trip limit and the continuation of the running clock in the Gulf of Maine cod trip limit system. In the case of the mesh size increase, the Council is aligning the selectivity characteristics of the square mesh with those of the 6-inch diamond mesh, and with the minimum legal sizes for flatfish species. In some cases, such as with American plaice and witch flounder, fishermen have asked the Council to take this action to reduce the amount of discards of sub-legal sized fish.

One of the trade-offs in using trip limits as a conservation measure is the potential for discards. In the case of the haddock trip limit, the Council has increased the trip limit every year since it was implemented, in response to the increased TAC and the increased catch rates that result from an improving stock status.

In the case of the running clock, the Council debated whether to eliminate it because of it enables some vessels to target cod (and then run the clock). However, with the Gulf of Maine cod trip limit at such low level, the Council decided to retain the running clock, primarily because it allows vessels

to land increasingly likely overages (under decreasing trip limits) rather than discard fish.

10. *Conservation and management measures shall, to the extent practicable, promote safety of human life at sea.*

The Council is acutely aware of the safety implications of its decisions, both through extensive public comment and the practical experience of many of its members. Notwithstanding the restrictive measures that are needed to achieve the plan goals, the Council has chosen measures that minimize the safety impacts. It has sought, and continues to seek to provide as much opportunity as possible for inshore vessels within the constraints of the conservation program so that fishermen are not put in the position of having to take risks just to survive financially. The Council retained the running clock, for example, so that fishermen could land overages rather than having to choose between continuing to fish (to account for the catch against the DAS clock) or discarding cod.

5.1.2 Other FCMA requirements

Section 303 (a) of FCMA contains 14 required provisions for FMPs. These are discussed below. Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery, shall--

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the national standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law;

See Section 3.0 for a description of the measures contained in this framework adjustment, and Section 5.1.1 for a discussion of the action's consistency with the national standards.

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any;

The Environmental Assessment contained in this document (Section 5.2.1) supplements the documents submitted with preceding amendments (particularly Amendment 5, 7 and 9), in forming the description of the fishery. There is no foreign fishing for species covered under this FMP, nor are there any Indian treaty fishing rights.

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

Amendment 9 contains proposed overfishing definitions based on achieving maximum sustainable yield, and a revised specification of optimum yield. The report of the Overfishing Definition Review Panel in Appendix II of that amendment contains a complete description of the information used in calculating the target and limit reference points. This FMP provides for timely adjustment to management measures to rebuild overfished stocks to levels that will produce maximum sustainable yield based on the most recent and best scientific information available. The target TACs for the critical stocks represent optimum yield for those stocks which are the primary focus of the rebuilding plan. The FMP also specifies a target TAC for the group of other regulated species in the multispecies fishery management unit that are not individually managed. As future conditions warrant, the Council may adopt individual rebuilding target fishing mortality rates based on the overfishing definition control rules which will facilitate the calculation of annual yield targets for individual stocks.

(4) assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3), (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing, and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

Based on the annual Multispecies Monitoring Committee analysis of DAS utilization rates, fishing mortality rates and target TACs, the total capacity of the fleet exceeds that needed to harvest optimum yield at current stock levels and fishing mortality targets designed to rebuild the resource. Consequently, no portion of the allowable catch is available for foreign fishing. However, much of the capacity, in terms of permitted vessels, is inactive or only uses a fraction of its allotted fishing effort (DAS). As the stocks rebuild, that now-excess capacity will provide the means to harvesting the available resource competitively, efficiently and safely. The Council has an annual review and adjustment process to manage the effort levels and keep them within the target range. The Groundfish Committee has also indicated its intent to begin a review of current fishing capacity and future capacity under rebuilt stock conditions.

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors;

Section E.6.1.1 of Amendment 9 contains a discussion of the FMP's data considerations and the Council's participation in the Atlantic Coastal Cooperative Statistics Program (ACCSP) and in the stock assessments. The Council has initiated efforts to organize and compile all of the data requirements for managing the stocks in a manner consistent with the Sustainable Fisheries Act. These efforts include calling on NMFS to prepare an annual publication of a Stock Assessment and Fishery Evaluation (SAFE) Report, activation of the Science and Statistical Committee and Social Sciences Advisory Committee and continued participation in the Stock Assessment Workshop Steering Committee.

(6) consider and provide for temporary adjustments, 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 safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery;

The Council has carefully considered the impacts of needed conservation restrictions on vessels that are constrained because of size or other factors in their ability to fish offshore. This has been the single most difficult issue in the development of the GOM cod rebuilding strategy because the area where those measures will be most effective in achieving rebuilding are inshore areas where the cod aggregate, especially to spawn, and where the highest cod landings are observed. It has worked closely with the industry to develop alternatives that minimize these impacts, and it has a framework adjustment process for making changes as needed to address safety consistent with National Standard 10 while maintaining fair and equitable access to the fishery within the limitations of the conservation program.

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

The Council has undertaken a major effort to bring all of its FMPs into compliance with this requirement. It submitted Amendment 11 to this FMP for Secretarial review in October, 1998 as mandated by the SFA. Final approval of this amendment is still pending.

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

The Council is working closely with NMFS to coordinate the reporting of scientific information in a timely manner so it coincides with the annual plan review and adjustment process. See discussion under item 5 above.

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on--(A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

The Environmental Assessment contains analysis and discussion of the impacts of the proposed action on the human environment, including fishing communities. The Council developed measures in this framework in consultation with the Mid-Atlantic Council through their participation on the Groundfish Committee and attendance at Council meetings.

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

The proposed overfishing definitions in Amendment 9 specify both biomass and fishing mortality criteria for evaluating a stock's status. The Overfishing Definition Review Panel Report in Appendix II to Amendment 9 contains a full description of the analysis and methodology used to establish these criteria. The FMP contains measures to stop overfishing and an annual review and adjustment process to keep the rebuilding plan on track.

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority--

(A) minimize bycatch; and

(B) minimize the mortality of bycatch which cannot be avoided;

The Vessel Trip Reports (logbooks) mandatory under the FMP since 1994, require fishermen to report discards. In conducting the stock assessments, NMFS uses information provided in the VTR as well as information gathered in the Northeast Fisheries Observer Program. In recent years, assessment scientists have expanded the analysis of discards in the stock assessments for some species. The Council and NMFS are both participating in the Atlantic Coastal Cooperative Statistics Program which is a long-term effort to improve the collection and utility of fisheries data (including bycatch).

The FMP contains a number of measures that directly or indirectly minimize bycatch or bycatch

mortality as discussed in the submission documents for previous amendments and framework adjustments, for example, minimum mesh size, exempted fishery programs based on minimum bycatch standards for regulated species, the GOM cod trip limit “running clock” that allows vessels to land rather than discard trip limit overages. This framework contains additional proposals that minimize bycatch by increasing the minimum mesh size for square mesh from 6 inches to 6.5 inches. This will particularly reduce juvenile flatfish bycatch in directed fisheries where square mesh is used, but will also improve selectivity for all species caught incidentally with square mesh.

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

The FMP contains no recreational fishery catch-and-release programs.

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors; and

Amendment 9 contains several sections that update the FMP in the context of this requirement: Appendix III describes the social and cultural aspects of the multispecies fishery; Section E.6.4. contains additional descriptions of the halibut fishery and recreational fishery, including trends in landings; and Appendix II, the Report of the Overfishing Definition Review Panel, describes the long-term landings history by species for all of the stocks in the multispecies fishery. Furthermore, Amendments 5 and 7 to the Multispecies FMP contain detailed descriptions of the commercial recreational and party/charter sectors participating in the fishery which provides additional historical perspective. Data and information contained in this Framework, particularly in the Environmental Assessment and the Regulatory Impact Review are supplemental to the baseline information contained in the earlier amendments.

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery.

The Council has incorporated all sectors of the fishery into the FMP. It has determined that recreational and party/charter landings have declined proportionally relative to the required reductions in fishing mortality needed to achieve plan goals. It will monitor the recreational fishery and make adjustments as needed.

5.2 National Environmental Policy Act (NEPA)

The Council conducted an analysis of the environmental impacts of the stock rebuilding plan under Amendment 7. The Final Environmental Impact Statement (FSIES) indicated that the impacts of Amendment 7 would be significant, particularly the positive biological and long-term economic impacts of rebuilding the stocks. The assessment of environmental impacts of the proposed action is conducted in the context of the impacts projected for Amendment 7 and taking no action. The following table shows Amendment 7 projected cod landings for 1996-1998 under the status quo and rebuilding program, as well as actual landings recorded. It illustrates how, in broad terms of all cod fisheries, the anticipated impacts have not yet been realized. Proposed combined TACs for cod in this framework correspond to the 1997 projected landings had Amendment 7 goals been achieved.

(1,000 metric tons) Year	1995 Projections in Amendment 7		Landings
	Status Quo	Amendment 7	
1996	12.7	11.3	14.4
1997	11.8	5.4	13.0
1998	11.0	7.2	10.4

5.2.1 Environmental Assessment

Section 2.1 of this document contains a discussion of the purpose and need for the proposed action. Section 3.0 contains a description of the proposed action and alternatives, including the no-action alternative. Section 4.0 (and Appendices) contains an analysis of potential impacts.

In developing the proposed measures and in reviewing the analysis of impacts contained in this Environmental Assessment, the Council has consulted with NMFS, the Mid-Atlantic Fishery Management Council, Atlantic States Marine Fisheries Commission and the state marine fisheries agencies (New England states) through their participation in Council and Groundfish Committee meetings. The Council has also informed the interested public of the proposed action and review of environmental documents through notice in the *Federal Register* and by mailing of Council meeting notices and agendas to approximately 1,650 persons. About 850 interested parties receive notices of the Groundfish committee meetings.

5.2.2 Finding of No Significant Impact (FONSI)

NOAA Administrative Order 216-6 provides guidance for the determination of significance of the impacts of fishery management plans and amendments. The five criteria to be considered are addressed below:

1. *Can the proposed action be reasonably expected to jeopardize the long-term productive capability of any stocks that may be affected by the action?*

The proposed action is part of the ongoing Amendment 7 stock rebuilding program. As such, the Council expects that the proposed action will improve the long-term productivity of the resource. The Council considers the proposed action to be consistent with National Standard 1 of the

Magnuson-Stevens Act, which requires fishery management plans to achieve maximum sustainable yield.

2. *Can the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats?*

As discussed in Section 4.1.4 of this document, the alternatives and actions proposed in this framework adjustment will not increase any adverse impacts on essential fish habitat (EFH) resulting from fishing activity. The Council does not expect that the proposed action will cause or allow substantial damage to ocean and coastal habitats generally, because the measures consist primarily of those that are protective of habitat (area closures and gear reductions) or those that are neutral on habitat (trip limits).

3. *Can the proposed action be reasonably expected to have an adverse impact on public health or safety?*

The proposed action will probably not adversely affect public health, as no public health issues have been identified. The action is consistent with National Standard 10 of the Magnuson-Stevens Act which requires fishery management plans to promote safety. In developing management measures the Council receives significant comment from affected members of the industry regarding the safety implications of various alternatives which it considers in deciding on a final action.

4. *Can the proposed action be reasonably expected to have an adverse effect on endangered, threatened species or a marine mammal population?*

As discussed in Section 4.1.3, the Council does not expect that the proposed action will have a negative impact on endangered or protected species.

5. *Can the proposed action be reasonably expected to result in the cumulative adverse effects that could have a substantial effect on the target resource species or any related stocks that may be affected?*

As discussed earlier, the proposed action is part of the ongoing Amendment 7 stock rebuilding program, and as such is designed to have a positive effect on the fishery resource. With the continuing deterioration of Gulf of Maine cod, taking no action would have a far more adverse impact on the resource than the proposed action. While some effort shifting may result in short-term adverse impacts on some stocks as vessels seek alternative fisheries, these impacts are likely offset by the cumulative benefit of closed areas, mesh size increase and roller-gear limitations that will accrue to target stocks and related species.

Based on the preceding criteria and analysis, the Council proposes a finding of no significant impact.

FONSI STATEMENT: In view of the analysis presented in this document and in the FSEIS for Amendment #7 to the Northeast Multispecies Fishery Management Plan, the proposed action will not significantly affect the quality of the human environment with specific reference to the criteria contained in NAO 216-6 implementing the National Environmental Policy Act. Accordingly, the preparation of a Supplemental Environmental Impact Statement for this proposed action is not necessary.

**Assistant Administrator
for Fisheries, NOAA**

Date

5.3 Regulatory Impact Review (Regulatory Flexibility Act and Executive Order 12866)

5.3.1 Introduction

This section provides the information necessary for the Secretary of Commerce to address the requirements of Executive Order 12866 and the Regulatory Flexibility Act.

The purpose and need for management (statement of the problem) is described in Section 2.0 of this document. The proposed action is described in section 3.1 of the amendment document. Alternatives to the proposed action are also summarized in section 3.2. The economic impacts are described in section 4.2 and summarized below under the discussion of how the proposed action is characterized under Executive order 12866 and the Regulatory Flexibility Act (RFA) (section 5.3.2).

The Framework 27 document contains all the elements of RIR/RFA and the relevant sections are identified by reference to the document. The Initial Regulatory Flexibility Analysis (IRFA), which evaluates the impacts of management alternatives on small businesses, is provided in section 5.3.2.

5.3.2 Executive Order 12866

The proposed action does not constitute a significant regulatory action under Executive Order 12866 for the following reasons:

- (a) The Framework 27 proposed action is developed as a part of the adjustment process to ensure that rebuilding goals of Amendment 7 are met on a continuing basis. Specifically, the Framework 27 measures are proposed to adjust the fishing mortality of the Gulf of Maine Cod to the trajectories laid down by Amendment 7 plan objectives. As projected by the cost-benefit analysis in the FSEIS

of Amendment 7, in the short-term, the proposed regulations will reduce gross revenues, profits, and crew income in the fishing industry. Over the long-term, however, the net impacts on the economy will be positive.

Due to the proposed area closures coupled with the cod trip limits and the expected reduction in Gulf of Maine (GOM) cod stock size, the GOM cod landings and revenues are estimated to decline by 70-80 percent from its 1998 levels. The revenues from other species may be reduced as well to a degree determined by the ability of the vessels to recover their losses by shifting effort to other areas during the period of closure or by targeting other species. The proposed measures regarding the increase in haddock trip limit and the TAC will, however, have some positive impacts on revenues if they are successful in inducing the vessels to land more haddock.

The proposed measures contained in this framework are designed to achieve the biological objectives of Amendment 7 at a minimum economic cost to the industry whenever possible without compromising the conservation goals. The area closures and cod trip limits will reduce the landings and revenues in the short-term, but will contribute to stock rebuilding, and therefore, will increase the net economic benefits in the long term. The increase in square mesh size will likely reduce landings from flatfish species in the short-term, but these losses will be recovered in a matter of months as the fish grow. The modification of the haddock trip limit and the TAC will have a short-term positive economic impact on the industry which may offset some of the short-term negative impacts of other measures. For these reasons, the proposed action will not adversely affect in a material way the economy, productivity, competition and jobs.

The short-term impacts will be a maximum revenue loss of \$16.5 million compared to 1997 level and a \$7.3 million loss compared to the Framework 25 levels under a no-effort displacement scenario (Tables 14 and 15 in section 4.2.2). If the loss from other species is recovered by shifting effort to other areas, periods and species, the revenue reduction will be less. For example, under a 50 percent effort displacement scenario, the revenue reduction will be \$8.4 million from its 1997 level, and \$3.6 million from Framework 25 level. Therefore, the proposed action will not have an annual effect on the economy of more than \$100 million.

For the same reasons as above, the proposed action will not significantly affect competition, jobs, the environment, or state, local or tribal governments and communities. The area closures and trip limits will not affect safety or public health.

- (b) The proposed action will not create an inconsistency or otherwise interfere with an action taken or planned by another agency. No other agency has indicated that it plans an action that will impact the same areas and the fisheries.
- (c) The proposed action will not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of their recipients.

- (d) The proposed action does not raise novel legal or policy issues. Regulations regarding area closures, trip limits, and gear requirements have already been used to manage fisheries in the Northeast.

5.3.3 Initial Regulatory Flexibility Analysis

5.3.3.1 Introduction

The purpose of the Regulatory Flexibility Analysis (RFA) is to reduce the impacts of burdensome regulations and recordkeeping requirements on small businesses. To achieve this goal, the RFA requires government agencies to describe and analyze the effects of regulations and possible alternatives on small business entities. On the basis of this information, the Regulatory Flexibility Analysis determines whether the proposed action would have a “significant economic impact on a substantial number of small entities.”

The main elements of the RFA are fully discussed in several sections of the Framework 27 document and the relevant sections are identified by reference to this document. The following discussion summarizes the consequences for small businesses of the proposed action and non-preferred management options in the northeast multispecies fishery.

5.3.3.2 Problem Statement

The purpose and need for management (statement of the problem) is described in Section 2.0 of the amendment document.

5.3.3.3 Objectives

The management objectives are enumerated in section 2.1 of this document.

5.3.3.4 Management Alternatives

The proposed action is described in Section 3.1 of the amendment document. Alternatives to the proposed action are summarized in section 3.2.

5.3.3.5 Determination of Significant Economic Impact on a Substantial Number of Small Entities

The RFA recognizes three kinds of small entities: Small business, small organization and small government jurisdictions. It defines a small business in any fish-harvesting or hatchery business as a firm which is independently owned and operated and not dominant in its field of operation with receipts of up to \$3 million annually.

The vessels in the northeast multispecies fishery operating in the Gulf of Maine areas are primarily small business entities. Section 4.2.3 of the Framework 27 document and Tables 17 to 19, and 23 to 25

provide extensive information on the number, the port, state and the size of vessels that will be affected by the proposed regulations. Section 4.2.5 provides information on the dealers and the processing sector (See Tables 27 and 29 for information on dealers and processors by state).

Table 20 shows the estimated gross revenues of the affected vessels for 1997 calendar year and estimated revenues under Frameworks 25&26 and Framework 27. The average annual revenues of these vessels were \$115,379 in 1997 whereas the vessels in the 10th percentile averaged \$3,976 and the vessels in the 90th percentile averaged \$316,012. Therefore, based on the standards established for the commercial fishing sector (\$3 million in gross sales) by the SBA, all of these vessels are small entities.

There were a total of 3,736 vessels that held one or more (i.e., vessels that do not possess a limited access permit can have more than one open access permit category) multispecies permits during the 1997 multispecies fishing year. In principal, every one of the 3,736 vessels will have to comply with the regulations proposed under Framework 27. In practice, only those vessels that actually decide to participate in the groundfish fishery may be affected. Based upon dealer reports, a total of 1,958 vessels recorded having landed one pound or more of any species in the Northeast region (Table 18). Of the vessels that reported some activity, 671 did not report having landed any one of the 13 species managed under the Multispecies plan. This leaves a pool of 1,287 vessels that both held a multispecies permit and participated in the multispecies fishery during calendar year 1997. These participating vessels were considered to be the universe for purposes of estimating the economic impacts of the Framework 27 measures within the context of RFA.

Based upon calendar year 1997 data there were a total of 601 vessels that were found to have fished within one or more of the rolling closures and/or would be affected by one or more of the proposed trip limits. The majority of these vessels (434) were less than 50 gross registered tons in size and/or listed a Massachusetts homeport (404) on their 1997 permit application (Table 19).

According to the Regulatory Flexibility Act, if more than 20 percent of the small businesses in a particular industry are affected by the regulations, the regulations are considered to have an impact on a "substantial number" of these entities. Since the proposed action is estimated to impact about 47 percent, or 601 vessels out of a universe of 1,287 vessels that both held a multispecies permit and participated in the multispecies fishery during calendar year 1997, the "substantial number" criterion will be met.

Economic impacts on small business entities are considered to be "significant" if the proposed regulations are likely to cause any of the following:

- a) a reduction in annual gross revenues by more than 5 percent;
- b) an increase in total costs of production by more than 5 percent as a result of an increase in compliance costs;
- c) an increase in compliance costs as a percent of sales for small entities at least 10 percent higher than compliance costs as a percent of sales for large entities;

- d) costs of compliance that represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities; or
- e) a number (two percent as a "rule of thumb") of small businesses being forced to cease business operations.

The determination of 'significant impacts' based on these criteria are examined extensively in Section 4.2.3 of the Framework 27 document and summarized below:

- The proposed action **will** result in a reduction in annual gross revenues of more than 5 percent for a substantial number of small entities. The estimated proportional reductions in gross revenues (due to area closures and cod trip limit) from the 1997 baseline for the Framework 25&26 and Framework 27 measures are reported in Table 22 of section 4.2.3. Of the 601 vessels that were estimated to be affected by the Framework 27 measures, there were 456 vessels that would be affected by a reduction in gross revenues of more than 5 percent. These 456 vessels comprise 35 percent of the small business entities (out of a total 1,287 vessels). Therefore, based on criterion 'a', the proposed measures will have a significant impact on a substantial number of small business entities. Further information on the affected vessels by home state and port is provided in Tables 23-25 in section 4.2.3 of the Framework 27 document.
- The impact of the proposed measures on the profitability and the financial viability of the vessels in the northeast multispecies fishery is analyzed in Section 4.2.3 of the Framework 27 document. Compared to the 1997 baseline, the cumulative profitability for the median vessel was estimated to decline 66 percent from \$21,409 to 7,282 (Table 26 of section 4.2.3). A total of 115 vessels were found to be operating below break-even (i.e., zero profit) as a result of the combined Frameworks 25&26. Carrying these losses forward into Framework 27 and adding the accumulated debt under Frameworks 25, 26, and 27 results in a total of 155 vessels that were estimated to be below break-even profit. Therefore, 155 out of 1287 vessels, or 12 percent of the small business entities, may not be able to maintain their economic viability and as a result may be forced to cease their operations. As a result, the proposed measures would have a significant impact on a substantial number of small business entities based on criterion 'e' as well. Further discussion on the affected vessels by home state and port is provided in Tables 23-25 in section 4.2.3 of the Framework 27 document.

The impacts on compliance costs are discussed in Section 4.2.4 of the Framework 27 document in regard to the impacts of gear restrictions. It is not possible to determine with certainty if the impacts will be significant based on the criteria 'b', 'c', and 'd' although some vessels will be significantly affected by these measures:

- It is not known how many of the participating multispecies vessels used square or diamond mesh, therefore, it is not possible to estimate the number of vessels which will be impacted with the increase to 6.5-inch square mesh. The economic impacts of the increase in square-mesh size are expected to be small, however, because with the elimination of the Stellwagen Bank and Jeffreys Ledge regulated mesh areas, vessels will still be able to use existing 6-inch diamond mesh wherever they fish and the cost of 6.5-inch square mesh is likely to be similar

to that of 6-inch mesh. The estimated average cost of a new 6-inch square mesh codend was \$500-\$800 and was expected to be approximately the same for 6.5-inch mesh (for further discussion see section 4.2.5).

- The cost of restrictions on rock-hopper and roller gear is difficult to estimate since gear configurations vary by vessel and existing data is not adequate to determine gear usage at such a fine degree of resolution. According to one estimate, the cost of gear change may range from \$1,100 to \$2,500. In general, the vessels that fish exclusively in the inshore blocks may not be affected by the regulations assuming that they currently fish with the conforming gear. Similarly, those vessels that fished exclusively in offshore areas will not be affected by the inshore prohibition on roller gear if they continue to concentrate their activity in offshore areas. Out of the 173 bottom trawl vessels, 127 vessels fished, to varying degrees in both inshore and offshore areas. Clearly, those with rollers less than 12" will not be impacted. The decision facing the vessels with rollers 12" and greater will be whether or not their inshore activity warrants the cost of 1) converting existing nets to smaller rollers or 2) buying an additional net with small rollers for their inshore activity. Further discussion on the impacts of these gear restrictions are provided in section 4.2.5.

The haddock trip limit/ target TAC adjustment is expected to have either no effect or positive impacts on revenues. For this reason, above discussion mainly focused on the measures aimed at reducing Gulf of Maine cod mortality, i.e., area closures, trip limits and gear restrictions.

The comparative economic impacts of non-selected alternatives are examined in section 4.2.2 of the framework document. The reasons why these alternatives were not selected by the Council are discussed in detail in Section 3.2 of the Framework 27 document. The negative impacts of these alternatives, except option 1 (Gulf of Maine Alliance) on the multispecies fishery are expected to be more severe than those of the proposed action (See Table 14 section 4.2.2). The proposed action is developed, as a product or out of careful consideration of these alternatives and their potential impacts, to reach the rebuilding goals of Amendment 7 for while at the same time minimizing the negative impacts on the fishing industry to the extent practicable.

5.3.3.6 Mitigating Factors

In order to minimize the negative impacts on other species and fisheries, the proposed action exempts some gears from the area closures as discussed in Section 3.1.1.1 of the Framework 27 document. In addition to the existing list of exempted gears, scallop dredge gear will also be exempt from any newly closed areas (in Framework 26 or 27). The Council has also stated its intent to develop a process for establishing other closed area exemptions that are based on demonstrated minimal cod bycatch. The short-term impacts of the square-mesh size increase are offset by the rapid increase in yield expected per recruit and by the reduced discards of sub-legal size flounders. Finally, the haddock trip limit/ target TAC adjustment, if successful in inducing the vessels to increase their catch of haddock, would have some mitigating effects by offsetting some of the revenue loss from area closures, cod trip limits and gear restrictions.

5.3.3.7 Indirectly Affected Industries

Framework 27 does not include any new regulations that will apply to seafood dealers. Nevertheless, reductions in supplies of seafood products may have an economic impact on dealers. Section 4.2.5 of the Framework document discusses the impacts on the dealers and the processing sector. There were a total of 466 dealers with Federal multispecies dealer permits in 1997. Of these, only 203 entities held a multispecies dealer permit and purchased multispecies during 1997. Compared to the 1997 baseline, the effects of Frameworks 27 were estimated to result in a reduction in total dealer purchases in excess of 5 percent for 77 of the 186 identified dealers (Table 28).

The processors, while not directly subject to the regulations, will still be indirectly affected through the reduction in the domestic harvest of cod, and other species of groundfish. For purposes of the RFA, all of the firms that reported processing fresh or frozen cod and haddock in Maine, Massachusetts and New Hampshire would be considered a small business. The Small Business Administration (SBA) considers any business involved in canned and cured fish and seafood or prepared fish or frozen seafood to be a small business if it employs 500 employees or less. The average number of employees per firm in 1997 ranged from a low of 8 in Barnstable, MA to a high of 52 in Essex, MA (Table 29).

Although the actual impacts of this regulatory action on processors is unknown, clearly there are several counties in Maine, Massachusetts and New Hampshire that are substantially dependent upon a stable supply of fresh and frozen cod and haddock, and will be disproportionately affected by the measures. Further discussion of impacts on dealers and processors is provided in section 4.2.5 of the Framework document.

5.3.3.8 Compliance Costs

The impacts on compliance costs are discussed in Section 4.2.4 of the Framework 27 document in regard to the impacts of gear restrictions. See also the discussion above on the determination of significant economic impacts (Section 5.3.2.5).

5.3.3.9 Identification on Overlapping Regulations

The proposed action does not create overlapping regulations with any state regulations or other federal laws.

5.3.3.10 Conclusion

The preceding Regulatory Flexibility Analysis and the relevant sections of the Framework 27 document indicate that the proposed regulations will have “significant impacts” on a substantial number of small businesses.

5.4 Endangered Species Act (ESA)

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that may affect threatened or endangered marine species to ensure that those effects do not

jeopardize the continued existence of listed species. The proposed action may affect, but is not likely to jeopardize the continued existence of any endangered and threatened species. The Council recognizes that this conclusion does not change the basis for the previous determination that overall operation of fisheries under the Northeast Multispecies FMP, without modification, is likely to jeopardize the continued existence of endangered species under NMFS jurisdiction or result in adverse modification of critical habitat. Should activities associated with the Multispecies FMP change significantly or new information become available that changes this determination, the Council will reinitiate consultation.

5.5 Coastal Zone Management Act (CZMA)

The Council has reviewed the coastal zone management programs for states whose coastal waters are within the range of areas affected by the proposed actions, including: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware and Maryland. It has determined that the proposed action is consistent with the CZM programs of those states and has sent a notification of this determination, along with a copy of the amendment document, for their concurrence. Copies of the correspondence are on file at the Council office.

5.6 Paperwork Reduction Act (PRA)

The proposed action contains no new collection-of-information items.

5.7 Marine Mammal Protection Act

The Council has reviewed the impacts of Framework 27 on marine mammals (Section 4.1.3) and concludes that this action is consistent with the provisions of the MMPA and will not alter existing measures to protect species likely to inhabit the management unit. Overall, positive benefits may accrue to species inhabiting the areas affected by the proposed measures.