DRAFT

Emergency Action to Implement Measures to Reduce Overfishing of the Northeast Fishery Complex Under the Northeast Multispecies Fishery Management Plan

Continuation of Part II of the Settlement Agreement

Environmental Assessment and Regulatory Impact Review

Including an Initial Regulatory Flexibility Analysis

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DRAFT 2003

Executive Summary

The Secretary of Commerce (Secretary) finds that emergency action is necessary to comply with the Settlement Agreement Among Certain Parties (Settlement Agreement), which was ordered on May 23, 2003, to be implemented by the U.S. District Court for the District of Columbia (Court) in Conservation Law Foundation, et al., v. Evans et al. (Case No. 00-1134, D.D.C., December 28, 2001). In addition, this emergency action would implement a program to allow leasing of days-at-sea (DAS) in order to mitigate impacts of the restrictions contained in the proposed action. The Settlement Agreement measures were developed in response to Court-sponsored mediation and were initially ordered by the Court to remain in place until such time that Amendment 13 to the Northeast (NE) Multispecies Fishery Management Plan (FMP) was implemented. The Settlement Agreement, to which the National Marine Fisheries Service (NMFS) is a party, stipulates that NMFS and the New England Fishery Management Council (Council) must develop interim measures to reduce overfishing until Amendment 13 is implemented in order to bring the FMP into compliance with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act (SFA).

In accordance with the Settlement Agreement, NMFS implemented a series of actions to reduce overfishing and allow the Council time to complete Amendment 13. The initial deadline set by the Court for implementation of Amendment 13 was August 22, 2003. The principal actions that implemented the management measures in response to the Court order were two interim rules that were intended to manage the fishery until Amendment 13 is implemented, which was to occur no later than August 22, 2003. However, in September 2002, the NMFS Northeast Fisheries Science Center (NEFSC) discovered a discrepency with the configuration of the gear used to conduct standardized trawl surveys of marine resources, specifically, the mismeasurement of trawl warps. NMFS concluded that these problems could have an affect on the scientific information upon which Amendment 13 was based. Because of the uncertainties as to the effect of the trawl warp discrepancy, particularly in light of newly developed biological reference points, NMFS and Plaintiffs to the lawsuit requested from the Court an extension of time to develop and implement Amendment 13 in order to conduct an independent peer review to determine the implications of the trawl survey warp discrepancy, as well as any impacts of that problem on the scientific information on which management of the fishery, and development of Amendment 13, is based.

On December 3, 2002, the Court extended the deadline for completion of Amendment 13 to May 1, 2004. Because this extension and the fact that the August 1, 2002, interim final rule would expire by law on July 27, 2003, well before the new deadline for implementation of Amendment 13, the action that is the subject of this Environmental Assessment (EA) implements (effectively, continues) the measures required by the Court's order through the Secretary's emergency rulemaking authority under section 305(c) of the Magnuson-Stevens Act. The Preferred Alternative (Alternative 2) described in this document consists of

measures specified in the Settlement Agreement, which includes temporal extension of existing area closures, new area closures, new gear restrictions and restrictions on NE multispecies DAS usage for the commercial sector of the fishery, as well as additional measures for the recreational sector. The measures are intended to reduce overfishing and provide substantive protection for Gulf of Maine (GOM) cod, as well as several other groundfish stocks in the Northeast beginning July 28, 2003, and continuing until such time that Amendment 13 is implemented. A measure that is not contained in the Settlement Agreement, but appears as a sub-option of the Preferred Alternative, is the NE Multispecies DAS Leasing Program (Program). This Program would allow leasing of NE multispecies DAS by NE multispecies limited access permit holders in order to mitigate the impacts on the fishing industry while maintaining conservation neutrality.

The non-preferred alternative consists of a "hard" total allowable catch (TAC) system, based on elements the Council developed for inclusion in Amendment 13. The no-action alternative consists of the management measures that were in place in the NE multispecies fishery during the 2001 fishing year (prior to the Settlement Agreement). Given the unusual context of this short-term action, no other alternatives were reasonable.

Implementation of the preferred alternative would result in a reduction of effort of approximately 25 to 35% compared to the no-action alternative, and reductions in exploitation as follows: Gulf of Maine cod: 23%; Georges Bank cod: 20%; Cape Cod yellowtail flounder: 20%; Southern New England/Mid-Atlantic yellowtail flounder: 26%; American plaice: 24%; and white hake: 23%. The resultant fishing mortalities estimated for Gulf of Maine haddock and yellowtail flounder, northern windowpane, Georges Bank haddock, winter flounder, and yellowtail flounder, witch flounder, pollock, and redfish would be below the fishing mortality reported by the GARM, required to rebuild stocks.

Implementation of the preferred alternative would reduce overall DAS allocations by approximately 45% compared to the no-action alternative. Vessels with a relatively high dependence upon groundfish for their total fishing revenue would be the vessels most adversely impacted economically. Assuming that overall DAS use decreases by 35%, vessels that derive at least 75% of their income from groundfish may experience a relative reduction in gross revenue on the order of twenty to thirty percent. If the reduction in DAS use is less, it is likely that the reduction in gross income would also be less severe for such vessels. DAS reductions would particularly impact, in terms of total DAS usage, those vessels that currently fish their total DAS allocation, mostly large vessels, vessels in the Individual permit category, and vessels with homeport states in Maine, Massachusetts, and New Hampshire. The DAS Leasing Program would provide vessel owners an opportunity to reduce the impacts from the DAS reductions. DAS leasing could make it possible for vessels to redistribute DAS so that a higher percentage could operate at or above

profitability. For the charter/party boat fishery, the economic impacts would depend on the extent to which patrons would continue to participate in fishing, despite the creel limits and fish size restrictions.

In contrast, the no-action alternative may result in increased DAS use over recent levels, as well as fishing mortality levels greater than levels necessary to rebuild for many stocks. Although in the short term under the no-action alternative, the adverse economic impacts would be avoided, the no-action alternative may undermine timely rebuilding of the stocks and postpone the increased revenue that would be derived from rebuild stocks. The hard TAC alternative, if implemented with the necessary reporting and enforcement, could result in the achievement of the biological objects, but at a relatively high economic and social cost to the industry.

With respect to endangered and protected species, the preferred alternative would avoid causing jeopardy to the Right Whale. Assuming implementation of the Reasonable and Prudent Alternatives (separate recommendations to protect the Right Whale), it is unlikely that this action will have significant cumulative effects to this species. Cumulative effects are not anticipated to other protected species such as sea turtles, shortnose sturgeon, and Atlantic salmon.

Overall, the impacts of this action will not be significant. A net positive impact on the NE. multispecies stocks is anticipated.

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1.0 Introduction

1.1 Background

Amendments 5, 7, and 9 to the FMP form the basic structure of the current groundfish management measures. In addition, since implementation of Amendment 5 (59 FR 9872, March 1, 1994), a series of

framework adjustments have made alterations and modifications to this management system. Currently, many of the stocks managed under the FMP are overfished and/or overfishing is occurring (i.e., the stock is at a low level, and/or the amount of fishing mortality on the stock is excessive).

On December 28, 2001, a decision was handed down by the U.S. District Court for the District of Columbia on Conservation Law Foundation, et al. v. Evans et al. (Case No. 001134, D.D.C., December 28, 2001), brought against NMFS by the Conservation Law Foundation, Center for Marine Conservation, National Audubon Society and Natural Resources Defense Council. The Court found that Framework 33 to the FMP should have implemented measures to meet Amendment 9 (SFA Amendment) overfishing criteria and rebuilding objectives, rather than those of Amendment 7. Further, the Court found that Amendment 9 and Framework 33 violated the SFA because they did not include a "standardized bycatch reporting methodology" and because they did not adequately justify the lack of new measures to minimize bycatch to the extent practicable.

The Court did not establish a remedy, however, instead the Court asked the parties to the litigation to submit information to determine the appropriate remedy. Shortly thereafter, interveners from the states of Maine, New Hampshire, Massachusetts, and Rhode Island, and 3 industry interveners were allowed into the lawsuit for purposes of developing the appropriate remedy.

On March 1, 2002, NMFS, on behalf of the Secretary, submitted to the Court a proposed remedy to bring the FMP into full compliance with the SFA, the Magnuson-Stevens Act and all other applicable law as quickly as possible. The remedy provided for three separate actions: A Secretarial interim action, under authority of section 304(c) of the Magnuson-Stevens Act, to be implemented on May 1, 2002; a Secretarial amendment to the FMP, under authority of section 304(e) of the Magnuson-Stevens Act, to be implemented before the first interim action expired in October 2002; and Amendment 13 to the FMP, to be completed by both NMFS and the Council on an accelerated schedule, to bring the FMP into full compliance with all provisions of the SFA, the Magnuson-Stevens Act, and other applicable law.

During the course of Court-ordered mediation, the majority of parties in the lawsuit agreed to a Settlement Agreement, which was filed with the Court on April 16, 2002. The Settlement Agreement specified an interim rule, to be effective May 1, 2002; a second interim rule, to be effective August 1, 2002; and an amendment to the FMP (Amendment 13), to be implemented by August 22, 2003. The goal of the Settlement Agreement was to reduce overfishing and allow the Council time to complete Amendment 13.

The Court issued an order on May 23, 2002, requiring that NMFS comply with provisions of the Settlement Agreement. In accordance with the Settlement Agreement, a series of actions were implemented by NMFS, including two interim rules that were intended to manage the fishery

until Amendment 13 was implemented. August 22, 2003, was the initial Court-imposed deadline for implementation of Amendment 13.

In September 2002, the NEFSC discovered a discrepancy with the configuation of the gear used to conduct standardized trawl surveys of marine resources, specifically, the mismeasurement of trawl warps. NMFS concluded that these problems could have an affect on the scientific information upon which Amendment 13 was based. Because of the uncertainties as to the effect of the trawl warp discrepancy, particularly in light of newly developed biological reference points, NMFS and plaintiffs to the lawsuit requested from the Court an extension of time to develop and implement Amendment 13 in order to conduct an independent peer review to determine the implications of the trawl survey warp discrepancy, as well as any impacts of that problem on the scientific information on which management of the fishery, and development of Amendment 13, is based. On December 3, 2002, the Court extended the deadline of Amendment 13 to May 1, 2004. Because this extension and the fact that the August 1, 2002, interim final rule would expire by law on July 27, 2003, well before the new deadline for implementation of Amendment 13, the action that is the subject of this document implements (effectively, continues) the measures required by the Court's order through the Secretary's emergency rulemaking authority under section 305(c) of the Magnuson-Stevens Act. Without additional regulatory action, the management measures that constitute the Settlement Agreement will expire on July 28, 2003.

Table 1 outlines the series of actions resulting from the lawsuit and Settlement Agreement.

Table 1. Summary of Recent Events Impacting Groundfish Management.

Date	Event
Dec. 28, 2001	Court Decision in favor of Plaintiffs; (Conservation Law Foundation, et al., v. Evans et al.)
Apr. 16, 2002	Settlement Agreement filed with Court
Apr. 25, 2002	NMFS filed interim rule to implement Settlement Agreement (May through July management measures)
Apr. 26, 2002	Court issued Remedial Order requiring Settlement Agreement, with some differences from NMFS' filed interim rule
May 6, 2002	NMFS published correction to interim rule to implement Court-ordered measures that were not in the Settlement Agreement
May 10, 2002	NMFS filed motion for reconsideration
May 23, 2002	Court granted motion for reconsideration; orders Settlement Agreement with no differences
Jun. 5, 2002	NMFS published interim final rule to remove items in initial Court Order that were inconsistent with Settlement Agreement (May through August management measures)

Jul. 1, 2002	NMFS published proposed interim rule for management measures for August, 2002, through implementation of Amendment 13
Aug. 1, 2002	NMFS published final interim rule for management measures for August, 2002, through implementation of Amendment 13
Nov. 5, 2002	NMFS and Plaintiffs requested extension of deadline for implementation of Amendment 13, due to scientific uncertainties
Dec. 3, 2002	Court granted a delay of Amendment 13 implementation until May 1, 2004
Jan. 22, 2002	NMFS published notice of continuation of interim rule; authority to continue the interim final rule expires July 27, 2003

On February 27, 2003, the results of the peer review that addressed pending scientific issues was released. The "Report on the Groundfish Science Peer Review Meeting February 3-8, 2003" concluded that the current scientific methods upon which the FMP is based are valid, and made several technical recommendations for improvements to the methodology used to assess these stocks.

2.0 Purpose

2.1 Need for Emergency Action

As described in the previous paragraphs, stock conditions of species in this fishery and the Court Order require that the current management measures (contained in the Settlement Agreement) remain in place until the implementation of Amendment 13. To come into full compliance with the requirements of the Magnuson-Stevens Act, as amended by the SFA, severe reductions in fishing mortality rates (F) are necessary for many of the groundfish stocks managed under the FMP. To address these requirements, the Council is currently developing Amendment 13. Amendment 13 is expected to implement rebuilding plans for many groundfish stocks and to address capacity issues in the fishery. As discussed above, an interim rule was implemented, consistent with the Settlement Agreement, to reduce overfishing during the time needed to develop and implement Amendment 13. However, due to statutory time constraints associated with the amendment process and other applicable law, the Court order requiring interim measures to be implemented until Amendment 13 is promulgated, and the time required to complete a peer review of several aspects of the underlying science in order to resolve outstanding scientific issues, it was determined that implementation of Amendment 13 is not possible before May 1, 2004. Due to these factors, the Court agreed to extend the deadline for completing Amendment 13 to May 1, 2004. Because management measures implemented under the current interim rule will expire on July 28, 2003, and further extension of the interim rule is not possible under interim rulemaking authority in the Magnuson-Stevens Act, and due to the constraints of the MSA, the only means to continue necessary interim measures is through the Secretary's emergency rule making authority of Section 305(c) of the MSA.

As provided under section 305(c) of the Magnuson-Stevens Act, and in accordance with NMFS policy guidelines for the use of emergency rules (62 FR 44421, August 21, 1997), emergency management actions may be prepared under special circumstances. The policy guidelines state:

> Congress intended that emergency authority be available to address conservation, biological, economic, social, and health emergencies. In addition, emergency regulations may make direct allocations among user groups, if . . . absent emergency regulations, substantial harm will occur to one or more segments of the fishing industry.

The policy guidelines also state:

> The preparation or approval of management actions under the emergency provisions of section 305(c) of the Magnuson-Stevens Act should be limited to extremely urgent, special circumstances where substantial harm to or disruption of the resource, fishery, or community would be caused in the time it would take to follow standard rulemaking procedures . . . In addition, the preamble to the emergency rule should indicate what measures could be taken or what alternative measures will be considered to effect a permanent solution to the problem addressed by the emergency rule.

The policy guidelines defines an "emergency" as a situation that:

> (1) Results from recent, unforeseen events or recently discovered circumstances; and
> (2) Presents serious conservation or management problems in the fishery; and
> (3) Can be addressed through emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and deliberative consideration of the impacts on participants to the same extent as would be expected under the normal rulemaking process.

The justification for emergency rulemaking provided in the policy guidelines specifies that:

> If the time it would take to complete notice-and-comment rulemaking would result in substantial damage or loss to a living marine resource, habitat, fishery, industry participants or communities, . . . emergency action might be justified under one or more of the following situations:
>
> (1) Ecological--(A) to prevent overfishing as defined in an FMP, or as defined by the Secretary in the absence of an FMP, or (B) to prevent other serious damage to the fishery resource or habitat; or
> (2) Economic--to prevent significant direct economic loss or to preserve a significant economic opportunity that otherwise might be forgone; or
> (3) Social--to prevent significant community impacts or conflict between user groups . . .

Applying the above criteria, NMFS, on behalf of the Secretary, has determined that, given the recent, unforeseen issues associated with

the trawl survey and the potential impacts of the scientific basis for management of this fishery; the species circumstances of unanticipated Court extension of the Amendment 13 implementation deadline to examine and resolve pending issues; and the presence of serious conservation and management problems in the NE multispecies fishery, the current situation constitutes an emergency. Further, emergency action is justified for ecological, economic, and social reasons. Failure to keep measures in place to reduce or prevent overfishing while the Council completes Amendment 13 would likely lead to further reductions in stock sizes and would require even more stringent measures, with more severe economic consequences, to be promulgated in the future. Implementation of the proposed DAS Leasing Program as an emergency action is justified in order to mitigate the potential economic harm resulting from the management measures. Although notice and comment rulemaking is being proposed, there is insufficient time to implement the proposed measures under the normal amendment or framework process, leaving the 305(c) emergency action process as the only means to implement such measures. Therefore, an emergency action to reduce overfishing while a more comprehensive amendment is being developed, is appropriate and consistent with the Magnuson-Stevens Act and agency policy guidelines.

2.2 Objective

The Secretary has determined that several stocks of NE groundfish are being overfished and some are in need of rebuilding. This action will implement Secretarial emergency measures to continue significant reductions to overfishing on GOM cod, as well as other groundfish stocks, while NMFS and the Council complete Amendment 13. The measures included in this action (with the exception of the Days-at-sea Leasing Program), represent a reasonable compromise among interested parties, including one of the Plaintiff conservation groups, on measures that will continue to reduce overfishing substantially in the near-term, while minimizing the impact on the fishing industry. As is more fully discussed later in this document, these measures result in both quantifiable and non-quantifiable reductions in fishing mortality for virtually all of the NE multispecies stocks managed under the FMP.

The measures in the Court-ordered Settlement Agreement that are contained in the Preferred Alternative are necessarily limited in scope because they are intended only to provide sufficient interim reduction in overfishing on NE multispecies stocks so as not to jeopardize the ability of NMFS and the Council to develop and implement Amendment 13 consistent with the Settlement Agreement. These measures were developed in compliance with the national standards and other required provisions of the Magnuson-Stevens Act and other applicable law.

Given the severity of the DAS reduction measures that were implemented by the August 1, 2002, interim final rule, a sub-option under the Preferred Alternative for a DAS leasing program is included, as a way to minimize economic and social impacts by providing flexibility to transfer DAS within the fishery.

The emergency measures to be implemented on July 28, 2003, are analyzed and discussed in detail in sections 3.2, 5.1.2., and 5.2.2.2. To come into full compliance with the requirements of the Magnuson-Stevens Act, as amended by the SFA, additional reductions in fishing mortality will be necessary for many of the groundfish stocks managed under the FMP. The full extent of all of these requirements will be met through Amendment 13, which will implement rebuilding plans for several groundfish stocks and address capacity issues in the fishery on a long-term basis. Amendment 13 is under development by NMFS and the Council and is scheduled to be implemented by May 1, 2004.

Given the benefits of significant reductions in fishing mortality on GOM cod and other groundfish stocks that would result from this emergency rule, and the improving status of the stocks, delaying implementation of Amendment 13 until May 1, 2004, is not expected to jeopardize the ability of the NE multispecies complex to meet SFA rebuilding objectives.

The analyses presented in this document examine three alternatives to meet the above objectives, with regard to their environmental consequences, economic impacts, and social impacts. Given the unusual and narrow context of this action, and the special circumstances of a Court ordered remedy, no other alternatives were considered reasonable.

3.0 Alternatives

In this EA, three alternatives are considered and analyzed--the Preferred Alternative, or Part 2 of the Settlement Agreement; a hard TAC alternative; and the No Action Alternative. In addition, a sub-option to allow leasing of NE multispecies DAS is included under the Preferred Alternative.

The NMFS NEFSC Groundfish Assessment Review Meeting (GARM; October 2002) is the most recent stock assessment for most of the groundfish species. Assessment of yellowtail flounder, southern New England/Mid-Atlantic (SNE/MA) winter flounder, and GOM winter flounder was conducted at the 36th Stock Assessment Workshop (SAW; December 2002). Because recreational landings are factored into the most recent estimates of F for some stocks such as GOM cod, measures to reduce F through restrictions on the recreational fishery are also included in the Preferred Alternative. Each alternative discussed below was analyzed (see section 5.0 Environmental Consequences) as a package for both the commercial and recreational sectors. That is, each individual quantifiable measure may have its own specific impact on the stock and the human environment, but total impacts are not necessarily the sum of the individual measures. Thus, one measure's impact cannot necessarily be separated from others to identify impacts specific to that one measure. The NE multispecies DAS leasing program was analyzed separately.

3.1 Alternative 1 (No Action)

All management measures in place for the NE multispecies fishery (as contained in 50 CFR part 648), prior to May 1, 2002, would be reinstated under this alternative. The Western GOM (WGOM) Area Closure--implemented by Framework 25 in 1998, and extended in time by Framework 33 in 2000--would reopen under this alternative.

Closed areas

Area closure measures discussed throughout this document reference the block numbers in Figure 1. The area closures that were implemented in Amendments 5 and 7 to the FMP, as modified by Frameworks 27, 31, and 33 to the FMP, would be reinstated. GOM seasonal area closures are shown in Figure 2. This alternative would continue the provision that, if 50 percent of the GOM cod target TAC is landed by July 31 in any year, additional closures result (i.e., "triggered closures"). If the contingency were met and the triggered closures enacted, Cashes Ledge Closed Area would remain closed for an additional month (November), and blocks 124 and 125 would close in January (see Figure 2). Without the triggered closures, Cashes Ledge would be closed only from July 1 through October 31. The triggered closure would effectively close blocks 124 and 125 from January 1 through April 30, and again from October 1 through November 30.

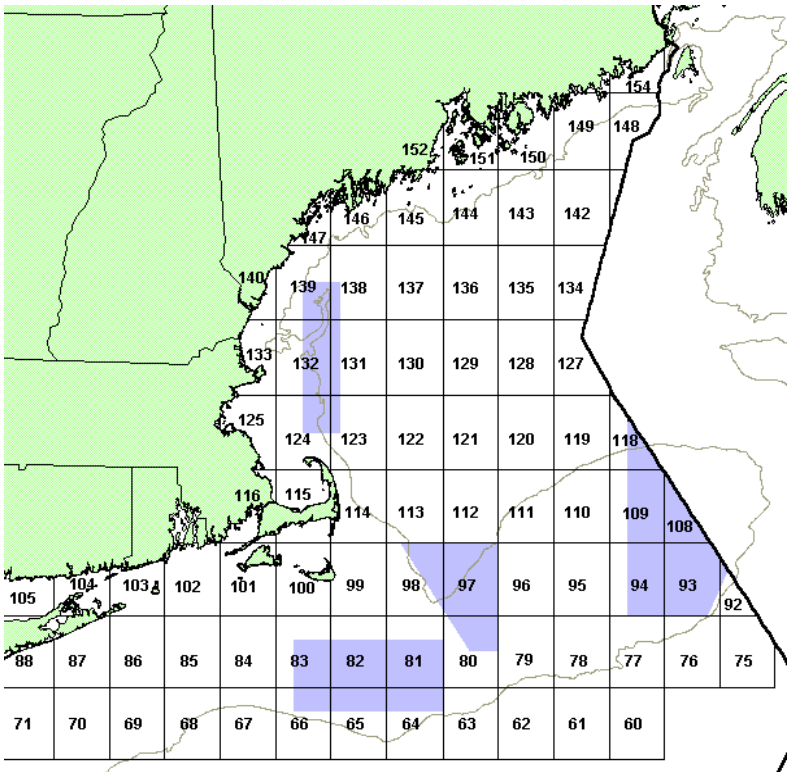


Figure 1. Area closure block reference map.

Trip limits

The trip limit that was in place for GOM cod prior to May 1, 2002,(400 lb/day, with a maximum possession limit equal to 10 times the daily limit (i.e., 4,000 lb)) would be reinstated under this alternative. For each trip longer than 24 hr, the no action provision would allow the vessel to land up to an additional 400 lb for each additional 24-hr block of DAS, or part of an additional 24-hr block of DAS, provided that the vessel did not call out of the DAS program and did not depart from a dock or mooring in port (unless transiting) until the rest of the additional 24-hr block of the DAS had elapsed. The trip limit for haddock would be consistent with the current trip limit. The Georges Bank (GB) cod trip limit would be calculated as it was prior to May 1, 2002, (i.e., prior to the requirement that the DAS accounting, with respect to the trip limit, be consistent with the GOM accounting system). The only other trip limit would be for Atlantic halibut; no vessel issued a NE multispecies permit could land or possess on board more than one Atlantic halibut per trip.

Table 2. "No action" trip limits for selected groundfish stocks.

Species	Time	Fishery	lb per Day	lb per Trip
Haddock*	May 1 through September 30	NE multispecies DAS	3,000	30,000
Haddock*	October 1 through April 30	NE multispecies DAS	5,000	50,000
GOM Cod	Year-round	NE multispecies DAS	400	4,000
GB Cod	Year-round	NE multispecies DAS	2,000	20,000
Halibut	Year-round	N/A	N/A	1 fish

* Unless otherwise adjusted during the fishing year by the Regional Administrator.

Effort Controls

Days-at-Sea (DAS)

Current DAS allocations would revert back to those implemented prior to the implementation of the Settlement Agreement, as contained in 50 CFR 648.82. Vessels that qualified for a limited access groundfish permit under regulations implementing Amendment 5 (59 FR 9872, March 1, 1994) were allowed to select one of several DAS permit categories, according to the criteria specified, and received an allocation of DAS under the Amendment 5 DAS reduction program. Regulations implementing Amendment 7 (61 FR 34966, July 3, 1996) further accelerated the 50-percent DAS reduction schedule established by Amendment 5. Individual DAS category holders--including those with a Combination category permit--are currently allocated 50 percent of their initial (1994) allocation baseline; Fleet DAS category vessels--including those with a Hook-Gear category permit--are currently allocated 88 DAS. Vessels

that are 30 ft or less in length overall and that have selected to fish in the Small Vessel category are not restricted to DAS, but are subject to a trip limit of 300 lb of cod, haddock, and yellowtail flounder, combined, and one Atlantic halibut per trip. Separate permit categories for those vessels fishing under a Large Mesh DAS category permit exist where the vessels are allocated a 36-percent DAS increase over their individual DAS allocations, or 120 DAS (as opposed to 88 DAS under the Fleet DAS program). To be eligible to fish under the Large Mesh DAS category, a vessel must fish with gillnet gear with a minimum mesh size of 7-inch diamond or with trawl gear with a minimum mesh size of 8-inch diamond throughout the net, for the entire year. Spawning season restrictions and declaring blocks out of the fishery, as described in 50 CFR 648.82(g) and (k), would remain in effect for all vessels.

Gear restrictions

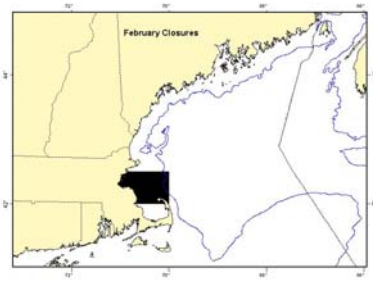
The gear requirements would revert back to those in place prior to May 1, 2002. Vessels fishing under a NE multispecies DAS in the GOM/GB Regulated Mesh Area would be required to use at least 6-inch diamond or 6.5-inch square mesh throughout the net. Vessels fishing under a NE multispecies DAS in the Southern New England (SNE) Regulated Mesh Area would be subject to the same mesh size requirement. Vessels fishing in the MA Regulated Mesh Area would be required to use at least 5.5-inch diamond mesh or 6.0-inch square mesh throughout the net.

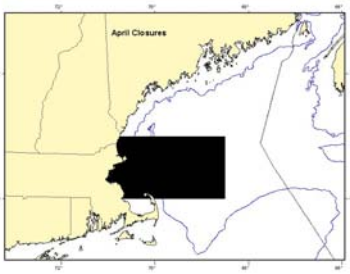
For all trawl vessels fishing in the GOM/GB Inshore Restricted Roller Gear Area (50 CFR 648.80(a)(2)(iv)), the diameter of any part of the trawl footrope, including discs, rollers or rockhoppers could not exceed 12 inches. Additionally, trawl vessels fishing under a NE multispecies DAS would be prohibited from pair-trawling and all trawl vessels would be prohibited from possessing brush-sweep trawl gear while in possession of NE multispecies. Gillnet vessels that declare into the Day gillnet vessel category would be restricted to 80 stand-up nets or 160 tie-down nets, which could not be longer than 300 ft. All Day gillnets would be required to be tagged.

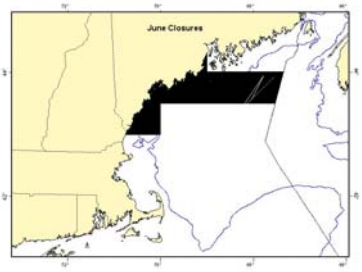
Recreational fishing measures

The recreational fishing measures would revert to those in place prior to May 1, 2002. Private recreational vessels would be limited to 10 cod and/or haddock, combined, in, or harvested from, the Exclusive Economic Zone (EEZ). There would be no possession limit for other groundfish species. The minimum recreational fish sizes for groundfish species would be:

SPECIES	MINIMUM FISH SIZE (inches)
Cod	21
Haddock	21
Pollock	19
American plaice (dab)	14







Winter flounder (blackback).....12
Redfish.....
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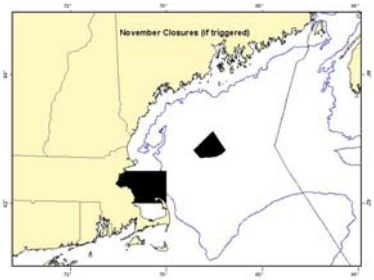
. 9
Yellowtail flounder.....
.....13
Atlantic halibut.....
.....36
Witch flounder (gray sole).....14



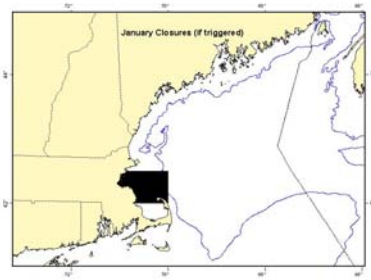
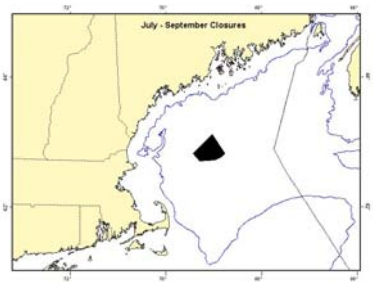


Figure 2. GOM rolling closures under Alternative 1 (i.e., no action).

3.2 Alternative 2 (Preferred)

This alternative would implement measures consistent with those implemented on August 1, 2002 (area closures, gear restrictions, trip limits, recreational measures, and DAS allocations for the commercial sector of the fishery). The DAS restrictions and accounting rules that were specific to the period May through July, 2002, are not



included in this alternative (restriction of DAS use to 25 percent and differential accounting for trips of from 3 to 15 hr). This alternative would also add a DAS Leasing Program to mitigate the social and economic impacts on the industry. Existing measures that were not specifically implemented by the August 1, 2002, interim rule would remain in effect.

Regulated Mesh Areas (RMA)

This alternative would divide the GOM/GB RMA into two areas: The GOM RMA, which is the area north of the GOM cod exemption line currently

used to define the divide between the GOM cod and GB cod trip limit allowances; and the GB RMA, which is that part of the GOM/GB RMA that lies south of the GOM cod exemption line. This measure would also revise the boundary between the SNE and MA RMAs and between the SNE and GB RMAs. These revisions resulted from the Settlement Agreement modification to the SNE RMA.[1] These areas are shown in Figure 3. Specific management measures would also apply, depending on the area fished.

[1]The boundary for the area where specific SNE measures apply is described as follows:

Bounded on the east by straight lines connecting the following points:

N. Lat.	W. Long.
(*)	70/00'
40/50'70/00'	
40/50'	69/40'
40/18.7'	69/00'
40/2.7'	69/00'
(**)	69/00'

(*) South-facing shoreline of Cape Cod.
(**) Southward to its intersection with the EEZ.

Bounded on the west by:

A line beginning at the intersection of 74/00' W. long. and the south-facing shoreline of Long Island, NY, and then running southward along the 74/00' W. long. line.

Exempted Fishing Areas
This alternative would maintain the pre-Settlement agreement RMA delineations for the purposes of identifying the pre-Settlement agreement Exempted Fishing Areas (see Figure 3).

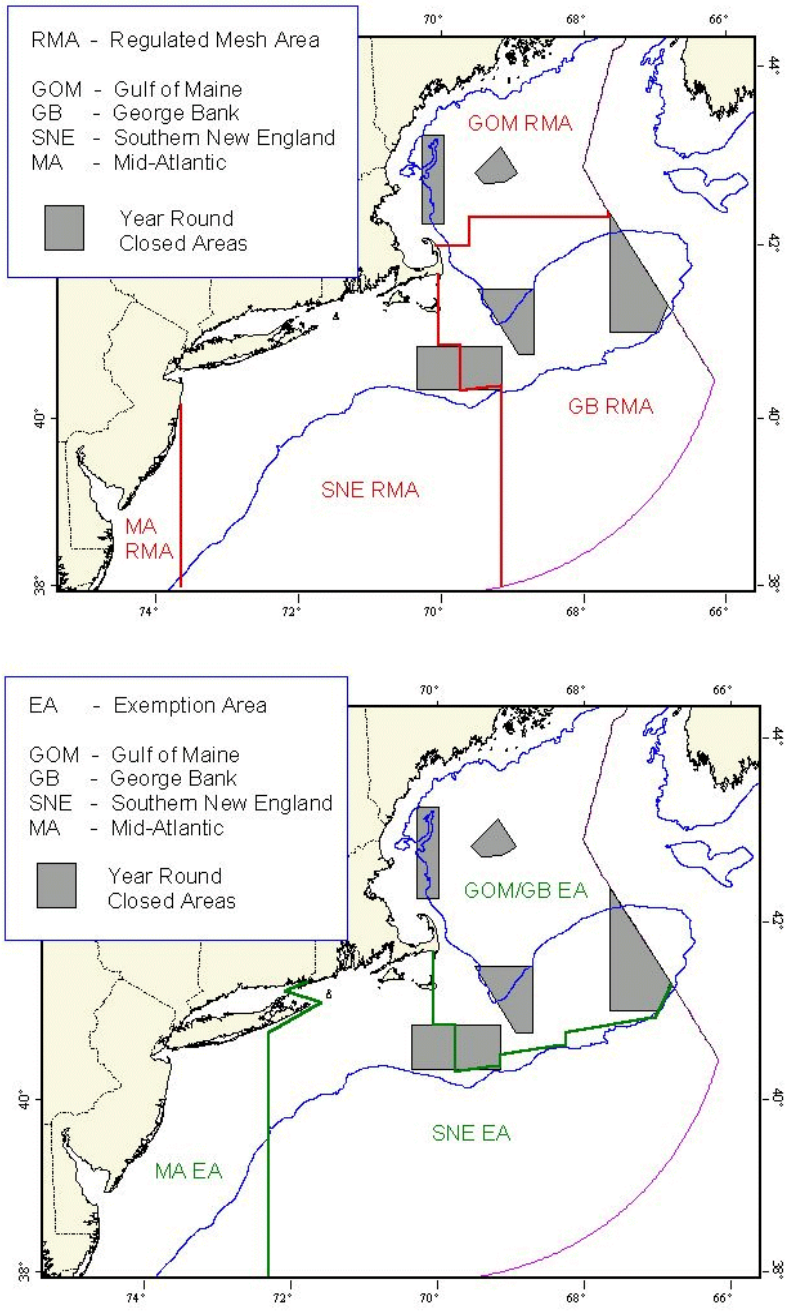


Figure 3. New Regulated Mesh Areas and Exempted Fishery Areas, including the year-round closure areas, under Alternative 2 (Preferred).

Permits

Under this alternative, no additional open access Hand-gear permits would be issued to any vessel that has never been issued such a permit.

DAS Counting

Under this alternative, only vessels fishing under the Day gillnet designation and fishing with gillnet gear under a NE multispecies DAS would have their DAS clock count as a minimum of 15 hr for trips that exceed 3 hr and that are less than or equal to 15 hr.

Limitation on DAS

DAS would be set using the period of May 1, 1996 - April 30, 2001, at the *maximum* DAS used by a permit in any single fishing year, not to exceed the current allocation. No vessel would receive a baseline of DAS less than 10 days. For limited access vessels not under the call-in system during the period May 1996 through June 1996, a vessel's DAS would be based on vessel trip reports (VTRs) submitted to NMFS before April 9, 2002. Otherwise, DAS would be based on the NMFS call-in system or, for vessels fishing with a Vessel Monitoring System (VMS), DAS would be based on DAS tracking via the VMS unit.

Under this alternative, the DAS reduction implemented under the August 1, 2002, interim rule would remain in place until implementation of Amendment 13. For example, DAS for the 2003 fishing year would be reduced by 20 percent from the above baseline. DAS used in fishing year 2003 prior to implementation of this emergency action would be counted against the 2003 fishing year allocation. That is, for the 2003 fishing year, NE multispecies DAS that were fished by a vessel during the period May 1 through July 27, 2003, would be deducted from that vessel's total allocated DAS for the 2003 fishing year. Thus, each vessel's DAS allocation for July 28, 2003, through April 30, 2004, would be equal to that vessel's used DAS baseline, minus 20 percent of the vessel's used DAS baseline, minus any DAS that vessel fished during May through July 27, 2003.

Vessels that have a monkfish Category C or D permit (i.e., vessels that possess both a monkfish and a limited access NE multispecies DAS permit) must run both their monkfish DAS clock and the NE multispecies DAS clock concurrently when fishing under a monkfish DAS. Limited access monkfish permit holders are allocated 40 monkfish DAS (under the monkfish FMP). Under the proposed measure, for vessels for which the NE multispecies DAS reduction would result in the vessel having more monkfish DAS allocated than NE multispecies DAS, such vessels could still fish under a monkfish DAS when NE multispecies DAS are no longer available, but would then be required to fish under the provisions of a monkfish Category A or B vessel, i.e., limited access monkfish vessels that do not possess a limited access NE multispecies permit. For example, if a monkfish Category D vessel's NE multispecies DAS allocation were 30, and the vessel fished 30 monkfish DAS, 30 NE multispecies DAS would also be used. However, after all 30 NE multispecies DAS were used, the vessel could utilize its remaining

10 monkfish DAS to fish on monkfish, without a NE multispecies DAS being used, provided the vessel fishes under the regulations pertaining to a Category B vessel and does not retain any regulated multispecies.

All limited access NE multispecies vessels that have a Large Mesh Individual DAS category or a Large Mesh Fleet Das category permit would be required to fish with nets with mesh that is 2.0 inches larger than the current regulated mesh size when fishing under the NE multispecies DAS program. Thus, vessels fishing in the MA RMA with trawl nets or sink gillnets would be required to fish with nets with a minimum mesh size of 7.5-inch (19.0-cm) diamond or 8.0-inch (20.3-cm) square mesh throughout the entire net.

The minimum mesh size restrictions and number of nets required for gillnet vessels when fishing in the MA RMA under a NE multispecies DAS would remain unchanged. That is, vessels would be allowed to continue to fish up to 160 nets. This net restriction is different from the net restriction of 150 nets, as in the Settlement Agreement and Court Order, for vessels fishing under the monkfish DAS program.

Additional measures that would apply in all areas

Vessels would be prohibited from using de-hookers ("crucifiers") with less than 6-inch spacing between the fairlead rollers.

Monkfish vessels that have a monkfish limited access Category C or D permit (i.e., vessels that possess both a monkfish and NE multispecies limited access permit) and that are fishing under a monkfish DAS in any of the RMAs would be restricted from fishing more than 150 nets, provided the vessel fishes with nets with a minimum mesh size of 10 inches. Vessels would be required to affix one tag to each net. Monkfish vessels that have a limited access Category A or B permit would be subject to the pre-Settlement agreement number of nets (i.e., 160 nets).

Minimum Fish Size

Under this alternative, the minimum size for cod that could be sold would be 22 inches.

Trip Limits

Hand-gear permitted vessels: The trip limit for open access Hand-gear vessels would be reduced to 200 lb from the current 300-lb level. The trip limit would apply to cod, haddock and yellowtail flounder, except that, when fishing in the SNE and MA RMAs south of 40/00' N. lat., no possession of yellowtail flounder would be permitted (see below).

Yellowtail flounder possession limit restrictions: Limited access NE multispecies vessels fishing any part of a NE multispecies DAS trip would be allowed to retain the following amounts of yellowtail flounder in the areas specified and during the time periods specified,

provided the vessel has on board the appropriate authorization to fish from the Regional Administrator:

< When fishing in the SNE and MA RMAs north of 40/00' N. lat.:

A vessel fishing any part of a DAS in the SNE and MA RMAs north of 40/00' N. lat. would be allowed to possess no more than 250 lb of yellowtail flounder per trip during the period March 1- May 31. During the period June 1 to February 28, a vessel could posses no more than 750 lb of yellowtail flounder per DAS, with a maximum trip limit of 3,000 lb per trip, provided the vessel was enrolled in the appropriate seasonal exemption program.

< When fishing in the GOM RMA and the GB RMAs north of 40/00' N. lat.:

A vessel fishing in the GOM RMA and the GB RMAs north of 40/00' N. lat. would be exempt from the yellowtail flounder trip limit provisions, provided the vessel was enrolled in the appropriate seasonal exemption program.

Yellowtail flounder prohibition: Vessels would be prohibited from possessing yellowtail flounder in the SNE, MA, and GB RMAs south of 40/00' N. lat., unless transiting this area with gear properly stowed according to the regulations.

Cod trip limit modifications

Vessels fishing in the GOM RMA on a NE multispecies DAS would be subject to a trip limit for GOM cod of 500 lb per DAS, with a maximum trip limit of 4,000 lb per trip.

This alternative would also continue the current method of how the DAS clock would accrue for those vessels fishing in the GB RMA and harvesting GB cod. The GB cod trip limit would be maintained at 2,000 lb per DAS, up to a maximum possession limit of 20,000 lb per trip. A vessel subject to this landing limit restriction could come into port with, and offload, cod in excess of the landing limit, as determined by the number of DAS elapsed since the vessel called into the DAS program, provided that the vessel operator does not call out of the DAS program and does not depart from a dock or mooring in port until the rest of the additional 24-hr block of the DAS has elapsed, regardless of whether all of the cod on board is offloaded. For example, a vessel that has been called into the DAS program for 25 hr at the time of landing may land only up to 4,000 lb of cod, provided the vessel does not call out of the DAS program or leave port until 48 hr have elapsed from the beginning of the trip. This accounting system would be consistent with the GOM cod trip limit provisions in the NE multispecies regulations. A vessel that would be required to remain in port for the time that it must run its DAS clock could transit to another port during that time, provided the operator notifies the Regional Administrator according to the regulations.

Recreational and Charter/party Vessel Restrictions

Under this alternative, the minimum length for cod that could be retained by federally permitted charter/party vessels, and private recreational vessels not holding a Federal permit and fishing in the EEZ, would continue to be 23 inches, as specified under Part 1 of the Settlement Agreement, which became effective May 1, 2002. The minimum length for haddock that could be retained by both charter/party and private recreational vessels would remain at 23 inches.

This alternative would continue the current cod and haddock bag (possession) limit for the charter/party recreational fishing sector when fishing in the GOM RMA. Each person on a charter/party vessel would be allowed to possess no more than 10 cod or haddock, combined, per trip, except that, from December 1 through March 31, only 5 of that total could be cod.

The regulations currently prohibit a vessel fishing under the charter/party regulations from fishing in the GOM area closures unless the vessel has on board a letter of authorization (LOA) issued by the Regional Administrator. Vessels intending to charter/party fish in the GOM closed areas must declare into charter/party fishery for the duration of the closure or for 3 months, whichever is greater. Vessels wanting to obtain an LOA for the entire duration of this emergency action would need to obtain a LOA by calling the NMFS Permit Office. All other existing recreational measures would remain unchanged, including the no-sale provision for both the party/charter and private recreational sectors.

Observer Coverage

Although not proposed as a regulatory management measure, NMFS would continue the increased level of its observer coverage in the NE multispecies fishery to monitor and collect information on bycatch, as well as other biological and fishery-related information. For all gear sectors, NMFS would provide a minimum of 5-percent observer coverage, to provide statistically reliable data.

3.2.1 NE Multispecies DAS Leasing Program (Program) Sub-Option

Under this sub-option, NMFS would administer a Program to allow limited access NE multispecies permit holders to lease DAS from each other; in a conservation neutral manner, until the implementation of Amendment 13. Draft Amendment 13 includes options that would either eliminate, modify, or continue the DAS leasing program described in this alternative. Implementation of the Program on an emergency basis would provide the fishing industry flexibility and an opportunity to mitigate the potentially severe economic and social impacts caused by the restrictive measures implemented by this action.

Because of the DAS reduction proposed under this alternative, the ability of some vessels to participate in the fishery would be severely reduced, resulting in a loss of revenue or an inability to

operate at a profit. A DAS leasing program would enable vessels to earn additional revenue in two ways: (1) It would allow a vessel owner to increase the number of DAS that he/she could use during the fishing year; or (2) allow a vessel owner to lease DAS to another vessel, as a way to earn revenue from DAS he/she may not otherwise use.

The Council requested on May 20, 2002, that NMFS implement a DAS Leasing Program through Secretarial action, and reiterated the request on December 19, 2002. Draft Amendment 13 contains an alternative for a proposed Program, with three provisions to maintain conservation neutrality (i.e., to maintain groundfish fishing effort at the level that would be fished in the absence of a DAS leasing program). To a large degree, NMFS developed the Program proposed under this alternative using the Council's Amendment 13 options for such a Program.

All vessels with a valid limited access NE multispecies DAS permit would be eligible to lease NE multispecies DAS to or from another such vessel through the Program, unless otherwise noted below. Eligible vessels acquiring leased NE multispecies DAS would be termed the "lessee," or transferee, and eligible vessels transferring or leasing NE multispecies DAS would be termed the "lessor," or transferor. Although all eligible vessels would be allowed to lease NE multispecies DAS from another such vessel, vessels holding the minimum allocation of 8 DAS would be prohibited from leasing, or transferring, DAS under the Program. Prohibiting vessels with the minimum allocation of 8 DAS from leasing their DAS to another vessel would prevent previously inactive (latent) DAS from becoming active, since many of these vessels did not fish any of their DAS during the 1996-2000 qualification period. This restriction would be necessary to promote the conservation neutrality of the Program. For similar reasons, NE multispecies DAS associated with Confirmation of Permit Histories (CPH) would be prohibited from being activated for the sole purpose of leasing-out DAS to another vessel.

In addition, this alternative would allow limited access NE multispecies Hook-gear permitted vessels (Category D) to lease NE multispecies to and from other limited access Hook-gear permitted vessels only. This restriction is being proposed because current regulations prohibit limited access Hook-gear permitted vessels from using gear other than hook gear.

An eligible vessel owner wanting to lease NE multispecies DAS would be required to submit a complete application to lease DAS (Application) at least 45 days prior to the time that the vessels intends to fish the leased DAS. (Vessels fishing with a VMS would likely be able to receive notification of an approved lease agreement sooner than 45 days.) Upon approval of the Application by NMFS, the lessor and lessee would be sent written confirmation of the approved application. Leased DAS would be effective only during the fishing year for which they were leased, unless the vessel has carry-over DAS (see below). A

vessel may lease to as many qualified vessels as it desires, provided all of the restrictions and conditions described in under this sub-option are complied with.

An Application may be submitted at any time throughout the fishing year, up until March 1. A complete application would consist of the following: Lessor's (transferor) owner name, vessel name, permit number and official number or state registration number; lessee's (transferee) owner name, vessel name, permit number and official number or state registration number; number of NE multispecies DAS to be leased; total price paid for the leased DAS; signatures of lessor and lessee; and date the form was completed. Information obtained from the Application, although subject to examination by NMFS law enforcement agents, would be held confidential and would be used only in summarized form for management of the fishery in the future.

The Regional Administrator could reject an Application for any of the following reasons: The application is incomplete or was submitted past the March 1 deadline; the lessor or lessee does not possess a valid limited access NE multispecies permit; the DAS to be leased are subject to sanction; the vessel leasing the DAS is sanctioned; or the lessor has an insufficient number of allocated DAS available to lease. Upon denial of a Application, the Regional Administrator would send a letter to the applicants describing the reason(s) for Application rejection. There would be no formal appeal allowed after such a rejection.

No sub-leasing of NE multispecies DAS would be allowed. This means that once a lease application is approved by NMFS, the leased DAS could not be leased a second time, even if the lessee was prevented from fishing the leased DAS due to circumstances beyond his/her control (e.g., a vessel sinking). This restriction is necessary to ensure NMFS' ability to administer and account for all leased DAS in an efficient manner.

Eligible vessels would be allowed to carry over up to 10 DAS, regardless of whether these DAS were allocated or leased days in order to promote safety at sea. Thus, a vessel that purchased leased DAS that remained unused at the end of the fishing year would be allowed to carry over these leased DAS, under the conditions of the carry over provision, to the subsequent fishing year. To determine DAS fished for a given fishing year, a vessel's allocated DAS (as opposed to DAS that it acquired through lease) would be counted first for purposes of determining how many DAS remain for the fishing year. As an example, if a vessel was allocated 50 DAS and acquired an additional 20 DAS by leasing them from another vessel, that vessel would have 70 DAS that it could use during the fishing year. If that vessel, for whatever reason, used only 60 DAS during that year, NMFS would consider that the vessel's 50 allocated DAS were used first, and that 10 of the leased DAS were then used. The remaining 10 leased DAS that were unused would be carried over to the next fishing year.

This alternative would require that vessels lease a minimum of 5 NE multispecies DAS to any one vessel, or the full amount of the vessel's remaining allocated DAS, whichever is less. For example, a vessel with 50 DAS could lease any number of DAS equal to 5 or more DAS to as many vessels as possible. If the vessel leased 6 DAS to eight vessels, leaving 2 DAS (i.e., 6 DAS x 8 = 48 DAS), the vessel could then lease its remaining 2 DAS to another vessel, since it only has 2 DAS left. Although setting a minimum increment at a level less than 5 DAS would provide additional flexibility to the industry, NMFS believes it would be administratively burdensome to process and monitor the increased number of leases that this may invite, particularly in the first year of implementation. Because, as a new Program, the actual administrative burden associated with the Program is unknown, NMFS has determined that a 5-DAS minimum for vessels applying to lease DAS would better enable NMFS to ensure it can effectively administer the Program. Under this alternative, there would be no maximum number of DAS a lessor could lease out to another vessel. Similarly, there would be no maximum number of DAS a lessee could receive. In addition, a lessor would be allowed to lease to multiple lessees, and a lessee could lease from multiple lessors. Vessel owners with more than one vessel with a valid limited access NE multispecies DAS permit would be allowed to lease NE multispecies DAS from one eligible vessel under their ownership to another, to allow the owner to optimize the number of DAS available for use by his/her vessels.

Several of the stocks managed under the FMP are considered overfished. To help ensure that fishing effort is not increased under the proposed Program, an adjustment factor would be applied to leased DAS when DAS are being leased from a smaller horsepower class vessel to a larger horsepower class vessel (that is, from a vessel with less fishing power to one with more fishing power). For the purposes of the Program, all limited access NE multispecies DAS permit holders would be classified according to the baseline horsepower associated with that permit as of [insert date of publication of proposed rule in the Federal Register]. Thus, if the lessee vessel were in a higher horsepower category than the lessor vessel, the lessee would receive a fraction of the DAS leased, based on the relative horsepower classes of the two vessels (see Table 3). Conversely, if the lessee vessel were in the same or a lower horsepower category than the lessor vessel, the lessee would be allowed to use the full amount of DAS leased.

Table 3. Adjustment Factors For DAS Leases.

		Lessor Vessel (selling vessel) Horsepower Class					
		0-175	176-250	251-324	325-400	401-650	651 +

Lessee Vessel Horse-power Class	0-175	1.00	1.00	1.00	1.00	1.00	1.00
	176-250	0.80	1.00	1.00	1.00	1.00	1.00
	251-324	0.70	0.88	1.00	1.00	1.00	1.00
	325-400	0.58	0.73	0.83	1.00	1.00	1.00
	401-650	0.49	0.61	0.70	0.84	1.00	1.00
	651 +	0.36	0.45	0.52	0.62	0.74	1.00

For example, if Vessel A, a 176-250 horsepower class vessel, leases 10 NE multispecies DAS to Vessel B, a vessel in the 325-400 horsepower class, Vessel B would receive 7.3 DAS (10 x 0.73). Using these same horsepower class vessels, if Vessel B leases 10 DAS to Vessel A, Vessel A would receive 10 DAS.

Because use of a DAS may be important to the management of the fishery and to participants in the fishery (as evidenced by the Settlement Agreement and Amendment 13 capacity alternatives), this sub-option would specify the vessel where the DAS use history will reside. To relieve administrative burden, under the proposed Program, NMFS would presume that the history of leased DAS used would remain with the lessor vessel, and that landings resulting from the leased DAS would remain with the lessee vessel (the vessel actually catching the fish). However, the history of used leased DAS would be presumed to belong to the lessor only if the lessee actually fished the leased DAS in accordance with the DAS notification rules currently in place. Presuming that the history of a leased DAS stays with the lessor reduces the incentive to lease for speculative reasons (with the goal of accruing DAS use history).

Under the proposed Program, the history of fish landings would be presumed to belong to the vessel that actually landed the fish (lessee). Attributing landings history to the lessor would be inconsistent with the current administrative system used for all other fisheries in the Northeast Region, and would be extremely difficult and costly for NMFS to implement.

In the case of multiple lessors, the leased DAS actually used would be presumed to be credited to the lessors based on the order in which such leases were approved by NMFS. For example, if lessee Vessel A has 50 allocated DAS, leases 10 DAS from lessor Vessel B on August 1, and leases another 10 DAS from lessor Vessel C on August 5, then the first 50 DAS used by lessee Vessel A during that fishing year would be attributed to lessee Vessel A, the next 10 DAS would be attributed to lessor Vessel B, and the next 10 DAS would be attributed to lessor Vessel C, for purposes of accounting for DAS-use history. If lessee Vessel A used only 60 DAS during the fishing year, then lessor Vessel C would not be attributed with DAS use for the DAS it leased to Vessel A during the fishing year for which the DAS were leased (these DAS could be attributed to Vessel C in the subsequent fishing year, if

they are carry-over DAS and are actually used). In cases where a horsepower adjustment factor is applied to leased DAS, the number of DAS credited to the lessor for those leased DAS used would be the actual number of DAS leased, prior to the calibration reduction. For example, suppose Vessel A leased 10 DAS from Vessel B and, because Vessel A is in a larger horsepower category than Vessel B, the 10 leased DAS were reduced to 8.8 DAS that could actually be fished. If the 8.8 leased DAS were fished by Vessel A, then Vessel B would still be credited with 10 DAS used for that year, for purposes of its DAS-use history.

Under this sub-option, the Regional Administrator would maintain the authority to terminate acceptance of new applicants to the Program if, due to unanticipated impacts, she determines that the goals of reducing fishing mortality or increasing economic opportunity would be seriously undermined by allowing the continuance of leasing of DAS. Such a determination would be done through rulemaking consistent with the Administrative Procedure Act (APA), and, would be based upon all available information, including, but not limited to projected landings, patterns of DAS use, or information obtained from the leasing program.

Similar to the August 1, 2002, interim rule measures, a vessel with both a limited access NE multispecies permit and a limited access monkfish permit (monkfish Category C or D vessels) for which the NE multispecies DAS reductions proposed under this emergency action would result in the vessel having more allocated monkfish DAS than NE multispecies DAS, the vessel would be allowed to fish under a "monkfish-only" DAS when multispecies DAS are no longer available, provided the vessel fishes under the provisions of the monkfish Category A or B permit, or unless otherwise noted below. Under this sub-option, monkfish Category C and D vessels that have remaining monkfish-only DAS at the time of implementation of the emergency action, and that have submitted a NE Multispecies DAS Leasing Application that has been approved by NMFS, would be required to fish their available "monkfish-only" DAS in conjunction with their leased NE multispecies DAS, to the extent that the vessel has NE multispecies DAS available. This is consistent with the original intent of the Monkfish Fishery Management Plan (Monkfish FMP).

If a monkfish Category C or D vessel leases DAS to another vessel, equal in number to the difference between the number of remaining multispecies DAS and the number of unused monkfish DAS at the time of the lease, the vessel is required to forfeit a monkfish DAS for each NE multispecies DAS that the vessel leases. For example, if a lessor vessel, which had 40 unused monkfish DAS and 47 allocated multispecies DAS, leased 10 of its multispecies DAS, the lessor would forfeit 3 of its monkfish DAS (40 monkfish DAS - 37 multispecies DAS = 3) because it would have 3 fewer multispecies DAS than monkfish DAS after the lease. The Monkfish FMP specifies that monkfish Category C and D vessels must fish a NE multispecies DAS concurrently with a monkfish DAS. Not deducting monkfish DAS in a situation where NE multispecies DAS are leased (transferred) would allow monkfish and NE multispecies

DAS to be fished independently. This could create a significant effort increase in the monkfish fishery.

3.3 Alternative 3 (Hard TAC Alternative)

This alternative would specify TAC levels for all the large mesh groundfish stocks. The TAC would represent the maximum amount of catch allowable for each stock, and is referred to as a "hard" TAC because, when the TAC is reached, directed fishing for that stock would cease. As with the Preferred Alternative, the goal of this alternative is to reduce fishing mortality on the groundfish stocks until Amendment 13 brings the FMP into full compliance with the Magnuson-Stevens Act. Hard TACs would be set at the levels that would achieve F reductions of similar magnitude to those under the Preferred Alternative. This alternative would put into place hard TACs in conjunction with the measures described in the no-action alternative (Section 3.1).

TACs would be set for stocks in the NE multispecies fishery on a single-stock basis. Such TACs would be set explicitly for the commercial fishery, but TACs could also be specified for the recreational fishery, if the recent recreational harvest represents a significant portion of the total catch. Because of the speed at which the industry may harvest the TAC, and the fact that the TACs for many of the stocks are likely to be relatively small, it is possible that an entire TAC may be caught fairly quickly. This alternative, therefore, would include a system to monitor the status of catch so that management decisions could be made in a timely manner when the harvest of a TAC is anticipated. Without such a system, a hard-TAC scheme would not be effective at controlling fishing mortality. This alternative would require improvements to the system currently used by NMFS to monitor groundfish landings. There are two options proposed to achieve this: (1) Federal seafood dealers would be required to report landings electronically, on a daily basis; dealers would be required to record a unique trip identifier number for each vessel; and vessels would be required to identify the area fished and provide the trip identifier number through the DAS call-in system; or (2) all limited access NE multispecies vessels would be required to utilize a VMS in order to transmit landings data on a real-time basis.

For each stock for which a TAC is defined, the TAC may be subdivided into a directed TAC and an incidental TAC, depending upon the size of the TAC and the expected bycatch rates. For example, if the TAC for a particular stock is calculated to be relatively small (such as for GOM/Cape Cod yellowtail flounder), and the bycatch rate of yellowtail flounder in fisheries directing on other target species is calculated to be sufficient to attain the TAC, then only an incidental TAC would be defined. Incidental trip limits would be defined for that particular stock.

Once a directed TAC is projected to be reached for a particular stock, the Regional Administrator would prohibit directed fishing for that stock and inform the public through notification in the Federal

Register. At that time, only the specified incidental amount of catch would be allowed. When the incidental TAC for a stock is projected to be attained, the Regional Administrator could close the geographic area associated with that stock (or a portion of that area) to fishing with any gear capable of catching that particular stock.

4.0 Affected Environment

A full description of the affected environment, including a description of the resource species, fishing activities, economic characteristics, and social characteristics of those communities likely to be affected by the actions under consideration and proposed in this EA was prepared by the Council for the preliminary Draft Supplemental Environmental Impact Statement (DSEIS) that was prepared for Amendment 13. Although that document is currently a draft, and has not been formally submitted to NMFS, it represents the most up-to-date description of the affected environment.

The description of the affected environment in the DSEIS is referenced in order to provide sufficient background information on the various resources and entities likely to be affected by the actions proposed or under consideration. Readers may reference this document via the internet at the following address: http://www.nefmc.org/documents/amend13.htm. Readers may access the most recent assessment of the status of the stocks managed under the FMP through the following internet address: http://www.nefsc.noaa.gov/groundfish/index.htm. Although this section deals with the *affected* environment, it does not present the effects of the proposed management alternatives.

4.1 Marine Mammals, Endangered Species and Other Protected Resources

A description of potentially affected protected species (marine mammals, sea turtles and fish), including those that are threatened and endangered or proposed to be listed as threatened or endangered, was provided in Amendments 5 and 7 to the FMP. The GOM Distinct Population Segment (DPS) of Atlantic salmon (*Salmo salar*), was listed as endangered under the Endangered Species Act since Amendment 7 to the FMP (November 17, 2000, 65 FR 69459). Further details about protected species inhabiting the action area may be found in stock assessment reports prepared by NMFS pursuant to section 117 of the Marine Mammal Protection Act (MMPA). The fifth and most recent in the series, *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2001* (Waring *et al*. 2001), contains updates to 18 of 60 Atlantic and Gulf of Mexico assessments. The updated stock assessment reviews include 11 strategic and 17 non-strategic stocks. Additionally, information on human interactions (fishery and ship strikes) affecting right, humpback, fin and minke whales stocks was re-reviewed and updated. Species of particular concern or those that merit further comment in this document are discussed separately below. Information on sea turtle status is contained in the 1995 and 1997 status reviews of listed sea turtles prepared jointly by NMFS and the U.S. Fish and Wildlife Service (NMFS and USFWS, 1995). Additional

information on protected species, in particular relative to the types of measures proposed in this document (gear modifications, closed areas, DAS restrictions) was previously discussed in FMP Framework Adjustments 20, 24, 25, 26, 27, 30 and 33. The available information, including an updated list of affected species, was most recently considered in the Biological Opinion (BO) for the FMP issued in June 2001.

4.1.1 Threatened and Endangered Species

North Atlantic Right Whales - The western North Atlantic right whale (right whale) population, which numbers approximately 300 animals, ranges from wintering and calving grounds off the southeastern United States to summer feeding grounds off New England, in the northern Bay of Fundy, and on the Scotian Shelf. New England waters are a primary feeding ground. Principal prey items include copepods in the genera *Calanus* and *Pseudocalanus*, although they may feed on similar-sized zooplankton and other organisms. Feeding efficiency may depend on the ability of whales to find and exploit dense zooplankton patches. This is considered to be the most endangered whale in the world. Sources of mortality include ship strikes and entanglement in fixed fishing gear.

Sea Turtles - While there is NE multispecies fishing effort in southern New England and south, the BO notes that the majority of effort occurs in the GOM and on GB. In turn, sea turtle interactions with the fishery are most likely to occur in these areas during the summer and early fall when turtle movements and the presence of gear overlap. Species that are most likely to be affected include green, leatherback, loggerhead, and Kemp's ridley sea turtles.

Shortnose Sturgeon - Although shortnose sturgeon have the potential to interact with groundfish gear, the possibility is remote, given that they mainly occupy the deep channel sections of large rivers.

Atlantic Salmon - The recent ESA-listing for Atlantic salmon covers the wild population of Atlantic salmon found in rivers and streams from the lower Kennebec River north to the U.S.-Canada border. These include the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers and Cove Brook. Juvenile salmon in New England rivers typically migrate to sea in May after a 2- to 3-year period of development in freshwater streams, and remain at sea for two winters before returning to their U.S. natal rivers to spawn.

4.1.2 Species of Concern

Harbor Porpoise - Harbor porpoise are widely dispersed from New Jersey to Maine, but generally are more abundant in the western GOM and move northward to the Bay of Fundy in the summer. During the periods October-December and April-June they are widely dispersed from New Jersey to Maine. The most common cetacean species caught in

commercial fishing gear in the NE, this species is the subject of a Take Reduction Plan (TRP) implemented by NMFS in December 2, 1998. To reduce takes, the TRP targets NE multispecies gillnet, as well as monkfish, dogfish and MA coastal gillnet fisheries. TRP requirements include the use of acoustic deterrents ("pingers") on nets according to specified protocols, time/area closures and gear modifications. Measures implemented through the Harbor Porpoise TRP have significantly reduced takes to numbers below the Potential Biological Removal level allowed for this species.

Barndoor Skate - On March 4, 1999, NMFS received a petition from GreenWorld to list barndoor skate as endangered or threatened and to designate critical habitat. On, April 2, 1999, NMFS received a second petition from the Center for Marine Conservation, to list barndoor skate as endangered. This second petition was considered a comment on the first petition submitted by GreenWorld. On June 21, 1999, NMFS, acting on behalf of the Secretary, found that the petition and information available indicated that the requested action may be warranted. NMFS initiated a status review and, as part of that review, conducted a stock assessment (30th Stock Assessment Workshop (SAW-30)) (NEFSC, 1999). SAW-30 indicates that barndoor skates are most common in the GOM, on GB, and in the SNE offshore strata regions, with very few fish caught inshore or in the MA regions. Also, research surveys and Canada's Department of Fisheries and Oceans sampling in the area between Gulf of St. Lawrence and GB indicate two principal area of barndoor skate concentration: GB/Fundian Channel and the central Scotian Shelf. Dwindling concentrations of barndoor skate occur from southern GB to the Hudson Canyon. Very few, if any, barndoor skate are recorded south of the Hudson Canyon area (30th SAW). On September 20, 2002, after review of the best available scientific and commercial information, NMFS made a finding that listing the barndoor skate as endangered or threatened was not warranted at this time. NMFS is retaining the species on the candidate species list.

4.2 Essential Fish Habitat (EFH)

The area affected by the proposed action has been identified as EFH for species managed by the NE Multispecies; Atlantic Sea Scallop; Atlantic Monkfish; Summer Flounder, Scup, and Black Sea Bass; Squid, Atlantic Mackerel, and Butterfish; Atlantic Surf Clam and Ocean Quahog; Atlantic Bluefish; Atlantic Billfish; and Atlantic Tuna, Swordfish and Shark Fishery Management Plans. In general, EFH for these species includes pelagic and demersal waters, saltmarsh creeks, seagrass beds, mudflats, and open bay areas, as well as mud, sand, gravel and shell sediments over the continental shelf, and structured habitat containing sponges and other biogenic organisms.

5.0 Environmental Consequences

Alternatives 1 (No Action) and Alternative 2 (Preferred) are specifically compared and contrasted because they are based on similar management measures. Alternative 3 (Hard TACs) and its impacts are discussed separately and in a qualitative manner.

5.1 Biological Impacts

5.1.1 Analytical Methods for Commercial Measures

Where possible, quantitative impacts are estimated, but the General Algebraic Modeling System (GAMS)[1] (also referred to as the area closure model), the tool used to conduct this analysis, has limited ability to quantify either the biological or economic impacts of some of the indirect management measures proposed in one or more alternatives evaluated for this action. Specifically, changes in DAS allocations, DAS counting, trip limits, and area closures are amenable to quantitative analysis using math programming methods, whereas measures such as prohibiting front-loading, changes in mesh sizes, limits on numbers of hooks or gillnets, and changes to permit categories cannot be explicitly modeled. The following describes the analytical methods used to estimate the biological impacts of the alternatives and identifies the directionality of impact for measures that could not be explicitly modeled.

5.1.1.1 Area Closure and Effort Control Model

The area closure model was used to project the changes in exploitation, given an extension of the management measures in the August 1, 2002, interim rule. Changes in exploitation compared to the status-quo management regime are calculated through a non-linear programming model. The model allocates effort to specific block month combinations for vessels holding a valid 2001 groundfish permit and landing groundfish during the time period 1998-2001. A 4-year period is used to smooth out any peaks or valleys in the data, which include average catch per unit effort (CPUE) by species, gear type, block and month, prices by species and month, and effort by vessel and month. All prices were deflated to 1996 levels in order to remove the influence of inflation from the analysis. The model attempts to maximize revenue for each vessel by allocating their effort to the highest revenue blocks. However, because the revenue functions embedded in the model are downward sloping, effort stops flowing to a block when marginal revenue hits zero. The model can also be modified to incorporate changes in allowable DAS, trip limits, differential DAS and changes in CPUE by species and stock area.

An advantage of the model is that, unlike a "no displacement" analysis of closed areas (that is, assuming that effort in a newly closed area does not shift into another location), the closed area model captures redistribution of fishing effort from closed areas into open areas based on rational decisions by fishermen to maximize revenue. A second advantage is that the model output can include predicted impacts on revenues, and this can be broken down by gear sector and vessel size. While the model output results in apparently precise numerical estimates, it is better to use these as broad indicators of relative changes, rather than as precise predictions of fishing

[1]GAMS Development Corporation, Washington, D.C.

mortality or economic impacts. Small percentage changes, for example, should be viewed as less likely relative outcomes than large percentage changes.

5.1.1.2 Sources of Uncertainty

Results from the model should be interpreted cautiously because some conditions may have changed that are not reflected in the base period data. Additionally, variability around the estimates is not fully captured by the model. One weakness is uncertainty about catch rates that may result from opening areas that have been closed for a long period of time. This is most problematic when changing the boundaries of year-round closed areas. Because there is limited trip information from the closed area, the closed area model may under-estimate the catch rates that will result when an area closed to year-round fishing is re-opened. This is less of a problem for seasonal closures, since the model incorporates recent trip information that reflects the catch rates that result immediately after reopening an area.

Analysis of the impacts of the proposed management Alternatives 1 and 2 is complicated by the following factors:

< The interaction between management measures precludes analysis of the components on both large and small scales.
< The impacts of changes in trawl mesh size on fishing mortality cannot be accurately estimated for reasons explained in the following sections.
< Many of the management measures interact with each other. Whenever possible, the impacts of each alternative are analyzed as a combination of measures, usually by using the closed area model. When estimates of F reductions are obtained from different analytic techniques, they cannot be summed to obtain an estimate of the overall impacts. This is partly because the measures interact with each other, even if analyzed separately.
< The impacts of some measures in the alternatives cannot be quantified. As a result, overall impacts are expressed in a combination of quantitative and qualitative terms.

5.1.2 Biological Impacts of Alternatives 1 & 2 Commercial Measures

An initial model run was made based on the pre-Settlement agreement management regime, which held effort levels to that which existed during the 1998-2001 baseline. Three alternative scenarios were constructed and the results compared to those from the status-quo scenario. The first scenario assumed that extension of the Settlement Agreement resulted in a 25% reduction in effort from the baseline, and the second assumed a 35% reduction in effort. These assumed reductions in effort are based on DAS use during the 2002 fishing year, as described in section 5.2.2. The third scenario was the no-action scenario, which assumed the Settlement Agreement expired and the WGOM closure was opened to fishing. The results from each scenario yielded exploitation rates for each species, which were compared to the no-action scenario. Estimated F's were then

calculated by converting exploitation to fishing mortality rates. Projected changes in exploitation and estimated F's are 1-year estimates, and it is assumed that, when Amendment 13 is implemented, management measures will be put in place to achieve any additional reductions in F required for each species.

Under the 25% effort reduction scenario, changes in exploitation ranged from 13.7% (northern windowpane) to 25.6% (SNE/MA yellowtail flounder, Table 4). Under the 35% effort reduction scenario, changes in exploitation ranged from 19.8% (northern windowpane) to 35.6% (SNE/MA yellowtail flounder, Table 4). With the no action alternative, changes ranged from a reduction of 2.7% in exploitation (Cape Cod/ GOM yellowtail flounder) to an increase of 6.7% in exploitation (GOM cod). The F's that resulted from the change in exploitation are shown in Table 5. The estimated F's for GOM haddock and yellowtail flounder, northern windowpane, GB haddock, winter flounder and yellowtail flounder, witch flounder, pollock and redfish were all below the F rebuild level reported in the GARM for the 25% and 35% reduction scenarios. For the remaining stocks, additional reductions in F will be necessary in order to reach the F rebuild level. Under the no-action alternative, estimated F's for GOM haddock, GB yellowtail flounder , pollock and redfish are all below F rebuild levels.

Table 4. Change in exploitation under each management option						
25% Reduction in Effective Effort						
			Area			
	Gulf of Maine	Georges Bank	Southern New England	Cape Cod/ Gulf of Maine	Mid-Atlantic/ Southern New England	All Areas
Cod	-22.6%	-19.9%				
Haddock	-22.6%	-19.6%				
Winter Flounder	-22.5%	-17.3%	-22.7%			
Yellowtail Flounder		-15.3%		-19.7%	-25.6%	
Windowpane Flounder	-13.7%					
American Plaice						-24.4%
Witch Flounder						-23.0%
Pollock						-20.1%
Redfish						-23.3%
White Hake						-22.8%
35% Reduction in Effective Effort						
	Gulf of Maine	Georges Bank	Southern New England	Cape Cod/ Gulf of Maine	Mid-Atlantic / Southern New England	All Areas
Cod	-32.2%	-28.6%				

Haddock	-31.9%	-28.0%				
Winter Flounder	-31.9%	-24.9%	-31.8%			
Yellowtail Fldr.		-22.1%		-28.1%	-35.6%	
Windowpane Fldr.	-19.8%					
American Plaice						-34.2%
Witch Flounder						-32.4%
Pollock						-28.5%
Redfish						-32.7%
White Hake						-32.1%
Non-Preferred Alternative						
	Gulf of Maine	Georges Bank	Southern New England	Cape Cod/ Gulf of Maine	Mid-Atlantic/ Southern New England	All Areas
Cod	6.3%	-0.8%				
Haddock	6.7%	-0.6%				
Winter Flounder	4.0%	-0.3%	0.1%			
Yellowtail Fldr.		-0.1%		-2.7%	0.0%	
Windowpane Flounder	-0.1%					
American Plaice						-0.1%
Witch Flounder						1.4%
Pollock						3.0%
Redfish						-0.1%
White Hake						-0.7%

Table 5. Projected F's from Interim Action with 25% reduction in effective effort.						
	Gulf of Maine	Georges Bank	Southern New England	Cape Cod/ Gulf of Maine	Mid-Atlantic/ Southern New England	All Areas
Cod	0.34	0.29				
Haddock	0.09	0.17				
Winter Flounder.	0.12	0.20	0.37			
Yellowtail Flounder		0.11		0.55	0.59	
Windowpane Flounder	0.08					
American Plaice						0.31
Witch Flounder						0.33
Pollock						1.20
Redfish						<.01
White Hake						0.86
35% DAS reduction in effective effort						
	Gulf of Maine	Georges Bank	Southern New England	Cape Cod/ Gulf of Maine	Mid-Atlantic/ Southern New England	All Areas
Cod	0.29	0.26				
Haddock	0.08	0.15				

Winter Flounder	0.11	0.18	0.36			
Yellowtail Flounder		0.10		0.72	0.64	
Windowpane Flounder	0.08					
American Plaice						0.66
Witch Flounder						0.68
Pollock						0.99
Redfish						<.01
White Hake						0.73
Non-Preferred Alternative						
	Gulf of Maine	Georges Bank	Southern New England	Cape Cod/ Gulf of Maine	Mid-Atlantic/ Southern New England	All Areas
Cod	0.51	0.38				
Haddock	0.13	0.22				
Winter Flounder	0.15	0.25	0.51			
Yellowtail Flounder		0.13		0.72	0.91	
Windowpane Flounder	0.10					
American Plaice						0.43
Witch Flounder						0.46
Pollock						3.70
Redfish						0.01
White Hake						1.34

5.1.2.1 Biological Impacts of DAS Leasing Program

The potential biological impacts of a DAS Leasing Program would be limited changes in either the level or distribution of fishing effort. The proposed DAS Leasing Program, as described in section 3.2.1, is designed to limit the potential that more DAS would be used under the Program than would have been used in the absence of the Program. In other words it is designed to be conservation neutral with respect to fishing effort. The aspects of the Program that address the goal of conservation neutrality by limiting the pool of leasable DAS are the following: 1) Adjustment factors for some transfers of DAS to prevent effort increases resulting from vessel fishing power differentials; 2) a restriction on limited access NE multispecies Hook-gear permitted vessels (Category D) to lease NE multispecies to and from other limited access Hook-gear permitted vessels only; and 3) prohibition of vessels with 8 DAS from acting as lessor. Implementation of the Preferred Alternative in conjunction with the DAS Leasing Program sub-

option may result in a level of fishing effort (by limited access multispecies permit holders) at or slightly above the level of effort that would occur in the absence of a DAS Leasing Program.

It is possible that even if the level of DAS use in the fishery as a whole does not change as a result of the DAS Leasing Program, the leasing of DAS and resultant use of DAS by different vessels could result in an increase or decrease in fishing efficiency as compared with previous years. For example, if a vessel leased DAS to another vessel of similar size, but with greater efficiency at catching fish, the result could be a increased amount of catch per unit effort. Because the leasing of DAS among vessels may either increase or decrease efficiency, it is difficult to predict the cumulative effect of such changes in efficiency on the fishery as a whole.

If the net distribution of DAS among vessels changes significantly, there may be changes in the geographic distribution of fishing effort associated with that DAS shift. The impact of changes in the distribution of effort on the groundfish stocks would be mitigated by the other management measures in the preferred alternative that control fishing effort such as closed areas and gear restrictions.

5.1.3 Analytical Methods for Recreational Measures

Introduction

Alternatives to the recreational fishing measures include changes in current minimum fish size and bag limits, as well as continuation of an enrollment program for charter/party operators. Specifically, the following recreational measures were considered:

Alternative 1 (No Action)

- A minimum 21" size for Atlantic cod for all modes and all areas
- A 10-fish bag limit for cod/haddock, combined, for private recreational anglers
- No bag limit for party/charter recreational anglers
- Enrollment program for party/charter vessels fishing in closure areas

Alternative 2 (Preferred)

- A minimum 23" size for Atlantic cod for all modes and all areas
- Private boat bag limit of 10 fish (cod and haddock combined) year-round for GB and April 1 - November 30 in the GOM.
- Private boat bag limit of five cod in the GOM, only, from December 1 - March 31
- No bag limit for party/charter mode year-round for GB
- Party/charter bag limit of 10 cod/haddock, combined, in GOM from April 1- November 30
- Party/charter bag limit of five cod in the GOM from December 1 to March 31

- Enrollment program for charter/party vessels in the GOM closure areas for the duration of the closure or 3 months, whichever is longer

For comparative purposes, each of these alternatives was analyzed for a 12-month period. The effects that these measures may have on recreational cod fishing mortality are described below.

Data

To evaluate the potential benefit of a minimum fish size change, Marine Recreational Fishery Statistics Survey (MRFSS) data were used to construct size and catch per angler distributions of cod mortality (Type A plus B1 catch), by stock area, wave and mode. Data from calendar years 1998-2000 were used to calculate a 3-year average for both charter/party and combined private/rental boat and shore modes. These years were selected because they represent a time period during which Federal recreational size limits and bag limits were constant. These data suggest that there are important differences in seasonality (the majority of charter/party catch of cod occurs between November and April, while the majority of the private boat catch comes during the summer months), catch distributions (proportionally more cod are caught at larger sizes in the charter/party sector as compared to the private boat mode) and conformance or compliance rates (for example, approximately 35 percent of private boat fishing mortality in the GOM was associated with trips where cod was landed below the current Federal minimum size of 21 inches or in excess of the Federal 10-fish bag limit, or both, while 10 percent of cod fishing mortality was associated with trips where cod was landed below the Federal minimum fish size of 21 inches in the charter/party mode). These differences need to be considered in evaluating the effectiveness of the proposed management measures and how they may need to be constructed in order to achieve the conservation objectives. The analysis of biological impacts conducted here is limited to Atlantic cod. Haddock was not included because estimated catches were imprecise due to low MRFSS intercept sample sizes.

Procedures and Assumptions

The potential effectiveness of the proposed recreational fish size and bag limits for cod were evaluated in the following manner. First, assuming no change in observed compliance or conformance rates, observed landings below the current minimum size and bag limits were assumed to continue to occur. Second, all landings at or above the proposed limits were also assumed to continue. Any landings between the current Federal minimum size and bag limits and the Preferred Alternative's minimum size were assumed to no longer be legally landed, with adjustments made for conformance rates and discard mortality. The former adjustment was based on the observed non-conformance rates by stock area wave and mode, while the latter was evaluated using a sensitivity analysis ranging from 0 to 50-percent discard mortality.

The effectiveness of an enrollment program is difficult to assess. Based on analysis of relative dependence on passenger income, about 70 percent of charter/party vessels that landed groundfish earned 100 percent of their business income from taking passengers for hire. This means that a majority of charter/party vessels would not be affected by an enrollment program, since they earned no income from commercial fishing in the first place. Further, during fishing year 2000, 107 charter/party vessels reported catching GOM cod through VTR data: 55 of these vessels participated in the enrollment program. While these vessels represent only 51 percent of reporting vessels, they accounted for 78 percent of the total GOM cod catch. In fishing year 2000, 23 charter/party vessels accounted for 80 percent of the GOM cod catch. Of these 23 vessels, 12 had no limited access NE multispecies permit, all but 6 participated in the 2000 enrollment program, and only 2 reported sales of commercially caught fish in the NMFS Northeast Region dealer data. These data indicate that the proposed enrollment program, in and of itself, will not have a substantial conservation benefit. However, an enrollment program may be an important feature of an overall GOM cod conservation program, as it would prevent opportunistic switching between commercial and recreational activities.

The catch distributions developed to evaluate the bag and size limit changes were further subdivided by 2-month wave, beginning with Mar-Apr and ending with Nov-Dec. The MRFSS survey is not implemented in Jan-Feb in New England and the 2-month waves overlap the proposed changes in bag limits for the Nov-Apr time period. For these reasons, the impacts of the five-fish bag limit from Nov to Mar could not be directly evaluated. However, a lower bound estimate was developed by assuming that the five-fish bag would not apply at all, while an upper bound estimate was developed by applying the five-fish bag to the entirety of waves 2 and 6.

5.1.4 Estimated Conservation Benefits of Recreational Measures

Given the assumptions detailed above, three scenarios were constructed incorporating best, worst, and intermediate levels for each assumption.

Alternative 1 (No Action)

The No Action alternative would make no changes to the current Federal regulations for recreational fisheries for Atlantic cod or haddock. However, MRFSS data on size distribution of the recreational catch and the distribution of numbers of fish caught per angler indicate that non-compliance with existing Federal regulations may be contributing to higher Atlantic cod mortality than would be the case if compliance were higher.

Non-compliance with Federal regulations is likely due to a combination of unintentional non-compliance (lack of knowledge), deliberate non-compliance, and differences between state and Federal landings laws. With respect to the latter, Maine and Massachusetts landings laws for

Atlantic cod are consistent with Federal regulations, but landings laws in New Hampshire and Rhode Island are not. Note that changes in state landings laws and improved compliance would not necessarily mean that fewer Atlantic cod would actually be caught, but it may result in a reduction in total mortality, as a larger number of fish would be released. The resulting conservation benefit would depend on release survival. At this time, release survival is not known, so a range estimate for purposes of analysis was developed as being 100 percent, 50 percent, and 75 percent.

Best Case - Maximum conservation benefit would be achieved if all state and Federal regulations were consistent, compliance with all regulations were 100 percent, and discard mortality were zero. Under these assumptions, the annual reduction in mortality for GOM cod would be 11 percent and the annual reduction in mortality for GB cod would be 7 percent.

Worst Case - Assuming that states do not come into conformance with the Federal minimum size and non-compliance rates do not change, there would be no expected change in Atlantic cod fishing mortality.

Intermediate Case - An intermediate scenario was developed with the following assumptions: (1) Discard mortality rate is 25 percent; and (2) through a combination of increased conformance with Federal regulations and improved compliance, the compliance rates for Atlantic cod are improved by 50 percent. Under these assumptions, the reduction in annual exploitation for GOM cod would be 6 percent and the annual exploitation rate for GB cod would be 4 percent.

Alternative 2 (Preferred)

Since previous analysis indicates that the majority of charter/party vessels that account for most of that sector's fishing effort have a past record of participation in the enrollment program, they were assumed to do so for the duration of this action, as well. For this reason, conservation benefits for this alternative were attributed only to the changes in size and bag limits.

Best Case - Maximum conservation benefit would be achieved if all state and Federal regulations were consistent, compliance with all regulations were 100 percent, and discard mortality were zero. Under these assumptions, the reduction in GB cod harvest would be 25 percent, while the reduction in GOM cod harvest would range from 40 percent to 53 percent, where the upper bound estimate corresponds to the estimated reduction in harvest if the five-fish bag limit were applied for all of waves 2 and 6, while the lower bound estimate is based on continuation of the 10-fish bag limit throughout.

Worst Case - Minimum conservation benefit would result if states do not come into conformance with the Federal minimum size, non-compliance rates continue as observed and discard mortality were 50 percent. Under these assumptions, the reduction in exploitation for

GB cod was estimated to be 6 percent, while the reduction in GOM cod exploitation ranged from 13 percent to 20 percent.

Intermediate Case - An intermediate scenario was developed with the following assumptions: (1) Discard mortality rate is 25 percent; and (2) through a combination of increased conformance with Federal regulations and improved compliance, the compliance rates for Atlantic cod are improved by 50 percent. Under these assumptions, the reduction in exploitation on GB cod was estimated to be 23 percent while GOM cod exploitation ranged from 17 percent to 35 percent.

5.1.5 Biological Impacts of Non-Modeled Measures

Certain management measures were amenable to incorporation into the area-closure model, while a number of other measures were not. This section provides a qualitative description of the potential biological impacts associated with these non-modeled measures.

5.1.5.1 Changes to Open Access Hand Gear Trip Limit and Freeze on New Permits

The biological impacts of the freeze on issuance of the open access Hand Gear permits or the change in trip limit cannot be estimated with precision. The July 2002 EA that analyzed the impact of the August, 2002, interim measures stated that the number of open access Hand Gear permits at that time was 1,812. The current number of such permits is 2,973. Although no new permits were issued after implementation of the August 1, 2002, interim rule, new permits were issued during the time period from the Settlement Agreement until implementation of the application deadline for that permit. However, only a fraction of the these permits are actually used in any given year. The effect of the trip limit change is similarly difficult to evaluate, since vessels may be expected to adjust fishing strategies by fishing for and retaining only the most valuable of regulated groundfish. Since prices received vary by species, quality, and season, it is not possible to predict which species might be most sought. Nevertheless, at least an upper bound estimate of biological impact may be provided by estimating the proportion of each of the regulated groundfish accounted for by open access Hand Gear permit holders while using Hand Gear.

Based on VTR reports for FY 2000, the trip limit for open access Hand Gear would have no biological impact on most species within the groundfish complex (Table 6). Of the relative quantity of groundfish landed by open access Hand Gear permit holders, only GOM cod was more than 1 percent of total landings. Of these landings, 40 percent were from trips that landed less than 200 lb of GOM cod. If on all trips the landings of GOM cod was greater than 200 lb then, at most, the biological impact would be 60 percent of 1.16 percent, or 0.72 percent. By contrast, if all trips landed only 200 lb, and no GOM cod were discarded over the trip limit, then the reduction in GOM cod landed by open access hand gear permit holders would be 0.23 percent.

Table 6. Proportion of regulated groundfish landed by open access permit holders using hook gear.

Stock/Species	Percent Landed by Open Access Hand Gear
GOM Cod	1.16
GB Cod	0.46
GOM Winter flounder	0.00
GB Winter flounder	0.00
SNE Winter flounder	0.00
GB Yellowtail	0.00
SNE Yellowtail	0.00
CC Yellowtail	0.00
MA Yellowtail	0.22
American plaice	0.00
Southern windowpane	0.00
Northern windowpane	0.00
GOM haddock	0.14
GB haddock	0.00
White hake	0.00
Pollock	0.08
Redfish	0.03
Witch flounder	0.00

5.1.5.2 Prohibition on Front-loading

Most multispecies vessels currently use the DAS call-in system to report the start and the end of a NE multispecies DAS trip. The total DAS used on a trip dictates the landing limit for GOM cod, GB cod, haddock, and yellowtail flounder during certain times of the year. The regulations require that, at the end of a vessel's trip, upon its return to port, the vessel owner or owner's representative must call the Regional Administrator (RA) and notify him/her that the trip has ended, thus stopping the clock and ending a DAS. Modifications to the DAS rules (running clock provision) have been implemented through several actions specifically to limit a vessel owner's ability to catch large volumes of GOM cod in a short time span. However, until the implementation of the Settlement Agreement measures there was no restriction on when a vessel must start its clock. Consequently, some vessel owners started their DAS clock well in advance of the actual departure of the vessel, a process known as "front-loading."

Front-loading allowed a vessel to run the clock for up to 10 days prior to departing on a trip in order to catch 10-days worth of the GOM cod trip limit (the maximum amount allowed) in 1 day of fishing. For example, a vessel could remain in port for about 9 days and then, on the 10th day, fish for 6 hours, and return to port with 4,000 lb of GOM cod. Although the actual time fished in this example was 6 hours,

the vessel's DAS clock ran for nearly 10 DAS. Since the practice was not previously prohibited, the trip was technically legal. However, front-loading provided an unintended opportunity to target GOM cod, and in fact may have encouraged it. The practice was not consistent with the cod rebuilding program and made the trip limit less effective at reducing fishing mortality on GOM cod.

In addition to the inappropriate targeting of GOM cod by those who front-loaded the DAS clock, the provision also created inequities between fishing vessels. Rather than using the DAS call-in system to track NE multispecies fishing effort, multispecies vessels may voluntarily use a VMS and, in some cases, are required to do so. Vessels that possess a NE multispecies Combination permit are required to have a VMS unit in order to satisfy their scallop permit requirements. To activate the VMS DAS clock, the vessel operator must select the proper macro code and cross the demarcation line. Since the vessel must be at sea to cross the demarcation line, it is impossible for these vessels to front-load their multispecies clocks. Vessel owners using VMS have indicated to NMFS that it is unfair that a DAS call-in vessel can front-load and they cannot.

A review of VTR landings data from vessels fishing in the GOM for the 2000 calendar year was conducted to determine the extent of this practice, which NMFS believes is increasing. Data were selected from the VTR database according to the following criteria:

- The landing date was between January 1, 2000, and January 31, 2001;
- At least 1 lb of cod was landed;
- The gear type was either trawl, gillnet, or longline;
- The trip occurred in the GOM (statistical areas 464, 465, 511, 512, 513, 514, or 515); and
- The trip category was commercial, and not charter or party.

The permits database was used to identify any vessels less than 30 ft in length, that were dropped from the selected data set. A vessel less than 30 ft in length may qualify for and fish under the Small Vessel permit category without being subject to DAS restrictions. Trips that landed more than 400 lb of cod per day of fishing were identified. A sample of these trips was examined to confirm they were legal trips--that is, the vessels legally front-loaded the DAS clock in order to land more cod. The data indicated that, over the course of calendar year 2000, 10 percent of the trips were front-loaded in order to land additional cod and 26 percent of the reported VTR landings of cod were on front-loaded trips. The practice varied by month, with May 2000 being the peak month, when 37 percent of the cod landed was from trips that were front-loaded. Other months where front-loading appears to have accounted for more than 30 percent of the GOM cod landings were February, June, and December. Fifteen percent of trips in May and December exceeded the 400-lb daily allowance.

The practice of front-loading the clock may have positive impacts in that it reduces cod discards by allowing vessels to land more than the daily limit of cod and decreases the amount of time gear is fished (thus, mitigating impacts to EFH). However, if the practice changed fishermen's behavior and encouraged them to target cod, then it could have reduced the effectiveness of the trip limit. Only if the excess catch is unavoidable is the practice beneficial. Continuation of the prohibition of this practice may result in increased cod discards if fishermen are unable to avoid catching cod and have no way to retain legally the excess cod, such as through use of additional DAS. The data show that few vessels in calendar year 2000 averaged landings of more than 700-800 lb of cod per day absent from port (see Table 5.5). Although this does not include additional cod that may have been discarded, discards are likely to decrease under this alternative, due to additional area closures and restrictions on DAS during times when cod landings are traditionally high.

Front-loading of the clock enables a vessel to catch more cod per trip. If front-loading were prohibited, vessels that used this option in the past may increase the number of their trips in order to catch the same amount of cod. As a result, gear may be in the water for a longer period of time, the same amount of cod may be landed, and cod discards could increase. However, since it is difficult to predict behavior changes, it should also be noted that, if a vessel does not increase time on the water, these issues may not arise.

In effect, front-loading means that vessels are using DAS allocations at a rate that exceeds 2:1. Because DAS allocations would be reduced under the Preferred Alternative, the practice of front-loading would lose much of its economic advantage and the practice would likely be reduced, if not eliminated, for the majority of NE multispecies vessels, even in the absence of a specific prohibition of this practice. Therefore, the additional conservation benefit of prohibiting front-loading (over and above that of the DAS freeze itself) is likely to be low.

Table 7. Trips in the GOM by vessels greater than 30 ft in length using otter trawl, gillnet, or longline gear, on which cod was landed, in calendar year 2000, with the trips grouped in 400-lb categories. Cell shading/italics indicates trips that exceeded 400 lb of GOM cod per day. LANDING TRIP DURATION(24-Hour Days Absent)

X 1000	0-1		>1-2		>2-3		>3-4		>4-5		>5-6		>6-7		>7-8		>8-9		>9-10		>10		TOTAL	
(LBS.)	TRIPS	%	Trips	%	TRIPS	%	TRIPS	%	TRIPS	%	TRIPS	%	TRIPS	%	TRIPS	%	TRIPS	%	TRIPS	%	TRIPS	%	TRIPS	%
.1-.2	3,725	43	528	40	308	34	158	29	140	28	47	16	23	14	16	13	8	14	5	9	1	3	4,959	39
>.2-.3	756	9	98	7	78	8	39	7	36	7	17	6	8	5	6	5	-		1	2	-		1,039	8
>.3-.4	3,165	37	198	15	48	5	26	5	32	6	20	7	7	4	1	<1	1	2	3	6	3	8	3,504	28
>.4-.7	***280***	***3***	159	12	134	14	55	10	40	8	23	8	14	9	20	16	4	7	4	8	3	8	736	6
>.7-.8	***340***	***4***	253	19	168	18	36	7	10	2	6	2	1	<1	2	2	1	2	3	6	1	3	821	6
>.8-1.1	***99***	***1***	***35***	***3***	77	8	62	11	45	9	23	8	5	3	15	13	2	4	6	11	2	5	371	3
>1.1-1.2	***91***	***1***	***26***	***2***	84	9	86	15	41	8	14	5	5	3	2	2	3	5	-		2	5	354	3
>1.2-1.5	***43***	***<1***	***14***	***1***	***13***	***1***	29	5	42	8	24	8	13	8	4	3	6	11	3	6	2	5	193	2
>1.5-1.6	***38***	***<1***	***7***	***<1***	***7***	***<1***	40	7	53	10	7	2	1	<1	-		1	2	3	6	1	3	158	1
>1.6-2.0	***42***	***<1***	***11***	***<1***	***13***	***1***	***16***	***3***	51	10	76	26	15	9	6	5	9	16	1	2	1	3	241	2
>2.0-2.4	***30***	***<1***	-		***1***	***<1***	***2***	***<1***	***9***	***2***	30	10	29	18	12	10	5	9	3	6	-		121	<1
>2.4-2.8	***20***	***<1***	***2***	***<1***	-		***1***	***<1***	***1***	***<1***	***7***	***2***	30	19	15	13	6	11	6	12	2	6	90	<1

>2.8-3.2	*11*	*<1*	*3*	*<1*	*-*		*1*	*<1*	*1*	*<1*	*1*	*<1*	*2*	*1*	15	13	6	11	1	2	1	2	42	<1
>3.2-3.6	*7*	*<1*	*-*		*-*		*-*		*1*	*<1*	*1*	*<1*	*2*	*1*	*3*	*3*	4	7	3	6	1	3	22	<1
>3.6-4.0	*5*	*<1*	*3*	*<1*	*-*		*-*		*1*	*<1*	*-*		*1*	*<1*	*1*	*<1*	*-*		7	14	13	34	31	<1
>4.0	*3*	*<1*	*2*	*<1*	*1*	*<1*	*2*	*<1*	*3*	*<1*	*1*	*<1*	*2*	*1*	*1*	*<1*	*-*		*3*	*6*	4	11	22	<1
TOTAL Trips	8,655	100	1,339	100	932	100	553	100	506	100	297	100	158	100	119	100	56	100	52	100	37	100	12,704	100
Under Limit	7,646	88	1,236	92	897	96	531	96	490	97	287	97	151	96	114	96	56	100	49	94	37	100	11,494	90
Over Limit	1,009	12	103	8	35	4	22	4	16	3	10	3	7	4	5	4	-		3	6	-		1,210	10
TOTAL Landings	2,741,490	100	585,495	100	514,571	100	410,446	100	468,834	100	368,359	100	268,170	100	189,261	100	95,443	100	110,803	100	107,323	100	5,860,195	100
Under Limit	1699464	62	432,544	74	447,664	87	361,045	88	397,467	85	331,670	90	219,440	82	164,457	87	95,443	100	86,695	78	107,323	100	4,343,212	74
Over Limit	1042026	38	152,951	35	66,907	13	49,401	12	71,367	15	36,689	10	48,730	18	24,804	13	-		24108	22	-		151698	26

5.1.5.3 Prohibition on Use of De-Hookers

The biological impact of a prohibition on the use of de-hookers is not known. In general, the prohibition may have two effects. First, discard mortality associated with de-hookers is likely to be high. A prohibition on their use may reduce this source of mortality. Second, in effect a de-hooker is a time-saving device that permits hook vessels to tend their gear efficiently. The extent to which their elimination would reduce operational efficiency is not known, but if efficiency is reduced, then hook vessels may not be able to set as much gear and total fishing mortality may be reduced. Given that the majority of bottom longline catch is cod, any reduction in fishing mortality that might result from reduced gear efficiency or discard mortality would benefit GOM cod, and GB cod in particular.

5.1.5.4 Change in Large Mesh Permit Categories

The biological impact of a change in mesh size for Large-Mesh permits will depend upon whether or not vessels switch to a smaller mesh permit category (e.g., Individual or Fleet DAS, or Category A and B, respectively) and the impact of the larger mesh, should vessels choose to continue to elect the Large-Mesh permit category. The latter is not known, since the mesh trials described in section 5.1.5.5.1 do not cover mesh sizes that would be required under the Preferred Alternative for the Large Mesh permit categories. If the majority of vessels elect to fish under the smaller mesh permit categories, then the biological impact of the change in large mesh could be negative, as vessels that had formerly been fishing with large mesh would be switching back to the regulated mesh sizes. The relative magnitude of this effect will depend on whether reduced DAS will more than offset the potential increase in catch rates associated with smaller mesh.

During FY 2000 there were 31 vessels that elected to fish under the Large Mesh permit category. Of these vessels, 3 did not call in any DAS, 1 called in DAS but did not record any fishing activity through a VTR record, and 18 called in fewer DAS than they would have received anyway as a Category A or B permit holder. The remaining 13 vessels called in more DAS than they would have otherwise received. Assuming that all vessels were to choose to fish under either a Category A or B allocation, all but these 13 vessels would be able to fish as many DAS as they did in FY 2000 (not taking into account the 20-percent reduction from the baseline freeze). Therefore, if any positive biological impact were to result from the Large Mesh permit change, it would come from the reduced fishing time by any vessel that would be constrained by lower DAS allocations.

The potential biological impact of this effect was approximated by calculating the average catch by species/stock per DAS by the aforementioned affected 13 Large Mesh permit holders. This average CPUE was then multiplied by the total DAS that would be available to these vessels, as if they were fished as a Category A or B permit holder. This estimate is likely to be an upper bound estimate, since the CPUE calculation was based on activity reports using large mesh.

CPUE using small mesh is likely to be higher, so that the biological impact of reduced DAS will be offset to some extent by higher catch rates.

Catches of GOM cod and pollock by the 13 affected Large Mesh permit holders were just under 5 percent of total reported landings through the VTRs (Table 8). Landings of other species ranged between 1.4 percent and 2.7 percent for GB cod, CC yellowtail, GOM haddock, and white hake. The estimated reduction in total landings exceeded 1 percent for only GOM cod (1.4 percent) and pollock (1.1 percent). As noted above, this reduction in GOM cod landings is likely to be an upper bound estimate and the realized reduction is likely to be lower.

Table 8. Proportion of regulated groundfish landed by affected Large Mesh permit holders

Stock/Species	Percent Landed by Affected 13 Large Mesh Vessels	Change in Catch (percent)
GOM Cod	4.9	-1.2
GB Cod	1.4	-0.3
GOM Winter flounder	1.6	-0.4
GB Winter flounder	0.0	0.0
SNE Winter flounder	0.0	0.0
GB Yellowtail	0.0	0.0
SNE Yellowtail	0.0	0.0
CC Yellowtail	1.7	-0.4
MA Yellowtail	0.0	0.0
American Plaice	0.1	-0.02
Southern windowpane	0.0	0.0
Northern windowpane	0.0	0.0
GOM Haddock	1.6	-0.4
GB Haddock	0.2	-0.04
White hake	2.7	-0.6
Pollock	4.6	-1.1
Redfish	0.0	0.0
Witch flounder	0.1	-0.02

5.1.5.5 Gear Changes

5.1.5.5.1 Impacts of Mesh Size Changes

The Preferred Alternative includes measures that would change mesh regulations for trawl and gillnet vessels, with respect to the no-action alternative. It is important to note, however that these requirements are currently in place, and the discussion of the biological impacts is from the perspective of implementation of measures that occurred on August 1, 2002. Mesh selectivity is only

one of a number of factors that influence the overall selection pattern in a fishery. Fishermen can influence the size of fish they catch by fishing at different times of the year, in different locations, or by using different gear or techniques. Most mesh selectivity studies have examined smaller mesh sizes and have focused on trawls. Indeed, in one experiment that examined the performance of 6.5-inch square mesh in selecting winter flounder in southern New England (DeAlteris, et al., 1999), the results suggested that scaling up earlier mesh experiments over-estimated the retention of winter flounder--that is, the mesh allowed more escapement than predicted by the earlier experiments at smaller mesh sizes. Even with adequate experiments that evaluate the selection pattern of a particular size of fish, mesh selectivity in commercial fishing operations may not match experimental results. There is evidence that selectivity can vary considerably based on different characteristics at the vessel level (Tschernej and Holst, 1999). There are several mathematical models for fitting results of mesh experiments to a selectivity curve. Using a different model can result in different estimates for the selection of fish at a certain size. Studies done in different locations, or using different experimental techniques, may give different results. The exploitation pattern is only one element of fishing mortality. If effort increases, even as the exploitation pattern is shifted to older fish, it is not clear what the final impact on fishing mortality will be. For all of these reasons, it is not possible to accurately predict how an increase in mesh size will affect fishing mortality.

In addition to the difficulty in predicting the impacts of a change in mesh size, a review of past attempts to manage exploitation patterns in North Atlantic groundfish stocks indicate only partial success. Pinhorn and Halliday (2001) examined changes in partial recruitment patterns for 26 cod, haddock, and pollock stocks between the immediate period after the extension of jurisdiction (1979-1988) and the last decade of international regulation (1967-1976). While the data reviewed showed widespread, modest improvements in partial recruitment patterns, the authors were not able to correlate the improvements with the expected changes based on regulations. Problems with compliance and poor data on size of removals are two of the factors they note may obscure the impacts of mesh changes. A preliminary review of GOM cod exploitation patterns since 1981 shows that, in spite of several increases in mesh size, the partial recruitment pattern for age 4-6 fish is essentially unchanged, while fishing mortality on age 4-5 fish has declined.

This does not mean that increases in mesh size do not have positive impacts, or that the impacts may be inconsequential. The following positive impacts should result from an increase in mesh size.

- A likely increase in spawning stock biomass per recruit.
- Discards may be reduced, as larger mesh would capture smaller numbers of fish below the minimum size limits. The impacts of this benefit also depend on the type of mesh, as square and

diamond mesh have different selection patterns for flat and round fish.

- "Harvesting at a delayed PR…" [partial recruitment, i.e. harvesting at older ages] "… enables the stock to maintain a high spawning biomass with an expanded age structure, while supporting a sustainable fishery" (O'Brien, 1999). To the extent that a mesh change contributes to a delayed PR, it contributes to an expanded age structure and potentially a higher spawning biomass at a given level of removals from the fishery.
- A likely increase in the number of times each fish spawns prior to capture. If the mesh size results in an increase in older spawners in the stock, there may be improvements in recruitment, since there is evidence that the eggs and larvae of older fish have higher survival rates (Trippel and Morgan, 1994; Knutsen and Tielseth, 1985; Kjesbu et al., 1996). Vallin and Nissling (2000) showed that, for Baltic cod, older, repeat spawners produce more, and larger, eggs than first time spawners, and showed that the number of age 2 cod recruits was positively related to the fraction of eggs produced by older females. There are some genetic data that suggest that male fertilization success increases with male body size (Hutchings et al., 1999), though other studies question this conclusion. All of these factors suggest that an increase in mesh size, to the extent it increases the age distribution and size of fish in the population, may lead to improved spawning success and recruitment.

Predicted Changes in Exploitation Pattern

As noted in the previous section, there are a number of difficulties with estimating the impacts of a change in mesh size. In order to provide a qualitative picture of the changes in exploitation that may result, selection patterns for trawl gear were calculated using the average mesh selectivity results from mesh studies as summarized in DeAlteris and Grogan (1997a). The selectivity characteristics of the mesh were plotted using a simple logistic selection curve for both diamond and square mesh. In order to show the range of possible estimates, this table also includes estimates based on specific studies used in DeAlteris and Grogan (1997a). The alternatives were chosen to illustrate the range of results from the studies using the mesh closest to the mesh under consideration, without considering location or type of experiment. Their use is not meant to imply they are the "right" values, but to illustrate the variability between results from various experiments. Age at length was converted using the Von Bertanlanffy growth parameters from various sources, as summarized in NEFMC (1994). Length was calculated at the mid-year point to consider growth over the course of the year. This section focuses on the impacts of changes in mesh size on cod.

Regardless of the specific selection factors used, the proposed mesh change has the most impact on fish in the range of 3 to 4 years. For GOM cod, this is the age when the proportion of mature fish increases from about 88 percent females/76 percent males, to about 99 percent females/94 percent males (O'Brien, et al., 1993). All of the examples

from the aforementioned scientific studies show that changing the minimum mesh size from the current 6-inch diamond mesh to 6.5-inch or 7-inch square mesh should reduce the probability of selection for age 3 fish. Generally, the examples show that changing the minimum mesh size from 6-inch diamond to 6.5-inch square mesh moves a given probability of selection at a certain size about 1 year into the future. An increase in trawl codend mesh from 6-inch diamond to 6.5-inch diamond, or from 6.5-inch square to 7-inch square, moves the probability of selection at a certain size less than a year into the future. That is, a fish is likely to live longer, and grow larger, before it would be retained by the larger mesh. Changing from 6-inch diamond mesh to 7-inch square mesh moves a given probability of selection at a certain size about 18 months into the future. Changing the minimum mesh size from the current 6-inch diamond mesh to 6.5-inch or 7.0-inch square mesh should reduce the probability of selection for age 3 fish.

Using the same mesh studies, the impacts on GB cod can also be illustrated. While the selectivity of the mesh does not change, the age at selection is different because of the different growth rates for GOM and GB cod. Changing mesh from 6-inch diamond to 6.5-inch square shifts the pattern about 1 year.

Effect on Yield per Recruit (YPR)

YPR calculations can be used both to show the change that results from the change in exploitation, and to estimate the impact of the change on the reduction in fishing mortality for GOM cod. An increase in mesh size will not affect the full force of fishing mortality, as the increase tends to affect only a narrow range of size classes and therefore would not impact significantly fully recruited F. For GOM cod, the first age at full recruitment has been, and remains age 4, despite recent increases in codend mesh size, and the 2000 fully recruited F is 0.73. Although the stock is presently dominated by predominantly young fish, the age structure in a rebuilt stock under a low-F regime will be considerably broader. Therefore, it is important to consider the effect of the full force of fishing mortality on all fully recruited ages. An increase in mesh size will not have any impact on the fully recruited F. If a mesh increase were to shift the first age at full recruitment from age 4 to age 5, the definition of fully recruited F would simply shift from ages 4 and older fish to ages 5 and older fish, so the actual fully recruited F would remain unchanged.

Given this, it is more illustrative to examine the effect of a mesh increase (and therefore change in partial recruitment over the incompletely recruited ages) on the F reference points that can be derived from a simple YPR analysis. In this way, the impact of the mesh change can be examined from the perspective of reducing the distance between the current F and the management target F, advantageous because both Fs are in the same fully recruited units.

SAW-33 examined changes in F_{MAX} and $F_{0.1}$ reference points for GOM cod, given varying assumptions in changes in partial recruitment patterns associated with mesh change (see Table 5.7). The partial recruitment pattern in this analysis was calculated from the average 1999-2000 virtual population analysis (VPA) Fs at age. These years were chosen so that the calculated PR could reflect the most recent increase in mesh size.

The effects of the proposed mesh change were based on an examination of the possible impacts on selectivity at age of a ½-inch mesh size increase. It appeared that the overall effect of a ½-inch increase in mesh was a 1-year shift in the selectivity at age. However, given the incremental changes in partial recruitment that has been observed based on the VPA Fs over the past decade, it is likely that a less than full 1-year shift in partial recruitment will occur, even if the selection at age information is accurate.

Changes in mesh selectivity do not translate directly into equivalent changes in the partial recruitment pattern for several reasons:

1. Targeting behavior;
2. Illegal adjustments to the mesh;
3. Incomplete application of the regulated mesh to all gear sectors; and
4. Incomplete translation of selectivity experiments to actual field applications.

Given this, two additional YPR analyses were done. In each of these, the base partial recruitment pattern was adjusted to reflect the possible effects of the mesh change. The YPR runs were as follows:

Run 1. Base run with 2001 assessment partial recruitment pattern.
Run 2. Partial recruitment pattern from base run adjusted by ½ year.
Run 3. Partial recruitment pattern from base run adjusted by 1 year.

The 1-year shift in partial recruitment was accomplished by shifting the original PR up one full age. The ½-year shift in partial recruitment was accomplished by averaging the PR values for adjacent ages and applying the average to the higher of the two ages. All other input data to the analyses remained the same. The results are summarized below.

Estimates of F_{MAX}	Base Run	½ Year Shift	1 Year Shift
	0.27	0.30	0.34
Estimates of $F_{0.1}$	Base Run	½ Year Shift	1 Year Shift
	0.15	0.17	0.18

These reference point F's were then compared to the calendar year 2000 F (0.73) for GOM cod. Differences between the reduction multiplier based on the current reference point with existing partial recruitment pattern and the re-estimated reference points corresponding to the adjusted partial recruitment patterns were used as the basis for percentage contributions attributed to the proposed mesh increase.

Overall, the results suggest that a ½-inch increase in mesh size may contribute, at best, 9.6 percent to the required reduction from the current F for GOM cod to F_{MAX} (63 percent) and 4.1 percent to the required reduction from the current F for GOM cod to $F_{0.1}$ (79 percent). If the mesh increase serves to shift the partial recruitment pattern by only ½ year, the contributions are about halved, to 4.1 percent and 2.7 percent for F_{MAX} and $F_{0.1}$, respectively. The estimates were based on an assumed ½-inch mesh increase for all nets fished throughout the GOM. While the Preferred Alternative would increase the required size of diamond mesh, the square mesh size provision would not change. This means that the biological impact of the mesh change estimated above would be diminished by some unknown amount.

Table 9. Changes in F reference points (for GOM cod), given varying assumptions in changes in partial recruitment patterns associated with mesh size change.

	No change	½-year shift in PR	1-year shift in PR
$F_{0.1}$	0.15	0.16	0.18
F_{MAX}	0.27	0.30	0.34
$F_{20\%}$	0.36	0.42	0.53

Impacts on Other Regulated Groundfish

There is a limited amount of selectivity information available for plaice, yellowtail flounder, pollock, and winter flounder for trawl mesh, and even less for gillnet mesh. This information is subject to the same caveats, as were described in previous sections. Using the average selection factors from DeAlteris and Grogan (1997), and with the same cautions regarding the use of these data, selectivity curves comparing diamond and square mesh of different sizes for plaice (see Table 10), pollock, and GOM haddock (see Table 11) are shown below. Selection of plaice with square mesh is roughly the same as with diamond mesh that is ½ inch smaller.

Table 10. Theoretical exploitation at age for plaice. Trawl mesh selectivity from DeAlteris and Grogan (1997) using average mesh characteristics.

	Theoretical Plaice Probability of Mesh Selection at Age			
Age/Length				
	6" diamond	6.5" diamond	6.5" square	7" square
1.5/5.2 in.	0	0	0	0
2.5/8.4 in.	0	0	0	0
3.5/11.0 in.	.08	.02	.03	.02
4.5/13.3 in.	.40	.20	.30	.10
5.5/15.1 in.	.79	.56	.78	.51
6.5/16.7 in.	.94	.85	.96	.87
7.5/18.0 in.	.98	.95	1.0	.97
8.5/35.4 in.	1.0	1.0	1.0	1.0

The selectivity results for pollock are not definitive. DeAlteris and Grogan (1997) list only one square-mesh experiment for pollock. Comparing these results to the average diamond-mesh characteristics from the same paper suggests that 6.5-inch square mesh selects a higher percentage of pollock at a given age than does 6-inch diamond mesh. This difference, however, is not consistent with other roundfish (e.g., cod, haddock) selection patterns and later experiments. Halliday et al. (1999) conducted experiments with 5.5-inch (140-mm) square and diamond mesh, and 6.1-inch (155-mm) diamond mesh. In these experiments, the length at 50-percent selection was larger for 140-mm square mesh than for either size diamond mesh. A data review of other studies by the same authors found another study, using much smaller mesh, that showed square mesh selects larger pollock than diamond mesh. Based on this paper, it is likely that square mesh will select larger pollock than diamond mesh. Halliday et al. (1999) developed the following formulas relating size at 50-percent selection (L50) to the size of mesh for pollock:

Square: L50 = 0.529m – 12.243
Diamond: L50 = 0.256m + 15.036

Based on this relationship, the pollock L50 for 7-inch square mesh is about 32 inches, and for 6.5-inch square mesh is about 29.5 inches. For 6-inch diamond mesh, the L50 is 21.2 inches. Generally, any increase in size of square mesh will provide positive biological benefits to pollock.

Based on this limited information, the mesh size changes under consideration in this action should not have negative biological impacts on other groundfish species, and in some instances will have positive benefits. Increases in the mesh size would likely cause a short-term reduction in catch rates for cod, but may also affect short-run and long-run catch rates for other species. Note that selectivity differs across species and that a proportional change in cod selectivity may result in a more than proportional change in the selectivity of other species. Council analysis indicated that, for plaice, Cape Cod yellowtail flounder, and witch flounder, mesh size increase may cause a short-term loss in yield, but probably not affect long-term yield. While a change in mesh size may have similar effects on other large-bodied fish, the same change may have a much different impact on selectivity of other species. For example, white hake may not be retained in some of the larger meshes, since they are a thinner-bodied fish than cod of the same length. Several groundfish stocks have high Fs that will need to be further reduced in future management actions. These stocks include white hake, plaice, and GOM haddock. The mesh size change proposed under this alternative should benefit these stocks.

Table 11. Theoretical probability of selection at age for GOM haddock using trawl gear. Average mesh characteristics.

Theoretical GOM Haddock Probability of Trawl Mesh Selection At Age*				
	6-inch diamond	6.5-inch diamond	6.5-inch square	7-inch square
1.5	0	0	0	0
2.5	0	0	0	0
3.5	0.12	0.05	0	0
4.5	0.48	0.21	0.1	0.02
5.5	0.75	0.47	0.41	0.12
6.5	0.87	0.69	0.67	0.3
7.5	0.93	0.81	0.83	0.5
8.5				

Source: DeAlteris and Grogan, 1997a. * Note: GOM haddock growth slows significantly after age 7.5, little change in selection expected after that age.

Gillnet selectivity curves are usually assumed to be roughly bell-shaped, or "Gausssian." These curves have a fish length that is the "optimal" length of selection (L_{opt}) – that is, a length that has the highest probability of selection of all lengths, usually equal to 1 – and then the probability of selection tapers off as fish size increases or decreases from this optimal length. The precise shape of these curves is subject to considerable debate, and reflects choices on the mathematical model and techniques used to describe the fish caught in the net, as well as different opinions on whether both gilled and non-gilled fish should be considered when determining selectivity. At this point, it is not clear that any one model is better than another, and the choice of model rests primarily with the data obtained and the preference of the individual researcher (Pol and Hovermale, 2000). One of the differences between the various models

is how they treat fish that are at the extremes of L_{opt}. Some models assume that there is a minimum and maximum size that have a very low probability of retention in the mesh. Other models recognize that some fish at these extremes may get tangled in the mesh and still be caught, and thus these models conclude that the fish at the extremes have higher probability of retention than does the first model. These latter models explicitly recognize that "gilling" is only one way that fish are caught in gillnets.

DeAlteris and Grogan (1997) summarized available gillnet selectivity information in addition to that for trawl mesh. They used a simple, rescaled normal probability curve to estimate selection patterns. Using this model, change in probability of selection at age can be estimated using a process similar to that used for trawl gear. Unlike trawl gear, however, the theoretical exploitation pattern for gillnets shows a peak probability at some interim age, and then declining probability at both younger and older ages. The primary source used for gillnet selectivity summarized in this study is a 1992 study by DeAlteris and Lazar. One advantage of these gillnet data, compared to the available trawl data, is that the earlier study examined mesh from 6 inches to 9 inches, covering the range of mesh considered in this action. Using the average mesh characteristics from DeAlteris and Grogan (1997), the theoretical probability of selection at age for GOM cod is shown in Table 12. This table shows that the theoretical L_{opt} for gillnet mesh is roughly the same as the theoretical length at full exploitation for diamond mesh of the same size. A ½-inch increase in mesh size shifts this age/size less than 1 year into the future. For Alternative 2, then, a ½-inch increase in gillnet mesh will shift the gillnet exploitation pattern less than 1 year into the future for GOM cod.

Table 12. Theoretical probability of gillnet selection at age for GOM cod. Based on average gillnet selection factors.

Theoretical GOM Cod Probability of Gillnet Mesh Selection at Age*			
	6-inch	6.5-inch	7-inch
Age/Length			
1.5/7.5 in.	0	0	0
2.5/13. in.	0	0	0
3.5/18 in.	0	0	0
4.5/22.3 in.	0.3	0.06	0.01
5.5/26 in.	1	0.7	0.25
6.5/29.6 in.	0.4	0.85	0.96
7.5/32.7 in.	0.03	0.21	0.65
8.5/35.4 in.	0	0	0.1
$L_{optimum}$ (cm/in)	66.2/26 in.	71.9/28.3 in.	77.1/30.4 in.

Source: DeAlteris and Grogan, 1997. * Lengths at age based on Von Bertanlanffy growth parameters; annual variation likely to result in different lengths at age during any given year.

5.1.5.5.2 Impacts of Changes in Gear Limits

The No Action alternative would implement no changes to either mesh size, numbers of gillnets or hooks fished. By contrast, the Preferred Alternative would implement several gear changes that differ by area. These changes are detailed in section 3. The level of complexity involved with potential changes in gear and the myriad adaptive strategies that may result made it impossible to incorporate the biological impact of gear changes into the math programming model. To assess the potential impact of these changes, VTR data for trips landing regulated groundfish during fishing year 2000 were queried to ascertain area fished, catch, gear type, gear quantity, and mesh size. Each of these trips (approximately 22,500) was classified as being either a trawl, trip gillnet, day gillnet, or bottom longline trip. Each record was then examined to determine if the trip in question was already using conforming gear in terms of amount and size of gear; was using the conforming amount of gear but non-conforming size; was using conforming size but not conforming amount; or was not in conformance with either size or quantity of gear. Since hook size is not recorded on the VTR records, no analysis was possible on the minimum hook size. However, note that there is little available information on the selectivity of different size hooks. In fact, what information is available suggests that selection for larger fish is correlated with the size of the bait, rather than hook size.

Logbook records do not provide sufficient information about the size of catch. Therefore, no attempt was made to estimate the foregone yield associated with the proposed mesh size changes. However, the proportion of trips using conforming gear was estimated to provide a relative measure of what proportion of groundfish activity might be affected by the mesh size changes.

For gillnet and hook vessels, the change in numbers of nets or hook size may be more significant and provide greater biological impact than the change in mesh. In the absence of an explicit behavioral model to predict how vessels may adapt to these changes in amount of gear an estimate of the impact was developed by assuming that average landings rates (discards were not included) by species/stock per unit of gear fished (by net panel, or per hook) would be constant for all gear fished on the trip. In this manner, the biological impacts on trips where the observed quantity of gear fished would be greater than under the Preferred Alternative may be estimated by multiplying the average landings by the gear limit. The resulting product provides a rough estimate of the biological impact of the changes in gear limits, exclusive of mesh size changes.

Of the VTR-reported trips in the Northeast region, the largest proportion were taken by otter trawl vessels in the GOM (38.4 percent) (Table 13). Among other species, trawl trips landed 56.9 percent of GOM cod, 81.8 percent of GOM winter flounder, and 82.6 percent of GOM haddock. Compared to Trip gillnet vessels (4.7 percent of all trips), Day gillnet vessels accounted for proportionally more effort in terms

of trips (16.1 percent), but Trip vessels landed almost as much GOM cod (18.4 percent as compared to 22.3 percent) as Day boats.

According to reported activity, 37 percent of all trips taken in the Northeast region would not be affected by either mesh or gear quantity, because both mesh size and quantity of gear used would be consistent with the Preferred Alternative (Table 14). An additional 55.2 percent of trips would only be affected by the mesh change. These values include otter trawl vessels that would not be affected by any changes in quantity of gear fished. For the subset of vessels (hook and gillnet) that may be affected by changes in both mesh and quantity of gear, 55 percent of the 7,800 trips taken by these vessels were already in conformance with the proposed gear changes. An additional 22 percent of fixed gear trips would have to change mesh size, but would not be affected by the nominal reductions in gear. This leaves 23 percent of all fixed gear trips that would be affected by reductions in gear. In terms of landings, the fixed gear sector accounted for 18.3 percent of total groundfish landings, of which 12.9 percent of total landings would not be affected by a change in quantity of gear used, leaving a maximum biological benefit of approximately 5.4 percent for all regulated groundfish combined. This maximum benefit would only occur if all trips that used more than the proposed gear changes would allow were to be abandoned. Should vessels choose to fish with the reduced gear allowance, the biological impacts would be lower.

Based on the assumption that vessels do not abandon any trips, applying the average landing per unit of gear set results in an estimated aggregate reduction in regulated groundfish landings of 1.7 percent (Table 15). Across the species in the groundfish complex, estimated reductions exceeded 1 percent only for GOM cod (2.61 percent), GB cod (5.06 percent), pollock (3.99 percent), and redfish (1.99). Although the relative reduction for some species in some trip categories appears relatively large, the total reduction is low because the given category only accounts for small quantities of total landings. For example, the reduction in GB cod from Trip gillnet vessels was estimated to be almost 36 percent. However, cod landings from these trips only accounted for 1.1 percent of total GB cod landings in FY 2000. This means that the effective reduction in total GB cod landings is only 1.1 percent of 36 percent, or 0.4 percent.

Table 13. Summary of relative distribution of effort and landings by trip type ar
(percent).

	GOM				GB					
	Trawl	Trip Gillnet	Day Gillnet	Long line	Trawl	Trip Gillnet	Day Gillnet	Long line	Trawl	Tri Gillne

Trips	38.4	4.7	16.1	0.9	9.5	0.4	6.4	4.2	17.5	0.4	1.0	0.4
Gom Cod	56.9	18.4	22.3	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GB Cod	0.0	0.0	0.0	0.0	62.8	1.1	21.8	10.4	2.1	0.5	0.8	0.5
GOM Winter	81.8	3.2	13.7	0.0	0.1	0.0	0.0	0.0	1.0	0.0	0.0	0.0
GB Winter	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SNE Winter	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	99.5	0.3	0.1	0.0
GB Yellowtail	0.0	0.0	0.0	0.0	99.6	0.0	0.0	0.0	0.4	0.0	0.0	0.0
SNE Yellowtail	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	99.7	0.0	0.0	0.0
CC Yellowtail	57.9	2.4	9.4	0.0	29.9	0.1	0.3	0.0	0.0	0.0	0.0	0.0
MA Yellowtail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Plaice	59.8	0.2	0.6	0.0	38.7	0.0	0.0	0.0	0.6	0.0	0.0	0.0
S. Windowpane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
N. Windowpane	62.4	0.1	0.9	0.0	35.4	0.0	0.0	0.0	1.1	0.0	0.0	0.0
GOM Haddock	82.6	12.5	2.3	2.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GB Haddock	0.0	0.0	0.0	0.0	95.3	0.3	3.2	0.6	0.4	0.2	0.0	0.0
White Hake	22.2	13.6	1.6	0.1	18.8	1.5	0.4	0.0	41.5	0.2	0.0	0.0
Pollock	20.7	37.3	7.5	0.0	25.3	2.7	4.5	0.1	0.2	1.7	0.0	0.0
Redfish	30.2	14.8	0.5	0.0	48.1	2.0	0.8	0.2	1.1	2.3	0.0	0.0
Witch Flounder	47.9	0.2	1.0	0.0	48.4	0.0	0.0	0.0	2.4	0.0	0.0	0.0

Table 14. Relative proportion of trips by conformance with proposed gear quantity and size regulations for FY 2000 (percent)

Trip Category	Conforming Gear	Conforming	Non-Conforming	Non-Conforming	Prohibited

		Quantity/Non-Conforming Size	Quantity/Conforming Size		Quantity/Non-Conforming Size	
GOM Trawl	7.9	30.5	0.0	0.0	0.0	
GOM Trip Gillnet	2.3	2.0	0.4	0.0	0.0	
GOM Day Gillnet	10.8	4.8	0.2	0.0	0.3	
GOM Longline	0.6	0.0	0.3	0.0	0.0	
GB Trawl	1.9	7.5	0.0	0.0	0.0	
GB Trip Gillnet	0.1	0.0	0.2	0.1	0.0	
GB Day Gillnet	2.5	0.8	2.7	0.4	0.0	
GB Longline	1.3	0.0	2.8	0.0	0.0	
SNE Trawl	8.0	9.6	0.0	0.0	0.0	
SNE Trip Gillnet	0.2	0.0	0.1	0.1	0.0	
SNE Day Gillnet	0.9	0.0	0.1	0.0	0.0	
SNE Longline	0.4	0.0	0.0	0.0	0.0	
Total	37.0	55.2	6.9	0.7	0.3	

Table 15. Biological impact of gear quantity changes by trip type and species/stock

		GOM				GB				SNEngland			
Species/Stock	Totals	Trawl	Trip Gillnet	Day Gillnet	Longline	Trawl	Trip Gillnet	Day Gillnet	Longline	Trawl	Trip Gillnet	Day Gillnet	Longline
Gom Cod	-2.61	0.00	-3.27	-7.42	-15.11	0.00	-58.33	0.00	0.00	0.00	0.00	0.00	0.00
GB Cod	-5.06	0.00	-1.52	0.00	0.00	0.00	-35.78	-12.58	-16.38	0.00	-22.21	-10.32	-2.41
GOM Winter	-0.80	0.00	-6.38	-4.11	-50.76	0.00	-58.33	0.00	0.00	0.00	0.00	0.00	0.00
GB Winter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-10.00	0.00	0.00	0.00	0.00
SNE Winter	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-12.99	-0.14	0.00
GB Yellowtail	0.00	0.00	0.00	0.00	0.00	0.00	-2.63	-37.50	0.00	0.00	0.00	0.00	0.00
SNE Yellowtail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-11.82	-10.31	0.00
CC Yellowtail	-0.58	0.00	-6.62	-2.67	0.00	0.00	-26.05	-42.08	0.00	0.00	0.00	0.00	0.00
MA Yellowtail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plaice	-0.07	0.00	-2.44	-8.42	0.00	0.00	-33.70	-28.86	-4.10	0.00	-25.00	0.00	0.00
S Windowpane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-25.00	0.00	0.00
N. Windowpane	0.00	0.00	0.00	-0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GOM Haddock	-0.68	0.00	-1.41	-14.50	-8.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GB Haddock	-0.72	0.00	0.00	0.00	0.00	0.00	-39.03	-14.51	-12.51	0.00	-24.94	0.00	0.00
White Hake	-0.90	0.00	-0.74	-8.97	-5.06	0.00	-34.25	-23.07	-10.63	0.00	-23.57	0.00	-12.35
Pollock	-3.99	0.00	-1.94	-11.35	-22.28	0.00	-42.54	-18.37	-14.54	0.00	-24.76	-0.14	-18.18
Redfish	-1.99	0.00	-1.50	-7.90	-18.30	0.00	-45.37	-29.15	-3.53	0.00	-25.08	0.00	0.00
Witch Flounder	-0.05	0.00	-0.77	-2.65	0.00	0.00	-42.63	-47.29	0.00	0.00	-6.59	0.00	0.00
Total	-1.74	0.00	-2.21	-7.26	-13.63	0.00	-38.76	-13.43	-16.24	0.00	-23.56	-9.95	-2.44

5.1.6 Biological Impacts of Alternative 3 Hard TAC

Under Alternative 3, hard TACs, as determined by the best available science, would be implemented for all stocks managed under the FMP, in conjunction with the measures described in the no-action alternative. If directed and incidental catch for managed stocks were effectively limited to the specific TAC levels, the desired fishing mortality reductions would be achieved. This alternative may have a high probability of achieving the desired reductions in fishing mortality rates because the catch of a certain level of TAC would trigger management actions to either cease or slow the harvest of fish. Because of these triggers and the resultant management actions, the Hard TAC alternative may also cause extremely severe economic and social impacts. It is important to note, however, that the effectiveness of such a management system would depend upon effective monitoring of landings, correct attribution to landings to the various stocks, and timely implementation of the management actions that would be triggered. An administrative system that would enable effective execution of a Hard TAC system could not be fully implemented by July 28, 2003, when this action is required to take effect.

5.1.7 Bycatch

This emergency action would put in place restrictive measures to continue reduction in fishing effort and fishing mortality on groundfish stocks in NE, which would reduce overall bycatch in the groundfish fishery (in comparison to the no action alternative). In most geographic areas where the groundfish fishery operates, several stocks of groundfish occur together, along with other non-groundfish species, such as skates, spiny dogfish, and monkfish. Under the Preferred Alternative, area closures, effort restrictions, modifications to the DAS clock, and gear restrictions such as mesh increases, gillnet net reductions, and hook gear restrictions would help reduce bycatch in both the groundfish fishery and on these other stocks by reducing levels of fishing effort and efficiency.

The primary means of an indirect effect on bycatch would be through the following management measures: Continued control of latent DAS through use of a used DAS baseline, continued reduction in fishing effort through a 20=percent cut in DAS, continuation of GB closures in May, continuation of closures in the inshore GOM during the months of May and June, continued limitations on the number of gillnets fished, and on the number of hooks fished, and a continued moratorium on the issuance of new open access Hand-gear permits. The maintenance of the GOM cod daily possession limit at 500 lb per DAS will likely decrease regulatory discards of cod. In the context of an increasing stock size, increases in trip limits for the target species will result in decreases in regulatory discards of the target species.

Continuation of the relatively large required minimum mesh size will have a direct effect on bycatch and result in a decreased bycatch of most species (both target and non-target species), within a certain body size range. The concurrent increase in cod minimum size for

commercial vessels (to 22"), however, may increase regulatory discarding of cod below the 22" size limit. It is instructive to note, however, that a return to a minimum cod size of 19" (the no action alternative regulation), in conjunction with an increase in minimum mesh size, may serve as an incentive for otter trawl fishers to use net liners in order to retain a greater portion of fish that enter the net. It is very difficult to quantify or predict the affect of mesh size increases due to the large number of variables that affect the size of catch, and the limited number of applicable scientific studies.

For some measures, such as front-loading and the decrease in trip limit for the open access Hand Gear category, the net effect on bycatch depends on the behavior of the individual vessel operator. For example, the prohibition on front-loading may serve as incentive to increase the amount of time spent fishing. Under a scenario where front-loading is prohibited, if a vessel operator who was in the practice of front-loading in the past chose to remain fishing in order to catch the same amount of fish he/she would have caught in the past (while front-loading), he/she would have spent more time actually fishing for the same amount of fish. Such a behavior pattern would cause an increase in bycatch. Similarly, the reduction in trip limit for the open access Hand Gear permit category could serve as an incentive to continue fishing for species in the NE multispecies FMP that do not have a trip limit, which could increase regulatory discards of cod, haddock, and yellowtail flounder. It is possible that the continuation of the yellowtail possession limit could cause some regulatory discarding in the SNE RMA, if yellowtail flounder are caught as bycatch in that area.

The analysis of the DAS Leasing Program sub-option (section 5.2.5) suggests that fewer vessels may fish if that Program is implemented and that economic efficiency may increase for the fishery as a whole. These changes would likely mitigate the effect on bycatch that any increase in DAS use may cause.

Given the limited scope and context of this interim action and numerous measures already in place that reduce bycatch, it is not practicable to implement measures solely to minimize bycatch.

Although not proposed as a regulatory management measure, NMFS will continue its current level of observer coverage in the NE multispecies fishery to monitor and collect information on bycatch, as well as other biological and fishery-related information. For all gear sectors, NMFS will continue to provide between 5-percent and 9-percent observer coverage. NMFS will provide 10-percent observer coverage for all gear sectors, unless it can establish by the most reliable and current scientific information available that such increase is not necessary. Observer coverage would be distributed over gear categories, vessel size categories and fishing regions, in order to provide statistically sound estimates of directed catch, nondirected catch and discards (bycatch).

5.1.8 Impacts to Threatened and Endangered Species

North Atlantic Right Whales - In the June 14, 2001, BO, NMFS concluded that fisheries conducted pursuant to the FMP are likely to jeopardize the continued existence of the right whale, and outlined a Reasonable and Prudent Alternative (RPA) with multiple management components that, once implemented, is expected to avoid the likelihood of jeopardizing right whales. Components include minimizing the overlap between right whales and NE multispecies gillnet gear, expanding gear modifications to the Mid-Atlantic and Southeast fisheries, continuing gear research and monitoring the implementation and effectiveness of the RPA. On January 9, 2002, NMFS published an interim final rule to amend the regulations that implement the Atlantic Large Whale Take Reduction Plan to provide further protection for large whales, especially North Atlantic right whales, through a Seasonal Area Management (SAM) program (67 FR 1142). The measures for SAM apply to two defined areas called SAM West and SAM East in waters off Cape Cod and out to the EEZ line, in which additional gear restrictions for anchored gillnet gear are required. SAM West and SAM East will occur on an annual basis for the period March 1 through April 30 and May 1 through July 31, respectively. The dividing line between SAM West and SAM East is the 69/24' W. long. line. Also on January 9, 2002, NMFS published a final rule to clarify the agency's authority to restrict temporarily the use of lobster trap and gillnet fishing gear within defined areas to protect right whales and establish criteria for procedures for implementing a Dynamic Area Management (DAM) program in areas north of 40/ N. lat. (67 FR 1133). On January 10, 2002 (67 FR 1300), NMFS published a final rule to expand gear modifications required by an earlier rule to the Mid-Atlantic and offshore lobster waters and modified Mid-Atlantic gillnet gear requirements.

With the implementation of the proposed Reasonable and Prudent Alternatives (see 4.1.1), the proposed fishing activities would avoid causing jeopardy to the Right Whale. Assuming these alternatives will be implemented, it is unlikely that this extension will have significant cumulative effects to this species. Based on the evaluations in section ??? of this report, cumulative effects are not anticipated to other protected species such as sea turtles, shortnose sturgeon, and Atlantic salmon.

Sea Turtles - Information included in the BO indicates there have been no observed takes of sea turtles in the NE multispecies fishery, even though interactions have occurred in otter trawl, sink gillnet and hook gear. No additional information contradicts this statement, although it must be noted that observer effort in this fishery has been extremely low. Therefore, although the potential for interactions between sea turtles and gear types used in the NE multispecies fishery and sea turtles exists, the potential impacts of this action are expected to fall within the scope of the actions already analyzed in the FMP and previous framework adjustments and considered in the BO. The impacts of the fishery and the measures proposed relative to turtles will not be discussed further in this document.

Shortnose Sturgeon - The BO concluded that the current FMP is not likely to adversely affect shortnose sturgeon and established no documented takes in NE multispecies gear or fisheries in similar locations and/or gear types. No current information contradicts this statement.

Atlantic Salmon - The potential exists for juvenile and adult Atlantic salmon to be incidentally taken in commercial fisheries targeting other species. Results from a 2001 post-smolt trawl survey in Penobscot Bay and the nearshore waters of the GOM indicate that Atlantic salmon post-smolts are prevalent in the upper water column throughout this area in mid to late May. Commercial fisheries deploying small-mesh active gear (pelagic trawls and purse seines within 10 m of the surface may have the potential to incidentally take smolts). The magnitude and extent of the threat has not been extensively studied and can not currently be adequately assessed. In 2001, a commercial fishing vessel engaged in fishing operations captured an adult salmon subsequently determined to be an escaped aquaculture fish.

Therefore, while there is a concern for the take of salmon in fishing gear, the greatest concern is for gear that operates in the upper 10 m of the water column. For the following reasons, interactions with the NE multispecies fishery are considered unlikely.

- The NE multispecies fishery uses primarily bottom trawl gear and sink gillnet gear
- The eight Atlantic salmon DPS rivers where Atlantic salmon are listed as endangered are near the southern extent of their range (after leaving the rivers they travel north to foraging areas)
- Population abundance of the Maine DPS is low (there were an estimated 75-110 adult returns to all eight rivers in 2000), and
- The NE multispecies interim action will reduce effort in the fishery

5.1.9 Cumulative Impacts

Although the measures in the EA are for the time period July 28, 2003, until the implementation of Amendment 13 (anticipated by May 1, 2004), the emergency action could have potential cumulative impacts. The scope and magnitude of any cumulative impacts from measures established in previous years is largely dependent on how effective those measures were in meeting their intended objectives. Mitigating measures may have lessened the cumulative impacts of restrictions.

Prior actions taken to reduce fishing mortality in the NE multispecies fishery have contributed to stock size increases, enhancements to stock structure, and production of large year classes for some stocks. Biomass has increased in 19 of 20 stocks since 1995, with a median percent increase in biomass for all stocks of 177%. Fishing mortality rates have declined substantially for most stocks since 1995 (Northeast Fisheries Science Center Reference Document 02-16, October 2002). According to a recent report issued by the the New England Fishery Management Council, the biomass of 12 multispecies stocks,

collectively, have more than tripled in biomass since 1994 (NEFMC Heading Toward Recovery, Fall 2002).

The Preferred Alternative (versus the No Action alternative), would continue the current measures and, therefore, continue to protect important year classes (such as the 1998 year class of GOM cod) and increase the likelihood of timely stock rebuilding. Preliminary estimates of fishing mortality in calendar year 2002, which includes the time period during which the preferred alternative measures were in place (August through December), indicate that for many stocks, fishing mortality decreased in 2002, compared with 2001 as follows: GOM cod decreased 23%; Georges Bank haddock decreased 9%; witch flounder decreased 58%; American plaice decreased 40%; GOM winter flounder decreased 57%; and Southern New England/Mid-Atlantic winter flounder decreased 12%. It is difficult to compare the fishing mortality of yellowtail flounder stocks during 2001 and 2002, due to the changes in stock boundary definitions, however, data suggest that the fishing mortality on Cape Cod yellowtail flounder decreased also. However, for some stocks, the fishing mortality increased from 2001 to 2002: Georges Bank cod increased 18%; and Georges Bank yellowtail flounder increased 8%.

An important aspect of the Preferred Alternative that enhances the protection of the stocks is the control of latent DAS. The continuation of the DAS freeze restriction would significantly curtail activation of latent DAS and, therefore, limit the extent to which increases in fishing mortality from the use of such DAS could undermine efforts to control fishing mortality. The number of DAS that were allocated for the 2002 fishing year (including carryover days), represented a 45.7% reduction compared with the number of DAS allocated in fishing year 2001. Section 5.2.3 of this EA notes the pattern of DAS use during the time the DAS restrictions under the preferred alternative were in place during fishing year 2002, and indicates the effectiveness of these DAS restrictions. DAS reports indicate that DAS use during August to December 2002 was running at about 68% of DAS used in 2001, on a month-to-month basis. It is predicted that the relative decrease in fishing year 2002 DAS use could range from a low of 16% to a high of 41%. In contrast, the No Action alternative or Hard TAC alternative, would not limit the use of latent effort, and would therefore be less effective in ensuring that fishing mortality did not increase and undermine the cumulative rebuilding gains achieved.

Implementation of the Preferred Alternative in conjunction with the DAS Leasing Program sub-option may result in reduced socio-economic impact in the industry, greater economic efficiency, and increased profitability for vessel owners, while maintaining fishing effort at or slightly above the level of effort that would occur in the absence of a DAS Leasing Program. It is possible, however, that even if the level of DAS use in the fishery as a whole does not change as a result of the DAS Leasing Program, the leasing of DAS and resultant use of DAS by different vessels could result in a change in fishing efficiency as compared with previous years. For example, if a vessel

leased DAS to another vessel of similar size, but with greater efficiency at catching fish, the result could be a increased amount of catch per unit effort. Because the leasing of DAS among vessels may either increase or decrease efficiency, it is difficult to predict the cumulative effect of such changes in efficiency on the fishery as a whole.

Under the FMP, the Multispecies Monitoring Committee (MMC) meets annually to develop target TACs for the upcoming fishing year, and to develop options for Council consideration on any adjustments or additions to management measures that may be necessary to achieve the FMP goals and objectives. The annual nature of the management measures is intended to provide the opportunity for the Council and NMFS to regularly assess the status of the stocks and to make adjustments. Rebuilding of some stocks under the FMP began in 1994, with Amendment 5 to the FMP, followed by amendment 7 in 1996. Subsequent frameworks, implemented measures based on recommendations from the MMC that were developed to attain the appropriate level of fishing mortality, based upon the available information. Because each year's measures build upon the previous year's measures, the cumulative effects of the management program on the health of the stocks and the fishery are assessed from year to year.

Although this interim action would not reduce fishing mortality to the full extent necessary to comply with the rebuilding objectives of the Magnuson-Stevens Act, the level of fishing mortality anticipated would not compromise the rebuilding of overfished stocks. Despite the fact that some NE multispecies stocks have experienced overfishing (excessive fishing mortality) over a number of years, there does not appear to be a cumulative effect that would prevent the rebuilding of stocks.

Amendment 13, which is scheduled to be implemented by May, 2004, will contain management measures to fully rebuild all groundfish stocks. Although the Amendment 13 alternatives have not been finalized as of the writing of this document, the preliminary draft Amendment 13 document contains a range of alternatives that represent several different management strategies. All alternatives utilize a variety of management tools and have elements in common with the current management scheme. However, these strategies may be characterized by the type of management tool that is most heavily relied upon to achieve the required mortality reductions as follows: Days-at-sea reductions; area management; gear restrictions; and hard total allowable catches (quotas). Secondary strategies such as sector allocation and special access programs may also be utilized in conjunction with those listed above. A net positive impact on the stocks of multispecies is anticipated.

5.1.9.1 Cumulative Impacts on Essential Fish Habitat

The effects of fishing and factors other than fishing have been reviewed in the "Draft Environmental Impact Statement For the Essential Fish Habitat Components of Amendment 13 to the Northeast

Multispecies Fishery Management Plan" prepared by the New England Fishery Management Council (March 13, 2003). With respect to non-fishing factors, in general, the closer the proximity of fishery resources to the coast (close to pollution sources and habitat alterations), the greater the potential for impact on the resources. For the offshore area, with the exception of events such as oil spills and algae blooms, which can spread over large areas, moderate effects were generally localized to a well-defined and relatively small impact area such as oil/gas mining and dredged material disposal. Thus, only small portions of fish stocks would potentially use these sparsely located areas.

The repeated use of trawls/dredges reduce the bottom habitat complexity by the loss of erect and sessile epifauna, smoothing sedimentary bedforms and bottom roughness. This activity, when repeated over a long term also results in discernable changes in benthic communities, which involve a shift from larger bodied long-lived benthic organisms to smaller shorter-lived organisms. This shift can also result in loss of benthic productivity and biomass available for higher trophic levels. Therefore, such changes in bottom structure and loss of productivity can reduce the value of the bottom habitat for demersal fish. In the northwest Atlantic, the more valued groundfish habitat is located in areas where there is a high percentage of gravel and cobble. In the northwest Atlantic, otter trawls are used to catch most federally managed fisheries.

Historically, the overall trend has been an increased impact on bottom habitat caused by the groundfish fishery of New England. By the 1930, otter trawls had become the dominant fishing gear, replacing the earlier techniques (handlines and jigging) that had less impact on bottom habitat. The expansions of fishing effort in the 1950s, due to the influx of foreign vessels after World War II, and in the late 1970s and early 1980s, when the domestic fishery expanded in response to restrictions on foreign vessels also impacted bottom habitat. In more recent years, the use of larger vessels, larger gear, and new electronic aids increased the efficiency and intensity of fishing, and has been correlated with habitat impacts. However, management measures developed to date to control fishing effort and fleet capacity have indirectly benefitted habitat by reducing bottom contact time of mobile bottom-tending fishing gear.

The negative effects of fishing gear occur throughout inshore and offshore habitats. These effects generally tend to combine with the negative effects of coastal pollution and habitat degradation/alteration more in inshore areas and less so in offshore areas where the management alternatives are proposed to be implemented. With respect to the NE Multispecies FMP, it is anticipated that the combined effect of the many of the fishery management actions that have been implemented during the last 10 years (reduced days at sea, area closures, gear restrictions, etc.), has been to enhance the protection and preservation of Essential Fish Habitat. Thus, in spite of the negative effects of fishing gear, the management alternatives proposed under this emergency action, combined

with historical effort reductions and those proposed in the forthcoming Amendment 13, will have a net positive cumulative effect on habitat and should not have significant adverse cumulative effects.

5.2 Economic Impacts

5.2.1 Introduction

The following discussion provides an analysis of anticipated economic impacts associated with this emergency action. Quantitative analysis of the impacts of DAS reductions, potential fishing income losses, DAS leasing and vessel break-even analyses are discussed. A discussion of the effects of the non-modeled measures and impacts of recreational measures is also included.

Anticipated economic impacts were estimated and described in the Environmental Assessment of the impacts of the Settlement Agreement (June, 2002). With the exception of the proposed DAS leasing sub-option, the present action would only extend, without change, those measures that were implemented on August 1, 2002. For this reason, the proposed action would not result in any realized economic or social impacts over and above what may have already been felt by industry participants and coastal communities. Although potential impacts were described in the June 2002 EA, these impacts may have been underestimated, as year-to-date DAS use under the Settlement Agreement has been lower than what was anticipated at the time those assessments were prepared. Consequently, the economic impacts of the Settlement Agreement were likely greater than estimated.

The following economic assessment is broken up into two sections. In the first section, analyses prepared for the June, 2002, EA have been revised based on observed and possible adaptations to DAS use through FY2003. The economic impacts reported in this first section were developed without a DAS leasing condition. Note that these analyses should not be regarded as additive to economic impacts of the FY2002, since all analyses remain relative to a pre-Settlement Agreement baseline condition. The second section describes the anticipated impacts of implementing a DAS leasing program. Since the DAS leasing program has been designed to be conservation neutral, leasing will not alleviate aggregate economic impacts. That is, while there may be changes in product mix or changes in geographic distribution of landings, DAS leasing is not intended to have an appreciable impact on the total supply of groundfish available to seafood dealers or processors. The primary benefit of the DAS leasing will be to offer individual vessels the opportunity to operate more efficiently; increasing industry profits without changing overall seafood supplied to the market.

5.2.2 Economic Impacts of DAS Reductions

As of March 4, 2003, there were 1,383 limited access multispecies permits with a valid baseline DAS allocation for FY2002. Of these permits, 343 received the minimum allocation of 8 DAS (the baseline

freeze of 10 DAS less 20%). Including carryover days (11,764), a total of 71,180 DAS were allocated for the fishing year; a reduction of 45.7% compared to final FY2001 allocations.

The relative reduction in DAS allocations varied by permit category. The total reduction for individual allocation vessels (Category A) was 21.7%, as compared to 65.9% for Category D permit holders (Table 16). DAS allocation reductions for vessels in other individual allocation permit categories (E and F) were approximately one-third, while reductions for fleet allocation vessels in permit categories B and G exceeded 50%.

Reductions in total DAS allocations for FY2002 were larger for small vessels (less than 50 feet) (53%) than for medium (50 to 70 feet) (37.9%) or large vessels (greater than 70 feet) (32.4%) (Table 17). As a group, five times as many small vessels received the minimum DAS allocation for FY2002 as either medium or large vessels. These small minimum allocation vessels represent about 25% of all permitted vessels and 31% of all small vessels.

Across home port states, the reduction in final FY2002 DAS allocations was largest for the two Mid-Atlantic states New Jersey (61.4%) and New York (57.7%) (Table 18). The remaining states formed two clusters with reductions below 40% (Connecticut; 33.6%, Delaware; 37.6% and New Hampshire; 38.8%) and above 40% but below 50% (Maine; 43.9%, Massachusetts; 43.2%, and Rhode Island; 42.4%).

Table 16. Summary Changes in DAS Allocations by Permit Category										
Permit Cat.	Number of Permits (Permit Year 2002)	Number of Permits with Minimum Alloc.	FY2001 Baseline Alloc.	FY2001 Carry-Over DAS	FY2001 Alloc.	FY2002 Baseline Alloc.	FY2002 Carry-Over DAS	FY2002 Alloc.	Change in Baseline Alloc.	Change in Final Alloc.
A	136	3	16,800	909	17,718	13,257	696	13,874	-21.1%	-21.7%
B	1,025	255	85,289	8,698	93,976	39,078	9,092	47,948	-54.2%	-49.0%
D	120	60	9,504	1,036	10,569	2,518	1,089	3,607	-73.5%	-65.9%
E	45	19	1,966	337	2,303	1,254	383	1,637	-36.2%	-28.9%
F	2	0	291	20	311	193	8	269	-33.5%	-13.6%
G	55	6	5,848	445	6,279	2,550	498	3,845	-56.4%	-38.8%
Totals	1,383	343	119,698	11,445	131,155	58,851	11,764	71,180	-50.8%	-45.7%

"Cat." = Category; "Alloc." = Allocations

Table 17. Summary of Changes in DAS Allocations by Vessel Length Category										
Length Class	Number of Permits (Permit Year 2002)	Number of Permits with Minimum Alloc.	FY2001 Baseline Alloc.	FY2001 Carry-Over DAS	FY2001 Alloc.	FY2002 Baseline Alloc.	FY2002 Carry-Over DAS	FY2002 Alloc.	Change in Baseline Alloc.	Change in Final Alloc.
Large	247	45	22,619	1,892	24,529	14,702	1,822	16,589	-35.0%	-32.4%
Medium	305	48	27,154	2,488	29,667	15,661	2,494	18,412	-42.3%	-37.9%
Small	831	250	69,925	7,066	76,960	28,488	7,449	36,178	-59.3%	-53.0%
Totals	1,383	343	119,698	11,445	131,155	58,851	11,764	71,180	-50.8%	-45.7%

"Alloc." = Allocations

Table 18. Summary of Changes in DAS Allocations by Home Port State										
Home Port State	Number of Permits (Permit Year 2002)	Number of Permits with Minimum Alloc.	FY2001 Baseline Alloc.	FY2001 Carry-Over DAS	Final FY2001 Alloc.	FY2002 Baseline Alloc.	FY2002 Carry-Over DAS	Final FY2002 Alloc.	Change in Baseline Alloc.	Change in Final Alloc.
CT	17	3	1,191	121	1,312	713	140	871	-40.2%	-33.6%
DE	4	1	477	30	507	283	22	317	-40.8%	-37.6%
MA	737	164	64,986	5,986	70,923	33,697	6,156	40,305	-48.1%	-43.2%
ME	177	53	15,855	1,382	17,265	8,299	1,386	9,684	-47.7%	-43.9%
NH	73	13	6,469	644	7,093	3,591	636	4,344	-44.5%	-38.8%
NJ	78	28	6,530	726	7,304	2,132	774	2,816	-67.4%	-61.4%
NY	137	38	10,989	1,201	12,176	3,946	1,218	5,149	-64.1%	-57.7%
RI	109	20	9,347	961	10,318	4,933	991	5,941	-47.2%	-42.4%
Other	51	23	3,854	394	4,258	1,258	440	1,753	-67.4%	-58.8%
Totals	1,383	343	119,698	11,445	131,155	58,851	11,764	71,180	-50.8%	-45.7%

"Alloc." = Allocations

5.2.3 Fishing Income Changes

Quantitative analysis of the economic effect of the proposed alternatives was accomplished by using the same area closure model and data described previously in the June 2002 EA. However, due to the permit buyout and other considerations, the number of vessels considered in the present analysis was reduced to 837. As before, analytical results should be regarded as a representative sample of the total number of potentially impacted vessels.

At that time, the Settlement Agreement measures were assumed to result in a 20% reduction in used DAS. However, DAS reports indicate that DAS use was less than 55% of DAS used during May and June of FY2002 compared to the same 2 months of FY2001, and was running at about 68% of DAS use on a month-to-month basis from August to December. Assuming the same pattern were to continue for the balance of the fishing year, total DAS use would be down by about 36% compared to FY2001. By making a variety of alternative assumptions, the relative decrease in FY2002 DAS use could range from a low of 16% (assuming all vessels will fish at least as many DAS as they did in FY2001 constrained by their FY2002 allocation) to a high of 41.2% (assuming DAS use February - April is proportional to use from May to January).

While projecting DAS use for the remainder of the 2002 fishing year provides some information about realized impacts over this time period, the present need is to estimate DAS for the coming 2003 fishing year. There are a variety of reasons why FY2002 DAS may end up being lower than what may be expected for FY2003. The months prior to May, 2002 were filled with uncertainty and significant change in DAS allocations created by the initial Court Order and the subsequent amended order. These changes would likely have made trip planning difficult and could easily have resulted in a reduction in DAS use. The Settlement Agreement contained a provision restricting DAS use to no more then 25% of allocated days from May through July in fishing year 2002 only. This measure, in combination with uncertainty over what final DAS allocations would be, almost certainly resulted in the very low DAS use in May and June, in particular. At a minimum, FY2003 DAS use will likely be greater during these months than they were in 2002. To what extent DAS use adjustments are made over the rest of the fishing year is not known with certainty. For this reason, a range estimate of 25 and 35% was used to provide a bounded estimate of economic impacts of the proposed action.

Taking no action would revert all current management measures in place back to what had been in place prior to May 1, 2002. These measures would include all measures in place for the 2001 fishing year, including a reopening of the WGOM Area Closure (i.e., the sunset provision would be effective). This change would increase commercial fishing opportunities for vessels that have ready access to the area. This option would not affect the majority of vessels included in the economic analysis, but would provide an increase in annual fishing income of 7.2 percent at the 90th percentile (see Table 19). The results reported in Table 19 (and all other tables in this section)

should be interpreted in the following manner. Each percentile represents the economic impact on a unique vessel. For example, the 10th percentile represents the estimated impact on the 84th vessel, sorting all 837 vessels from most negative/least positive impact to least negative/most positive impact. The results at each percentile are reported as a range, where the upper end represents the estimated impact at the specified percentile and the lower end represents the estimated impact at the next lowest percentile. The number of vessels represents the number of vessels between these percentiles. For example, there are 126 vessels between the 75th and 90th percentiles. The impact on these vessels ranges between 0.4% (the impact on the vessel at the 75th percentile) and 7.2% (the impact on the vessel at the 90th percentile). Similarly, the impact on the 209 vessels between the 50th and 75th percentile (inclusive) ranged from no impact to an increase in gross fishing revenue of 0.4%.

The Preferred Alternative would result in estimated revenue loss for the 209 vessels between the 25th and 50th percentile of from 18.4 to 12.6% for a 25% reduction in DAS, use and from 19.7 to 11.5% for 35% reduction in DAS (Table 20). For the 84 most impacted vessels, revenue losses would be 21.3% or greater for an assumed 25% reduction in DAS use and 25% reduction in fishing revenue for an assumed 35% reduction in used DAS. Revenue impacts for the 84 least affected vessels would be no more than 1.5% and 0.1%, respectively, for an assumed 25% and 35% reduction in used DAS.

Table 19. Summary of Relative Change in Gross Revenue for All Vessels

				Preferred Alternative			
		No Action		25% Reduction in Used DAS		35% Reduction in Used DAS	
Percentile	Number of Vessels	Lower	Upper	Lower	Upper	Lower	Upper
10th Percentile	84	Minimum	0.0%	Minimum	-21.3%	Minimum	-25.0%
25th Percentile	126	0.0%	0.0%	-21.3%	-18.4%	-25.0%	-19.7%
50th Percentile	209	0.0%	0.0%	-18.4%	-12.6%	-19.7%	-11.5%
75th Percentile	209	0.0%	0.4%	-12.6%	-5.5%	-11.5%	-2.8%
90th Percentile	126	0.4%	7.2%	-5.5%	-1.5%	-2.8%	-0.1%
Above 90th Percentile	84	7.2%	Maximum	-1.5%	Maximum	-0.1%	Maximum

5.2.3.1 Effects by Proportion of Groundfish Income

Differential impacts of groundfish management measures derive from two sources: Different fishing patterns in terms of season, gear, and area fished; and differing levels of dependence on groundfish for fishing income. Vessels that share common groundfish fishing patterns may be affected very differently, depending upon how groundfish activity fits into their overall fishing business. Relative dependence on groundfish was calculated as the proportion of groundfish revenue to total fishing revenue for the 1998-2000 baseline average. Dependence on groundfish was than classified into quartiles.

The No Action Alternative would have positive impacts, but these impacts are greater for vessels (approximately 68 % of total vessels included in the analysis) that rely on groundfish for at least half of fishing income (Table 6). Vessels that earn at least 50 % of income from species other than groundfish would receive relatively little benefit from opening the WGOM Closure Area.

Just as the No Action Alternative had a greater positive impact on vessels with higher groundfish dependence, the Preferred Alternative has a greater adverse impact on these vessels. At the 10th percentile, adverse income effects (22.7% and 32% for scenarios of 25% and 35% reduction in DAS use, respectively) are nearly twice that of vessels that rely on groundfish for less than half of their annual fishing income (10.4% and 14.5% for the two DAS use scenarios, respectively).

Table 20. Relative Change in Gross Revenues by Level of Dependence on Groundfish for Total Fishing Revenue

		No Action		Preferred Alternative 25% Reduction in Used DAS		Preferred Alternative 35% Reduction in Used DAS	
Dependence on Groundfish	Number of Vessels	Lower	Upper	Lower	Upper	Lower	Upper
Less than 25% (n=235)							
10th Percentile	18	Minimum	0.0%	Minimum	-4.6%	Minimum	-6.5%
25th Percentile	27	0.0%	0.0%	-4.6%	-3.4%	-6.5%	-4.9%
50th Percentile	45	0.0%	0.0%	-3.4%	-2.0%	-4.9%	-2.8%
75th Percentile	45	0.0%	0.0%	-2.0%	-0.6%	-2.8%	-0.9%
90th Percentile	27	0.0%	0.5%	-0.6%	0.0%	-0.9%	0.0%
Above 90th Percentile	18	0.5%	Maximum	0.0%	Maximum	0.0%	Maximum
25 to less than 50% (n=158)							
10th Percentile	14	Minimum	0.0%	Minimum	-10.4%	Minimum	-14.5%
25th Percentile	21	0.0%	0.0%	-10.4%	-8.9%	-14.5%	-12.9%
50th Percentile	36	0.0%	0.0%	-8.9%	-7.3%	-12.9%	-10.4%
75th Percentile	36	0.0%	0.0%	-7.3%	-6.1%	-10.4%	-8.7%
90th Percentile	21	0.0%	0.3%	-6.1%	-5.2%	-8.7%	-7.4%
Above 90th Percentile	14	0.3%	Maximum	-5.2%	Maximum	-7.4%	Maximum

50% to less than 75% (n=176)							
10th Percentile	15	Minimum	0.0%	Minimum	-16.0%	Minimum	-22.4%
25th Percentile	23	0.0%	0.0%	-16.0%	-14.4%	-22.4%	-20.5%
50th Percentile	38	0.0%	0.0%	-14.4%	-12.6%	-20.5%	-17.9%
75th Percentile	38	0.0%	1.8%	-12.6%	-11.5%	-17.9%	-16.6%
90th Percentile	23	1.8%	13.8%	-11.5%	-10.0%	-16.6%	-14.5%
Above 90th Percentile	15	13.8%	Maximum	-10.0%	Maximum	-14.5%	Maximum
75% or Greater (n=395)							
10th Percentile	37	Minimum	0.0%	Minimum	-22.7%	Minimum	-32.0%
25th Percentile	55	0.0%	0.0%	-22.7%	-21.0%	-32.0%	-29.6%
50th Percentile	91	0.0%	0.0%	-21.0%	-18.9%	-29.6%	-26.8%
75th Percentile	91	0.0%	1.8%	-18.9%	-16.8%	-26.8%	-24.0%
90th Percentile	55	1.8%	12.0%	-16.8%	-14.8%	-24.0%	-21.3%
Above 90th Percentile	37	12.0%	Maximum	-14.8%	Maximum	-21.3%	Maximum

5.2.3.2 Effects by Vessel Size

Under Alternative 1 (No Action), all expected revenue changes would be positive (Table 21). However, opening of the WGOM Area Closure to fishing would have greater positive impacts on small vessels (23.5 percent at and above the 90th percentile) than medium vessels (7.6 percent at the 90th percentile), and medium vessels would benefit relatively more than large vessels (see Table 21). These results indicate that the WGOM Area Closure is more important as a source of fishing revenues for vessels less than 50 feet than it is for larger vessels.

The Preferred Alternative would have result in revenue reductions of between 10% and 13.5% (the 25% DAS reduction scenario) for the median vessel across all size classes. For both DAS use reduction scenarios, there were only small differences across all vessels size classes and percentiles. These results suggest that the Preferred Alternative would not have a disproportionate impact on vessels of differing sizes.

Table 21. Proportional Change in Gross Annual Revenues by Vessel Size (Large = +70'; Medium = 50 to 70', Small = Under 50')

	Preferred Alternative

		No Action		25% Reduction in Used DAS		35% Reduction in Used DAS	
Large (n=184)	Number of Vessels	Lower	Upper	Lower	Upper	Lower	Upper
10th Percentile	18	Minimum	0.0%	Minimum	-19.9%	Minimum	-28.1%
25th Percentile	28	0.0%	0.0%	-19.9%	-18.3%	-28.1%	-26.2%
50th Percentile	46	0.0%	0.0%	-18.3%	-12.7%	-26.2%	-18.3%
75th Percentile	46	0.0%	0.0%	-12.7%	-6.1%	-18.3%	-8.8%
90th Percentile	28	0.0%	1.4%	-6.1%	-1.8%	-8.8%	-2.5%
Above 90th Percentile	18	1.4%	Maximum	-1.8%	Maximum	-2.5%	Maximum
Medium (n=483)							
10th Percentile	48	Minimum	0.0%	Minimum	-21.3%	Minimum	-29.9%
25th Percentile	72	0.0%	0.0%	-21.3%	-18.5%	-29.9%	-26.2%
50th Percentile	121	0.0%	0.0%	-18.5%	-13.5%	-26.2%	-19.0%
75th Percentile	121	0.0%	0.6%	-13.5%	-6.1%	-19.0%	-9.2%
90th Percentile	72	0.6%	7.6%	-6.1%	-2.0%	-9.2%	-3.0%
Above 90th Percentile	48	7.6%	Maximum	-2.0%	Maximum	-3.0%	Maximum
Small (n=170)							
10th Percentile	17	Minimum	0.0%	Minimum	-22.7%	Minimum	-32.0%
25th Percentile	26	0.0%	0.0%	-22.7%	-18.3%	-32.0%	-25.6%
50th Percentile	43	0.0%	0.0%	-18.3%	-10.0%	-25.6%	-14.0%
75th Percentile	43	0.0%	1.4%	-10.0%	-2.9%	-14.0%	-4.3%
90th Percentile	26	1.4%	23.5%	-2.9%	-0.2%	-4.3%	-0.6%
Above 90th Percentile	17	23.5%	Maximum	-0.2%	Maximum	-0.6%	Maximum

5.2.3.3 Effects by Gear Groups

Among the gear groups, gillnet and hook gear would benefit most from Alternative 1 (No Action), as revenues would increase 4.8 percent at

the 75th percentile and 22.3 percent at the 90th percentile for gillnet gear, and 2.2% and 38.9%, respectively, for hook gear (see Table 22). These results indicate that the WGOM Area Closure is more important for fishing revenue for fixed gear, as compared to mobile gear.

Table 22. Proportional Change in Gross Annual Revenues by Gear Group

				Preferred Alternative			
		No Action		25% Reduction in Used DAS		35% Reduction in Used DAS	
Gear Group	Number of Vessels	Lower	Upper	Lower	Upper	Lower	Upper
Gillnet Gear (n= 200)							
10th Percentile	20	Minimum	0.0%	Minimum	-21.9%	Minimum	-30.8%
25th Percentile	30	0.0%	0.0%	-21.9%	-18.5%	-30.8%	-26.7%
50th Percentile	50	0.0%	0.0%	-18.5%	-12.2%	-26.7%	-17.9%
75th Percentile	50	0.0%	4.8%	-12.2%	-4.4%	-17.9%	-6.2%
90th Percentile	30	4.8%	22.3%	-4.4%	-0.6%	-6.2%	-0.9%
Above 90th Percentile	20	22.3%	Maximum	-0.6%	Maximum	-0.9%	Maximum
Hook Gear (n=103)							
10th Percentile	10	Minimum	0.0%	Minimum	-22.3%	Minimum	-31.5%
25th Percentile	15	0.0%	0.0%	-22.3%	-19.2%	-31.5%	-26.8%
50th Percentile	26	0.0%	0.0%	-19.2%	-13.7%	-26.8%	-19.2%
75th Percentile	26	0.0%	2.2%	-13.7%	-4.4%	-19.2%	-6.3%
90th Percentile	15	2.2%	38.9%	-4.4%	-0.3%	-6.3%	-0.7%
Above 90th Percentile	10	38.9%	Maximum	-0.3%	Maximum	-0.7%	Maximum
Trawl Gear (n=534)							
10th Percentile	53	Minimum	0.0%	Minimum	-20.6%	Minimum	-29.2%
25th Percentile	80	0.0%	0.0%	-20.6%	-18.3%	-29.2%	-26.1%
50th Percentile	134	0.0%	0.0%	-18.3%	-12.5%	-26.1%	-17.9%
75th Percentile	134	0.0%	0.0%	-12.5%	-6.0%	-17.9%	-8.8%

90th Percentile	80	0.0%	3.5%	-6.0%	-2.0%	-8.8%	-3.0%
Above 90th Percentile	53	3.5%	Maximum	-2.0%	Maximum	-3.0%	Maximum

Under the Preferred Alternative, median vessel revenue losses were between 12.2 and 13.7 percent and 17.9, and 19.2 percent, respectively, for the 25 and 35 percent DAS reduction scenarios. Just as there were only small differences in revenue impacts among vessels of differing sizes, the Preferred Alternative would not result in disproportionate impacts among gear groups.

5.2.3.4 Effects by Gear/Vessel Size Groups

Alternative 1 (No Action) would have the greatest positive impact on small gillnet and large hook vessels. Opening the WGOM Area Closure would result in an estimated 40.1-percent and 25.9-percent increase in annual gross revenues at the 90th percentile for small gillnet and large hook vessels, respectively (see Table 23). Consistent with the gear group impacts detailed in the previous section, the beneficial impacts to trawl vessels of opening the WGOM closure area are much smaller than any of the hook or gillnet size groupings, regardless of trawl vessel size class.

Under the Preferred Alternative, estimated revenue impacts on trawl vessels of differing sizes were similar at all percentiles below the 75th percentile. Above the 75th percentile, the revenue impacts on small vessels were a little less than half that of either large or medium sized trawl vessels. Likewise, revenue impacts on vessels of different size for both hook and gillnet gear followed a similar pattern, with small vessels being less impacted than larger vessels using the same gear.

Table 23. Proportional Change in Gross Annual Revenues by Gear Group and Vessel Size (Large = +70'; Medium = 50 to 70', Small = Under 50')

				Preferred Alternative			
		No Action		25% Reduction in Used DAS		35% Reduction in Used DAS	
Gear/Size Group	Number of Vessels	Lower	Upper	Lower	Upper	Lower	Upper
Medium Gillnet (n=137)							
10th Percentile	14	Minimum	0.0%	Minimum	-21.5%	Minimum	-30.2%
25th Percentile	21	0.0%	0.0%	-21.5%	-18.5%	-30.2%	-26.4%
50th Percentile	34	0.0%	0.0%	-18.5%	-12.7%	-26.4%	-18.1%
75th Percentile	34	0.0%	4.8%	-12.7%	-5.5%	-18.1%	-7.8%
90th Percentile	21	4.8%	19.3%	-5.5%	-1.2%	-7.8%	-1.9%
Above 90th Percentile	14	19.3%	Maximum	-1.2%	Maximum	-1.9%	Maximum
Small Gillnet							

(n=63)								
10th Percentile	6	Minimum	0.0%	Minimum	-22.8%	Minimum	-32.0%	
25th Percentile	9	0.0%	0.0%	-22.8%	-19.1%	-32.0%	-27.3%	
50th Percentile	16	0.0%	0.0%	-19.1%	-9.3%	-27.3%	-13.6%	
75th Percentile	16	0.0%	6.4%	-9.3%	-2.5%	-13.6%	-3.5%	
90th Percentile	9	6.4%	41.4%	-2.5%	-0.1%	-3.5%	-0.1%	
Above 90th Percentile	6	41.4%	Maximum	-0.1%	Maximum	-0.1%	Maximum	
Large Hook								
(n=56)								
10th Percentile	6	Minimum	0.0%	Minimum	-22.3%	Minimum	-31.3%	
25th Percentile	8	0.0%	0.0%	-22.3%	-19.0%	-31.3%	-26.8%	
50th Percentile	14	0.0%	0.0%	-19.0%	-14.9%	-26.8%	-21.5%	
75th Percentile	14	0.0%	0.0%	-14.9%	-10.0%	-21.5%	-15.1%	
90th Percentile	8	0.0%	25.9%	-10.0%	-0.5%	-15.1%	-1.4%	
Above 90th Percentile	6	25.9%	Maximum	-0.5%	Maximum	-1.4%	Maximum	
Small Hook								
(n=47)								
10th Percentile	5	Minimum	0.0%	Minimum	-22.5%	Minimum	-32.1%	
25th Percentile	7	0.0%	0.0%	-22.5%	-19.4%	-32.1%	-27.1%	
50th Percentile	12	0.0%	0.0%	-19.4%	-10.7%	-27.1%	-15.0%	
75th Percentile	12	0.0%	0.3%	-10.7%	-2.3%	-15.0%	-3.4%	
90th Percentile	7	0.3%	4.0%	-2.3%	-0.2%	-3.4%	-0.4%	
Above 90th Percentile	5	4.0%	Maximum	-0.2%	Maximum	-0.4%	Maximum	
Large Trawl								
(n=173)								
10th Percentile	17	Minimum	0.0%	Minimum	-19.9%	Minimum	-28.1%	
25th Percentile	26	0.0%	0.0%	-19.9%	-18.3%	-28.1%	-26.1%	
50th Percentile	43	0.0%	0.0%	-18.3%	-12.4%	-26.1%	-17.8%	
75th Percentile	43	0.0%	0.0%	-12.4%	-6.1%	-17.8%	-8.7%	
90th Percentile	26	0.0%	1.3%	-6.1%	-1.8%	-8.7%	-2.5%	
Above 90th Percentile	17	1.3%	Maximum	-1.8%	Maximum	-2.5%	Maximum	
Medium Trawl								
(n=179)								
10th Percentile	18	Minimum	0.0%	Minimum	-20.3%	Minimum	-28.8%	
25th Percentile	27	0.0%	0.0%	-20.3%	-18.2%	-28.8%	-25.7%	
50th Percentile	45	0.0%	0.0%	-18.2%	-12.7%	-25.7%	-18.3%	
75th Percentile	45	0.0%	0.0%	-12.7%	-7.2%	-18.3%	-10.7%	
90th Percentile	27	0.0%	4.6%	-7.2%	-3.7%	-10.7%	-5.5%	
Above 90th Percentile	18	4.6%	Maximum	-3.7%	Maximum	-5.5%	Maximum	
Small Trawl								
(n=182)								

10th Percentile	18	Minimum	0.0%	Minimum	-21.4%	Minimum	-30.5%
25th Percentile	27	0.0%	0.0%	-21.4%	-18.5%	-30.5%	-26.3%
50th Percentile	46	0.0%	0.0%	-18.5%	-11.9%	-26.3%	-17.4%
75th Percentile	46	0.0%	0.3%	-11.9%	-4.1%	-17.4%	-6.5%
90th Percentile	27	0.3%	4.0%	-4.1%	-0.9%	-6.5%	-2.5%
Above 90th Percentile	18	4.0%	Maximum	-0.9%	Maximum	-2.5%	Maximum

5.2.3.5 Effects by Home Port State

The No Action alternative would only affect vessels that list home ports in Maine, New Hampshire, or Massachusetts on their multispecies permit applications. Among these GOM border states, New Hampshire vessels would benefit most (20.7 percent at the 90th percentile), followed by Massachusetts (15.4 percent) and Maine (7.2 percent) (see Table 24).

The Preferred Alternative would have broader impacts across the Northeast region, although the economic impacts are greater on vessels in Maine, New Hampshire, and Massachusetts. However, among these states, the estimated impacts would be similar at all percentiles, so the Preferred Alternative would not result in disproportionate impacts on these three states. Among the remaining states, the distribution of revenue impacts would be similar for both Rhode Island, and New York and Connecticut combined, and would be somewhat lower for vessels with a New Jersey home port.

Table 24. Proportional Change in Gross Annual Revenues by Home Port State

				Preferred Alternative			
		No Action		25% Reduction in Used DAS		35% Reduction in Used DAS	
Home Port State	Number of Vessels	Lower	Upper	Lower	Upper	Lower	Upper
Massachusetts (n=387)							
10th Percentile	39	Minimum	0.0%	Minimum	-22.3%	Minimum	-31.5%
25th Percentile	58	0.0%	0.0%	-22.3%	-19.7%	-31.5%	-27.8%
50th Percentile	97	0.0%	0.0%	-19.7%	-16.2%	-27.8%	-23.6%
75th Percentile	97	0.0%	1.7%	-16.2%	-8.9%	-23.6%	-13.1%
90th Percentile	58	1.7%	15.4%	-8.9%	-1.5%	-13.1%	-2.9%
Above 90th Percentile	39	15.4%	Maximum	-1.5%	Maximum	-2.9%	Maximum
Maine (n=133)							
10th Percentile	13	Minimum	0.0%	Minimum	-20.7%	Minimum	-29.3%
25th Percentile	20	0.0%	0.0%	-20.7%	-19.1%	-29.3%	-27.2%
50th Percentile	33	0.0%	0.0%	-19.1%	-16.6%	-27.2%	-23.5%
75th Percentile	33	0.0%	1.4%	-16.6%	-10.3%	-23.5%	-14.5%

90th Percentile	20	1.4%	7.2%	-10.3%	-2.3%	-14.5%	-3.2%
Above 90th Percentile	13	7.2%	Maximum	-2.3%	Maximum	-3.2%	Maximum
New Hampshire (n=62)							
10th Percentile	6	Minimum	0.0%	Minimum	-21.6%	Minimum	-30.5%
25th Percentile	9	0.0%	0.0%	-21.6%	-19.4%	-30.5%	-27.7%
50th Percentile	16	0.0%	0.0%	-19.4%	-13.7%	-27.7%	-19.6%
75th Percentile	16	0.0%	4.3%	-13.7%	-10.0%	-19.6%	-15.1%
90th Percentile	9	4.3%	20.7%	-10.0%	-0.2%	-15.1%	-8.9%
Above 90th Percentile	6	20.7%	Maximum	-0.2%	Maximum	-8.9%	Maximum
New Jersey (n=43)							
10th Percentile	4	Minimum	0.0%	Minimum	-9.9%	Minimum	-13.9%
25th Percentile	6	0.0%	0.0%	-9.9%	-8.4%	-13.9%	-11.9%
50th Percentile	11	0.0%	0.0%	-8.4%	-5.5%	-11.9%	-7.8%
75th Percentile	11	0.0%	0.0%	-5.5%	-2.3%	-7.8%	-3.2%
90th Percentile	6	0.0%	0.0%	-2.3%	-0.6%	-3.2%	-0.9%
Above 90th Percentile	4	0.0%	Maximum	-0.6%	Maximum	-0.9%	Maximum
New York/Connecticut (94)							
10th Percentile	9	Minimum	0.0%	Minimum	-14.4%	Minimum	-21.0%
25th Percentile	14	0.0%	0.0%	-14.4%	-11.0%	-21.0%	-15.7%
50th Percentile	24	0.0%	0.0%	-11.0%	-6.1%	-15.7%	-8.7%
75th Percentile	24	0.0%	0.0%	-6.1%	-3.3%	-8.7%	-4.7%
90th Percentile	14	0.0%	0.0%	-3.3%	-0.6%	-4.7%	-0.9%
Above 90th Percentile	9	0.0%	Maximum	-0.6%	Maximum	-0.9%	Maximum
Rhode Island (n=94)							
10th Percentile	9	Minimum	0.0%	Minimum	-15.1%	Minimum	-21.1%
25th Percentile	14	0.0%	0.0%	-15.1%	-12.5%	-21.1%	-17.5%
50th Percentile	24	0.0%	0.0%	-12.5%	-8.2%	-17.5%	-11.7%
75th Percentile	24	0.0%	0.0%	-8.2%	-4.8%	-11.7%	-7.0%
90th Percentile	14	0.0%	0.0%	-4.8%	-2.0%	-7.0%	-2.8%
Above 90th Percentile	9	0.0%	Maximum	-2.0%	Maximum	-2.8%	Maximum
All Other (n=24)							
25th Percentile	6	Minimum	0.0%	Minimum	-8.8%	Minimum	-13.0%
50th Percentile	6	0.0%	0.0%	-8.8%	-3.8%	-13.0%	-5.4%
75th Percentile	6	0.0%	0.0%	-3.8%	-1.7%	-5.4%	-2.6%
Above 75th Percentile	6	0.0%	Maximum	-1.7%	Maximum	-2.6%	Maximum

5.2.3.6 Effects by Port Group

The preceding analysis was further subdivided into specific port groups that were identified by NEFMC staff as part of supporting analyses for development of Amendment 13 to the FMP. Since the number of vessels in any given port group may be small, reporting of economic impact results is only possible for the 25th, 50th (median), and 75th percentiles.

As indicated previously, the No Action alternative would have positive impacts on vessels that fish in the GOM and that may fish in the WGOM Area Closure specifically. Vessels that may be positively affected by the No Action alternative are in the Gloucester, New Hampshire Seacoast, Portsmouth, Portland, and South Shore Massachusetts port groups (see Table 25).

Under the Preferred Alternative, vessels at or below the 25th percentile in the Chatham/Harwich, Gloucester, Portland, and Portsmouth port groups would be affected by revenue losses exceeding 20% and 30%, respectively, for the 25 and 35 percent used DAS reduction scenarios. Revenue impacts on vessels at or below the 25th percentile in all other ports bordering the Gulf of Maine plus New Bedford would range between 15 and 19% for the 25 percent used DAS reduction scenario. Estimated revenue impacts on vessels from Point Judith, Eastern Long Island, and all other ports were generally lower.

Table 25. Proportional Change in Gross Annual Revenues by Port Group

				Preferred Alternative			
		No Action		25% Reduction in Used DAS		35% Reduction in Used DAS	
Port Group	Number of Vessels	Lower	Upper	Lower	Upper	Lower	Upper
Boston (n=19)							
25th Percentile	5	Minimum	0.0%	Minimum	-18.4%	Minimum	-26.1%
50th Percentile	5	0.0%	0.1%	-18.4%	-16.6%	-26.1%	-23.7%
75th Percentile	5	0.1%	2.7%	-16.6%	-5.2%	-23.7%	-7.2%
Above 75th Percentile	5	2.7%	Maximum	-5.2%	Maximum	-7.2%	Maximum
Chatham/Harwich (n=48)							
25th Percentile	12	Minimum	0.0%	Minimum	-22.0%	Minimum	-31.1%
50th Percentile	12	0.0%	0.0%	-22.0%	-19.0%	-31.1%	-26.9%
75th Percentile	12	0.0%	0.0%	-19.0%	-15.2%	-26.9%	-21.4%
Above 75th Percentile	12	0.0%	Maximum	-15.2%	Maximum	-21.4%	Maximum
Eastern Long Island (n=40)							
25th Percentile	10	Minimum	0.0%	Minimum	-7.3%	Minimum	-10.3%

50th Percentile	10	0.0%	0.0%	-7.3%	-4.6%	-10.3%	-6.5%
75th Percentile	10	0.0%	0.0%	-4.6%	-1.7%	-6.5%	-2.3%
Above 75th Percentile	10	0.0%	Maximum	-1.7%	Maximum	-2.3%	Maximum
Gloucester (n=100)							
25th Percentile	25	Minimum	0.0%	Minimum	-21.5%	Minimum	-30.3%
50th Percentile	25	0.0%	1.0%	-21.5%	-18.9%	-30.3%	-27.1%
75th Percentile	25	1.0%	12.0%	-18.9%	-13.6%	-27.1%	-19.2%
Above 75th Percentile	25	12.0%	Maximum	-13.6%	Maximum	-19.2%	Maximum
New Bedford (n=90)							
25th Percentile	23	Minimum	0.0%	Minimum	-18.9%	Minimum	-26.7%
50th Percentile	23	0.0%	0.0%	-18.9%	-16.9%	-26.7%	-24.0%
75th Percentile	23	0.0%	0.0%	-16.9%	-12.2%	-24.0%	-17.7%
Above 75th Percentile	23	0.0%	Maximum	-12.2%	Maximum	-17.7%	Maximum
New Hampshire Seacoast (n=31)							
25th Percentile	8	Minimum	0.0%	Minimum	-17.5%	Minimum	-24.5%
50th Percentile	8	0.0%	0.0%	-17.5%	-11.2%	-24.5%	-17.8%
75th Percentile	8	0.0%	2.6%	-11.2%	-9.3%	-17.8%	-14.0%
Above 75th Percentile	8	2.6%	Maximum	-9.3%	Maximum	-14.0%	Maximum
Point Judith (n=48)							
25th Percentile	12	Minimum	0.0%	Minimum	-12.7%	Minimum	-18.2%
50th Percentile	12	0.0%	0.0%	-12.7%	-8.6%	-18.2%	-12.4%
75th Percentile	12	0.0%	0.0%	-8.6%	-4.9%	-12.4%	-7.0%
Above 75th Percentile	12	0.0%	Maximum	-4.9%	Maximum	-7.0%	Maximum
Portland (n=42)							
25th Percentile	11	Minimum	0.0%	Minimum	-20.6%	Minimum	-29.0%
50th Percentile	11	0.0%	0.0%	-20.6%	-19.1%	-29.0%	-27.1%
75th Percentile	11	0.0%	4.6%	-19.1%	-16.6%	-27.1%	-23.5%
Above 75th Percentile	11	4.6%	Maximum	-16.6%	Maximum	-23.5%	Maximum
Portsmouth (n=28)							
25th Percentile	7	Minimum	0.0%	Minimum	-21.3%	Minimum	-30.0%
50th Percentile	7	0.0%	1.0%	-21.3%	-15.5%	-30.0%	-22.0%
75th Percentile	7	1.0%	6.9%	-15.5%	-12.5%	-22.0%	-17.9%
Above 75th Percentile	7	6.9%	Maximum	-12.5%	Maximum	-17.9%	Maximum

Provincetown (n=20)							
25th Percentile	5	Minimum	0.0%	Minimum	-16.3%	Minimum	-23.2%
50th Percentile	5	0.0%	0.0%	-16.3%	-13.7%	-23.2%	-19.3%
75th Percentile	5	0.0%	1.9%	-13.7%	-9.5%	-19.3%	-13.4%
Above 75th Percentile	5	1.9%	Maximum	-9.5%	Maximum	-13.4%	Maximum
South Shore Massachusetts (n=36)							
25th Percentile	9	Minimum	0.0%	Minimum	-15.9%	Minimum	-23.2%
50th Percentile	9	0.0%	0.5%	-15.9%	-12.6%	-23.2%	-17.9%
75th Percentile	9	0.5%	11.9%	-12.6%	-4.9%	-17.9%	-6.9%
Above 75th Percentile	9	11.9%	Maximum	-4.9%	Maximum	-6.9%	Maximum
Upper Mid-Coast Maine (n=15)							
25th Percentile	4	Minimum	0.0%	Minimum	-19.4%	Minimum	-27.4%
50th Percentile	4	0.0%	0.0%	-19.4%	-17.5%	-27.4%	-24.7%
75th Percentile	4	0.0%	0.0%	-17.5%	-15.2%	-24.7%	-21.4%
Above 75th Percentile	4	0.0%	Maximum	-15.2%	Maximum	-21.4%	Maximum
Other (n=320)							
25th Percentile	80	Minimum	0.0%	Minimum	-14.3%	Minimum	-20.6%
50th Percentile	80	0.0%	0.0%	-14.3%	-8.3%	-20.6%	-11.9%
75th Percentile	80	0.0%	0.0%	-8.3%	-3.1%	-11.9%	-4.5%
Above 75th Percentile	80	0.0%	Maximum	-3.1%	Maximum	-4.5%	Maximum

5.2.4 Economic Impacts of DAS Leasing Program

Leasing of DAS would provide individual vessel owners an opportunity to offset or reduce the impacts from the DAS reductions that were implemented in August, 2002 that would be continued under the proposed action. The relative impact of DAS reductions will depend on the dependence on groundfish for total fishing income and other fishing opportunities or permits that may be available. For some vessels with a high dependence on groundfish and few alternatives the DAS reductions could be sufficient to place these vessels at risk of business failure.

Given the lack of experience with DAS leasing the economic impacts are difficult to predict since the number of likely participating vessels is not known. The following provides two analytical approaches that were developed to identify anticipated economic impacts. The first analysis identifies the number of vessels whose FY2003 DAS allocations would not be sufficient to pay fixed costs plus provide a minimum crew payment. This analysis also identifies the total number of DAS that

would be required for vessels that may fall below this level and the total number of DAS allocated to vessels that may be above this level. The second analysis uses a math programming model to simulate a hypothetical market for leased DAS. This model is highly stylized and does not incorporate all of the features of the Preferred Alternative. Nevertheless, the model does provide an estimate of average lease price and can be used to identify possible market transactions to assess how DAS may end up being distributed.

As noted previously, DAS leasing will provide small fishing entities with greater flexibility to adapt to the regulatory framework that has been implemented and would be continued through the proposed action. These following analyses provide some insights as to how DAS leasing might affect individual vessels. However, DAS leasing could have broader seafood market implications as DAS are moved from one fishing platform to another. For example, there could be changes in the mix of species available to seafood buyers and distributors. Another possibility is that there could be regional changes in seafood supplies. Although, the aggregate supply of groundfish is not expected to differ, changes in the distribution of landings could result in increases in supply in one port while supplies in other ports may decline.

5.2.4.1 Vessel Break-Even Analysis

Data and Methods used to Estimate Break-even DAS

The most direct way to analyze the economic impact of DAS reductions would be to estimate impacts on vessel profitability. While information on vessel costs and revenue are available, the coverage of costs is not extensive enough to provide reliable estimates of fishing vessel profitability. Instead, this analysis first estimates the number of DAS needed by vessels of different gear and size classes to cover operating and annual costs before returns are divided among crew and owner. Then, the number of days needed to cover labor's and owner's return are estimated. Comparing these DAS requirements with current allocated DAS, and knowing the average daily return by vessel class, provides an indication of how close vessels are to being unable to realize adequate returns to labor and the owner, and to pay down debt under new restrictions.

The reason for partitioning DAS requirements this way is because, when faced with lower returns, vessel owners often adjust crew payments. Labor payments on fishing vessels are made on a trip basis, with the crew sharing the risk of variable levels of catch. Generally, a crew share formula is used, which deducts trip expenses from the revenue received on a trip and then divides the remainder among the crew and the vessel owner (or, the revenue is divided first then certain expenses deducted from the crew's share). The reason for not including a daily labor cost in the calculation of DAS requirements is that crew share formulas are often adjusted, or crew size is reduced, when revenue declines. They may also make other cost-saving

adjustments, but the risk sharing found in commercial fishing leads to first making adjustments in crew payments.

With reduced DAS, fishing vessel owners will evaluate their ability to meet expenses, crew payments, debts, and an owner's return, given their new allocation[2]. Returns from other fisheries will be a factor, but this analysis only considers groundfish DAS requirements. Since groundfish DAS are annual allocations, the DAS requirements are expressed as annual needs.

Crew share payments are made on a trip basis, so crew is normally paid before overhead expenses are paid. However, vessel owners are likely to project the effect of reduced DAS on their ability to pay all expenses. The decision to take an individual trip may be based on expected daily return and daily expenses, including crew payment and owner's return. But with limited DAS, the additional return needed to pay overhead expenses should also be considered.

Since crew payments and owner return can be adjusted in response to DAS reductions, this analysis shows the DAS required to meet all non-labor expenses and then treats DAS requirements for labor and owner's return separately. In reality, a vessel owner will decide to get out of fishing long, before crew payments and owner's return approach zero (in the long run but may continue for the short run if conditions are expected to change). This analysis, however, provides estimates of where returns would equal zero, then reports the additional DAS needed to provide a level of crew payments that approximate wages found in alternative shore-side occupations.

Cost data were collected through surveys of fleet sectors involved in catching groundfish. The University of Rhode Island surveyed the small trawl vessel fleet[3] in 1996 and the large trawl vessel fleet[4] in 1997. The University of Massachusetts Dartmouth surveyed the hook fleet[5] in 1996. Both surveys were funded through NMFS' Cooperative

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[2] Note that ownership arrangement (owner operated vs. hired captain) will impact the return to owner

[3]Lallemand, Philippe, J.M. Gates, J. Dirlam, and J. Cho. March 1998. The Costs of Small Trawlers in the Northeast. Department of Environmental and Natural Resource Economics, The University of Rhode Island.

[4]Lallemand, Philippe, J.M. Gates, J. Dirlam, and J. Cho. April 1999. The Costs of Large Trawlers in the Northeast. Department of Environmental and Natural Resource Economics, The University of Rhode Island.

[5]Georgianna, Daniel, and A. Cass. September 1998. The Cost of Hook Fishing for Groundfish in the Northeastern United States. University of Massachusetts Dartmouth.

Marine Education and Research (CMER) Program and the data provided to NMFS. Cost data for the gillnet fleet comes from economic questions asked by observers on sea sampling trips in 2000. Cost data from 1996-97 was adjusted for inflation with the GDP implicit price deflator, and is in 2000 dollars.

The cost surveys collected data on all fishing business costs - both variable and overhead. Variable costs include fuel, oil/lubrication, ice, food/water, bait (where applicable), offloading, consignment, supplies, and other trip costs. Overhead costs include association fees, permits, haul out, insurance, mooring, office expenses, professional fees, business taxes, vehicle, interest, repair/maintenance, and other overhead expenses. The variable cost questions asked by observers are limited to fuel, oil/lubrication, ice, food/water, and bait (which is not applicable to gillnet vessels). The only overhead cost question asked by observers is the cost of insurance. For this analysis, overhead costs for gillnet vessels are assumed to be the same as for long-line vessels.

Based on the number of observations and the range of vessel sizes in the cost data, the vessels were separated into length classes. There are two length classes for each gear group, except trawl vessels, which have three length classes. This grouping of vessels by gear and size is unique to the DAS requirements analysis. Further sub-divisions by port or other criteria were not possible due to limited numbers of observations.

Fishing year 2000 (May 2000 through April 2001) revenue data were generated by applying average fish prices from the NEFSC dealer data to logbook trips with groundfish landings. Observations were limited to those vessels with a limited access multispecies permit. Therefore, DAS would have been used on these trips. Revenue from all species was summed for the trip then divided by DAS used to get revenue per DAS. Trips were then categorized by gear type and vessel length class.

Overhead DAS Analysis

DAS requirements are estimated in two stages. The first stage estimates DAS requirements for non-labor expenses. Here, a daily return is calculated by subtracting variable costs per day from revenue per day. The software package *BestFit* was used to fit distributions to the cost and revenue data (Table 26)[6]. Daily returns by vessel group are shown in Table 27.

Even though crew share payments are a variable cost (paid at the end of a trip based on the catch and expense levels), these costs are not considered in the first stage. The latter part of the first stage divides the yearly overhead costs by the daily return to get the

[6] *BestFit* and *@RISK* software were developed by the Palisade Corporation in Newfield, NY

minimum number of DAS needed to cover overhead expenses. These will be referred to as overhead days. Rather than use the arithmetic means of cost and revenue data to calculate a point estimate of overhead DAS, this analysis uses the distribution of these data to estimate an expected value and likelihood of overhead DAS. Using the distributions helps to capture the variability of the cost and revenue data. The results show probability distributions of overhead DAS with confidence intervals of 80%.

The software package called *@RISK* was used to run a simulation where cost and revenue values are randomly chosen, according to their probability distribution, to get a distribution on overhead DAS. The *@RISK* software allows the user to correlate the selection of values in the simulation. For example, a high cost value is chosen in an iteration if a high revenue value is chosen, and vice versa. The simulation was allowed to continue until it converged (at 10,000 iterations). Overhead DAS values were constrained to between 0 and 365 DAS.

Since a groundfish trip was defined as a trip where at least a pound of groundfish was landed by a vessel with a limited access permit, and since revenue from all species was summed for that trip, the number of DAS reported here are what is needed to meet overhead expenses if only allocated multispecies DAS are used. As is the case with many vessels, additional revenue is earned by targeting other species during the year. That activity is not counted here.

A vessel owner's ability to pay the crew and get a return on his investment (and any principal payments) will be impacted by the new DAS restrictions. To assess how the DAS allocations impact payments to crew, the additional DAS needed to compensate the crew are given in Table 28. For example, the average daily return is $927 for long-line vessels less than 40 feet. If an annual salary of $25,000 per crew member (based on the Department of Labor's 2000 National Compensation Survey for shore-side occupations in New England) is assumed, and there are two crew members, it would take an additional 54 DAS to meet that wage. Additional days are then required for the owner to receive a return (which may be in addition to the captain's portion of the crew share, if the owner is also the captain). The average crew size by vessel and gear class is also given in Table 28. Adding average overhead DAS and the crew compensation DAS yields an estimate of the point where crew is paid, but there is no return to the owner. There are many different functions performed by crew members, which require different sets of skills. Some crew members are employed as deck hands, others as engineers, cooks, and captains. To account for these skill differences, the additional DAS requirements to meet shore-side alternative occupation salary levels was calculated at two additional levels - $35,000 and $50,000 per year (see Table 29).

Results

Since the number of break-even DAS is based on income from groundfish trips, the impact of DAS reductions and the benefits of a leasing

program are not likely to be as great for vessels that do not rely on groundfish for the majority of the fishing income. For this reason, results are reported only for vessels (a total of 632 vessels) whose fishing income was comprised of at least 50% groundfish trip revenue. Given FY2002 allocations there would be a total of 86 vessels that would not have enough DAS to even cover overhead costs. Assuming that all vessels were to make a minimum crew share payment of $25,000 per person, there would be 268 vessels that would be able to cover overhead costs but would not have enough DAS to make this minimum labor payment. The remaining 278 vessels would have more than enough DAS to cover all overhead and crew costs. The total number of excess DAS for these vessels was 11,935, and the total number of DAS that would be needed to bring all other vessels up to a break-even level would be 11,080. At this relatively low crew payment, DAS leasing could make it possible for vessels to redistribute DAS so that all vessels could operate at or above break-even. Note that, even in this situation no payments would be available for owner profits. Assuming an average crew payment of $35,000 or $50,000 per person, even with a leasing program, there would not be enough DAS available (to permit all vessels to acquire enough DAS to break even; among the vessels that rely on groundfish for 50% or more of total gross revenue). To obtain more DAS, this pool of vessels would need to lease DAS from vessels with lower dependence on groundfish.

Table 26. Revenue and Cost Distributions

Vessel Category	Distribution Name	Minimum	Maximum	Mean	Mode	Median	Standard Deviation
Long-line < 40 feet: revenue per day	Logistic			1,289	1,289	1,289	895
Variable costs per day	Normal			362	362	362	213
Yearly overhead costs	Triangular	3,824	66,703	26,630	9,362	24,244	14,254
Long-line >= 40 feet:	Exponential			2,643	0	1,832	2,643

revenue per day							
Variable costs per day	Lognormal			344	184	279	2
Yearly overhead costs	PearsonV			34,018	25,463	30,578	15,2
Trawl < 50 feet: revenue per day	PearsonVI			1,521	609	1,082	1,6
Variable costs per day	PearsonVI			268	151	216	2
Yearly overhead costs	Beta	1,469	56,526	30,073	33,680	30,384	14,5
Trawl 50 to 70 feet: revenue per day	Lognormal			6,254	1,063	3,464	9,4
Variable costs per day	PearsonV			363	251	316	1
Yearly overhead costs	PearsonVI			66,937	20,835	42,894	99,2
Trawl >= 70 feet: revenue per day	Normal			9,691	9,691	9,691	5,2
Variable costs per day	Logistic			814	814	814	3
Yearly overhead costs	Beta	51,831	223,010	135,092	112,312	134,284	47,7
Gillnet < 40 feet: revenue per day	PearsonVI			1,702	598	1,147	2,1
Variable costs per day	Lognormal			50	27	41	
Gillnet >= 40 feet: revenue per day	PearsonVI			1,485	705	1,144	1,2
Variable costs per day	Lognormal			94	55	79	

Table 27. Average Daily Returns by Vessel Group

	Average Daily Return
Long-line vessels < 40 feet	$927
Long-line vessels >= 40 feet	$2,299
Trawl vessels < 50 feet	$1,253
Trawl vessels 50 to 70 feet	$5,891
Trawl vessels >= 70 feet	$8,877
Gillnet vessels < 40 feet	$1,652
Gillnet vessels >= 40 feet	$1,391

Table 28. DAS Requirements by Vessel Group

	Average Crew Size Including Captain (min, max)	Average Overhead DAS (80% confidence range)	Additional DAS Needed for Crew Compensation - at various yearly amounts per crew member			Total DAS Requirements (80% confidence range)		
			$25k	$35k	$50k	$25k	$35k	$50k
Long-line vessels < 40 feet	2 (1, 4)	34 (16, 52)	54	76	108	88 (70, 106)	110 (92, 128)	142 (124, 160)
Long-line vessels >= 40 feet	3 (2, 4)	37 (7, 84)	33	46	65	70 (40, 117)	83 (53, 130)	102 (72, 149)
Trawl vessels < 50 feet	2 (1, 4)	37 (14, 68)	40	56	80	77 (54, 108)	93 (70, 124)	117 (94, 148)
Trawl vessels 50 to 70 feet	3 (1, 7)	19 (6, 35)	13	18	25	32 (19, 48)	37 (24, 53)	44 (31, 60)
Trawl vessels >= 70 feet	5 (2, 10)	20 (9, 30)	14	20	28	34 (23, 44)	40 (29, 50)	48 (37, 58)
Gillnet vessels < 40 feet	3 (1, 4)	25 (9, 44)	45	64	91	70 (54, 89)	89 (73, 108)	116 (100, 135)
Gillnet vessels >= 40 feet	3 (2, 5)	35 (15, 59)	54	75	108	89 (69, 113)	110 (90, 134)	143 (123, 167)

Table 29. Comparison of DAS Allocations to Overhead and Total DAS - Vessels dependent on groundfish (50% or more of revenue is from groundfish)

	DAS Requirements for $25,000 minimum crew member salary			DAS Requirements for $35,000 minimum crew member salary			DAS Requirements for $50,000 minimum crew member salary		
	# Vessels w/ DAS < Overhead DAS	# Vessels w/ DAS Between Overhead and Total DAS	# Vessels w/ DAS > Total Requirements	# Vessels w/ DAS < Overhead DAS	# Vessels w/ DAS Between Overhead and Total DAS	# Vessels w/ DAS > Total Requirements	# Vessels w/ DAS < Overhead DAS	# Vessels w/ DAS Between Overhead and Total DAS	# Vessels w/ DAS > Total Requirements
Long-line vessels < 40 feet	46	39	0	46	39	0	46	39	0
Long-line vessels >= 40 feet	4	6	3	4	9	0	4	9	0
Trawl vessels < 50 feet	25	118	5	25	120	3	25	122	1
Trawl vessels 50 to 70 feet	2	7	125	2	14	120	2	20	112
Trawl vessels >= 70 feet	1	1	123	1	4	118	1	5	119
Gillnet vessels < 40 feet	3	23	15	3	38	0	3	38	0
Gillnet vessels >= 40 feet	5	74	7	5	78	0	5	81	0
Total Vessels	86	268	278	86	302	244	86	314	232
Number of DAS Over/(Under) Total DAS Requirements	(5,316)	(5,764)	11,935	(6,958)	(10,978)	10,379	(9,374)	(19,129)	8,544

5.2.4.2 A Simulated DAS Leasing Market

In order to estimate the economic impact of a DAS leasing program, mathematical programming models were used to simulate a leasing market that might emerge, given constraints placed on individual vessels. The objective of the model was to maximize industry profits by choosing the DAS that each vessels will fish, up to a maximum number of days at sea. The model determines what level of their own days each vessel will fish (if any), the number of days they will lease from other vessels, and the number of their days they will lease to other vessels. The results give a very efficient outcome in terms of maximizing industry profit with as few vessels as possible. In reality, the actual leasing of DAS among industry participants may not

be as profitable as projected by the math programming model. An individual's vessel activity level chosen by the model is determined by its productivity, the maximum allowable days it can fish, the lease price for DAS, a trading schedule[7] that each vessel faces when leasing DAS from another vessel, daily fishing costs, and the prices of each species. The model doesn't differentiate between areas fished, where vessels land their fish, and a variety of other factors that will influence the amount of leased DAS, including other fisheries in which the vessel can participate.

Vessels were stratified by gear type into a hook sector, gillnet sector and trawl sector. For each sector, the model was run 1,000 times, in order to incorporate a stochastic lease price. Due to the number of vessels in the trawl sector, the trawl fleet was broken into five sub-fleets, and the model was run by combining two sub-fleets in one model run for 1,000 iterations. In all, 15 trawl runs made in order for each vessel to have the opportunity to lease DAS with every other vessel in the fleet. One key assumption was the maximum number of days that a vessel would fish in a year in the groundfish fishery. For these model runs, the maximum days assumed fished was 150 days. The assumed 150 DAS cap was based on an assumed upper limit on the number of DAS that vessels may demand. Two additional runs were made for the gillnet and hook sectors, with upper bounds of 100 days per year. This may be a more realistic level, given that the majority of these fleets are day boats, and could therefore make up to 200 12-hour trips with 100 DAS.

Results

Under the DAS leasing Program, fewer vessels will actually fish, but the profits for all vessels will be higher than if DAS trading were not allowed, and all vessels fished their allocation (Table 16). Vessels which choose to lease all their DAS can greatly enhance their profit because the owner is getting all the revenue from the lease without incurring any costs, and in particular not having to pay labor costs. The decision from a vessel perspective on whether to lease DAS *to* other vessels is based on whether they can lease their DAS for more then they would earn after paying crew share and covering other expenses[8]. If a vessel decides to lease DAS *from* other vessels, it is based on whether they can earn more from a leased DAS than what they

[7] When vessels lease days from vessels of lower horsepower class, each day at sea is reduced by an adjustment factor. If the adjustment factor is 0.9 for example, 1 leased day will only be able to be fished 0.9 days.

[8] The particular costs that each vessel faces depends on the particular pay system they employ. For the purposes of this model, it was assumed the vessel paid the variable operating costs such as fuel and ice, and then paid the crew. This simplified the model slightly, but may underestimate the profit that each vessel owner would earn under a DAS leasing program, if they decide to fish.

will pay for the lease plus what they will pay to the crew, and to cover other expenses.

There were 164 gillnet vessels used in the days at sea model. Under the scenario where all vessels can fish up to 150 days, the average profit level for vessels that lease DAS from other vessels is projected to increase 53.9% compared to what they would earn if they only fished their allocation (Table 30). These vessels would fish on average, 147 days, and would lease, on average, 81 days, at an average cost of $738 per day. At the same time, the number of vessels actively fishing would decline by 50%. Average profit for the 82 vessels that don't fish under this plan and instead lease all their DAS is projected to increase approximately 79.8% compared to what they would earn from fishing their allocation of DAS. When fishing under the 100 days per year scenario, the average profit per vessel for those that fish and lease DAS was projected to be 21.2% higher than if the vessel fished at its allocated DAS level. For those vessels that don't fish, but instead lease their DAS, average profit would be 101% higher than if the vessels fished at their Court-ordered allocation (Table 30).

The hook fleet had 43 vessels included in the model (Table 30). Under the 150 DAS model run, average profit for vessels that fish and lease quota was 61.8% greater than the profit level that would occur if the vessels fished at the Court-ordered alternative. However, the active number of vessels is projected to decrease by 67%. For vessels that don't fish and lease their DAS to other vessels, average profit level is projected to be 37.5% higher than if the vessels fished their allocation. The average lease price is projected to be $1,147, and vessels that lease DAS are projected to lease, on average, 94 days. Under the 100 DAS option, average profit for vessels that fish and lease DAS was projected to be 17.5% higher than if the vessels fished their Court-ordered allocations. Vessels that don't fish and instead lease their DAS are projected to increase their profit by 94.2% over what they would earn if they fished at their Court-ordered days at sea allocation. The active number of vessels fishing under this scenario would decline by 47% and, on average, vessels would lease 44 days. The average lease price under this scenario was $1,153.

The trawl fleet had 519 vessels included in the model (Table 30). Under a DAS leasing scheme with a maximum of 150 DAS per vessel, the number of active vessels fishing is projected to decline by 41%. For vessels that fish and lease DAS, average profitability is estimated to be 27.7% greater than if they fished their Court-ordered allocation. The average number of days leased per vessel is estimated to be 70, with an average lease price of $852 per day leased, with the average DAS per vessel estimated to be 144. For those vessels that don't fish, but instead lease their DAS, profitability is estimated to be 305% higher than if they fished their DAS allocation.

Table 30. Results from the DAS Leasing Model

	Gear		
	Gillnet	Hook	Hook

	Gillnet	(100 Days)	(150 Days)	(100 Days)	Trawl
Average Profit Fishing at Court-Ordered Allocation (All Vessels)	$45,904	$45,904	$65,042	$65,042	$51,063
Average Profit w/DAS Leasing (All Vessels)	$73,522	$61,966	$99,567	$85,495	$77,367
Percentage Change in Average Profit	60.2%	35.0%	53.1%	31.4%	51.5%
Vessels that Fish and Lease Days					
Average Profit for Vessels that Fish at Court-Ordered Allocation	$80,348	$66,315	$128,012	$108,924	$87,424
Average Profit for Vessels that Fish and Lease Days under Leasing Scheme	$123,640	$80,372	$207,145	$127,960	$111,602
Percent Change	53.9%	21.2%	61.8%	17.5%	27.7%
Vessels that Don't Fish, but Lease Days to Others					
Average Profit for Vessels that Don't Fish at Court-Ordered Allocation	$22,238	$21,942	$34,643	$23,155	$10,224
Average Profit for Vessels that Don't Fish Days but Lease Their Days to Others	$39,989	$44,193	$47,633	$44,960	$41,386
Percent Change	79.8%	101.4%	37.5%	94.2%	304.8%
Average Days Leased	81	37	94	44	70
Average Lease Cost/DAS	$738	$724	$1,147	$1,153	$852
Average Lease Expenditure	$59,778	$26,788	$107,818	$50,732	$59,640
Number of Vessels Fishing Modeled	164	164	43	43	519
Number of Vessels Leasing DAS	71	94	14	21	266
Number of Vessels Fishing under DAS Leasing	82	105	14	23	306
Percent Reduction in Vessels Fishing	-50%	-36%	-67%	-47%	-41%
Average DAS Fished by Vessels Leasing	147	97	149	99	144
MAX DAS Fished by Vessels Leasing	150	100	150	100	150

5.2.5 Economic Effects of Non-Modeled Measures

Economic analysis of gross revenue changes was accomplished using a math programming model that permits explicit consideration of impacts of regulatory measures including area closures, trip limits, and DAS reductions. However, the Settlement Agreement also resulted in several other measures that had economic impacts (gear restrictions and minimum size changes in particular). The previous analysis was revised due to observed DAS use for FY2002 that was well below what had been expected. The potential impacts of the gear changes were discussed in the June, 2002, EA. Since the proposed action would only extend existing measures without implementing any new gear changes, no additional economic impacts for FY2003 are anticipated.

5.2.5.1 Changes to Open Access Hand Gear Trip Limit and Freeze on New Permits

The open-access Hand-gear permit was first issued with implementation of Amendment 7. Since that time (FY1996), at least one open access Hand gear permit has been issued to a total of 3,316 unique vessels. Therefore, for the duration of the freeze on issuance of new permits the potential number of open access Hand gear permits would be limited to these qualifying vessels. The economic impact of this freeze is likely to be limited, since reported activity over the most recent 3 complete fishing years indicates that, even though a relatively large number of permits are issued, only about 10 percent of these vessels actually report any fishing through dealer records.

The number of open access Hand gear permits increased by an average of 160 permits each year from FY 1998 to 2001 (Table 31). As of June 3, 2002, a total of 1,518 open access Hand gear permits had been issued. As of March 10, 2003, 2,973 open access Hand gear permits had been issued. Of those vessels that have been issued such a permit, only about 10 percent actually report having landed any one of the ten large mesh regulated groundfish species through the Northeast dealer reports.

For the most recent complete fishing year analyzed (FY2000), the 172 vessels that held an open access Hand gear permit and that landed groundfish, had combined revenues of $12.1 million, of which $3.24 million (26 percent) was regulated groundfish. For these vessels, changing the combined cod, haddock and yellowtail flounder groundfish catch to a total of 200 pounds per trip was estimated by identifying all trips where regulated groundfish were landed and deducting the revenue from cod, haddock, and yellowtail flounder that exceeded a combined total of 200 pounds, where an average price by trip from these species was applied to the 200-pound trip limit. This simplifying assumption may tend to overstate the economic impact of the trip limit change, as vessels are likely to fill their trip limit with only the most highly valued species. Trip income from all other species where cod, haddock, or yellowtail flounder were caught, as well as income on trips where no groundfish were landed, was assumed to remain unchanged.

Table 31. Summary of Number of Open Access Hand Gear Permits Issued and Use of Permits

	1998	1999	2000	2001	2002
Number of Permits Issued	1,330	1,471	1,637	1,812	1,518*
Number of Vessels Landing Groundfish	128	118	172	218*	

* Preliminary year to date.

Groundfish income was estimated to decline to $3.06 million; a reduction of 5.8 percent in groundfish revenue but less than a 2.0-percent reduction in total fishing income. These revenue losses reflect average losses across all participating vessels. At an individual vessel level, 94 vessels (55 percent) would experience no reduction in revenues at all (i.e., combined cod, haddock, and yelowtail landings never exceeded 200 pounds in FY2000), while a smaller number of vessels would experience significant losses in fishing income. A total of 20 vessels (12 percent) would lose 5 percent or less of fishing income while an additional 7 vessels would lose from 5 to 10 percent of fishing income and 29 vessels would lose in excess of 25 percent of fishing revenues. The remaining 22 vessels would lose between 10 and 25 percent of total fishing income.

5.2.5.2 Prohibition on Front Loading

The practice of front loading enables an individual vessel to increase the amount of any given species managed by a daily trip limit that may be legally retained. From an economic perspective, front loading allows vessels to make more efficient use of DAS allocations, as trip income may be increased while keeping operating costs down. Effectively, on front-loaded trips, DAS allocations are being used at more than a 2:1 rate because, for each trip limit "unit", a total of 24 hours on the DAS clock must be used. For example, any vessel that wanted to retain up to 800 pounds of GOM cod would have to use at least 48 hours of its DAS allocation to do so. If the trip duration were actually 18 hours, then the DAS allocation would have been used at a rate of 2.7 hours for every hour fished. The practice of front loading is only advantageous as long as DAS allocations exceed actual time spent in the groundfish fishery, since the opportunity cost of using DAS at a rate that exceeds 1:1 is likely to be greater than the marginal gain in the GOM cod trip limit alone. Given that the Preferred Alternative would change available DAS allocations, the economic advantage of front loading is likely to be diminished, as most vessels are not likely to have sufficient excess DAS allocation to cover normal fishing activity and allow for front-loaded trips. For this reason, the practice of front loading the clock is likely to be greatly reduced; so much so, that the prohibition on front-loading may not add any increased adverse economic impact over and above that of the changes in DAS allocations themselves. Nevertheless, in the absence of the prohibition, some vessels may still find it advantageous to front-load the clock.

For vessels that had chosen in the past to front-load their DAS clock, the prohibition on front-loading would force vessels to alter trip decision making. Some vessels may choose to increase a trip duration to assure that at least no fishing time is lost, or may take an alternative trip where cod catch rates may be expected to be consistent with the trip limit and planned trip duration. In either case it may be presumed that the front-loaded trip would have been economically preferred and that an alternative trip may yield lower net return.

To evaluate the impact of a prohibition on front-loading, VTR records for FY2000 were compared to call-in records to identify trips that landed more than 400 pounds of GOM cod and where the difference between DAS in the call-in records exceeded that of the days absent as calculated by the start and landed date from the VTR records by more than 24 hours. Qualifying records were matched by landed data in both VTR and call-in records. The total number of qualifying records that met all matched criteria was 331. Due to a variety of circumstances, these trips are likely to represent only a subset of all trips that may have been front-loaded . This means that analysis of the total economic impact of the front-loading prohibition is not possible. Instead, the data were treated as a sample of trips where front-loading was evident, and the economic impacts were estimated at a trip level, rather than at a vessel or industry level.

If vessels are not able to front-load the DAS clock, they would be limited to the trip limit according to actual fishing time. Average trip income on front-loaded trips ranged from $1,689 to $2,546 for bottom long-line and gillnet gear, respectively (Table 32). Limiting these trips to a trip limit consistent with their recorded VTR time would more than halve average trip income for all gears except for gillnet vessels. These data suggest that prohibition of front loading would have a significant impact of trip income for vessels that may still want to target GOM cod. These vessels would have to increase their observed trip duration in order to retain larger quantities of GOM cod, or would have to find alternative fisheries to make up for the lost cod income. Note that the impacts reported below would be at least partially offset by the increase in the GOM cod trip limit to 500 pounds.

Table 32. Average Change in Trip Income for Front Loading Prohibition

Gear Type	Mean VTR Days Absent	Mean Call-in DAS	No Action	Preferred Alternative	Change in Trip Revenue
Bottom Long-	0.8	4.1	$1,689	$545	$-1,144

Line Hand Gear	0.6	4.9	$1,798	$348	$-1,450
Otter Trawl	0.8	4.6	$2,401	$1,241	$-1,160
Gillnet	0.8	4.5	$2,546	$1,635	$-911

5.2.5.3 Prohibition on Use of De-Hookers

The economic impact of a prohibition on the use of de-hookers will be related to the extent to which their elimination affects efficiency. Presumably, a de-hooker is used to improve time efficiency and may be a labor-saving device. With a prohibition on their use, vessel owners may need to hire more crew to remove fish from long-lines. While this may increase crew opportunities, the added cost is not likely to be accompanied by any increased production, particularly in the face of increased restrictions on the number of hooks that may be set. Given the likelihood that labor costs would increase with no offsetting change in output, it is probable that profitability of hook vessels would decline.

5.2.5.4 Change in Large Mesh Permit Categories

The large mesh permit categories were developed with implementation of Amendment 7 to provide an incentive for vessels to use larger mesh. In return, participating vessels would receive increased DAS allocations that were intended to be calibrated to be equivalent in terms of relative fishing mortality with that of vessels that chose to use smaller mesh. Since making a large mesh permit available, the numbers of permit holders had been relatively low (ranging between 10 in 1996 to 31 in 2000), but doubled to over 60 permit holders in FY2001. With the proposed changes in mesh sizes, there would be little difference between the current minimum mesh size for large mesh permit holders. Increasing the large mesh permit mesh size is consistent with the original rationale for assigning differential DAS allocations based on mesh size.

The economic impact of increasing the mesh size for large mesh permit holders will depend on the extent to which current permit holders are actually fishing, and whether, by opting to give up the permit category, their DAS allocations would be reduced below that of their observed use rate. Of the 31 large mesh permit holders in permit year 2000, three did not call-in any DAS and 18 did not call in as many DAS as they would have received as either a category A (individual) or Category B (fleet) permit. The remaining 13 vessels called in more DAS (an average of 28 more DAS) than they would have been allocated as a Category A or B permit holder (note that only 12 of these 13 actually reported any activity through the VTR's). For FY2001, five permit holders used no DAS, 32 used no more DAS and 28 vessels calledin more DAS than they would have received otherwise. Thus, in both FY2000 and FY2001 about half of the large mesh permit holders were able to take advantage of higher DAS allocations than they would have received as either a Category A or B permit holder.

Assuming that the change in large mesh permit category is most likely to affect only those permit holders that used more DAS than they would have received otherwise, an estimate of economic impact was derived by calculating revenue per day fished/called-in on trips where regulated groundfish (including monkfish) were landed. This average was used to estimate fishing income with no change to the minimum mesh to that of fishing income under DAS allocations that each vessel would receive as a Category A or B permit holder. This estimate is likely to overstate the economic impact on these vessels since higher catch rates may be expected to at least partially offset the reduction in DAS if they elect to switch back to a Category A or B permit.

Estimated average revenue per day fished for the 12 large affected large mesh permit vessels was $2.3 thousand. Applying this value to the lower DAS allocations each vessel would have received as a Category A or B permit holder yields an average loss of $78 thousand per vessel. As noted previously, this estimate may be overstated, since the average revenue per day is likely to increase for any given vessel that switches back to a smaller mesh permit category.

5.2.5.5 Economic Effects of Mesh Changes

The Preferred Alternative would require a larger codend mesh size/ mesh size for vessels fishing with multispecies trawl gear and gillnet throughout the Northeast region, compared with the mesh size utilized prior to implementation of the Settlement Agreement on August 1, 2002. It is important to note, however, that these requirements are currently in place, and most of the economic impacts discussed below (purchasing of new nets or net components) have already been bourne by the industry. The following discussion and underlying analysis reflects the analysis completed for the August 1, 2002 action, namely full implementation of mesh size changes, and not the impacts of additional industry members choosing to utilize a particular gear type. The regulations may also require replacement of hook gear to comply with the hook gear specifications. The economic cost of this measure would be quite different between trawl and gillnet vessels. Gillnet vessels may be required to spend anywhere from $10-20,000 on replacement costs, depending on the number and configuration of nets fished. By contrast, trawl vessels would be required to replace only the codend of the net; an expense that may range between $800 and $1,500. These increased gear costs would be in addition to foregone fishing revenues, although they would likely be a one-time only cost, as subsequent gear maintenance and replacement costs would not likely be appreciably greater than they would be under the pre-Settlement agreement.

The total cost of the mesh change cannot be known with certainty, since available data do not distinguish between diamond or square mesh. Nevertheless, at least an estimate of amount of gear that may need to be replaced can be developed by comparing VTR data on mesh size used and quantity of gear. Specifically, the VTR records for FY2000 were examined to identify trips that were fished in each of the general management areas (GOM, GB, and SNE) that used a mesh size that

was less than the largest of the smallest size allowable, or a gear quantity that exceeded the limits that will be allowed under the Preferred Alternative. For example, the maximum of the minimum mesh size that may be fished by otter trawl vessels would be 7-inch diamond mesh. Since VTR records do not distinguish between diamond and square meshes, it was assumed that any net fished in the SNE area that was less than 7-inches would have to be replaced. Tie-down nets fished by day boat gilllnets in the GOM must be 7-inches. Assuming that trips that landed more than 50 percent of combined flatfish by weight were conducted using tie-down nets, all nets used on any such trip that used less than 7 inch mesh would have to be replaced.

The total number of gillnet strings that would have to be replaced was estimated by first identifying every trip and quantity of gear used on that trip that used a mesh size below that of the proposed minimum size. These records were then sorted in ascending order by vessel and management area. In this manner, the last record for each vessel is equal to the maximum amount of gear fished on all trips taken by that vessel in that management area. Note that, where appropriate, the total number of nets that would have to be replaced was constrained by the limit on number of nets that may be fished. Summing across vessels provides an estimate of the total number of gillnet strings (based on an average of 10 nets per string) that would have to be replaced and an estimate of the number of vessels that would have to replace their gear. Since this procedure was repeated for each management area, the estimated gear replacement is likely to result in some double-counting of gear, since vessels may fish gear in more than one area; therefore, the resulting economic impacts may be biased upwards. On the other hand, the VTR records do not necessarily provide an accurate record of affected gear, as gear quantity and/or mesh size is not always reported or may not be reported accurately.

Based on these assumptions, a total of 751 vessels would be required to replace a total of 6,367 nets, the majority (5,722) of which would be gillnets (Table 33). Assuming replacement costs of $1,250 for trawl vessel codends and a cost of $2,000 per gillnet string (10 net panels per string), the total replacement cost would be nearly $2 million. On an per vessel basis, gillnet vessels would have to spend substantially more on replacement gear, with trip gillnet vessels fishing in the GOM having to spend twice as much as any other component of the gillnet fleet.

Table 33. Estimated Cost to Replace Gillnet and Trawl Gear

	Totals	GOM Day Boat Tie-Down Gillnet	GOM Day Boat Stand-Up Gillnet	GOM Trip Gillnet	GB Gillnet	SNE Gillnet	GOM/GB Trawl Cod-End	SNE Trawl Cod-End
Number of Nets	6,367	837	1,208	2,294	1,075	308	424	221
Number of	751	18	31	25	25	7	424	221

Vessels								
Nets per Vessel		46.5	39.0	91.8	43	44	1	1
Cost per Vessel ($)		9,300	7,794	18,352	8,600	8,800	1,250	1,250
Total Cost ($)	1,950,650	167,400	241,600	458,800	215,000	61,600	530,000	276,250

5.2.5.6 Economic Effects of Changes in Gillnet and Hook Gear Quantities

In addition to increasing mesh sizes vessels that fish with either gillnet or bottom longline gear will be subject to different limits on quantity of gear depending on where they fish. During FY2000 a total of 22.5 thousand trips were taken where one or pounds of groundfish were landed. Of these trips, 7.8 thousand groundfish trips were taken using fixed gear that may be subject to the proposed gear limits, but less than 25 percent of fixed gear trips in FY2000 exceeded the maximum allowable quantity of gear that would be allowed for the duration of this action. Average estimated FY2000 trip income on groundfish trips that used more than the Preferred Alternative amounts for the No Action alternative ranged from a high of $14,794 for trip gillnet vessels in the GOM to a low of $776 for bottom longline trips in the SNE area (Table 32). With the Preferred Alternative limits on amount of gear fished average trip income would be reduced between 50 and 16.7 percent for trip gillnet trips on Georges Bank and day gillnet trips in SNE respectively.

The gear limits would affect an estimated 30 longline, 72 day gillnet, and 24 trip gillnet vessels. The economic impact on total fishing income from all sources were highest for trip gillnet vessels for the most affected vessels. Ten percent of all trip gillnet vessels were estimated to lose 36.6 percent of total fishing income while the most affected day gillnet and longline vessels would lose an estimated 26.2 and 19.3 percent of fishing income respectively (Table 34). At all other percentiles the relative impact across fixed gear vessels were similar. Based on these results, the economic impact of the limits on number of nets may be at least as large as that, and perhaps more so, than the changes in DAS or the changes in mesh size. This impact may be particularly acute for trip gillnet vessels as they had not been subject to net limits while fishing for groundfish.. Even though the amount of trip gillnet activity in the GB and SNE areas was low in FY2000 the change from current regulations in these areas (three times lower than that of the GOM on GB and twice as low in the SNE area) is comparatively greater than for the same gear group in the GOM.

Table 34. Estimated Average Trip Income for Fixed Gear for No Action and Preferred Alternative

Trip Type	Number of Trips	No Action Average Trip Income	Preferred Alternative Average Trip Income	Percent Change
GOM Trip Gillnet	83	14,794	11,540	-22.0
GOM Day Gillnet	621	3,228	1,967	-39.1
GOM Longline	68	1,779	1,095	-38.5
GB Trip Gillnet	59	8,311	4,087	-50.8
GB Day Gillnet	713	3,797	2,439	-35.8
GB Longline	642	2,039	1,600	-21.5
SNE Trip Gillnet	55	6,147	4,695	-23.6
SNE Day Gillnet	34	2,585	2,152	-16.7
SNE Longline	5	776	387	-50.2

Table 35. Reduction in Fishing Income For Fixed Gear Vessels

	Longline (n=30)	Day Gillnet (n=72)	Trip Gillnet (n=24)
10th Percentile	-19.3	-26.2	-36.6
25th Percentile	-13.9	-14.8	-14.0
50th Percentile	-6.4	-7.2	-8.6
75th Percentile	-2.3	-1.6	-2.7
90th Percentile	-0.4	-0.7	-0.2

5.2.6 Economic Impacts of Recreational Measures

Changes in recreational measures will affect anglers across all modes and will affect charter/party operators directly, through regulatory action, or indirectly, through reduced passenger loads, if any one measure causes anglers to choose to reduce their fishing activity. Of the proposed recreational measures, the change in the minimum fish size for Atlantic cod would affect all recreational anglers while the seasonal change and imposition of the party/charter GOM cod trip limit would affect only those anglers in the Gulf of Maine. The year-round exemption letter would have a direct affect on charter/party operators.

5.2.6.1 Angler Impacts

Economic effects on anglers are manifested in a reduction in the value or satisfaction that they derive from taking a recreational fishing trip. If the primary motivation for fishing is based on catching fish, then changes in measures affecting keep rates without affecting catch may have a relatively small impact on recreational fishing value. Conversely, to the extent that anglers are motivated primarily by keeping fish, measures that affect keep rates would result in comparatively greater loss in economic value. Research indicates that recreational anglers are motivated by a variety of different factors, but it may be assumed that groundfish anglers are more motivated by keeping fish rather than for sport.

Data to determine the welfare loss associated with the proposed measures are not available. However, the combined effects of any given alternative having varying degrees of bag limit changes and an increased size limit may be expected to substantially reduce keep opportunities for anglers that target cod and would, therefore, result in a corresponding reduction in recreational fishing value. This reduced value may be partially offset by substitution of alternative target species, but this would still result in some welfare loss, assuming that cod would have been the preferred species choice.

In addition to some loss in economic welfare, an area closure may result in fewer recreational trips being taken if no suitable

alternative target species are available. Note the proposed possession and minimum fish size limits may also discourage trip-taking decisions, if anglers believe that these limits would not justify taking a trip. To the extent that anglers do take fewer trips other secondary economic impacts may accrue in the form of reduced angler expenditures. A loss in angler expenditures would result in lower sales by businesses that service the recreational fishing sector (bait and tackle, charter/party operators, restaurants, etc.). Note that these losses would be to specific businesses that sell recreational fishing inputs, but would not necessarily represent losses in total sales at either a local or a regional level since anglers may substitute freshwater for saltwater fishing or may substitute fishing with some other recreational activity. To the extent that anglers continue to engage in some other recreational activity, the regional or local impact may be one of a redistribution of expenditures among different businesses.

5.2.6.2 Charter/Party Impacts

Charter/party operators would be directly affected by the enrollment requirement, and indirectly affected, should any one of the recreational measures result in a reduction in passenger demand. The enrollment program would remove the possibility of a charter/party vessels switching back-and-forth between commercial fishing and carrying passengers for hire for those vessels that still want to be able to take recreational passengers into any one of the rolling closure areas. Vessels that forego the exemption program would still be able to switch between commercial and recreational activities, but may sacrifice some charter/party business to competitors if catch rates are actually higher, or even perceived to be higher, inside the closed areas.

Given the increase in the minimum size limit, charter/party vessels may experience a reduction in passenger demand. However, the minimum fish size increase will have a relatively small effect on charter/party keep opportunities. Experience following implementation of the minimum fish size increase in 1996 and 1997 indicates that passengers and trips have been increasing over the past 2-3 years. Further, among alternative management measures, size limits are generally supported by the recreational fishing public. Therefore, the change in minimum size does not seem likely to result in a substantial reduction in passenger demand for charter/party trips in the GOM or GB.

The Preferred Alternative would introduce a bag limit on charter/party anglers fishing for Atlantic cod in the GOM. Industry representatives have indicated in the past that passenger demand is, in part, driven by angler expectations, and that one important component of angler expectations is the opportunity to have a “big trip.” As the argument goes, even though these expectations are realized on only a small fraction of trips, imposition of a bag limit would cause individuals to lose interest in taking a charter/party trip. The extent to which anglers would respond in the manner described is not known, nor have

there been any studies that document angler response to changes in charter/party bag limits.

Based on VTR reports, the number of charter/party operators reporting trips where GOM cod were landed ranged between 103 and 114 from 1997 to 2000. Of these vessels, approximately 20 percent in any given year took 60 percent of total trips that landed GOM cod, carried 70 percent of total passengers on those trips, and landed 80 percent of the total GOM cod. Thus, it is likely that the majority of economic impacts will be borne by the 20-25 operators whose primary business is in offering groundfish trips to their recreational fishing customers.

5.2.7 Economic Impacts on Other Sectors

The impacts that have been estimated in the above section are for the harvesting sector. However, there will also be impacts on the marketing chain, and the infrastructure that supports the fishing industry.

Generally, fish are purchased at the dock by dealers who then sell to processors, and by processors themselves. Fresh fish processing and frozen fish processing are two separate industries in New England, each with its own customers, firms, and industrial organizations (Georgianna and Dirlam, 2000). Fresh fish processors buy whole fresh supplies from fishermen locally and at other New England ports, and they bring in fresh supplies from other parts of the U.S., from Canada and from other countries. They process the product (for example, cutting fish into fillets) and sell these products to wholesalers, retailers, restaurants, and other final users. Frozen groundfish processors buy frozen inputs, which are imported into the U.S. from Canada, Iceland, Norway, and from around the world. These frozen inputs, mostly frozen blocks of fillets, are processed into frozen portions, sticks, and other products for sale to supermarkets, restaurants, and institutions. Frozen products keep for a long time and are not subject to the same time constraints as fresh products. Prices for frozen products are less volatile, markets more impersonal, and business relations more competitive. Frozen groundfish plants are also much larger than fresh groundfish plants, and they operate longer through the day and through the year. Few fresh groundfish processors produce frozen product, and those that do, sell special orders to institutions, usually government agencies, who are sometimes required to purchase U.S. product (Georgianna and Dirlam, 2000). Wholesale firms do not process fish, but buy from processors and sell to retail outlets, institutions and other buyers.

Overall, the number of processing firms in New England has fallen since 1995, while wholesaling firms have increased. Employment trends saw an increase in processing sector employment until 1997, followed by a decline to a 1999 level that was below 1995 levels. Wholesale sector employment had the opposite trend with a decline until 1997, followed by an increase to its highest level in 1999. It is estimated that more than one-third of the fresh processing firms in business in 1992 are no longer operating, although the number of plants has been

stable since 1995. Surviving firms are now paying more attention to the bottom line (Georgianna and Dirlam, 2000). Most groundfish landed in New England goes into the fresh fish market, and landings since 1995 have been less than the total volume of processed products in live-weight terms. This has led fresh fish processors to import additional supplies from Canada and the West Coast. Recently, processors have increased imports from Iceland when Canadian supply declined, using air cargo routes into Logan Airport. Firms have also compensated for the decline in groundfish landings by expanding their product line to substitute species such as farmed salmon, shark, tilapia, mahi mahi, orange roughy and catfish (Georgianna and Dirlam, 2000). The majority of these processing facilities are in Massachusetts. Plants located in Massachusetts have a distinct competitive advantage because of their proximity to Boston's Logan Airport (Georgianna and Dirlam, 2000)

Frozen groundfish processing has also declined in the region, and has been similarly impacted by a shortage of groundfish supply. However, most of this has been caused by a decline in Canadian landings after the closure of the Grand Banks to cod fishing in 1991. Rarely, if ever, are New England groundfish landings processed into frozen blocks. As imports of cod blocks declined, imports of pollock blocks increased and processors substituted pollock for cod in the production of breaded cooked fillets, portions and nuggets (Georgianna and Dirlam, 2000). Georgianna and Dirlam (2000) report that consumer demand for fish sticks and portions has been declining since mid-1980.

As the processing sector has declined, the wholesale sector has increased as processors abandoned processing and merely concentrated on wholesaling. Employment in the wholesale sector has increased since 1997, as employment in the processing sector has fallen off. Imports of new products has offered profit potential to existing wholesalers and the potential to expand their product line. It is difficult to predict whether the wholesale sector will remain strong if inroads are made by firms that specialize in internet marketing.

5.2.8 Economic Impact of Hard TAC Alternative

Under a hard TAC alternative, the economic impacts on a particular vessel will depend upon a variety of factors, including the size of the vessel, the vessel’s harvest rate, the particular species targeted, and the ability of the vessel to target alternate species. If a vessel targets a species for which a relatively low TAC is set, and is dependant upon that species for a large percentage of its income, the vessel may be severely impacted by the limitation of access to that species that would occur when the TAC were reached. When the directed TAC for that species was harvested, the vessel’s access to that species would be limited by either a low possession limit, closure of a geographic area, or gear restrictions. Under such circumstances, the effect on the vessel would be mitigated if the vessel were able to fish in another geographic area, or utilize another gear configuration to target another species. In contrast, if a vessel targets a species for which a large TAC is set, it is

possible that the TAC would not be reached during the fishing year, and therefore the vessel's access to that resource would not be limited.

The two effects of a hard TAC described above illustrate the difficulty of analyzing a hard TAC management system. Because of the fact that many vessels in the Northeast multispecies fishery land a variety of groundfish species, and the fact that in most geographic areas several of the species co-occur and are caught at the same time, the affect of a hard TAC system on a vessel would be fairly complex. It is likely that the restricted access to a particular stock (as a result of harvest of the TAC for that particular species) would also impact the ability of the fishery to access other stocks for which the TAC had not yet been harvested.

The precise impacts of a hard TAC system depend to a large degree on the details of how such a system is implemented. If a TAC for a particular species were divided up and allocated to each quarter of the year the opportunity for access to the resource may be improved with respect to an individual vessel. Upon harvest of a TAC, the impact on a vessel would depend upon the specific management measures imposed. Complete closure of a geographic area such as the Gulf of Maine Regulated Mesh Area would have extremely severe economic consequences. A lesser restriction such as allowance of an incidental catch amount or limitation to certain gear configurations would mitigate the economic impacts by allowing some harvest from the area.

A hard TAC system could create an incentive for vessels to fish for a particular species sooner rather than later, in anticipation of the TAC being harvested. Multiple vessel owners making such a decision could result in a race to fish, and an acceleration of the rate at which the TAC is reached ('derby fishery'). A hard TAC system may favor those that can catch fish earliest and fastest. This scenario would not only reduce the amount of time a vessel had access to a particular stock, but also could affect the market price for the stock.

5.3 Habitat Impacts

5.3.1 Overview of Habitat Impacts

A comprehensive description of the physical environment in which groundfish species occur and an assessment of the impacts on habitat resulting from a variety of fishing practices are presented in the Council's omnibus Essential Fish Habitat (EFH) Amendment (NEFMC, 1998) and in the preliminary Draft Supplemental Environmental Impact Statement (DSEIS) that was prepared for Amendment 13. Readers may reference this document via the internet at the following address: http://www.nefmc.org/documents/amend13.htm. The EFH Amendment identifies and describes the EFH for 14 species of regulated groundfish and 4 other Council-managed fishery resource species. That document includes a description of the designs, functions, and actions of all types of fishing gear used in New England fisheries, including

the principal groundfish gears: Otter trawls, gillnets, and hooks and lines. The EFH for offshore hake is identified and described in Amendment 12 to the FMP. Additionally, a workshop was convened in October 2001 to further evaluate on the effects of fishing gear on marine benthic habitats (Northeast Region Essential Fish Habitat Steering Committee [NEFHSC] 2002) as well as the development of a draft gear effects review document detailing the most recent scientific studies in this subject area (NMFS 2001).

Different habitat types serve different ecological functions and are considered to have different functional values. Bottom types of higher complexity are generally believed to have higher functional value to the ecosystem than those of low complexity (Auster and Langton, 1999; NEFMC 1998). More complex habitats generally exhibit some form of structure, either in the form of the bottom type itself (e.g., rock or boulder piles) or due to some associated biogenic structure (e.g., sponges, bryozoans, tunicates, mussel beds, clay pipes, etc.) (Auster and Langton, 1999). The principal function provided by the structure associated with these complex habitats is often predator avoidance, which increases the survival rate of demersal species (juveniles especially) and contributes to higher recruitment (Kaiser *et al.*, 1999). Prey abundance may also be increased and energetics may be optimized in areas of higher complexity and functional value (Gerstner, 1998; Gerstner and Webb, 1998; Kaiser *et al.*, 1999).

Of the three principal fishing gears used to harvest groundfish (otter trawls, gillnets, and hooks and lines), otter trawls are most often associated with impacts to benthic habitats. Gillnets are a static gear and the majority of studies that have investigated the impacts of fixed gillnets have concluded that they have a minimal effect on benthic habitats (Barnette, 2001). West *et al.* (1994) stated that there was no evidence from their study that sink gillnets contributed importantly to bottom habitat disturbance. There is some evidence (Gomez *et al.*, 1987; Ohman *et al.*, 1993) that gillnets may be associated with adverse impacts to coral reef habitats, but aside from these potential impacts to coral reef communities, Barnette (2001) concluded that "the available studies indicate that habitat degradation from gillnets is minor." The gear effects workshop also concluded that the degree of impacts to habitat features from this gear is low (NEFHSC 2002).

There is very little information on the potential impacts to benthic habitats associated with hook and line gear, including bottom longlines (Barnette, 2001). There may be impacts associated with the retrieval of the gear as it is dragged along the bottom, where it can potentially snag on complex vertical habitat such as sponges, gorgonians and rocks. This action could result in damage or death to structural biota and the turning over of small rocks and other physical structure. Although these potential impacts are associated with hook-and-line gear, overall these impacts are considered relatively insignificant due to the extent of the use of this gear compared with the use of otter trawls and other bottom-tending mobile

fishing gears (3.3 percent of groundfish landings harvested with hook and line versus 87.2 percent with otter trawls) (NEFMC, 1998).

The most significant impact associated with bottom-tending mobile fishing gear, including the various designs of otter trawls, is the smoothing, or flattening, of substrate bedforms (Auster and Langton 1999). In sandy sediments, this gear type is associated with the flattening of sand ridges and the disturbance of some epifauna and infauna (Auster and Langton, 1999). The extent of these impacts is dependent on the frequency and intensity of gear use (Auster and Langton, 1999). In habitats of higher complexity, such as rock and gravel substrates, otter trawl gear is sometimes associated with the scraping and smoothing of gravel mounds and turning over of rocks and boulders (Auster and Langton, 1999). Epifauna present in these habitats are often removed or crushed (Auster and Langton, 1999; Collie, *et al.*, 1997).

The rate of habitat recovery from the disturbances associated with groundfish fishing is another important consideration to understanding habitat impacts. In general, high energy habitats (e.g., shallow areas with relatively strong currents and wave action) are thought to recover more quickly than low energy habitats (e.g., deep areas with relatively mild currents and little wave action), in part because the biologic communities present in these areas are adapted to those environments (Auster and Langton 1999; DeAlteris *et al.*, 1999; Witman, 1998). The biologic communities in relatively low energy environments tend to be long-lived and slow-growing (e.g., corals and sponges). The communities that form the biogenic structure in these areas take a long time to recover and may only recover in the absence of disturbance (Sainsbury, *et al.*, 1997).

The NMFS final rule for EFH defines an adverse effect as "any impact which reduces quality and/or quantity of EFH" (January 17, 2002, 67 FR 2343). The significance of a fishing gear-related impact to habitat, and whether it is considered adverse, can depend on several factors, including: (1) The type of habitat; (2) the effect of the gear on the habitat; (3) the recovery rate of the habitat; (4) the location of the habitat and impact; (5) the natural disturbance regime; and (6) the functional elements of the habitat to managed species.

The flattening or smoothing of sandy bedforms (sand ripples and waves) by bottom-tending gear may be short-term and inconsequential if these bedforms are frequently disturbed naturally and reform quickly in the face of currents and wave action (Auster and Langton, 1999). The rolling and turning over of rocks and boulders and the removal of attached epifauna may appear to be a significant impact, but it may not be adverse if the functional elements required by fish species are the interstitial spaces around and between the rocks and boulders and not the attached epifauna. Since the rocks and boulders remain, albeit in a different place or configuration, the functional elements of the habitat may not have been qualitatively affected.

Similarly, if the functional elements in a gravel habitat required by an organism are the interstitial spaces between the gravel itself or the opportunities for cryptic coloration, then the removal of attached epifauna as a result of fishing activity may not be an adverse impact on the habitat of that species. Even if the epifauna is important to some species, the impact may not be adverse or significant if the primary epifaunal species are fast-growing and are able to quickly repopulate an area following an impact. There are also cases where a fishing gear impact is clearly significant and adverse to the habitat of fish species. If attached epifauna (on either gravel or rocks and boulders) provide an additional functional element for some species by providing higher levels of habitat complexity (which contribute to survival and/or added prey opportunities), then the reduction or removal of this epifauna would affect the habitat's function. If it takes a long time to regenerate and repopulate an area (such as in slow-growing sponge and coral species), then this effect would be compounded. The crushing and removal of "clay pipe" habitat is a long-term impact (Valentine, 1998) and could have implications for shelter-seeking species, such as redfish, in areas where fishing affects this habitat type.

5.3.2 Habitat Impacts of Management Alternatives Under Consideration

The measures proposed in the various alternatives are intended primarily to reduce F on GOM cod, but address other species as well, including GB cod. The three alternatives (including the no-action) are described in detail in Section 3.0 of this document. This section of the EA is intended to present a description of the potential effects and impacts to fish habitat that are expected to be associated with each alternative. It is not intended to be, nor should it be considered a substitute for, the more detailed EFH analysis currently being formulated under the rubric of the U.S. District Court's December 17, 2001, Order in the lawsuit American Oceans Campaign, *et al.* v. Daley. The effects and impacts to habitat associated with each measure included in an alternative may be beneficial, adverse, or neutral. To the extent possible, the analysis in this section identifies whether the measure would be expected to be beneficial, adverse, or neutral, relative to existing practices, and the relative degree of that effect.

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. The modification of fishing gear to reduce the weight of fishing gear or the amount of fishing gear in contact with the bottom is another mechanism known to reduce the adverse impacts on habitat associated with certain fishing activities. Additionally, restricting the spacial extent in which particular gears may operate (closed areas) is considered by many to be the most effective means of protecting sensitive habitats susceptible to gear impacts. Ideally, any reductions proposed in this interim action will be focused on the sensitive habitats of GOM and GB that have been designated as EFH by the Council.

Some of the proposed measures are expected to provide some benefit to the habitat of the region by directly reducing fishing effort: DAS restrictions, gear restrictions, temporary (rolling) fishing closures, and fishing closures that would be closed for the duration of this action and closed year-round through a follow-up Secretarial amendment. Measures that would 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 mesh size restrictions, minimum fish size restrictions, bycatch reduction methods, or monitoring programs, are not be expected to have a direct effect on the habitat of the region. Measures that increase the fishing pressure in a specific area, such as through the reopening of a previously closed area or a part thereof, may increase the adverse impacts on EFH above the baseline set with the submission of Amendment 11 to the FMP (the omnibus EFH Amendment).

Alternative 1 - No-Action

This alternative would continue a set of measures, including target TACs, area closures, and trip limits, that are already in effect as a result of previous management actions. In addition, the WGOM Area Closure would reopen to fishing. The continuation of pre-Settlment agreement measures are not expected to have a direct effect on the habitat of the GOM and GB, with the exception of the reopening of the WGOM Area Closure. The WGOM Area Closure, although not closed specifically to protect fish habitat, does serve to protect a variety of essential fish habitat (EFH) for many species from potential adverse impacts associated with some types of fishing activities. The reopening of this closed area could reduce the incidental protections afforded by this area.

Alternative 2 - Preferred

This alternative would reduce fishing mortality primarily through restrictions on DAS use and additional closed areas. Modifications would be made to the seasonal closures and an additional year-round closure would be added in the central to eastern portion of the GOM (Cashes Ledge Area Closure).

Under this alternative, the current WGOM Area Closure would remain closed. This area provides significant incidental benefits and protections for EFH in the GOM even though it was not closed with the objective of protecting fish habitat. The current boundaries of the WGOM Area Closure contain a variety of habitat types, including complex hard bottom, mud bottom, and sand bottom. This area has been designated by the Council as EFH for 14 species and the area provides the only year-round protection for any EFH in the GOM. The maintenance of this area as a fishery closed area has allowed the habitats contained within to begin the process of recovery following the previous fishing-related disturbances and impacts. These benefits and habitat recovery would be continued if this alternative is selected. The addition of the Cashes Ledge Area Closure would increase in the amount of the GOM area that is closed year-round to

fishing for groundfish. This area is comprised of mixed substrate types based upon a very coarse substrate map (Poppe, *et al.*, 1986).

The proposal to increase the area of the year-round closures has the potential to allow for some recovery of the habitats within these areas, but the amount of recovery cannot be quantified without research to determine habitat recovery rates in the GOM. 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 in this measure. If a fraction of the fishing effort within the proposed year-round closed area 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 to the FMP, 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.

Changes to the seasonal (rolling) closures are also being considered under this option. The short duration of the rolling closures and the proposed changes make it unlikely, however, that any degraded habitats would have an increased opportunity to recover. Thus, the proposed changes to the seasonal area closures would not be expected to have any direct effect on the habitat of the GOM.

This alternative also includes measures to restrict DAS use and reduce by 20 percent. DAS restrictions that result in overall reductions of fishing effort may result in indirect benefits to EFH.

This alternative includes measures to limit Day boat gillnet vessels to 50 stand-up and 100 tie-down gillnets as well as other gill net restrictions depending upon area. This measure may result in a decrease in the amount of fishing gear used by the affected vessels. Although gillnets, as a static fishing gear, are not generally associated with adverse impacts to fish habitat, all fishing gears that come in contact with the bottom have some degree of effect on benthic habitats. Thus, this measure may serve to provide some degree of reduction in habitat impacts. Although the amount of the reduction cannot be quantified, it is expected to be small due to the relative habitat impacts associated with static fishing gear such as gillnets, and the limited decrease that may result from this measure.

The gear restrictions proposed in this alternative are all focused on mesh size changes that are not generally thought to have any effect on fish habitat. The proposed changes to the large mesh permit category are not expected to have any direct effect on habitat, due to the limitation of these proposed changes to mesh size. Because recreational fishing activities are not generally associated with adverse impacts to fish habitat, any changes to the regulation of recreational fishing would not be expected to have any effect on the

habitat of the GOM. This alternative also contains restrictions on vessels using hooks such as hook size and numbers. These actions are not expected to have any effects on habitat. Trip limits and possession limits have the potential to impact habitat if they result in a shift of fishing effort to other areas of habitat that are more sensitive and susceptible to gear impacts. Existing management measures in this FMP as well as other FMPs would most likely prevent a shift of effort into other fisheries, however, this assumption cannot be verified.

Overall, the measures proposed in this alternative are expected to result in a benefit to EFH by maintaining the WGOM closure area as well as attaining some fishing effort reductions.

DAS Leasing Program sub-option

This alternative would implement a DAS Leasing Program that would enable limited access NE multispecies permit holders to lease NE multispecies DAS to one another, with certain limitations to prevent an increase in overall fishing effort. Because the Program is designed to prevent increases in fishing effort, the implementation of the program is not expected to adversely affect essential fish habitat. The economic analysis of the DAS Leasing Program (section 5.2.5) indicates that the Program could result in a reduction in the number of limited access multispecies vessels that actually fish.

5.3.3 Habitat Experiments in the Vicinity of the WGOM Area Closure

The current WGOM Area Closure includes a section of the Stellwagen Bank National Marine Sanctuary (SBNMS), referred to as "the sliver" (see Figure 6). The SBNMS is making a significant investment in research in the "sliver" and surrounding area that will exceed over $4 million in funding over this decade. This research closure provides an unprecedented opportunity to understand the impacts of fishing gear on habitat, and the recovery from those impacts.

There are several properties of the WGOM/SBNMS overlap that make it an excellent choice for a habitat research area. These properties include scientific, practical, and political elements.

The area includes the four major habitat types found in SBNMS and in the GOM—boulder, gravel, mud and sand. This will enhance the exportability of any research results to areas outside the reserve. Further, the habitats are distributed on either side of the closed area boundary, making comparative habitat studies possible across the boundary.

The proximity of the area to the ports of Boston, Gloucester, Scituate, Plymouth and Provincetown make it accessible to researchers for day trips using small and relatively inexpensive vessels, including fishing vessels.

The area has already been closed to fishing for approximately 3 years. From a scientific perspective, this greatly enhances our ability to study the ecological processes and expedites the timeline on which results of research will be attained.

Several on-going studies are being conducted in the WGOM Area Closure. The SBNMS initiated a Seafloor Habitat Recovery Monitoring Program in 1998 to look at rates of habitat recovery from fishing in the four major habitat types found in the GOM. Three years of data now exist for the eight monitoring stations inside and outside of the closed area. A 10-year continuation of this study of seafloor habitat recovery following cessation of anthropogenic disturbance (e.g., fishing and fiber-optic cable installation) began in summer 2001. Other current projects in the closed area include the quantification of fish movement rates relative to seafloor habitat and species-area relationships of multiple taxa. This research is supported by NMFS, NEFMC and SBNMS.

Also, the WGOM/SBNMS seafloor has been mapped in its entirety by the US Geological Survey. One of the key issues for a GOM research reserve is the generalized applicability of research conducted there to other sites. Assuming that only one site will be designated as a habitat research area in the near future, the WGOM/SBNMS closed area provides the greatest opportunity to generalize research results to other areas due to the range of habitats it contains. The high resolution mapping completed provides for unprecedented specificity in the selection of research sites for a range of projects, and is a notably invaluable asset.

5.3.4 Essential Fish Habitat Assessment

Section 305 (b)(2) of the Magnuson-Stevens Act requires that each Federal agency shall consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken by such agency that may adversely effect EFH. This EFH Assessment is provided pursuant to 50 CFR 600.920 to initiate EFH consultation requirements with NMFS.

As stated in section 3.2 of this document, this action (preferred action) would continue, for the duration of this action, and indefinitely through a follow-up Secretarial amendment, in its current configuration, the WGOM Area Closure, unless changed by a future action. This area provides significant incidental benefit and protection for EFH in the GOM even though it was not closed with the objective of protecting fish habitat. Within the current boundaries of the WGOM Area Closure exist a variety of habitat types: Complex hard bottom, mud bottom, and sand bottom. This area was designated by the Council as EFH for 14 species and, prior to this action, provided the only year-round protection for EFH in the GOM. This action would also create a year-round closure in the formerly seasonal closure area referred to as Cashes Ledge. The Cashes Ledge Area Closure has the potential to allow for some recovery of the habitats within this area, however, the amount of recovery cannot be quantified. 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 in this measure. If a fraction of the fishing effort within the proposed year-round closed area is not displaced to other areas or seasons, the proposed closure may decrease the impacts on habitat, especially that habitat preferred by cod. 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. Regardless, the maintenance of the WGOM Area Closure and the introduction of the Cashes Ledge Area Closure will allow the habitats contained within them to continue or begin the process of recovery following the previous fishing-related disturbances and impacts.

Changes to the seasonal (rolling) closures would be adopted under the preferred alternative. The short duration of the rolling closures and the proposed changes makes it unlikely, however, that any degraded habitats would have an increased opportunity to recover. Thus, the proposed changes to the seasonal area closures would not be expected to have any direct effect on the habitat of the GOM.

There are measures proposed to directly reduce fishing effort through DAS use. As reductions offer direct reductions in the frequency and intensity of fishing activity averaged across the entire region (although there may be small-scale increases in the frequency and intensity of fishing effort in particular areas as vessels attempt to increase the efficiency of their remaining fishing effort).

This alternative includes a measure to limit Day boat gillnet vessels to 50 stand-up and 100 tie-down gillnets as well as other restrictions by area. This measure may result in a decrease in the amount of fishing gear used by the affected vessels. Although gillnets, as a static fishing gear, are not generally associated with adverse impacts to fish habitat, all fishing gears that come in contact with the bottom have some degree of effect on benthic habitats. Thus, this measure may serve to provide some degree of reduction in habitat impacts. Although the amount of the reduction cannot be quantified, it is expected to be small due to the relative habitat impacts associated with static fishing gear such as gillnets, and the limited decrease that may result from this measure.

Trip limits and possession limits have the potential to impact habitat if they result in a shift of fishing effort to other areas of habitat that are more sensitive and susceptible to gear impacts. Existing management measures in this FMP as well as other FMPs would most likely prevent a shift of effort into other fisheries, however, this assumption cannot be verified. The remaining measures proposed in this alternative, (e.g., Recreational fishing measures, Mesh size requirements, and hook sizes and limits,) will not have an adverse effect on EFH.

Overall, the measures proposed in the preferred alternative are expected to reduce the adverse effects to any EFH associated with the fishing activities managed under the FMP as a result of the maintenance of the WGOM Area Closure, the inclusion of the Cashes Ledge Area Closure, and the proposed DAS restrictions. NMFS concludes that this action would have no more than minimal adverse impacts to EFH and may even provide benefits to EFH. Therefore, pursuant to 50 CFR 600.815 (a)(2)(ii), NMFS has determined that this alternative minimizes, to the extent practicable, the adverse impacts to EFH.

5.4 Evaluation of E.O. 12866 Significance

E.O. 12866 requires a review of proposed regulations to determine whether or not the expected effects would be significant where a significant action is any regulatory action that may

- Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, of the principles set forth in the Executive Order.

Of these four criteria, the discussion to follow focuses primarily on the expected magnitude and duration of the economic impacts of the proposed Interim Action.

The proposed action would extend existing regulations that would otherwise expire in August, 2003. As such, the proposed action would not impose any added economic burden on the New England regional economy, coastal communities, or individual fishing businesses. If anything, the proposed action would provide some economic relief to small fishing entities. Specifically, DAS leasing would provide vessel owners with the flexibility to acquire additional DAS to offset fishing time lost as a result of the Settlement Agreement. Additionally, removal of the restriction limiting DAS use in the GOM to no more than 25% of allocated DAS will provide affected vessels with greater flexibility to make trip planning decisions.

The initial EA prepared for the Interim Action implemented in August, 2002 determined that the Settlement Agreement measures would be significant for purposes of the E. O. This determination was based on both the novel legal setting, as well as the quantitative and qualitative assessments that indicated the Interim Action would have

an adverse material affect on a large proportion of participants in both the commercial and recreational fishing sectors and would have an adverse impact on seafood wholesalers, processors, and retailers. The economic analysis prepared herein indicates that the economic impacts of the Settlement Agreement measures may have been greater than anticipated. These impacts would continue to be felt under the Preferred Alternative but no new or cumulative economic impacts beyond what has already been realized are anticipated. Nevertheless, the scope of impacts, if not their magnitude, will still be extensive throughout the fishing and fishing related economics sectors. These impacts will also affect jobs in these economic sectors and will have broad-based impacts on fishing communities primarily located in the states of Maine, New Hampshire, and Massachusetts. Based on the fact that the proposed action would extend existing regulations that have been determined to be significant, and the scope and potential magnitude of these material effects the proposed action is determined to be significant for purposes of the Executive Order.

Direct Effects

The proposed action is intended to be implemented through April, 2004 at which time the measures described herein would be replaced by a longer term action that will remain in place indefinitely or until it is modified or replaced. The potential economic effects that could be quantified were discussed in Section 5.2. Based on these analyses, the Interim Action would result in approximately a $16 million loss in revenues from groundfish trips paid to commercial fishermen. This estimated effect includes only the impact of the area closures, DAS changes, and trip limits. Additional monetary losses may be associated with the change in fixed gear quantities that may be fished and with the added costs of replacing gillnet and trawl nets required to comply with higher minimum mesh sizes for the Interim Action. However, the implementation of a DAS Leasing Program could mitigate a portion of the negative economic impacts by increasing revenues to vessels participating in the DAS leasing program. The scope and level of this mitigating effect would depend upon various factors including the number of vessels participating in the program, the cost of leased DAS, as well as the costs to vessel owners and price of fish.

The requirement to replace gear with larger mesh was implemented in August of 2002. The preferred alternative would maintain current mesh size regulations without change. Since vessels that fished during FY2002 would have already borne the cost of replacing their gear no additional gear replacement costs (other than normal maintenance and repair) would be borne for the duration of the proposed action. Vessels that did not fish in FY2002 but that decide to fish in FY2003 would have to pay to replace their gear with conforming mesh.

The likely gear replacement costs that may have already been borne was described in Section 5.2.6. Based on reported FY2000 VTR data there may be 6.4 thousand nets that will have to be replaced 751 different multispecies vessels at an aggregate cost of almost $2 million. The potential economic impact of the limits on amount of fixed gear (hooks

and gillnets) that may be used was described in Section 5.2.6. Based on that analysis an estimated 30 longline, 72 day gillnet, and 24 trip gillnet vessels would lose a combined $2.7 million in fishing revenue. The potential impact of reducing the cod, haddock and yellowtail flounder trip limit from 300 lb to 200 lb on open access Hand gear permitted vessels was described in Section 5.2.6. Based on that analysis, income losses could be $0.2 million. The combined monetized losses for FY2002 to commercial fishing vessel owners and crew comes to a total of $20.9 million as compared to FY2001. Since the preferred alternative would not add any new gear requirements expected revenues would be similar to that of FY2002 but would still be about $18 million less than FY2001.

In addition to direct effects on commercial fishing, the proposed action would also directly affect individuals engaged in recreational fishing or providing passenger services to anglers that catch cod in the Gulf of Maine. On average, recreational anglers took 132 thousand trips where Atlantic cod were harvested from 1998-2000. A large proportion of these anglers would be affected by one or more of the proposed measures in such a way that their opportunities to keep Atlantic cod will be constrained or curtailed altogether.

Indirect Effects

The proposed regulatory measures would have direct effects on fishing vessels, recreational anglers and providers of party/charter services. These measures would also indirectly affect a broad range of other economic activities particularly those activities involved in the wholesaling and distribution of fresh seafood and suppliers of purchased inputs to the fishing industry.

Dealer Impacts - Dealers will generally have less groundfish (particularly cod) available to provide for their customers. This reduced supply will be more difficult to overcome than may have been the case in the past since the regulations will reduce supplies not only of cod but of the full range of groundfish species. These reductions vary by stock (6 percent for GOM cod) but are generally on the order of 5 to 10 percent. Dealers will be forced to identify alternative sources of product outside the Northeast region such as Pacific groundfish or international imports. Regardless of source, dealers are likely to incur higher transportation and shipping costs and will be forced to pass at least some of these costs on to their customers. The DAS Leasing Program would not likely cause a change to the aggregate supply of groundfish, but could cause changes in the distribution of landing, resulting in increases in supply in one port and decreases in supply in other ports.

Processor Impacts - Processor impacts are likely to depend on their reliance on fresh groundfish. Processors that specialize in fresh products for resale to restaurants or retail outlets will, need to find alternative supplies of fresh fish to keep product lines available to their customers. Within the past year there had been anecdotal reports of processing bottlenecks as fresh-fish processors

had been reluctant to increase processing capacity due to concerns about continued reliability of groundfish supplies. It is not known to what extent processors have added processing capacity over time but individual businesses that have made recent investments in new equipment or physical plant would likely be relatively more disadvantaged than processors that have not expanded their capacity. Processors that rely mostly on frozen product for further processing will probably not be appreciably affected by the Interim Action.

Suppliers to Fishing Vessels Impacts - A number of businesses are engaged in providing the necessary inputs to fishing vessels. Sales by the these businesses will be reduced to the extent that individual fishing businesses either reduce the number of trips they take or, in some instances, cease operating. The impact on any given business will depend upon the relative proportion of their business that is dedicated to commercial fishing clients. As indicated in the discussion of economic impacts, the degree of impact is likely to have relatively greater impacts in ports along the Gulf of Maine (Portland, Portsmouth, and Gloucester in particular).

Employment Impacts - The Interim Action is likely to affect jobs in several different economic sectors. The anticipated effects on commercial and party/charter vessels is likely to at least result in a reduction in crew income but may also result in a reduction in the number of crew employed particularly in Maine, New Hampshire, and Massachusetts. Reduced supplies of groundfish and other related species will also result in a reduced demand for labor in shoreside occupations such as lumpers or cutters.

Cumulative Effects

Comprehensive economic analysis of the economic impact of all the regulatory measures was not possible. Instead, a piecemeal approach was required. Unfortunately, this approach may not fully capture the combined impact of all of the regulatory measures and how they may have very different impacts among vessel sizes, gear, or port. In general, the combined nominal regulatory burden may be greater for fixed as compared to mobile gear vessels. Both mobile and fixed gear vessels will be subject to the same trip limits and area closures and may receive equivalent DAS allocations. However, both hook and gillnet vessels will be subject different mesh and gear quantity restrictions based on where they fish. Mobile gear vessels will not be so limited. The DAS Leasing Program may serve to enable some vessels to remain profitable in the short term prior to full resource recovery.

Most vessels that are currently regulated under the Multispecies FMP also hold permits issued under other FMP's and would be affected not only by the Interim Action but may also be affected by management changes in other permitted fisheries. Of particular note is the development of new FMP's and regulatory actions taken for spiny dogfish and for monkfish. Both dogfish and monkfish were important fisheries that were available to many vessels as alternatives to

reliance on groundfish. With increased regulatory action taken to protect these two resources, there are fewer alternatives to turn to and may have caused many vessels to increase their reliance on groundfish. In addition to dogfish and monkfish, the Atlantic States Marine Fisheries Commission (ASMFC) has dramatically reduced the Northern shrimp season for this year; regulations have been implemented placing limits on mobile gear takes of lobster; and regulatory action has been taken affecting gillnet gear modifications as well as area restrictions to protect right whales.

Just as the variety of actions taken in other fisheries that affect multispecies vessels, the groundfish protection measures implemented under the Emergency Action may affect vessels engaged in fisheries other than groundfish. Such effects may be manifested either in terms of regulatory action taken to protect groundfish that affects prosecution of another fishery or by causing groundfish vessels to redirect effort onto other fisheries.

Under the Preferred Alternative the regulatory measures are relatively more restrictive for vessels operating in the GOM as compared to elsewhere in the Northeast region. These restrictions may be sufficient for vessels to seek alternative fisheries. Individuals that may want to continue to use a GOM port as a base of operation may turn to the lobster fishery if a license can be obtained or try herring fishing. Vessels that are able to move out of the GOM may attempt to switch to ports in Southern New England or the Mid-Atlantic depending what permits any given vessel may hold or may be able to obtain. Such a redirection of effort could lead to increased fishing pressure on Southern New England or Mid-Atlantic stocks and would add increased competition for local markets.

Long Term Economic Effects

The preceding discussion of impacts was based on the short time horizon covering the period July 2003 through implementation of Amendment 13 during which the Emergency Action would be in place. Even though the adverse economic effects are likely to be extended as this Emergency Action is replaced by Amendment 13, the associated adverse economic effects will be compensated for by increased economic yield over time as groundfish resources recover. The DAS Leasing Program may serve to enable some vessels to remain profitable in the short term prior to full resource recovery. As groundfish resources recover, economic yield will increase even as fishing effort is kept at low levels relative to the pre-Settlement agreement levels. The longer term impact on small entities should be positive as higher yields should be obtainable at lower effort hence profitability of the groundfish fleet should be enhanced. Such prospects for increased profitability will depend on the ability and wherewithal to control the rate at which latent effort becomes activated.

5.5 Initial Regulatory Flexibility Analysis

This Initial Regulatory Flexibility Analysis (IRFA)incorporates the analyses of section 5.2 of this document.

The IRFA considered three alternatives: The Preferred Alternative, the No Action Alternative, and a Hard TAC Alternative. Analysis of the Preferred Alternative examined the impacts on industry that would result from the continuation of the current management measures (Settlement Agreement), with implementation of a days-at-sea (DAS) leasing program. Analysis of the No Action alternative examined the impacts on industry that would result from implementation of the management measures that were in place for the 2001 fishing year (prior to implementation of the Court Order) and allowing fishing inside the WGOM Area Closure. Analysis of the hard TAC alternative examined the impacts to the industry that would result from a hard TAC system that achieved similar fishing mortality reductions as the preferred alternative. The economic impacts of the first two alternatives were analyzed and described according to the type of management measure as follows: (a) Commercial measures that were modeled (DAS restrictions, area closures, and trip limits); (b) commercial measures that were not modeled (changes to the open access hand gear category, prohibition on frontloading, prohibition on de-hooker use, mesh size restrictions, and limitations on the number of gillnets and hooks); and (c) recreational measures (private recreational vessel and party/charter). For the preferred alternative, gross revenue in the absence of reliable cost data is considered to be a proxy for profitability. For leasing DAS, profitability is estimated using a break-even analysis. The hard TAC alternative is a fundamentally different type of management scheme and the economic impacts were examined in a qualitative manner.

Description of the Reasons Why Action by the Agency is Being Considered.

A description of reasons this action is being considered appears in the Introduction and Purpose and Need sections of this document.

The Objectives and Legal Basis for the Proposed Rule.

The objectives and legal basis for the proposed rule are also found in the Introduction and Purpose and Need sections of this document.

Estimate of the Number of Small Entities.

All the commercial vessels with a multispecies permit had gross receipts less than $ 3.5 million, the SBA size standard for defining a small versus large commercial fishing business (3,894 multispecies vessels) (Environmental Assessment of the Settlement Agreement, June 2002). The economic impacts described in Section 5.2 also summarize the distributive impacts on commercial fishing vessels by vessel size in feet (Section 5.2.2.2), gear (Section 5.2.2.3), combinations of gear and size (Section 5.2.2.4), home port state (Section 5.2.2.5),

port group (Section 5.2.2.6) and relative reliance on groundfish income (Section 5.2.2.1).

Therefore, there would be no economic impacts resulting from disproportionality between small and large entities. The preferred alternative would impact all limited access permit holders (1,383) all open access Hand gear-only permit holders (2,973), and all party/charter operators (1,028 open access permit holders). Based upon the June 2002 Environmental Assessment, the number of participating vessels that may be affected by any one or more of the proposed measures is about 37 percent of the total number of those eligible to participate in the some component of the multispecies fishery.

The DAS allocations implemented under the August 2002 rule would continue under the preferred alternative. The reductions in 2002 DAS allocations impacted all permit categories. There were 1,383 limited access permits with baseline DAS allocations for the 2002 fishing year. Of these permits, 343 received the minimum allocation of 8 DAS. A total of 71, 180 DAS were allocated for the fishing year; a reduction of 45.7% compared to the final fishing year 2001 allocations.

The relative reduction in DAS allocations varied by permit category. The total reduction for individual allocation vessels (category A) was 21.7%, as compared with 49% for category B and 65.9% for Category D. Reductions in total DAS allocations for FY 2002 were larger for small vessels (less than 50 feet), than for medium or large vessels. New York and New Jersey were the two states with the largest reduction in fishing year 2002 DAS allocations. In contrast, under the no-action alternative, the DAS allocations would be markedly larger, with the potential for DAS use to increase above that which was recorded for the 2001 fishing year.

Relative changes to gross revenue were calculated based upon an estimation that DAS use in fishing year 2003 would range from 25% to 35% less than the number of DAS used during the 2001 fishing year. The estimated revenue loss for the 84 most affected vessels would be 21.3% or greater for an assumed 25% reduction in DAS, and would be 25% for an assumed 35% reduction in DAS. For vessels in the 25th to 50th percentile, the estimated revenue loss range from 19.7% to 11.5% for a 35% reduction in DAS use. Revenue loss for the least affected vessels would be no more than 1.5%. Relative dependence upon groundfish revenue is an important factor among the various factors that may determine the severity of the impact of the proposed measures on a particular vessel. The greater a vessel's dependence upon groundfish for annual fishing income, the greater the revenue loss is likely to be. The no-action alternative would result in no negative impacts or slightly positive impacts, in comparison with the preferred alternative.

With respect to gross annual revenue, earned during the 2001 fishing year (pre-settlement agreement), the preferred alternative would have

the largest adverse economic impacts on vessels in Maine, New Hampshire, and Massachusetts, but among these states, the estimated impacts would be similar. The no action alternative would have positive economic impacts on vessels that fish in the GOM and fish in the Western Gulf of Maine specifically. The least adverse economic impacts would be for those vessels from states bordering the Gulf of Maine, and for small gillnet vessels or large hook vessels.

A break even analysis was conducted that estimated a total of 86 vessels that would not have enough DAS to cover overhead costs. The analysis further concluded that if vessels were to make a minimum crew share payment of $ 25,000 per person, there would be 268 vessel that would be able to cover overhead costs, but would not have enough DAS to make this minimum labor payment. However, at this relatively low crew payment, DAS leasing could make it possible for vessels to redistribute DAS so that all vessels could operate profitably.

Leasing of DAS would provide individual vessel owners an opportunity to offset or reduce the impacts of the DAS reductions that were implemented in August, 2002 that would be continued under the preferred alternative. On a scale of the fishery as a whole, the aggregate supply of groundfish is not expected to differ under a DAS leasing program, however, changes in the distribution of landings could result in increases in supply in one port while supplies in other ports may decline. Although it is difficult to predict the number of vessels that would participate in a DAS leasing program, two analyses were conducted. The first analysis identified the number of vessels whose fishing year 2002 DAS allocations would not be sufficient to pay fixed costs plus provide a minimum payment to the vessel crew. Under the leasing program, fewer vessels will actually fish, but the profits for all vessels will be higher than if days at sea leasing were no allowed, and all vessels fished their allocation. Vessels which choose to lease all their DAS can greatly enhance their profit, because the owner is getting all the revenue from the lease without incurring any costs, and in particular not having to pay labor costs. Under the analytical scenario where all vessels can fish up to 100 or 150 days, the average profit level for vessels which lease DAS from other vessels is projected to increase from 31% to 60% (depending on gear sector) compared to what they would earn if they only fished their allocation. These vessels would fish on average from 97 to 149 days, and would lease on average between 37 and 94 days, at an average cost of between $ 724 and
$ 1,153 per day. At the same time number of vessels actively fishing would decline from 41 to 67%. Average profit for the vessels which don’t fish under this scenario and instead lease all their DAS is projected to increase approximately from 38% to 305% compared to what they would earn from fishing their allocation of DAS.

The economic impact of the changes in mesh size were described in Section 5.2.5.5. The mesh changes were estimated to affect 424 trawl vessels fishing in the GOM or GB area and 221 trawl vessels the fished in the SNE area. The average cost to replace the cod end was estimated to be $1,250. The mesh changes were estimated to affect 18

day boat gillnet vessels that used tie-down nets fished in the GOM. The average cost to these vessels to replace their nets was $7,794. The mesh changes were estimated to affect 31 day boat gillnet vessels that used stand-up nets that fished in the GOM. The average cost to these vessels to replace their nets was $9,300. The mesh changes were estimated to affect 25 trip gillnet vessels that fished in the GOM. The average cost to these vessels to replace their nets was $18,352. The mesh changes were estimated to affect 32 gillnet vessels that fished in either GB or SNE The average cost to these vessels to replace their nets was $8,800.

The economic impact of the changes in amount of gear fished was described in Section 5.2.5.6. Based on this analysis the gear limits would affect 30 bottom longline vessels, 72 day gillnet vessels, and 24 trip gillnet vessels. The average revenue loss for these vessels was estimated to be $21.4 thousand.

Under the Preferred Alternative, a large portion of recreational anglers fishing for cod in the Gulf of Maine, and individuals that provide passenger services to such anglers (charter/party vessels) will also be directly affected.

Alternatives which Minimize any Significant Economic Impact of the Proposed Rule on Small Entities.

Relative to the Preferred Alternative the No Action alternative would mitigate most of the adverse economic impacts associated with the Preferred Alternative. In general, gross fishing incomes would increase particularly for vessels operating in the GOM and would have particularly beneficial impact on small vessels and gillnet vessels in general. However, the No Action alternative also would result in unacceptably high increases in fishing mortality rates that could compromise the rebuilding of several GOM stocks, GOM cod in particular. For this reason the No Action alternative would not meet the regulatory objectives for this Interim Action.

Relative to the Preferred Alternative and the no action alternative, the hard TAC alternative would have a more severe adverse economic impact because of the severe consequences of closing down fisheries when a TAC is reached.

In any event, neither the No Action Alternative nor the Hard TAC Alternative are viable because they were not agreed upon in the Settlement Agreement ordered by the Court to be implemented.

If DAS leasing was implemented, the economic impact resulting from other proposed measures would be minimized. Under the leasing program, fewer vessels would actually fish, but the profits for all vessels would be higher than if days at sea leasing were not allowed, and all vessels fished their allocation. Vessels choosing to lease all their DAS to other vessels could greatly enhance their profitability, because owners would be getting all the revenue from

the lease without incurring any costs, and in particular not having to pay labor costs.

Reporting Requirements
The Preferred Alternative contains 1 new collection-of-information requirement. Vessel owners choosing to participate in the DAS leasing Program would be required to complete an application form in order to lease DAS.

Conflict with Other Federal Rules
This action does not duplicate other Federal rules and takes into consideration the monkfish regulations in order to be consistent with the objectives of the Monkfish Fishery Management Plan.

6.0 Social Impact Analysis

6.1 Background: Legislative Mandate

The mandate to consider the social impacts from proposed Federal fishery regulations stems from two main sources: the National Environmental Policy Act (NEPA) and the Magnuson-Stevens Act. NEPA requires that any regulation that will have impacts on the environment must also consider the economic and social impacts of such actions. National Standard 8 of the Magnuson-Stevens Act requires specifically that "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 economic impacts on such communities" (16 U.S.C.§ 1851(2)(8)). SFA further defines a fishing community as one that is "substantially dependent or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community" (16 U.S.C.§ 1802 (16)). The distributional impacts of the alternatives and their component measures are first briefly described. A fuller discussion of the impacts and their implications for fishermen, fishing families, businesses, and fishing communities can be found in the sections following, which compare the alternatives and address National Standard 8.

A general discussion of social impacts for Alternative 3 (Hard TACs) is included in section 5.2.7. This alternative could have the most severe social impact because of the likelihood of closing down fisheries altogether when a specific species TAC is reached.

6.2 No-Action alternative

For the purposes of the emergency action, the no action is considered to be the regulatory environment that would exist if the emergency

action were not implemented. This alternative includes the following measures:

- Seasonal/rolling area closures implemented through Frameworks 27, 31, and 33 – effective until modified by future Council action;
- Continuation of the triggered closures if 50 percent of the target TAC for GOM cod is landed by July 31 (Cashes in November and blocks 124 and 125 in January);
- GOM cod trip limit of 400 lb per day/4,000 lb trip maximum;
- pre-Settlement agreement gear restrictions (6-inch diamond, 6.5-inch square mesh, 80/160 gillnets); and
- pre-Settlement agreement recreational fishery restrictions (10 fish recreational bag limit, minimum size of 21 inches for cod, access to GOM closed areas with 3-month exemption letter).

Economic analysis has suggested that many fishing sectors would benefit from the reopening of WGOM, and thus would see positive short-term impacts from the no action alternative. Other analysis has indicated, however, that the pre-Settlement agreement management measures for GOM and GB cod will not meet the objectives specified in Amendment 7. Moreover, long-term projections of cod landings have suggested that landings would be much higher under the Amendment 7 target fishing mortality rate than under the pre-Settlement agreement management measures. The long-term impacts of the pre-Settlement agreement management measures are therefore likely to be more negative than the long-term impacts of any alternative that can meet the mortality objectives and rebuild the stock to sustainable levels, since declining landings would reduce revenues from groundfishing and cause related problems in fishing communities. The long-term social impacts of maintaining the pre-Settlement agreement management measures would also be affected by the probability that future additional Council action would be necessary to protect the GOM and GB cod stocks. If fishing mortality on these stocks remains too high, it is likely that stock biomass would decline, possibly below the threshold levels, as defined in the current overfishing definitions. The Council would then be required by law to take additional management action, the social consequences of which could be more severe and much larger in scale. Moreover, further declines in stock levels would lengthen recovery periods and, therefore, the period over which the greatest negative social impacts are experienced by affected communities.

6.3 Preferred Alternative

6.3.1 All Areas Fished under DAS

Changes to Open Access Hand Gear Trip Limit and Freeze on New Permits

The proposed continuation of the Hand-gear trip limit at 200 lbs of cod, haddock and yellowtail flounder could affect nearly half of the groundfish landings from the 271 Hand-gear vessels that showed activity during fishing year 2000 (Table 36). As the economic analysis shows (Section 5.2), such a trip limit would result in an

estimated 3 percent average revenue reduction, which may be mitigated somewhat by the substitution of higher-valued species. However this average revenue reduction would be unevenly felt as 39 vessels could lose over 25 percent of their fishing revenues; landing reductions appear also to be concentrated in smaller groundfish ports in primarily Massachusetts. In terms of long-term impacts, the freeze on the issuance of new open access Hand-gear permits could be even more significant, for although just a small number of issued permits are actually used in any given year, the permit category represents an important means of access to the fishery for newcomers–such as crew members seeking independent access, or fishermen without inheritance rights to vessels–and may enable traditional cycles of crew-to-owner to continue in coastal communities dependent on groundfish.

Table 36. Fishing activity by groundfish vessels fishing under the Hand gear permit (fishing year 2000)

No. of trips	No. of vessels	Total groundfish catch (in lbs.)	Pounds of which are over a 200-lb trip
1,749	271	356,380	168,424

* Source: logbooks.

Table 37. Hand gear groundfish activity, by port of landings (fishing year 2000)

Port of landing	No. of vessels	Total groundfish catch (in lbs.)	Pounds of which are over a 200-lb trip limit	Percent of the above-trip-limit-landings over all groundfish landings in port
Cape May NJ	1	cr	cr	cr
Cape Porpoise ME	1	cr	cr	cr
Dennis MA	3	8391	1980	3.4
Fairhaven MA	2	cr	cr	cr
Marshfield MA	9	10596	4819	1.7
Salisbury MA	4	2817	874	1.6

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 50,000 pounds AND greater than 2 percent of groundfish landings caught by handgear vessels going over the 200-lb trip limit. Cannot report (cr) confidential information if less than 3 entities.

Mesh changes for Monkfish and Large-mesh permit category

The preferred alternative contains a number of mesh and gear changes, two of which are area non-specific: changes in monkfish gillnet mesh and in the Large-mesh permit category. The requirement for monkfish gillnets to use at least 10" mesh and no more than 150 nets would affect about half the vessels using gillnet for the monkfish fishery , however for some of these vessels the change is only a reduction of 10 nets from the current 160 net limit. The majority of the monkfish gillnet catch is already caught using the mesh and nets that meet the preferred alternative, though the reduction in groundfish bycatch from vessels currently using smaller mesh could have negative impacts on vessel revenue, and positive impacts on biomass and thus ultimately long-term landings. The requirement for vessels in the large-mesh category to increase mesh size by 2" appears to affect mainly gillnet fishermen, whose only other option would be to move into another

groundfish category but which would involve a reduction in DAS; in either case these vessels can expect to see a reduction in groundfish income. The impacts from both these measures are primarily concentrated in ports throughout New England, particularly Portsmouth and Scituate (Table 39 and 41). These tables should be taken to imply that a significant portion of the active groundfish fleet in these ports will have to invest in new gear, and that their total landings will diminish by some unknown amount with the more restrictive gears.

Table 38. Gear used by monkfish gillnet vessels fishing under a multispecies DAS (fishing year 2000).

Size of mesh (Sink gill net only)	No. of trips	No. of vessels	Trip average monkfish	Monkfish (in lbs.)	Trip average groundfi	Groundfish (in lbs.)
Greater than or equal to 10", less than	3057	80	1473.1	4,503,346	102.7	313,930
Greater than or equal to 10", but more than 150 nets	42	13	4580.9	192,396	1673.6	70,291
Smaller than 10", less than or equal to 150 nets	812	61	1217.9	988,941	2323.0	1,886,291
Smaller than 10", but more than 150 nets	21	5	4129.6	86,721	5081.8	106,717

*Source: logbooks. Does not include trips with incidental monkfish catch (50 lb tail-weight equivalent).

Table 39. Monkfish gillnet vessels fishing under a multispecies DAS and using mesh less than 10" and/or more than 150 nets, by port of landing* (fishing year 2000).

Port of landing	Mesh size and/or net quantity	No. of vessels	Monkfish (in lbs.)	Percent of monkfish caught by this gear-mesh, out of all monkfish landed in port	Groundfish (in lbs.)	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port
Chatham MA	Small mesh only	9	54,380	11.5	174,598	3.8
Fairhaven MA	Too many nets only	1	cr	cr	cr	cr
	Small mesh only	1	cr	cr	cr	cr
Gloucester MA	Too many nets only	2	cr	cr	cr	cr
	Small mesh and too many nets	3	84,059	3.7	95,915	0.6
	Small mesh only	18	408,343	18.2	924,720	6.1
Little Compton RI	Too many nets only	2	cr	cr	cr	cr
	Small mesh only	5	28,308	7.5	8,315	9.5
Newport RI	Small mesh only	1	cr	cr	cr	cr
Ocean City MD	Too many nets only	1	cr	cr	cr	cr
	Small mesh only	1	cr	cr	cr	cr
Portland ME	Too many nets only	1	cr	cr	cr	cr
	Small mesh only	4	126,002	6.0	128,247	1.0
Portsmouth NH	Small mesh and too many nets	1	cr	cr	cr	cr
	Small mesh only	7	196,243	17.8	456,809	22.3
Rye NH	Small mesh only	2	cr	cr	cr	cr
Scituate MA	Small mesh and too many nets	1	cr	cr	cr	cr
	Small mesh only	6	59,425	17.0	85,067	7.9
Wanchese NC	Small mesh only	1	cr	cr	cr	cr
York ME	Too many nets only	1	cr	cr	cr	cr

* Source: logbooks. Only shows ports with monkfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of monkfish landings caught by combined illegal (by the preferred alternative) gillnet gear. Does not include trips with incidental monkfish catch (50 lb tail-weight equivalent). Cannot report (cr) confidential information if less than 3 entities.

Table 40. Mesh size used by vessels fishing under a multispecies large-mesh permit (fishing year 2000).

Type of gear	Size of mesh	No. of trips	No. of vessels	Groundfish (in lbs.)
Bottom otter trawl	Smaller than 10"	21	1	cr
Gill net	Greater than or equal	225	14	145,966
	Smaller than 9"	588	18	1,084,701

* Source: logbooks.

Table 41. Vessels fishing under a multispecies large-mesh permit using trawl mesh less than 10" or gillnet mesh less than 9", by port of landing* (fishing year 2000).

Port of landing	No. of vessels	Groundfish (in lbs.) caught by this gear-mesh	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port
Chatham MA	1	cr	cr
Plymouth MA	1	cr	cr
Portsmouth NH	3	285,247	13.9
Scituate MA	3	208,097	19.2
Seabrook NH	1	cr	cr
York ME	1	cr	cr

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by small mesh. Cannot report (cr) confidential information if less than 3 entities.

Other area non-specific measures, including DAS measures and prohibition on front loading

See Section 6.4, Comparison of Alternatives and Discussion of Impacts, below.

6.3.2 Georges Bank Measures

Areas Closures

During 1994-2000, those vessels that fished in the proposed additional closed areas on Georges Bank with gear prohibited by the preferred alternative depended on those areas for between 6.8 and 14.1 percent of their annual groundfish catch (in terms of landed lb), 0.0 and 24.8 percent of their annual scallop catch (although with very small total landings), and 1.4 and 6.5 percent of their annual catch of all other species combined; the number of vessels catching groundfish varied between 14 and 49 vessels (see Table 42). The impacts from the proposed closure would be strongest in Newport RI, as well as a number of ports in Massachusetts (see Table 43), and on medium-sized vessels (see Table 44). These results are based on past fishing practices (using 1994-2000 logbook data), and show a distribution similar to the impacts that are predicted in the economic impact analyses.

Table 42. Landings* (in thousands of lb) and areal dependence for calendar years 1994-2000 of the preferred alternative's May closed areas (blocks 80 and 81, and partial 118-120).

Area	Year	Groundfish landings	Scallop landings	Landings of other species	Ave. areal dependence on groundfish	Ave. areal dependence on scallops	Ave. areal dependence on other species	No. vessels landing groundfish	No. vessels landing scallops	No. vessels landing other species
Proposed Closed Area	1994	323.0	0.0	112.7	10.7	0.0	6.0	17	0	18
	1995	508.7	0.0	189.3	6.9	24.8	4.7	39	2	38
	1996	423.2	0.0	159.9	11.4	13.0	4.5	28	1	24
	1997	344.3	0.0	87.2	8.8	0.0	4.1	21	0	18
	1998	667.6	0.0	73.6	14.1	0.0	5.3	33	0	27
	1999	992.3	0.0	285.7	10.8	0.0	6.5	49	0	49
	2000	133.1	0.0	24.8	6.8	0.0	1.4	14	0	9

Rest of Northeast	1994	66,744.9	10,896.6	129,643.5	99.9	100.0	99.9	1,332	367	1,670
	1995	88,889.6	16,765.6	181,857.6	99.8	99.9	99.9	1,688	476	2,171
	1996	103,415.6	16,896.1	209,743.7	99.8	100.0	99.9	1,644	494	2,165
	1997	100,463.7	13,464.5	212,127.7	99.9	100.0	100.0	1,474	494	2,054
	1998	98,908.3	11,744.2	239,601.3	99.8	100.0	99.9	1,513	462	2,088
	1999	93,481.1	21,860.3	232,978.2	99.6	100.0	99.9	1,508	454	2,167
	2000	105,437.4	31,731.0	239,412.3	99.9	100.0	100.0	1,477	502	2,104

* Source: logbooks

Table 43. Ports in year 1999 most affected by the preferred alternative's proposed closed areas (p.c.a.) (in order of p.c.a. groundfish dependence).*

Port landed	No. vessels landing groundfish	No. vessels landing scallops	No. vessels landing other species	Groundfish landings from p.c.a.	Groundfish dependence on p.c.a.	Scallops landings from p.c.a.	Other species landings from p.c.a.	Total effort	Ave. days absent per trip	Ave. crew size per trip
Newport RI	3	0	3	65,825	5.7	0	64,320	191	7.9	3.4
Gloucester	13	0	12	372,196	2.7	0	88,820	550	5.5	4.2
New Bedford	9	0	9	267,092	1.3	0	34,549	358	8.3	3.9

* Source: logbooks. Only shows those ports with at least three vessels that showed either landings from the p.c.a. of at least 100,000 lb; or had a dependence on the p.c.a. for at least 5 percent of groundfish landings, with a total (from all areas) groundfish landings of at least 100,000 lb.

Table 44. Distribution of impacts from dependence on preferred alternative's proposed closed areas (p.c.a.) by size* of vessel (year 1999)

Vessel size	No. of trips	No. vessels landing groundfish	No. vessels landing scallops	No. vessels landing other species	Groundfish landings from p.c.a	Groundfish dependence on p.c.a.	Scallops landings from p.c.a.	Other species landings from p.c.a.	Total effort	Ave. days absent per trip	Ave. crew size per trip
Small	23	11	0	11	57,473	0.3	0	30,846	114	1.8	2.4
Medium	30	15	0	16	431,092	1.5	0	76,972	584	5.0	3.8
Large	29	23	0	22	503,771	1.0	0	177,893	870	8.1	3.7

* Source: logbooks and permit records. Small refers to vessels less than 50 feet in length; medium refers to vessels between 50 and 70 feet in length; and large refers to vessels greater than 70 feet in length.

Mesh Changes

The mesh and gear changes in Georges Bank could affect the nearly 250 trawl vessels using smaller-sized mesh, 25 hook vessels using more than 2000 hooks, and 75 gillnet vessels either using smaller-sized mesh or more than 50 nets (Table 45). Such regulations may differentially affect gillnet fishermen, who would have in their possession considerably more nets than trawl vessels, and thus have greater replacement costs, but the regulations will affect all of these fishermen, since they are instituting non-standard mesh sizes. In terms of affected ports, these impacts will be felt throughout New England (Table 46). These tables should be taken to imply that a significant portion of the active groundfish fleet in these ports will have to invest in new gear, and that their total landings will diminish by some unknown amount with the more restrictive gears.

Table 45. Gear used by vessels fishing under a multispecies DAS in Georges Bank (fishing year 2000).

Type of gear	Size of mesh or quantity of gear	No. of trips	No. of	Groundfish (in
Bottom otter	Greater than or equal to 6.5"	620	102	9,166,317
	Smaller than 6.5"	2430	248	41,703,812
Bottom longline	Less than or equal to 2000 hooks	349	31	438,615
	Greater than 2000 hooks	709	25	1,152,590
Sink gill net	Greater than or equal to 6.5", less than or equal to 50 nets	645	33	1,526,817
	Greater than or equal to 6.5", but more than 50 nets	648	38	1,575,841
	Smaller than 6.5", less than or equal to 50 nets	186	17	358,284
	Smaller than 6.5", but more than 50 nets	135	20	570,772

*Source: logbooks.

Table 46. Trawl vessels in Georges Bank using mesh less than 6.5", by port of landing (fishing year 2000).

Port of landing	No. of vessels	Groundfish (in lbs.) caught by this gear-mesh	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port
Barnstable MA	3	12,825	4.4
Boston MA	12	2,420,112	69.7
Chatham MA	5	106,838	2.3
Gloucester MA	45	6,499,502	42.7
Greenport NY	1	cr	cr
Marshfield MA	1	cr	cr
Montauk NY	2	cr	cr
Nantucket MA	28	492,069	71.9
New Bedford MA	137	21,595,713	70.3
New London CT	4	2,255,118	78.0
Newburyport MA	2	cr	cr
Newport RI	18	884,172	34.8
Plymouth MA	3	69,087	17.2
Point Judith RI	26	2,169,016	17.0
Portland ME	31	3,015,201	23.5
Provincetown MA	26	458,662	20.3
Sandwich MA	2	cr	cr
Scituate MA	3	109,202	10.1
Shinnecock NY	2	cr	cr
Stonington CT	6	1,063,999	39.7
Tiverton RI	1	cr	cr

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by small mesh in Georges Bank. Cannot report (cr) confidential information if less than 3 entities.

Table 47. Hook vessels in Georges Bank using more than 3600 hooks (fishing year 2000).

Port of landing	No. of vessels	Groundfish (in lbs.) caught by this gear-mesh	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port
Chatham MA	14	431,693	9.4
Harwichport MA	9	702,252	41.2

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by limited access vessels in Georges Bank using more than 3600 hooks. Cannot report (cr) confidential information if less than 3 entities.

Table 48. Gillnet vessels in Georges Bank using mesh less than 6.5" and/or more than 50 nets, by port of landing* (fishing year 2000).

Port of landing	Mesh size and/or net quantity	No. of vessels	Groundfish (in lbs.)	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port caught by this gear-mesh
Chatham MA	Too many nets only	17	1,269,858	27.6
	Small mesh only	12	310,857	6.8
	Small mesh and too many nets	7	131,538	2.9

Gloucester MA	Too many nets only	11	122,683	0.8
	Small mesh only	5	47,427	0.3
	Small mesh and too many nets	12	418,170	2.7
Plymouth MA	Too many nets only	2	cr	cr
Scituate MA	Too many nets only	4	35,314	3.3

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by combined illegal (by the preferred alternative) gillnet gear in Georges Bank. Cannot report (cr) confidential information if less than 3 entities.

Trip Limits

See Section 6.4, Comparison of Alternatives and Discussion of Impacts, below.

6.3.3 Gulf of Maine Measures

Areas Closures

During 1994-2000, those vessels that fished in the proposed additional rolling closed areas depended on those areas for between 16.0 and 32.2 percent of their annual groundfish catch (in terms of landed lb), 15.0 and 76.1 percent of their annual scallop catch (although with very small total landings), and 11.5 and 19.2 percent of their annual catch of all other species combined; the number of vessels catching groundfish varied between 120 and 206 vessels (see Table 49). The brunt of impacts from the proposed closure would be felt hardest in the ports of Massachusetts and New Hampshire (see Table 50), in particular some of the smaller ports, and on smaller vessels (see Table 51). These results are based on past fishing practices (using 1994-2000 logbook data), and show a distribution similar to the impacts that are predicted in the economic impact analyses. The opening of areas 124 and 125 during January-March would lessen this impact during the next fishing year, though the impacts from that closure during fishing year 2000 will contribute negative cumulative impacts to their closure in May.

Table 49. Landings* (in thousands of lb) and areal dependence for calendar years 1994-2000 of the preferred alternative's closed areas (blocks 124 and 125 in May, and 132 and 133 in June).

Area	Year	Groundfish landings	Scallop landings	Landings of other species	Ave. areal dependence on groundfish	Ave. areal dependence on scallops	Ave. areal dependence on other species	No. vessels landing groundfish	No. vessels landing scallops	No. vessels landing other species
Proposed	1994	428	0.4	385	26.7	76.1	11.5	120	9	117
Closed	1995	972	0.0	1,021	18.1	22.1	12.3	206	2	209
Area	1996	1,040	0.4	463	16.9	25.6	13.0	191	8	190
	1997	899	0.2	1,110	16.6	18.7	16.2	152	10	181
	1998	845	0.1	629	16.0	15.0	13.4	174	9	178
	1999	1,292	1.0	1,360	32.2	28.6	19.2	198	14	206
	2000	1,159	0.7	234	24.2	47.7	17.8	173	11	145
Rest of	1994	66,640	10,896	129,371	98.1	98.9	99.4	1,325	364	1,666
Northeast	1995	88,427	16,766	181,026	98.0	99.9	99.0	1,684	476	2,167
	1996	102,799	16,896	209,440	98.3	99.6	99.1	1,640	494	2,160
	1997	99,909	13,464	211,105	98.4	99.6	98.7	1,473	494	2,049
	1998	98,731	11,744	239,046	98.4	99.7	99.1	1,509	462	2,082

1999	93,182	21,859	231,903	96.4	99.6	98.3	1,497	452	2,163
2000	104,412	31,730	239,203	97.6	99.1	98.9	1,470	501	2,101

* Source: logbooks

Table 50. Ports in year 2000 most affected by the preferred alternative's proposed closed areas (p.c.a.) (in order of p.c.a. groundfish dependence).*

Port landed	No. vessels landing groundfish	No. vessels landing scallops	No. vessels landing other species	Groundfish landings from p.c.a.	Groundfish dependence on p.c.a.	Scallops landings from p.c.a.	Other species landings from p.c.a.	Total effort	Ave. days absent per trip	Ave. crew size per trip
Rockport MA	8	1	8	100,868	37.9	cr	11,479	184	1.0	1.8
Newburyport MA	10	3	10	69,749	25.3	23	5,867	116	1.0	1.5
Beverly MA	3	0	3	24,818	16.6	0	1,496	64	1.1	2.3
Marshfield MA	4	0	3	23,997	13.4	0	2,337	70	1.9	2.0
Hampton NH	4	0	3	28,449	12.3	0	4,081	49	1.0	2.0
Marblehead MA	3	0	2	31,159	11.1	0	cr	77	1.0	2.7
Seabrook NH	16	3	15	103,218	10.6	175	10,475	174	1.0	1.3
Rye NH	6	0	7	47,677	10.1	0	8,669	70	1.0	1.3
Scituate MA	12	0	10	90,202	7.9	0	14,471	240	1.1	2.5
Green Harbor MA	5	0	3	7,145	4.4	0	585	40	2.8	1.7
Gloucester MA	73	3	57	456,706	3.1	297	96,427	1,016	1.2	2.0
Provincetown MA	10	3	9	55,114	2.5	162	20,217	92	1.3	2.0
Plymouth MA	4	0	3	9,475	2.3	0	8,300	16	1.1	1.9
Portsmouth NH	11	0	10	30,932	1.5	0	40,001	115	1.5	1.8

* Source: logbooks. Only shows those ports with at least three vessels that showed either landings from the p.c.a. of at least 100,000 lb; or had a dependence on the p.c.a. for at least 10 percent of groundfish landings, with a total (from all areas) groundfish landings of at least 100,000 lb.

Table 51. Distribution of impacts from dependence on preferred alternative's proposed closed areas (p.c.a.) by size* of vessel (year 2000)

Vessel size	No. of trips	No. vessels landing groundfish	No. vessels landing scallops	No. vessels landing other species	Groundfish landings from p.c.a	Groundfish dependence on p.c.a.	Scallops landings from p.c.a.	Other species landings from p.c.a.	Total effort	Ave. days absent per trip	Ave. crew size per trip
Small	931	141	8	115	894,481	4.3	515	193,077	1,998	1.2	1.9
Medium	164	31	3	29	255,734	0.8	162	39,804	452	1.4	1.9
Large	10	1	0	1	cr	cr	0	cr	20	1.0	2.0

* Source: logbooks and permit records. Small refers to vessels less than 50 feet in length; medium refers to vessels between 50 and 70 feet in length; and large refers to vessels greater than 70 feet in length.

Mesh Changes

The mesh and gear changes in the GOM would affect the nearly 300 trawl vessels using smaller-sized mesh, 15 hook vessels using more than 2000 hooks, at least 26 Trip gillnet vessels using either smaller-sized mesh or more than 150 nets, 58 Day gillnet vessels using standup nets that would not meet new regulations, and the 17 Day gillnet vessels using tiedown nets that would not meet new regulations (Table 52-53). Such regulations may differentially affect gillnet fishermen, who would have in their possession considerably more nets than trawl vessels, and thus have greater replacement costs, but the regulations will affect all of these fishermen, since they are instituting non-standard mesh sizes. The measure restricting Day-gillnetters to 50 stand-up nets with a minimum mesh size of 6.5 appears to affect vessels that, on an average trip, catch nearly double the amount than those already fishing under the preferred alternative's measures, though the results are mixed for the tie-down nets (Table 53). In terms of affected ports, these impacts will be felt throughout Maine, Massachusetts, and New Hampshire (Table 54-57). These tables should

be taken to imply that a significant portion of the active groundfish fleet in these ports will have to invest in new gear, and that their total landings will diminish by some unknown amount with the more restrictive gears.

Table 52. Gear used by vessels fishing under a multispecies DAS in the GOM (fishing year 2000).

Type of gear	Size of mesh or quantity of gear	No. of trips	No. of vessels	Groundfish (in lbs.)
Bottom otter trawl	Greater than or equal to 6.5"	1,797	92	3,281,383
	Smaller than 6.5"	7,401	288	17,128,704
Bottom longline	Less than or equal to 2000 hooks	145	22	95,703
	Greater than 2000 hooks	68	15	113,754
Sink gill net, trip	Greater than or equal to 6.5", less than	516	26	1,468,259
	Greater than or equal to 6.5", but more than 150 nets	77	6	238,926
	Smaller than 6.5", less than or equal to 150 nets	465	26	2,794,624
	Smaller than 6.5", but more than 150 nets	1	1	cr

*Source: logbooks.

Table 53. Gillnet usage by day-trip gillnetters in the GOM (fishing year 2000).

Gillnet*	Net numbers and mesh size	No. of trips	No. of vesse	Average trip catch of	Average trip catch of	Total catch of groundfi	Total catch of flounder
Stand-up (or roundfish	Greater than 50 nets or mesh less than 6.5" (illegal under alternative)	1,065	58	1475.4	58.5	1,571,323	62,300
Stand-up (or roundfish) nets	Less than or equal to 50 nets with mesh greater than or equal to 6.5" (legal under alternative)	2,118	62	839.9	47.0	1,778,927	99,625
Tie-Down (or flatfish) nets	Greater than 100 nets or mesh less than 7" (illegal under alternative)	299	17	259.9	718.1	77,717	214,698
Tie-Down (or flatfish) nets	Less than or equal to 100 nets with mesh greater than or equal to 7.0" (legal under alternative)	352	25	342.3	776.0	120,491	273,164

*Source: 2000 and 2001 logbooks Since the logbooks do not differentiate between standup and tie-down nets, it was assumed that any trip landing more groundfish than flounders was using standup nets, and that any trip landing more flounders than groundfish was using tie-down nets. By doing so, 10 trips (representing 7 vessels, 4964 lb of groundfish and 4964 lb of flounders) were unaccounted for, since they landed equal amounts of groundfish and flounders. There is a question as to whether the variable gear type represents the aggregate number of nets or the number of nets per set; it was assumed to represent the aggregate quantity in this analysis, so this should be taken as a lower bound estimate of the impacts of this regulation.

Table 54. Trawl vessels in the GOM using mesh less than 6.5", by port of landing* (fishing year 2000).

Port of landing	No. of vessels	Groundfish (in lbs.) caught by this gear-mesh	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port
Bar Harbor ME	4	150,529	100.0
Boothbay Harbor ME	4	119,435	76.7
Boston MA	9	488,817	14.1
Cape Porpoise ME	3	15,012	11.1
Gloucester MA	78	3,962,570	26.0
Green Harbor MA	5	41,286	40.6
Hampton NH	4	142,862	52.3
Marshfield MA	3	29,485	10.6
Newburyport MA	9	246,628	66.6
Plymouth MA	4	55,025	13.7
Port Clyde ME	13	834,006	80.4
Portland ME	82	6,779,745	52.9

Portsmouth NH	18	217,249	10.6
Provincetown MA	22	1,263,560	55.9
Rockland ME	6	241,516	91.9
Rockport MA	6	153,981	56.4
Rye NH	6	276,399	45.1
Sandwich MA	3	17,787	6.4
Scituate MA	4	80,638	7.4
Seabrook NH	15	686,258	71.4
South Bristol ME	13	520,708	90.0

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by small mesh in the GOM. Cannot report (cr) confidential information if less than 3 entities.

Table 55. Limited access hook vessels in the GOM using more than 2000 hooks (fishing year 2000).

Port of landing	No. of vessels	Groundfish (in lbs.) caught by this gear-	Percent of groundfish caught by this gear-mesh, out of all
Marshfield MA	1	cr	cr

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by vessels in the GOM using more than 2000 hooks. Cannot report (cr) confidential information if less than 3 entities.

Table 56. Trip gillnet vessels in the GOM using mesh less than 6.5" and/or more than 150 nets, by port of landing* (fishing year 2000).

Port of landing	Mesh size and/or net quantity	No. of vessels	Groundfish (in lbs.)	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port caught by this gear-
Cape Porpoise	Small mesh only	2	cr	cr
Gloucester MA	Too many nets only	3	222,817	1.5
	Small mesh only	7	894,818	5.9
Portland ME	Too many nets only	2	cr	cr
	Small mesh only	11	889,064	6.9
Portsmouth NH	Small mesh only	6	781,887	38.0
	Small mesh and too	1	cr	cr
South Bristol	Small mesh only	1	cr	cr

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by combined illegal (by the preferred alternative) trip gillnet gear in the GOM. Cannot report (cr) confidential information if less than 3 entities.

Table 57. Dayboat gillnet trips in the GOM with nets illegal under the preferred alternative, by port of landing* (fishing year 2000).

Port of landing	Gillnet type	No. of trips	No. of vessels	Ave. crew size	Ave. trip catch of groundfish	Ave. trip catch of flounders	Total catch of groundfish	Total catch of flounders	% of all groundfish landed in port	% of all flounders landed in port
Beverly MA	Stand-	25	2	2.1	cr	cr	cr	cr	cr	cr
	Tie-	17	2	2.3	cr	cr	cr	cr	cr	cr
Cape Porpoise	Stand-	5	1	2.0	cr	cr	cr	cr	cr	cr
Gloucester MA	Stand-	527	27	2.5	1256.0	55.9	661,932	29,472	3.8	0.8
Marblehead MA	Stand-	4	1	3.0	cr	cr	cr	cr	cr	cr
	Tie-	137	3	2.7	352.5	880.2	48,286	120,581	36.4	81.2
Portsmouth NH	Stand-	219	8	2.7	2496.6	19.7	546,760	4,321	17.2	2.9
Rye NH	Stand-	19	2	2.2	cr	cr	cr	cr	cr	cr
Scituate MA	Stand-	128	7	2.9	994.7	160.8	127,319	20,587	15.0	3.5
	Tie-	113	4	2.7	129.9	556.3	14,674	62,857	1.7	10.7
Seabrook NH	Stand-	25	4	2.2	979.2	4.3	24,481	107	2.9	0.1
York ME	Stand-	5	1	3.2	cr	cr	cr	cr	cr	cr

* Source: logbooks. Only shows those ports that had total groundfish-flounder landings (from all gears and all areas) of greater than 100,000 pounds AND had greater than 2 percent of groundfish-flounder landings caught by illegal (under preferred alternative) gears. Cannot report (cr) confidential information if less than 3 entities.

Trip Limits

See Section 6.4, Comparison of Alternatives and Discussion of Impacts, below.

6.3.4 Southern New England Measures

Mesh Changes

The mesh and gear changes in SNE would affect the nearly 300 - 400 trawl vessels using smaller-sized mesh (logbooks do not differentiate between diamond and square mesh, so exact numbers are uncertain), 11 hook vessels using more than 2000 hooks, and 22 gillnet vessels using either smaller-sized mesh or more than 75 nets (Table 58). Such regulations may differentially affect gillnet fishermen, who would have in their possession considerably more nets than trawl vessels, and thus have greater replacement costs, but the regulations will affect all of these fishermen, since they are instituting non-standard mesh sizes. In terms of affected ports, these impacts will be felt throughout Southern New England and upper Mid-Atlantic ports (Table 59). These tables should be taken to imply that a significant portion of the active groundfish fleet in these ports will have to invest in new gear, and that their total landings will diminish by some unknown amount with the more restrictive gears.

Table 58. Gear used by vessels fishing under a multispecies DAS in the SNE (fishing year 2000).

Type of gear	Size of mesh or quantity of gear	No. of trips	No. of vessels	Groundfish (in lbs.)
Bottom otter	Greater than or equal to 7.0"	52	27	171,619
	Between 6.5 and 7.0	2,157	117	3,923,345
	Smaller than 6.5"	6,901	288	20,871,050
Bottom longline	Less than or equal to 2000 hooks	87	10	75,537
	Greater than 2000 hooks	86	11	186,065
Sink gill net	Greater than or equal to 6.5",less than or	309	28	113,511
	Greater than or equal to 6.5", but more than	59	12	58,464
	Smaller than 6.5", less than or equal to 75	20	7	17,384
	Smaller than 6.5", but more than 75 nets	26	3	174,932

*Source: logbooks.

Table 59. Trawl vessels in SNE using mesh less than 6.5", by port of landing* (fishing year 2000).

Port of landing	No. of vessels	Groundfish (in lbs.) caught by this gear-mesh	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port
Barnstable MA	4	7,899	2.7
Belford NJ	14	640,177	97.2
Boothbay Harbor ME	1	cr	cr
Freeport NY	6	123,466	96.1
Green Harbor MA	1	cr	cr
Greenport NY	5	93,648	37.9
Hampton Bays NY	4	609,774	91.5
Montauk NY	23	3,593,848	82.1
Nantucket MA	3	59,680	8.7
New Bedford MA	67	2,230,248	7.3
New London CT	2	cr	cr
Newburyport MA	1	cr	cr
Newport RI	27	1,172,074	46.1
Plymouth MA	1	cr	cr

Point Judith RI	77	8,053,847	63.3
Point Lookout NY	3	498,330	97.2
Point Pleasant NJ	20	728,575	62.8
Shinnecock NY	40	1,051,018	62.5
Stonington CT	16	1,043,346	38.9
Tiverton RI	3	12,800	8.5

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by small mesh in SNE. Cannot report (cr) confidential information if less than 3 entities.

Table 60. Limited access hook vessels in SNE using more than 2000 hooks (fishing year 2000).

Port of landing	No. of vessels	Groundfish (in lbs.) caught by this gear-	Percent of groundfish caught by this gear-mesh, out of all
Harwichport MA	4	137,885	8.1

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by vessels in SNE using more than 3600 hooks. Cannot report (cr) confidential information if less than 3 entities.

Table 61. Gillnet vessels in SNE using mesh less than 6.5" and/or more than 75 nets, by port of landing* (fishing year 2000).

Port of Landing	Mesh size and/or net quantity	No. of Vessels	Groundfish (in lbs.)	Percent of groundfish caught by this gear-mesh, out of all groundfish landed in port caught by this gear-
Portsmouth NH	Too many nets only	2	cr	cr
	Small mesh and too	2	cr	cr
Tiverton RI	Too many nets only	2	cr	cr
	Small mesh only	1	cr	cr

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds AND greater than 2 percent of groundfish landings caught by combined illegal (by the preferred alternative) gillnet gear in SNE. Cannot report (cr) confidential information if less than 3 entities.

Trip Limits

See Section 6.4, Comparison of Alternatives and Discussion of Impacts, below.

6.3.5 Recreational Measures

See Section 6.4, Comparison of Alternatives and Discussion of Impacts, below.

6.4 Comparison of Alternatives and Discussion of Impacts

Though the no action alternative may have negative long-term impacts on fishermen and fishing communities if stock biomasses remain at levels insufficient to support continued fishing levels, the preferred alternative can also be expected to have significant impacts on the Northeast groundfish industry, with particular segments and communities within that industry bearing a heavier share. Ultimately, the long-term sustainability of fisheries, fishermen and fishing families, and fishing communities all depend on healthy stocks of fish; but it is also the case that the sustainability of the institutions, processes, and relations that constitute fishing communities depend on a minimum of social capital. As the discussion below indicates, the proposed measures–particularly as they occur in the context of the cumulative effects from Amendments 5 and 7 to the

FMP–will have a significant impact on the revenues and flexibility of many fishing operations and shoreside facilities, such that many of the operations on the edge could go out of business, with the ensuing social and economic costs that such disruption entails.

The use of spatially based measures, such as the preferred alternative's closed areas in Georges Bank and the Gulf of Maine, has been noted in the anthropological literature as a means of controlling effort that is both widespread in many communities around the world, and often the most acceptable management measure to fishermen (McGoodwin, 1990; Acheson and Wilson, 1996). However, the acceptability of closed areas depends not only on how effective they are in achieving desired biological results, but also on the allocational affects, namely, whether those who bear the costs of management are the same as those who reap the benefits. It should be noted that, despite an image of a highly mobile fleet, many fishermen tend to fish in the same areas and in areas close to their home and landing ports. This behavior stems from any number of reasons - they fish with small boats, they have extensive knowledge of particular, but not all areas, etc. The majority of the commercial groundfish fleet (varying around 90 percent of the fleet) catch at least half of their annual groundfish catch in one statistical area alone, and a significant majority (between 71 and 75 percent of the fleet) catch at least 75 percent of their annual groundfish catch in just one statistical area (see Table 63).

Table 62. Spatial patterns of groundfish fishing, 1995-2000.

	1995	1996	1997	1998	1999	2000
No. of vessels landing at least a 40-lb trip of groundfish	1658	1585	1432	1434	1425	1419
Percent of vessels landings at least 50 percent of their annual	89.4	90.3	91.1	91.1	90.9	93.0
Percent of vessels landings at least 75 percent of their annual	72.9	74.0	74.7	73.4	71.4	74.9

Source: logbooks

Moreover, particular areas are more important than others for groundfish–in terms of an annual catch dependence, vessel landings and number of vessels–and are concentrated in the fishing grounds that border coastal areas in New England and the upper Mid-Atlantic (see Table 63). For example, the two most important areas for groundfish dependence are statistical areas 513 and 514, which together comprise a significant portion of the GOM, as well as the additional rolling area closures. Vessels that fished in area 514 depended on it for an average 73.2 percent of their annual groundfish catch, and vessels that fished in area 513 depended on it for an average 68.4 percent of their annual groundfish catch; these were not, however, the areas that saw the highest average trip catches, but the areas that vessels were most dependent on for their annual groundfish income. The upshot is not that closed areas *per se* have unacceptably high or

disproportionate impacts, but that *which* closed areas are selected matters crucially for the distribution and level of social and economic impacts, just as much as it does for the achievement of biological targets. As discussed in the previous sections, up to 206 vessels have a recent history of fishing in the proposed GOM closed area, accounting for 16-32 percent of their annual groundfish catch, depending on the extent to which they are able to fish different species or find new areas in which to fish; similarly the proposed Georges Bank closed areas affect up to 49 vessels with a recent history in the areas, affecting up to 6.5 percent of their annual groundfish catch. These impacts are not simply that fishing income will be reduced, though that is a probable impact; but that the closure of what may be traditional or close-to-shore areas can reduce the flexibility of fishing operations, an impact that may be more difficult for smaller vessels and the communities in which they operate; the closures may affect the safety of fishing operations if fishermen begin to fish farther from shore and on longer trips; and they can have significant impacts on families, communities, and patterns of interaction, if fishermen do stay away from shore for significantly longer periods, including the disruptions resulting from longer periods at home (NEFMC 2000; Olson and Clay, in press; Pollnac and Littlefield 1983). As well, the proposed closed areas may also differentially affect onshore facilities, employment patterns, and community revenues, if they significantly shift fishing and landing patterns.

Table 63. Fishing characteristics for groundfish, by statistical area, 1995 – 2000.*

	1995			1996			1997			1998			1999			2000			
Area	Ave. %	Ave GF	No. boats	Ave %	Ave GF	No. boats	Ave %	Ave GF	No. boats	Ave %	Ave GF	No. boats	Ave %	Ave GF	No. boats	Ave %	Ave GF	No. boats	6 yr ave.
514	70.	21772	486	70.	27,92	446	70.	29,81	415	77.	28,85	403	75.	22,68	347	75.	29,58	387	73.2
513	69.	30,70	367	69.	40,42	317	65.	28,75	278	66.	24,07	253	67.	19,20	220	72.	30,96	250	68.4
612	63.	14,43	110	64.	12,36	90	63.	21,53	102	55.	16,14	90	71.	18,45	98	75.	19,14	92	65.6
521	60.	28,17	419	63.	31,40	423	65.	40,43	390	62.	36,01	403	61.	44,40	404	62.	46,84	400	62.5
611	54.	8,171	55	57.	8,620	65	60.	13,40	45	55.	10,38	65	61.	10,26	63	65.	9,916	54	59.2
539	61.	12,10	164	54.	12,99	143	51.	17,10	122	51.	24,66	137	51.	21,60	130	53.	28,46	109	54.0
613	41.	22,26	191	42.	12,40	172	40.	24,75	199	39.	16,08	172	43.	18,00	151	43.	21,59	138	41.9
515	36.	56,04	168	38.	63,87	168	42.	61,87	158	44.	68,55	140	40.	53,47	139	40.	62,02	126	40.4
537	41.	36,47	250	42.	46,93	246	41.	54,46	188	37.	53,41	189	36.	48,60	190	37.	72,25	151	39.5
512	32.	21,47	108	43.	19,53	93	45.	25,27	72	40.	20,06	79	34.	15,07	75	33.	18,27	71	38.4
538	35.	2,549	67	33.	2,620	60	34.	3,580	47	37.	5,122	42	40.	3,131	34	33.	4,165	40	35.6
511	36.	24,38	41	34.	36,69	33	38.	20,20	19	38.	29,79	21	40.	14,09	17	25.	15,09	18	35.5
622	28.	2,617	40	31.	2,053	38	35.	8,689	22	45.	5,590	26	23.	2,381	33	45.	2,733	15	34.7
522	35.	45,01	194	29.	59,93	184	36.	64,70	187	31.	62,41	197	37.	70,03	230	37.	60,53	233	34.7
625	27.	3,872	6	34.	5,116	9	29.	182	4	32.	540	4	38.	8,285	9	35.	5,866	18	33.0
542	17.	2,603	8	47.	2,394	9	44.	50,94	5	c.r	c.r.	2	20.	10,40	5	25.	6,462	6	31.9
562	20.	21,76	55	23.	47,66	68	23.	43,56	54	23.	38,15	55	48.	13,77	174	46.	25,96	136	31.0
525	23.	36,64	115	26.	41,26	144	29.	50,39	124	36.	65,93	143	25.	68,49	122	33.	102,8	125	29.1
526	25.	13,19	113	25.	17,20	104	27.	16,03	62	29.	18,68	86	29.	27,23	103	34.	39,41	76	28.5
615	27.	5,319	57	26.	6,964	51	22.	4,736	55	23.	2,768	42	29.	1,980	49	31.	1,703	42	26.8
616	32.	32,04	156	32.	53,80	146	27.	47,30	127	23.	41,63	130	21.	35,11	103	18.	17,87	96	25.9

465	27.	12,87	10	41.	11,26	8	c.r	c.r.	1	10.	8,627	7	8.3	4,218	7	c.r	c.r.	2	25.5
561	21.	24,03	77	18.	25,33	68	20.	24,42	60	26.	40,61	85	24.	42,96	86	23.	46,18	78	22.4
464	14.	19,71	16	8.7	7,285	4	c.r	c.r.	1	19.	29,96	5	10.	9,714	6	41.	19,15	3	18.2
552	c.r	c.r.	1	3.3	4,674	4	14.	30,70	3	c.r	c.r.	2	37.	9,780	14	43.	17,65	8	17.3
520	9.9	30,18	11	17.	21,97	25	19.	28,08	16	13.	18,05	25	18.	37,46	15	15.	17,16	10	15.7
500	10.	16,57	16	14.	19,13	24	18.	15,55	35	15.	22,95	40	8.8	13,24	20	19.	28,51	10	14.4
543	2.1	18,74	3	8.9	28,38	7	10.	94,83	4	c.r	c.r.	2	c.r	c.r.	2	c.r	c.r.	2	14.0
510	18.	7,898	3	13.	12,88	17	15.	20,88	16	4.0	5,402	5	4.4	13,56	9	8.4	3,495	6	10.6
524	19.	135,8	3	5.5	5,328	5	c.r	c.r.	2	15.	198	3	6.0	9,706	6	3.9	2,622	7	9.7
637	c.r	c.r.	1	0.0	0	0	c.r	c.r.	1	c.r	c.r.	1	c.r	c.r.	1	3.8	20,15	6	6.7
533	7.7	19,66	3	2.9	6,589	5	1.9	3,380	4	8.7	25,06	7	8.0	5,707	5	0.0	0	0	4.9

* Source: logbooks. NB: only shows those areas that had at least 100,000 pounds of groundfish landed in at least one of the years 1995-2000. Average percent refers to the average percentage of a vessel's annual groundfish landings by area; average GF refers to the average vessel annual groundfish landings in that area; and boats refers to the number of vessels recording at least one trip in that area.

In addition to the proposed closed areas, the preferred alternative contains a number of other measures that combined would impact the groundfish industry and particular segments therein. As the economic impact analyses indicated, DAS changes would affect active fishermen across the board, but would particularly impact, in terms of total DAS usage, those vessels that currently fish their maximum DAS, mostly large vessels, vessels in the Individual permit categories (category A), and vessels with homeport states in Maine, Massachusetts, and New Hampshire. The prohibition on front-loading, though economic analysis has indicated may not be very prevalent, would half trip income for those vessels who practiced front-loading. Its prohibition would not only negatively impact income, but could induce those vessels to remain at sea for longer periods for the higher trip limit, with consequences for safety. On a positive note, its prohibition would equalize the fishing opportunities between those who did and did not practice front-loading, perhaps reducing perceptions of unfairness (though not entirely, since the baseline of DAS allocated in 2002 would reflect any front-loading practiced). Through the DAS reductions more generally, business and financial solvency may be at stake for many vessels, and business failures could have significant social impacts, such as increased community instability, crime rates, domestic violence, and other issues. In addition to impacting revenues and year-round fishing for those vessels for which the DAS reductions would be binding, a decrease in overall landings could affect shoreside facilities and communities that are historically dependent on groundfish, and the number and stability of crew positions. The long-term impacts of a reduction in crew, for example, is not only in the way a reduction affects the operation and safety of fishing vessels, but also in how the reduction affects the life cycle of crew-to-owner that is prevalent in some fisheries, and thus the long-term social sustainability of fishing families and fishing communities (see also NEFMC Report from the groundfish social impact informational meetings 2000). This crew-to-owner cycle, and the entry of fishermen into the profession more generally, will be additionally impacted by the freeze on issuance of hand-gear open access permits, one of the few remaining entry points for new fishermen, as discussed in the previous section.

While the increased trip limit for GOM cod would have positive impacts for some hook and gillnet fishermen, (with less impact on trawl vessels), the decreased trip limit for yellowtail flounder is expected to negatively impact trawl vessels operating out of southern New England and the upper Mid-Atlantic, as explained in the Economic Impact Analysis (see Section 5.2). It is difficult to predict the effects of the proposed mesh size changes, other than that many fishermen would have to invest in new gear at a time that fishing income is considerably more uncertain; moreover, the change in mesh size would both reduce and change the composition of the catch in ways that may impact income. Without a transitional period, gear suppliers with excess inventories of prohibited gear may suffer losses in revenues. Such changes will likely be felt throughout New England, from small ports to large ones, as discussed in the previous sections and detailed further in the section on National Standard 8. The net limits could also have income effects on gillnet fishermen, and as the economic analysis has shown, the effects at the 10^{th} percentile–the most adversely affected-- were the trip gillnetters, who face heavy net reductions in Georges Bank and Southern New England.

For the recreational fishery, as the economic impact analyses have indicated, the impacts will depend on the extent to which charter/party boat patrons would continue to participate in fishing, despite the creel limits and the additional likelihood that fewer fish could be retained due to the larger size limit. The requirement to declare into either recreational or commercial fishing for the duration of the GOM closure, would also limit the flexibility of charter/party boat operations in the GOM.

As mentioned above, the social impacts of a hard TAC alternative, discussed generally in section 5.2.9, is expected to be most severe of the three alternatives because it closes down fisheries altogether when a TAC is reached.

6.4.1 Social Impact of DAS Leasing Program

The following gives some indication of the possible social impacts from leasing DAS. This analysis is based on part on the predicted outcomes from economic modeling (section 5.2.5), further aggregated by port, state, and vessel size to give an indication of the differential effects of DAS leasing within the groundfish industry. This analysis should be interpreted as an indication of the *direction* of pressures or trends, rather than a precise estimate of impacts. The economic model itself is highly stylized and makes a number of theoretical assumptions about perfect markets (such as the overall ability and willingness to trade and the full information to do so) that are not reasonably expected to occur. There are also a number of reasons to expect, based on anthropological perspectives, that such trading will not take place as economic modeling may predict. Anthropological studies have demonstrated repeatedly that for many fishermen and fishing families, a commitment to fishing is based not solely on income or profit maximization but rather on fishing as a way of life (Gatewood and McCay 1988, Gatewood and McCay 1990). Other studies

have shown that many fishing businesses are family-run enterprises where income pooling and other forms of resource sharing mitigate against the more traditionally-capitalist assumptions about firms in economic analyses (Doeringer et al. 1986).

The economic modeling assumes that a vessel owner would only lease DAS if the income from leasing is more than the expected income from fishing those DAS; in other words, the impacts from such a leasing arrangement are expected to be positive, or at least no worse than the DAS allocation under the preferred alternative. Given the coupling of this alternative with other alternatives in order to meet conservation neutrality, leasing would at best mitigate the negative impacts from the overall reduction in fishing activity. However, since the income accrues to the owner of the vessel, crew members on vessels that lease DAS away may see a negative impact to income, depending on to what extent the vessel engages in alternative fishing activities (about which the model makes no predictions). Alternatively, crew on vessels that lease DAS in may see positive impacts from increased fishing activity. Changes in landing patterns that could occur with net outflows of DAS from particular ports (as indicated below) could have negative impacts on buyers and processors, depending again on to what extent vessels engage in other fishing activities. Moreover, the social impacts from policy changes extend beyond changes in income. Studies on the social ramifications of ITQ's (though fundamentally different from the policy proposed here since DAS are only leased and not permanently sold) have, for example, pointed to the significant impacts on social relations that stem from the commodification of fishing activity (Pálsson 1998, Pálsson and Helgason 1995). Moreover, such ITQ studies have pointed to the ramifications of changing market shares that enable the domination of particular segments of the industry over others without further protective legislation (McCay 1995, McCay et al. 1995).

In terms of the distributional effects within the groundfish industry, the economic modeling indicates a movement of DAS from large/medium to small vessels (see table 64). For all size categories, there is a movement to vessels more dependent on groundfish income, though this is more pronounced for the larger vessels. At the state level (see Table 65), the influx of DAS is primarily to Massachusetts, which is also the state with the highest groundfish income from the vessels modeled. Maine, though, with the second highest income and with income that comes from vessels dependent or highly dependent on groundfish, sees the highest loss of DAS. It is therefore expected that the negative impacts (as detailed above) from DAS leasing would be felt most there. At the port level, ports such as Chatham, New Bedford and Hampton/Seabrook might see a net gain of DAS while ports such as Point Judith/Newport, Hampton Bays, Portland, Sciutate, and Gloucester might see a net loss. Of additional concern are ports such as Montauk and the smaller groundfish port of Camp Ellis, where there is not only a net loss of DAS but also a higher relative loss of DAS from the vessels more dependent on groundfish.

Table 64. Distribution of net flows of leased days-at-sea, by size of vessel*

Vessel size	Groundfish income	% from dependent vessels	% from highly dependent vessels	Net gain in days-at-sea	% of days leased out by dependent vessels	% of days leased out by highly dependent vessels	% of days leased in by dependent vessels	% of days leased in by highly dependent vessels
Small	22,424,	25.9	60.6	2058.5	23.4	47.5	31.6	51.5
Medium	31,111,	30.1	52.5	-1753.9	27.4	28.7	30.5	56.4
Large	52,873,	30.0	52.1	-277.9	28.6	15.0	27.9	53.7

* Source: weighout and permit records. Small refers to vessels less than 50 feet in length; medium refers to vessels between 50 and 70 feet in length; and large refers to vessels greater than 70 feet in length. Groundfish income pertains only to vessels included in the economic model. Dependent vessels refers to those earning 50-75% of annual income from groundfish; highly dependent vessels refers to those earning 75-100% of annual income from groundfish (based on 2001 weighout records).

Table 65. Distribution of net flows of leased days-at-sea, by state of landing*

State	Groundfish income	% from dependent vessels	% from highly dependent vessels	Net gain in days-at-sea	% of days leased out by dependent vessels	% of days leased out by highly dependent vessels	% of days leased in by dependent vessels	% of days leased in by highly dependent vessels
ME	19,220,2	59.8	34.5	-1456.6	61.1	23.2	57.6	34.2
NH	3,753,36	22.1	51.8	478.2	21.0	40.2	27.4	54.6
MA	71,500,7	19.9	68.0	4268.7	15.2	50.7	25.3	62.5
RI	6,255,23	37.8	1.1	-1941.8	20.6	0.0	30.9	1.7
NY	4,576,00	43.4	5.3	-1261.1	16.9	8.3	30.8	1.1
NJ	1,103,23	11.1	0.1	-59.4	1.8	0.0	22.1	0.1

* Source: weighout and permit records. Does not include states with less than 200 dollars of groundfish income from vessels included in the economic model. Dependent vessels refers to those earning 50-75% of annual income from groundfish; highly dependent vessels refers to those earning 75-100% of annual income from groundfish (based on 2001 weighout records).

Table 66. Distribution of net flows of leased days-at-sea, by port of landing*

Port of landing	Groundfish income	% from dependent vessels	% from highly dependent vessels	Net gain in days-at-sea	% of days leased out by dependent vessels	% of days leased out by highly dependent vessels	% of days leased in by dependent vessels	% of days leased in by highly dependent vessels
New Bedford MA	38,920,	20.0	64.5	2713.3	14.2	22.1	29.1	55.7
Gloucester MA	17,256,	10.1	79.3	-485.8	12.3	65.6	22.9	66.6
Portland ME	16,253,	57.4	37.1	-801.6	66.0	18.6	47.4	41.8
Point Judith RI	5,042,5	43.1	1.3	-1354.4	26.5	0.1	48.3	2.7
Boston MA	4,575,2	68.0	30.7	-180.2	62.5	32.0	37.6	62.2
Chatham MA	4,439,2	20.0	73.1	2008.8	40.3	8.8	24.9	63.7
Montauk NY	3,007,2	54.1	5.3	-256.3	35.6	16.4	24.3	0.1
Portsmouth NH	2,059,7	15.4	52.1	-146.7	13.7	39.2	33.3	38.7
Provincetown MA	1,976,9	1.5	88.9	-55.2	5.2	62.7	0.8	81.4
Harwichport MA	1,370,9	1.7	91.7	143.8	0.0	77.1	13.0	61.7
Hampton Bays NY	1,207,1	20.2	5.0	-806.7	5.2	1.3	0.2	4.2
Hampton/Seabrook	1,107,8	27.3	67.6	529.7	12.7	64.2	18.4	81.5
Scituate MA	1,089,6	11.9	80.6	-595.0	19.2	51.4	4.1	84.6
Newport RI	1,020,4	18.7	0.4	-508.1	12.4	0.0	13.6	0.8
Port Clyde ME	986,479	78.8	0.0	-56.6	29.7	0.0	99.1	0.0
Point Pleasant	627,284	2.8	0.2	-239.9	2.8	0.0	0.4	0.3
South Bristol ME	579,136	95.8	3.9	173.6	93.0	5.1	68.1	31.9
Rye NH	576,437	34.7	20.9	100.7	63.4	7.0	36.8	21.5
Rockport MA	506,513	0.0	99.4	3.5	0.0	99.0	0.0	100.0
Belford NJ	456,024	22.4	0.0	192.6	0.0	0.0	27.5	0.0
Plymouth MA	387,996	18.9	78.4	348.8	0.0	58.7	21.5	63.8
Marblehead MA	335,022	60.0	38.7	75.2	0.0	86.6	62.3	37.6

Other Barnstable	246,788	64.3	22.6	77.4	39.8	0.0	73.9	26.1
Freeport NY	244,660	43.6	0.0	-52.2	48.0	0.0	100.0	0.0
Newburyport MA	201,857	15.9	84.1	26.6	0.0	100.0	53.6	46.4
Cundys Harbor ME	198,692	81.6	18.4	-63.0	70.6	29.4	100.0	0.0
New Harbor ME	179,404	91.8	0.0	13.8	80.4	0.0	100.0	0.0
Boothbay Harbor	156,597	68.6	30.7	-138.6	66.4	33.6	98.2	0.1
Bar Harbor ME	138,338	46.4	53.6	-110.3	41.1	58.9	21.4	78.6
Camp Ellis ME	131,117	10.7	87.1	-137.9	29.0	71.0	0.0	4.0
Tiverton RI	126,394	0.0	0.0	-196.7	0.0	0.0	0.0	0.0
Marshfield MA	104,123	16.5	83.1	253.1	0.0	100.0	19.9	77.0

* Source: weighout and permit records. Does not include ports with less than 100,000 dollars of groundfish income from vessels included in the economic model or fewer than 3 of these vessels landing. Dependent vessels refers to those earning 50-75% of annual income from groundfish; highly dependent vessels refers to those earning 75-100% of annual income from groundfish (based on 2001 weighout records).

6.5 National Standard 8

Introduction

National Standard 8 requires the consideration of impacts on fishery dependent communities. Current guidance on National Standard 8 defines communities as towns or cities, a geographic unit which might fit the Census Bureau's definition of a "place." Thus, while communities based on gear or target species will be discussed within the Social Impact Analysis (SIA), they are not part of this section. A number of factors to consider in making determinations of dependence are also supplied in current guidance, though methodological guidelines are in the process of refinement. Moreover, resources have not been directed towards the systematic and long-term collection of the kinds of baseline data needed to make such determinations in an empirically grounded way. However, the Northeast Region has made some headway in collecting the kinds of information and performing the kinds of analyses to support National Standard 8 determinations, most notably the Marine Fisheries Initiative (MARFIN) project on fishing communities and fishing dependency in New England (Hall-Arber *et.al.* 2001) and an updated port-profiles report for the Mid-Atlantic (McCay and Cieri 2000). While some of these efforts include discussions of communities at larger levels than a "place" they are still useful in providing context and background for a discussion of communities as defined for National Standard 8.

The MARFIN report tried to assess levels of dependence for natural resource regions (NRRs) in New England using a variety of dependency indices, as summarized in Table 67 below, from the report. Downeast Maine (or Washington County, including ports such as Beals Island, Jonesport, Cutler, Eastport, and Lubec), Upper Midcoast Maine (including such ports as Stonington, Deer Isle, Rockland, and Vinalhaven) and the Cape and Islands (with ports such as Sandwich, Hyannis, Chatham, Provincetown, and Vineyard Haven) were all characterized as highly dependent on fishing, in terms of actual employment and/or because of a lack of alternative occupations for fishermen. Additionally the report noted six ports–New Bedford, MA; Portland, ME; Gloucester, MA; Chatham, MA; Point Judith, RI; and Portsmouth, NH–as having primary infrastructure capacities, and a

number of secondary ports with positive factor rankings–Stonington, ME; Rockland, ME;, Vineyard Haven, MA; Stonington, CT; South Norwalk, CT; Port Clyde, ME; Newport, RI; Sandwich, MA; Kennebunkport ME; and Beals Island/Jonesport ME (Hall-Arber *et al.* 2001). Similar dependency analyses for the Mid-Atlantic region is underway but still pending.

Table 67. Comparative fishing dependence indices for the 11 sub-NRRs of New England.

Sub-NRR	A. Percent Related Occupations	B. Percent of Total Employed	C. Alternative Occupation Ratio Summary
Downeast Maine	45	3.6	255.54
Upper Midcoast	36	2	171.05
Cape and Islands	27	0.79	104.43
Lower Midcoast	23	0.46	51.32
New Bedford/ South	27	0.4	38.95
Southern Maine	23	0.39	36.94
Rhode Island	24	0.31	30.86
Gloucester/ North	20	0.21	24.91
New Hampshire Coast	8	0.09	9.46
Boston Area	7	0.05	6.39
Connecticut Coast	2	0.01	2.61

Source: Hall-Arber *et al.* 2001

6.5.1 Taking into account the importance of fishery resources to fishing communities

Sections 6.2 and 6.3 looked at the proposed alternatives and the distributional effects from the components measures of the preferred alternative in some individual detail. But the actual impact from the measures will come from the suite of measures as experienced in total and their cumulative effect on fishermen and fishing communities. The following table (Table 68) looks at the cumulative impacts on affected groundfish activity from the mesh and gear changes and the proposed area closures. Affected activity does not equate to a one-to-one reduction in activity; rather it refers to the volume of landings and port activity that will be affected by the new regulations and which will be presumably reduced by some amount depending on the ability of or opportunity for fishermen to find new areas in which to fish, for example, or adapt to the new gear specifications.

Table 68. Total affected activity from mesh and area closures in the preferred alternative (fishing year 2000)

State	Port Landed	No. of vessels	% of total groundfish affected	Total groundfish landed	State	Port Landed	No. of vessels	% of total groundfish affected	Total groundfish landed
Maine	Bar Harbor	4	100.0	150,529	Massachusetts	New Bedford	150	73.3	30,729,098
	Boothbay Harbor	4	79.3	156,550		Newburyport	12	85.5	370,398
	Cape Porpoise	5	100.0	134,784		Plymouth	9	48.7	401,827
	Port Clyde	13	80.4	1,037,660		Provincetown	37	77.0	2,258,782
	Portland	104	84.9	12,819,616		Rockport	9	56.6	273,106
	Rockland	6	91.9	262,679		Sandwich	7	18.7	278,367
	South Bristol	13	96.7	578,293		Scituate	22	49.1	1,084,848
	York	4	97.3	100,116	Rhode Island	Newport	36	80.2	2,541,745
New Hampshire	Hampton	5	52.3	273,367		Point Judith	85	82.7	12,727,794
	Portsmouth	35	77.2	2,058,041		Tiverton	5	24.6	151,368
	Rye	9	46.3	612,536	Connecticut	New London	4	99.0	2,892,489

	Seabrook	21	77.5	960,910		Stonington	18	79.9	2,681,518
Massachusetts	Barnstable	5	7.1	291,922	New York	Freeport	6	96.5	128,423
	Boston	14	83.2	3,471,624		Greenport	6	89.2	247,169
	Chatham	52	50.3	4,603,028		Hampton Bays	4	91.5	666,657
	Gloucester	166	84.5	15,212,821		Montauk	31	86.0	4,376,822
	Green Harbor	5	49.7	101,723		Point Lookout	3	97.2	512,461
	Harwichport	16	42.6	1,705,324		Shinnecock	45	71.7	1,680,614
	Marblehead	3	37.9	259,356	New Jersey	Belford	15	97.2	658,867
	Marshfield	6	18.1	278,561		Point Pleasant	20	64.0	1,160,630
	Nantucket	29	73.4	684,750					

* Source: logbooks. Only shows ports with total groundfish landings (from all gears and all areas) of greater than 100,000 pounds landed by at least 3 vessels.

In terms of National Standard 8, some of the communities most affected by the proposed regulations may not fit a strict interpretation of the criteria for substantial dependence on fishing. The ports have also not been assessed in terms of their dependence on groundfish as compared to other species, nor have extensive analyses been performed to assess the ability of different kinds of fishermen and communities to adapt to the increasingly stringent regulations: some of the ports that show the most groundfish activity affected, for example, could conceivably adapt more ably if their vessels are larger and more mobile (important for adapting to the proposed closed areas) or are in a more stable financial position to absorb the costs of new gear. Additionally, a number of small-sized fishing ports–Newburyport, Marshfield, Marblehead, Beverly, York, Cape Porpoise, Tiverton, Greenport, to name a few–would be collectively affected by the measures in the preferred alternative, and to what extent these small ports may be enmeshed in networks that constitute new spaces of fishing communities, as the MARFIN report indicates is happening in the New England fishing economy (Hall-Arber *et al.* 2001), is unknown, as is also the vulnerability of these networks to regulations such as the ones proposed. Again, the fact that many of these are small-boat, day-trip ports suggests that they are particularly vulnerable to the near shore closed areas proposed. Moreover, such small-scale operations may also be more vulnerable to the financial costs from other measures such as the gear changes, though, as the economic analysis suggests, there is a complex relationship between vessel size, gear used, income potential affecting the profitability of vessels (see section 5.2.4 on the break-even analysis). The following looks at the ethnographic data available for the ports listed in Table 68 in order to give some context for interpreting the potential effects on groundfish activity stemming from the preferred alternative.

In Maine, the major groundfishing port of Portland could see 84.9 percent of its groundfish activity affected by the preferred alternative through gear and area measures alone (Table 68). The MARFIN report writes that "Portland clearly fulfills the definition of a fishing community on the basis of central place theory [...]. Though Portland is a diverse city with a variety of commercial enterprises including a growing service industry catering to tourists, fishing and fishing-related businesses retain a strong presence" (Hall-Arber *et al.* 2001). South Bristol, which could see 96.7 percent

of its groundfish landings affected, "fulfills the definition of a fishing community on the basis of central place theory" (ibid.); Boothbay Harbor, which could see 79.3 percent of its groundfish landings affected, "together fulfill the definition of a fishing community on the basis of central place theory [...] Fishing is considered 'slightly important' to the community" (ibid.). Cape Porpoise, which could see all of its groundfish activity affected, lies next to Kennebunkport which the MARFIN report wrote "fulfills the definition of a fishing community on the basis on central place theory," with Cape Porpoise supporting approximately 100 households by fishing (ibid.). Rockland, which could see 91.9 percent of its groundfish activity affected, is now primarily a herring and lobster port but is considered "an essential provider to the fishing industry" because of its role in landing, marketing, and transportation and has "all the characteristics of a fishing community [...though] the character of the town has changed dramatically over time. With a limited processing sector (one groundfish, one seaweed, no sardines), the town serves principally as a depot for the transport of fish to other places" (ibid.). (Bar Harbor, Port Clyde, and York were not visited by the MARFIN researchers.)

New Hampshire ports–Portsmouth, Hampton, Rye, and Seabrook–would also be affected by the measures in the preferred alternative, particularly the proposed gear changes in the gillnet fishery; total impacted activity for the ports listed is 77.2, 52.3, 46.3, and 77.5 percent respectively. As described in the MARFIN report, these ports can be more clearly thought of as fishing communities: "Portsmouth is the site of the primary fishing fleet of New Hampshire [...]. The support of the fishing industry by the city reflects the view that the commercial fishing industry is an important component in both the diversification of the local economy and provision of cultural color that makes the waterfront attractive" (Hall-Arber *et al.* 2001). As well, "[...] Hampton Beach fulfills the definition of a fishing community on the basis of central place theory" (ibid.). And, though local economies may have begun to depend more on tourism, "This has not, however, drastically affected [the] productivity [of Portsmouth and Hampon/Seabrook] as fishing enclaves. Their linkages with regional networks have compensated for the diminished economic status in their own particular places and spaces" (ibid.).

In Massachusetts, New Bedford could see 73.3 percent of its groundfish activity affected, though the port as a whole may be less impacted since it is primarily dependent upon scallops. In terms of sheer volume, Gloucester is an important groundfish port, and could see 84.5 percent of its groundfish activity affected; moreover, "Gloucester fulfills the definition of a fishing community on the basis of central place theory [...]. Whether or not Gloucester should be classified as 'fisheries-dependent' is not consistently answered in the affirmative. Several respondents noted that the city is sufficiently diversified to survive even if the fishing industry does not. However, the image of Gloucester as a fishing community remains very prominent" (Hall-Arber *et al.* 2001). Another major groundfish port in the state affected, Chatham, could see 50.3 percent of its groundfish activity affected;

as the MARFIN report indicates, "Chatham is ranked fourth on the scale of infrastructure differentiation [...]. As part of the Cape Cod and Islands sub-region, Chatham ranks third for dependency" (ibid.). The Cape Cod ports of Provincetown, and to a lesser extent Sandwich, would also see groundfish activity affected, by 77.0 and 18.7 percent respectively. "Although fishing represents an historical activity [in Sandwich], it has always been part of a mixed economy including tourism, agriculture, and transport" (ibid.). Provincetown, once a significant groundfish port, is in decline as its position as a groundfish port is threatened by gentrification and tourism (ibid.); this decline could be accelerated by the preferred alternative, and should also be seen in the context of the MARFIN report's characterization of the Cape and Islands as one of the more fishery-dependent regions in terms of employment alternatives for fishermen (see Table 67). Scituate, which could see 49.1 percent of its groundfish landings affected,"sits on the edge of a harbor, once filled with commercial fishing vessels, but now being transformed into a gentrified community with a struggling fishing presence" (ibid.). Neighboring Green Harbor could see 49.7 percent of its groundfish landings affected and neighboring Marshfield, which could see 18.1 percent of its groundfish landings affected, "has 75-100 including 15 charterboats. All are small boats, less than 45 feet long, as the channel into Green Harbor is very narrow" (ibid.). Rockport, MA could see 56.6 percent of its groundfish activity affected; it is characterized by the MARFIN report as more geared towards the tourist industry but states that "[its] proximity to Gloucester and its fishing industry infrastructure makes it easier for Rockport to maintain a viable, if modest, fleet" (ibid.). Marblehead, which could see 37.9 percent of its groundfish activity affected, is described as "no longer a fishing dependent community. While there are a few fishermen who live here, the pool is small and it is difficult for the remaining fishermen to find local crew" (ibid.). Like Rockport, it depends on Gloucester for many of its fishing needs, a consolidation which the preferred alternative and current conditions may continue. While Plymouth could see 48.7 percent of its groundfish landings affected, "Locals look on fishing as an integral part of the historic setting [of Plymouth], but the weakness of the industry is reflected in the lack of interest or opportunity for local youth to enter the occupation and an overall decline in the place and space dedicated to the cultural capital of fishing" (ibid.). Boston could see 83.2 percent of its groundfish landings affected, and "While fishing-related business is dwarfed by some of the others, it is significant not only for its role as a component of Boston's economy, but also for its importance in serving dispersed, smaller communities that are more obviously dependent on fishing and fishing-related businesses. Boston remains an essential provider of fishing-related support services" (ibid.). (Barnstable, Harwichport, Nantucket, and Newburyport were not visited by the MARFIN researchers).

In Rhode Island, Tiverton, which could see 24.6 percent of its groundfish activity affected, is described by the MARFIN report as "fulfill[ing] the definition of a fishing community on the basis of central place theory" (ibid.). Newport could see 80.2 percent of its

groundfish activity affected. The MARFIN report writes that while Newport may not be fisheries dependent, "A different perspective is to think of the fishing 'community' as a regional contributor to the commerce associated with fishing, and as a means of providing support to approximately 200 families with a sustainable livelihood" (ibid: 93). Point Judith could see 82.7 percent of its groundfish activity affected. The MARFIN report writes of Point Judith that it "fulfills the definition of a fishing community on the basis of central place theory […and that] Fishermen comprise a social and occupational network" (ibid: 78), but the report also notes that the fishing community is becoming increasingly vulnerable to the pressures of gentrification. In terms of employment, "Point Judith is the most fisheries-dependent of the communities in Rhode Island. There are approximately 500 households involved in the commercial fisheries, and another 400 indirectly dependent" (ibid: 80). Further, the port scored 5th in fishery infrastructure and ranks high in landed value among U.S. ports (ibid).

In Connecticut, New London could see 99.0 percent of its groundfish activity affected. The MARFIN report writes that "New London/Groton represents a fishing enclave consisting of a small finfish fishery and a relatively substantial lobstering fleet without any central docking facility for fishing vessels" (ibid.: 65). Stonington could see 79.9 percent of its groundfish activity affected. For Stonington, the MARFIN report writes that "An attitude prevails that commercial fishing represents a significant cultural and economic feature of the town, and the present fishing infrastructure will most certainly support the fishing industry at its present level" (ibid: 55). The report estimates that "150 fishermen/fish processors work out of Stonington, and an additional 50 work in support roles. This makes an estimated 200 households directly dependent on the fisheries, and there are an estimated 300 additional households that are indirectly dependent" (ibid: 58).

In New York, Freeport could see 96.5 percent of its groundfish activity affected and neighboring Point Lookout could see 97.2 percent of its groundfish activity affected. The McCay and Cieri report notes for Point Lookout "Our local informant said they used to have fourteen trawlers tied up in Pt. Lookout and that they used to do a lot of out-of-state business. Now all their sales are local. However, another observer reports that out-of-state boats still land there (winter 2000). He said the relationship with the community is good: there has been no pressure to be off the docks up to this point" (McCay and Cieri 2000: 11). Their Freeport informant focused on the pressures of development (what the MARFIN report called gentrification) and the difficulties that was causing for the fishing community there (ibid: 12). Greenport could see 89.2 percent of its groundfish activity affected; "Greenport is the largest fishing center on the north fork of Long Island" (ibid.:16) and "The Village of Greenport is said to be 'fisherman friendly,' generally more supportive of the fishing industry than other communities" (ibid.: 17). For their Greenport informant, "Like other mixed-trawl fishermen of the Mid-Atlantic region, he is concerned that regulations are mostly written for single

species, which doesn't mirror the reality of fishing [...]. One consequence of the myriad of regulations and state-by-state quotas for some species is that fishing operations, especially draggers, are pressured to fish in different waters and offload in different ports" (ibid.: 17). Montauk could see 86.0 percent of its groundfish activity affected. "Montauk, the largest fishing port in New York, is situated near the eastern tip of the South Fork of Long Island. Otter-trawls and longlines are the principal gear-types, in terms of pounds landed and value" (ibid.: 23). The report goes on to note the extensive fishing activity, infrastructure and related services making up the fishing community in Montauk (ibid.: 25-29). Hampton Bays could see 91.5 percent of its groundfish activity affected and Shinnecock could see 71.7 percent of its groundfish activity affected. "Shinnecock/Hampton Bays is second only to Montauk as a commercial fishing center in New York. [...] This is primarily a dragger fishing port" (ibid.: 29). Their informant in these two ports estimated "that there are 30 boats working out of Shinnecock. Most are draggers, but there are probably 6 gillnetters [...]. One big change in Shinnecock is that there are fewer owner/operators than before. According to another observer, this is because the more successful fishermen have acquired more boats and thus must hire captains. It remains a small-business fishery, with little investment by non-fishing entities" (ibid.: 32). Additionally, "He said that given Long Island's geographical position between New England and the South, the closings on Georges Bank have had a major impact on fishing in Shinnecock" (ibid.). However, "He said that the town of Southampton is 'generally supportive' of the fishing industry" (ibid.: 33).

In New Jersey, Point Pleasant could see 64.0 percent of its groundfish activity affected. The McCay and Cieri report notes that "The commercial fisheries of Point Pleasant are third in New Jersey to those of the Cape May-Wildwood area and Atlantic City" (McCay and Cieri 2000: 41) and goes on to list the extensive fishing businesses and infrastructure present in the port. Nonetheless, the report notes the difficulties that the fishing community has faced in recent years, including gentrification pressures, and that "The town's economy is geared toward the summer tourist and recreational business. However, it is more than a "beach town", and has a large resident population" (ibid: 42). Belford could see 97.2 percent of its groundfish activity affected. An estimated 150 fishermen work out of the port (ibid.: 39), whose "fisheries are small-scale and owner-operated [...]. Otter trawl finfishing is the most important activity, accounting for 50 percent of the landed value in 1998 (ibid: 37). Moreover, "A survey done in 1984 (Princeton Economic Research 1985) found high levels of dependence on the fishery; only 25 percent of those surveyed had any other work experience. When times are bad, fishermen may "go up the road" to find other employment, but it is relatively unspecialized and unskilled work. The fishing community --defined more in terms of fishing out of the port of Belford than residence in Belford-- has a high degree of relatedness. The 1984 survey found that only 2 respondents (5 percent) said they had no relatives in the fishery, past or present" (ibid: 40).

6.5.2 Sustained Participation and Minimizing Impacts

The proposed closed areas in the preferred alternative, particularly in the GOM because of its proximity to shore and location in concentrated areas, affect some ports –the small North and South shore MA ports, Portsmouth and the other NH ports, and the small Maine and Cape ports–more than others. Because these ports have also been historically dependent on groundfish, and because of the small-boat, day-trip nature of their fisheries, these fishermen are less likely to be able to respond in ways that can enable their continued participation in fishing. The mesh changes affect ports large and small throughout New England and the upper Mid-Atlantic, financial costs which are intensified by the DAS reductions for active groundfish fishermen. Given the need to protect groundfish stocks, the alternatives have proposed conservation measures that, however, do not provide the possibility of creatively encouraging grassroots efforts, such as carefully constructed harvest cooperatives or regional and community-based management systems that might draw on the rich histories, experience, and knowledge of the fishermen, families, and communities of the region.

7.0 Other Applicable Law

7.1 Coastal Zone Management Act (CZMA)

The Preferred alternative would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and North Carolina. This determination has been submitted to the responsible state agencies for review under section 307 of the Coastal Zone Management Act.

7.2 Paperwork Reduction Act (PRA)

The PRA concerns the collection of information. The intent of the PRA is to minimize the Federal paperwork burden for individuals, small business, state and local governments, and other persons, as well as to maximize the usefulness of information collected by the Federal Government.

This action proposes measures that require review under PRA. The DAS leasing program would required participants to submit a standardized application form with details regarding the proposed lease, including cost information. The preferred alternative has collection of information requirements that have already been approved. The possession of yellowtail flounder will be prohibited south of 40/00' N. lat., and yellowtail flounder possession restrictions (i.e., trip limits) would apply in a newly designated SNE and Mid-Atlantic RMAs,

north of 40/00' N. lat. Vessels fishing north of 40/00' N. lat. would need to obtain from the Regional Administrator a certificate (i.e., LOA), to be exempt from the yellowtail flounder possession prohibition, and vessels fishing in the GOM and GB RMAs north of 40/00' N. lat. would need a second exemption to possess unrestricted amounts of yellowtail flounder.

Although no request for approval would be needed for the yellowtail flounder requirements associated with the preferred alternative, such approval would be necessary to implement the DAS leasing program. Upon approval and final clearance of the submission, NMFS intends to merge the requirements into the OMB-approved family of forms that currently covers the Northeast Region's permit requirements for fishing vessels, operators, and dealers for the Northeast Region Permits (OMB Control No. 0648-0202).

This action contains no other changes to the existing reporting requirements previously approved under OMB Control Nos. 0648-0202, nor does it contain changes to existing requirements approved under 0648-0212 (Vessel logbooks), 0648-0229 (Dealer reporting), 0648-0351 (Northeast Region Gear Identification Requirements), and 0648-0422 (Northeast Region Raised Footrope Trawl Exempted Fishery).

7.3 Magnuson-Stevens Act

Compliance with Magnuson-Stevens Act measures is based in large measure on the scope and context of this emergency action. This action is a short-term compromise set of measures being implemented under section 305(c) of the Magnuson-Stevens Act and, thus, necessarily is not intended to or required to meet all requirements of SFA. The National Standard Guidelines list three criteria that should be met in order for a situation to be defined as an emergency: "(1) Results from recent, unforeseen events or recently discovered circumstances; and (2) Presents serious conservation or management problems in the fishery; and (3) Can be addressed through emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and deliberative consideration of the impacts on participants to the same extent as would be expected under the normal rulemaking process." Furthermore, the National Standard Guidelines list four possible justifications for emergency action: (1) Ecological; (2) Economic; (3) Social; and (4) Public Health.

The alteration in the planned date of implementation of Amendment 13 from August 2003 until May 2004, and the concomitant expiration of the current interim regulations require that emergency action be taken to continue the current management measures to reduce overfishing. The alteration in the timeline and resultant expiration of the interim regulations prior to Amendment 13 represent unforseen events. The alteration in timeline was the result of the recently discovered problems with the trawl survey procedures. Taking no action during this period would seriously undermine the rebuilding of the stocks. To the extent that public comment would be curtailed, the benefits to the management measures outweigh the costs to the public. To conduct

complete notice and comment rulemaking would prevent this action from being implemented until after the authority under which the current rules are effective, would expire. The justifications for the emergency action are ecological and economic. The emergency action is necessary to reduce overfishing and provide additional economic opportunity in the fishery.

7.3.1 Consistency with National Standards

Section 301 of the Magnuson-Stevens Act requires that regulations implementing any FMP or amendment be consistent with the 10 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.*

Under the provisions of section 304(e)(6) and 305(c), interim measures addressing overfishing may be implemented even if they are not sufficient, in and of themselves, to stop overfishing. This emergency action contains interim measures implemented in accordance with the Settlement Agreement. These measures apply to both the commercial and recreational fishery sectors and are designed to reduce overfishing on several major stocks of fish in the Northeast multispecies fishery. The measures will continue substantive protection for the above-average 1998 year class of GOM cod, which is important to the rebuilding of that stock, as well as protection for the older, fully recruited year classes. Restrictions on the possession of yellowtail flounder will be continued for the protection of the Southern New England/Mid-Atlantic stock (SNE/MA). This emergency action will also reduce fishing effort and mortality on several other groundfish and non-groundfish stocks in the Northeast. This action is consistent with national standard 1 because it takes positive steps to stop overfishing of important groundfish stocks and provides sufficient interim protection to groundfish stocks, thereby enabling the Court and the Agency to institute rebuilding programs through Amendment 13. This action therefore, is an important step to bring the FMP into full compliance with all provisions of the SFA, the Magnuson-Stevens Act, and other applicable law, as discussed in sections 1.0 and 2.0 of this EA.

2. *Conservation and management measures shall be based upon the best scientific information available.*

This action incorporates the results of the Groundfish Assessment Review Meeting (GARM) assessment updates for the 20 stocks managed under the FMP (October, 2002). This action also incorporates advice from the draft report of the 36th Stock Assessment Review Committee (SARC 36; January 2003). This action, therefore, incorporates the best scientific information available to achieve critical F reductions. This conclusion was reviewed and concurred with by the Peer Review Panel, as described in section 1.1 above.

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 FMP is based on measures, such as effort controls, gear restrictions, and area closures, that apply across the range of species in the multispecies complex. In cases where additional measures are needed to achieve FMP objectives for individual stocks, such as GOM cod, GB cod, or SNE/MA yellowtail flounder, this action applies those measures stock-wide. In contrast to the first part of the Settlement Agreement (Part 1, implemented May 1, 2002) which focused reductions in fishing mortality primarily on GOM cod (since it is one of the most overfished stocks), the measures in this action will continue the fishing mortality reductions began on August 1, 2002, for other stocks, as well. In most areas where the fishery operates, several stocks of groundfish exist together, along with other non-groundfish species, such as skates, spiny dogfish, and monkfish. Closures and gear restrictions that are targeted on cod thus also reduce fishing effort on these other stocks. DAS reductions are more broad in application, and serve to reduce fishing effort on the full multispecies complex. This approach is consistent with the FMP, given the interrelated nature of the multispecies complex.

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.*

Although the measures in this interim action do not specifically discriminate between residents of different states, the impacts of some of the measures necessarily but unavoidably will be more severe for those vessels fishing in the GOM, particularly small vessels because that is where more restrictive measures are needed. Some areas are more important than others for the groundfish fishery–in terms of annual catch dependence, vessel landings and number of vessels that fish there. The seasonal and area closures included under this action were selected as areas reasonably calculated to contribute to a reduction in GOM cod mortality. The analytical model results indicate that the inshore and offshore GOM closures distribute impacts--and thereby mitigate, to some degree–the impact of these measures on vessels (see section 5 of this EA).

A prohibition of yellowtail flounder catch south of 40/00' N. lat. and trip limits for Mid-Atlantic and SNE yellowtail flounder north of 40/OO’ N. lat. were calculated to reduce sufficiently mortality on those stocks, while the exemption programs allow those who target other stocks of yellowtail flounder, not in need of such reductions in mortality, to continue to fish.

Recreational measures are adopted in accordance with Council policy to provide reasonable and regulated access to the resource for all participants, and while specific management measures differ between the recreational sectors, the measures achieve similar reductions in exploitation consistent with the differences between the sectors. The differential impacts on various states is a necessary consequence of the distribution of the stocks most in need of reductions in F. As described elsewhere in this document, to the extent possible, measures have been designed to spread the burden of new restrictions across geographical areas, gear types, vessel sizes, and user groups. The Preferred alternative was chosen, in part, to reduce impacts on those vessels that may be most affected by these proposed measures. Further, this alternative is being implemented precisely because it would be more fair and equitable in the short-term while longer-term measures are developed.

The DAS leasing Program would enable limited access multispecies permit holders, regardless of State, to participate in the Program in order to increase economic opportunity and mitigate some of the negative economic effects of the preferred alternative. Program rules that set limits and conditions for the lease of DAS are designed and calculated to promote conservation (minimize to the extent practicable any increase in fishing effort) and do not include criteria that refer to States. Although the DAS leasing Program may result in redistribution of useable DAS among the valid limited access permit holders, such redistribution will be based upon mutual consent by participants in the voluntary program, and such redistribution will be temporary. The program will serve as an important means to gather information from the fishery in order to ensure that any long-term program implemented in the future may be designed optimally. If a situation arises where this program is deemed to be inconsistent with National Standard 4, or any other National Standard, the Regional Administrator would have the authority to limit additional DAS leasing.

5. *Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.*

Within the context of the conservation goals of the FMP, this emergency action contains measures to reduce impacts of the restictions and to promote efficiency in the utilization of the fishery resource. These measures, while promoting economic efficiency in part, are not intended to allocate resources. The prohibition on front-loading the DAS clock will require fishermen to leave the dock within 1 hour of starting their trip so as to utilize efficiently their allocation and the maintain the conservation goals of the FMP by not allowing targeted trips for GOM cod. The DAS Leasing Program will increase the flexibility within the fishery by allowing participants to increase or decrease their level of fishing activity. This increased flexibility is likely to offset or reduce impacts from the measures and increase economic efficiency for the fishery as a whole.

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

The emergency action takes into account the differences in fisheries and fishery resources by incorporating differential measures by stock area as more fully discussed in section 3.2. Recreational measures, while specific to the GOM, take into account variations between the charter/party and private recreational sectors, as discussed in section 5.1.6 of this EA.

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

NMFS considered the costs and benefits of a range of alternatives that would achieve the conservation goals of the FMP. It considered costs to the industry, as well as enforcement and administrative costs, in selecting the proposed action. Alternative 2, the Preferred alternative, would provide broad protection to groundfish resources in the Northeast region while mitigating some of the economic and social dislocations that would have resulted otherwise. The DAS Leasing Program is a means of mitigating economic losses that may result from DAS allocations associated with the Preferred Alternative. Therefore, the proposed action would minimize the material economic affect on the regional economy.

8. *Conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens 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 economic impacts on such communities.*

Compliance of the emergency action with this national standard are discussed in more detail in section 6.5 of this EA. The preferred alternative was specifically chosen based on negotiations with industry and fishing community representatives, in connection with Court-sponsored mediation regarding the Court order discussed above. The DAS leasing program was designed in order to minimize adverse economic impacts resulting from the restrictions of the Preferred Alternative. The primary objective of this alternative is precisely to minimize short-term impacts on the industry and fishing communities, without sacrificing needed conservation benefits.

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.*

Although not its primary purpose, this interim action, through measures to reduce overfishing, will put in place restrictive measures to reduce fishing effort and fishing mortality on groundfish stocks in

the Northeast which will reduce bycatch in the groundfish fishery. Through simultaneous non-regulatory action, NMFS will maintain an increased level of at-sea observer coverage to better monitor and assess bycatch at a level of 5% or more. In most areas where the groundfish fishery operates, several stocks of groundfish occur together, along with other non-groundfish species, such as skates, spiny dogfish, and monkfish. Under the Preferred alternative, area closures, effort restrictions, modifications to the DAS clock, and gear restrictions such as mesh increases, gillnet net reductions, and hook gear restrictions will help reduce bycatch in both the groundfish fishery and on these other stocks by reducing levels of fishing effort and efficiency. For many of the other species, the expected reductions are substantial. Given the limited scope and context of this interim action and numerous measures already in place that reduce bycatch, its not practicable to add additional measures to minimize bycatch. This approach is consistent with the FMP, given the interrelated nature of the multispecies complex.

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

In light of the limited scope and context of this action, the conservation and management measures proposed here, to the extent practicable, promote the safety of human life at sea. This action is a compromise set of interim measures. The Preferred alternative measures are more likely to promote the safety of human life at sea in comparison to the hard TAC alternative that could encourage derby fisheries. Nevertheless, the measures are more restrictive in several respects than the no action alternative. However, nothing in the measures necessarily forces a fisher to risk his safety at sea other than an incentive to maximize landings or profits. Certain measures such as the increase in GOM cod trip limits, in fact, may decrease such risk. The DAS leasing Program provides more flexibility to vessel owners. In addition, the carry over provision for 10 DAS is extended to leased DAS in order to reduce the incentives to fish remaining DAS in potentially hazardous weather that could occur in the waning days of the fishing year. To the extent that vessel owners have more choices with respect to how they seek to be economically profitable, it can be said that safety at sea is promoted. Fishers tend to make more risk-prone decisions when choices become more limiting. Given the scope and context of this action and existing measures already in place, there does not appear to be any more practicable alternatives that will promote safety at sea. See also the discussion on public health and safety in Section 8.0, number 3.

7.3.2 Required provisions

Given its interim context, this emergency action and the FMP it amends when taken together are consistent with the required provisions of section 303(a) of the Magnuson-Stevens Act (Act). Such consistency is summarized below, and discussed more fully elsewhere in the document, including section 7.3.1. Note, the following required provisions of

the Act have been paraphrased below. The full text of section 303(a) is contained in the Magnuson-Stevens Act.

(1) contain the conservation and management measures, necessary and appropriate for the conservation and management of the fishery.

The proposed action would continue the reductions to overfishing implemented under the August 1, 2002 interim action, as well as measures implemented by previous amendments and frameworks to the FMP. Although the proposed measures will not fully rebuild stocks, they will be sufficient for protection of the stocks until implementation of Amendment 13, which will fully comply will the Act (May, 2004). This delay in full compliance with the Act will not undermine the ability of the stocks to fully rebuild.

(2) contain a description of the fishery.

This EA references a description in fishery found in another document (see section 4.0)

(3) assess and specify the maximum sustainable yield from the fishery.

This EA references the best available scientific information (see section 4.0).

(4) assess and specify the harvest and processing of optimal yield by United States vessels and processors, respectively.

This EA references a description of recent patterns of harvest and processing in another document (see section 4.0)

(5) specify the pertinent data which shall be submitted to the Secretary.

The proposed emergency action would continue the current data requirements of the FMP, and the interim action currently in effect, which are consistent with this provision of the Act. Specific new data will be required to be submitted in support of the proposed DAS Leasing Program.

(6) consider access to the fishery for vessels otherwise prevented from harvesting because of conditions affecting the safe conduct of the fishery.

The proposed emergency action maintains the current management measures that have been developed in response to this consideration, and the new measures have taken safety into consideration.

(7) describe and identify essential fish habitat and minimize to the extent practicable adverse affects caused by fishing.

Section 5.3 describes the impact of this proposed emergency action on essential fish habitat.

(8) specify the nature and extent of scientific data which is needed for effective implementation of the plan.

Amendment 7 to the FMP and the preliminary draft Amendment 13 to the FMP specify the data needed for implementation of the FMP. The reader may located the preliminary draft Amendment 13 document as indicated under section 4.0 of this EA.

(9) include a fishery impact statement for the plan or amendment.

This environmental analysis includes a biological, economic, and social impacts analysis (sections 5.1, 5.2, and 6.0, respectively).

(10) specify objective and measurable criteria for identifying when the fishery is overfished.

Although Amendment 9 to the FMP contains approved stock status determination criteria, Amendment 13 will establish new or revised criteria regarding the identification of overfished fisheries. This action is an interim action to protect stocks while Amendment 13 is being developed.

(11) establish a standardize reporting methodology to assess bycatch.

The proposed emergency action will make not changes to the current reporting requirements for vessels, which includes bycatch. The current level of observer coverage is sufficient to adequately assess bycatch.

(12) assess pertinent information on the recreational fishery.

The proposed emergency rule would make no changes to the current reporting requirements for the recreational fishery. The proposed action includes measures designed to reduce fishing mortality in the recreational sector.

(13) include a description of the various sectors of the fishery and quantify related trends.

The preliminary draft Amendment 13 document contains the most up-to-date description of the fishery and related trends. See section 4.0 for the location of this document.

(14) allocate restrictions and benefits fairly among sectors in the fishery.

The proposed restrictions affect all sectors of the fishery, and given the context under which they were developed, and are proposed to be continued, represent a reasonable compromise among sectors. All sectors are expected to be able to have equitable access to the recovered stocks in the future.

8.0 Finding of No Significant Impact

National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6 (revised May 20, 1999) provides nine criteria for determining the significance of the impacts of a proposed action. The significance of this action is analyzed in the context of the fact that it continues the second step in a three-step process agreed to as a compromise in a lawsuit to bring the FMP into full compliance with the SFA, the Magnuson-Stevens Act and all other applicable law as quickly as possible. It is intended to be a short-term interim measure that, by itself, does not result in a significant impact. The longer term impacts associated with the final step of this process, i.e., Amendment 13, will analyze impacts through a supplemental Environmental Impact Statement. These criteria are discussed below:

1. *Can the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?*

As more fully discussed in section 5.1 that describes biological impacts, the emergency action is not expected to jeopardize the sustainability of any target species that may be affected by the action. In fact, the action is intended to protect the sustainability of all groundfish stocks managed under the FMP in the interim period provided to the Council and the agency while Amendment 13 is being developed. The proposed action to extend the time period of the WGOM Area Closure will provide interim protection for a portion of the GOM cod resource that could be expected to be fished at a high level fishing effort in the absence of any other measures to control that effort. That area, as well as additional seasonal closures represent time/areas with high cod landings and will contribute to a reduction in groundfish and non-groundfish mortality. Expanding temporally the Cashes Ledge Area Closure will provide additional protection for GOM cod and other stocks in the offshore areas. The mesh changes in this action should have positive biological benefits for several groundfish stocks. Effort reductions will also reduce fishing mortality. This action will protect the long-term productive capability of the GOM cod stock, as well as afford protection for several other stocks of fish.

2. *Can the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Act and identified in FMPs?*

This emergency action is not expected to allow any incremental damage to the ocean, coastal habitats, and/or EFH as defined under the Magnuson-Stevens Act, and in fact, is likely to reduce such damage over and above the level of impacts that have already been analyzed and approved in earlier actions, and identified in the FMP. In general, bottom-tending mobile gear, primarily otter trawls, associated with the FMP have the potential to adversely effect EFH for 14 species of groundfish as well as EFH for sea scallops, monkfish, Atlantic sea herring, and Atlantic salmon. The interim action would continue the WGOM Area Closure and add new closure areas, thereby providing additional protection to ocean and coastal habitats. These closure areas represent a variety of habitat types and provide

significant incidental benefit and protection for EFH in the GOM, even though these were not closed with the objective of protecting fish habitat. The maintenance of the closed areas will allow the habitats contained within them to continue or begin the process of recovery following the previous fishing-related disturbances and impacts, although changes to the short-term seasonal (rolling) closures would not be expected to have any direct effect on the habitat of the GOM.

The overall effect of other measures in this proposed action, such as those to address fishing effort (prohibition on front-loading of the DAS clock and DAS reductions) and gear modifications (gillnet net limits, and mesh changes for gillnet and trawl vessels) are largely dependent upon the responding behavior of those impacted by the change. Generally, the measures would serve to provide some degree of reduction in habitat impacts, although such reductions can be expected to be small. The DAS leasing program is designed to reduce the potential for any increase in fishing effort. The remaining measures proposed in this alternative, (e.g., the recreational fishing measures) will not have an adverse effect on EFH.

As more full discussed in Section 5.3, overall, the measures proposed in this action are expected to result in a reduction in the adverse effects to any EFH associated with the fishing activities managed under the FMP as a result of the maintenance of the WGOM Area Closure and other closures and the DAS reductions. NMFS concludes that this action will have no more than minimal adverse impacts to EFH.

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

The closure of what may be traditional or nearshore areas could reduce the flexibility of some fishing operations. The impact of these closures may be more severe for smaller vessels and operations, and the communities in which they operate. Closures may affect the safety of fishing operations if fishermen begin to fish farther from shore and on longer trips; and could have significant impacts on families, communities, and patterns of interaction if fishermen stay away from shore for significantly longer periods. However, restrictions in the nearshore areas of the GOM are necessary, because that is where concentrations of GOM cod, the stock in the most urgent need of protection, occur.

In addition to the area closures, the action contains a number of other measures to restrict effort in the fishery. DAS changes are expected to affect fishermen across the board, but would particularly impact–in terms of total DAS usage–those vessels that in the past, fished their maximum DAS allowances. Such vessels are mostly large and medium vessels and generally receive an individual DAS allocation. The Multispecies Monitoring Committee reported that a majority (90 percent) of the Individual DAS allocation holders used at least 70 percent of their allocation in 2000 (MMC, 2001). In contrast, only 42 percent of the smaller, fleet allocation holders used that percentage in 2000. Thus, many vessels, particularly smaller vessels, are not

usually constrained by their total DAS allocation; that is, many of these smaller vessels do not currently use a majority of their DAS, and thus their flexibility is not viewed as sufficiently constrained to have a substantial adverse impact. See also section 5.2.1 for more information on DAS use.

Thus, while closures restrict immediate flexibility for smaller, inshore fishing vessels, those vessels are not usually constrained by their DAS allocation, and thus maintain a degree of flexibility in its use. The DAS leasing program would increase the flexibility for limited access vessels. Therefore, the overall effect of the proposed action on the fishery, including the communities in which it operates, will not impact adversely public health or safety. One commentor stated that the DAS reduction is a safety concern because it will be an incentive to fish in the fall and winter in order to maximize the value of a DAS. See also discussion of safety at sea in Section 7.3.2, number 10.

4. *Can the proposed action be reasonably expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species?*

In the June 2001 Biological Opinion, NMFS concluded that fisheries conducted pursuant to the FMP are likely to jeopardize the continued existence of the Western North Atlantic right whale, and outlined a Reasonable and Prudent Alternative (RPA) with multiple management components that, once implemented, is expected to avoid the likelihood of jeopardizing right whales. Components include minimizing the overlap between right whales and multispecies gillnet gear, expanding gear modifications to the mid-Atlantic and Southeast, continuing gear research and monitoring the implementation and effectiveness of the RPA. On January 9, 2002, NMFS published both an interim final rule to implement gear restrictions for the anchored gillnet and lobster trap fisheries based on predictable annual concentrations of right whales (67 FR 1142) and a final rule to clarify the Agency's authority to restrict temporarily the use of lobster trap and gillnet fishing gear within defined areas to protect right whales and establish criteria for procedures for implementing a Dynamic Area Management (DAM) program in areas north of 40/ N. latitude (67 FR 1133). On January 10, 2002 (67 FR 1300), NMFS published a final rule to expand gear modifications required by an earlier rule to the Mid-Atlantic and offshore lobster waters and modified Mid-Atlantic gillnet gear requirements. Since this action would not circumvent the efficacy of these actions, there is no reason to expect that the interim action would have any impacts that were not considered previously. If anything, the extension of the closures would lessen the likelihood of any impacts of the fishery on endangered or threatened species, marine mammals, or their critical habitat because of a reduction in fishing effort, closed areas, and the reduction in the number of gillnets. See also discussion on impacts on endangered and threatened species and marine mammals at Section 4.1.

5. *Can the proposed action be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?*

This emergency action is not expected to result in cumulative adverse effects on target or non-target species. This is due largely to the fact that these regulatory measures would be relatively more restrictive for vessels operating in the GOM as compared to elsewhere in the Northeast region. These restrictions may cause vessels to seek alternative fisheries. Both dogfish and monkfish were important fisheries that were available to many vessels as alternatives to reliance on groundfish. However, increased regulatory action taken independent of this action to protect those two resources limit the alternatives for groundfish vessels and should minimize cumulative adverse effects on those species. In addition to dogfish and monkfish, the Atlantic States Marine Fisheries Commission has reduced dramatically the Northern shrimp season for this year. Individuals that may want to continue to use a GOM port as a base of operation may turn to the lobster fishery, if a license can be obtained, or try herring fishing, which is not a limited-access fishery. However, regulations have been implemented placing limits on mobile gear takes of lobster. Current regulations do not list scallop dredge gear as an exempted gear for year-round closures in the GOM, but scallop dredge gear is an exempted gear for GOM seasonal closures. Vessels that are able to move out of the GOM may attempt to switch to ports in southern New England or the Mid-Atlantic, depending on what permits a given vessel may hold or may be able to obtain. Such a redirection of effort could lead to increased fishing pressure on southern New England or Mid-Atlantic stocks, but not likely at a level, given the short-term duration of this action, to cause a substantial effect on non-target species.

6. *Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?*

The proposed action is not expected to jeopardize the sustainability of any non-target species. As discussed in number 5, above, sufficient constraints exist in other fisheries to minimize the ability of groundfish vessels from redirecting into a previously non-target fishery to the extent that the shift in effort would jeopardize the sustainability of that resource.

7. *Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?*

The proposed action is not expected to have any incremental substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.). The area affected by this action in the Northeast multispecies fishery has been identified as EFH for species managed by the Northeast Multispecies; Atlantic Sea Scallop; Atlantic Monkfish; Summer Flounder, Scup and Black Sea Bass; Squid, Atlantic

Mackerel, and Butterfish; Atlantic Surf Clam and Ocean Quahog; Atlantic Bluefish; Atlantic Herring, Spiny Dogfish, Red Crab, Tilefish, Atlantic Billfish; and Atlantic Tuna, Swordfish and Shark fishery management plans. The measures adopted in this interim action suggest a potential reduction in the adverse effects to any EFH associated with the fishing activities managed under the Northeast Multispecies FMP as a result of the maintenance of the WGOM and Cashes Ledge Area Closures and restrictions on DAS. NMFS concludes that this action will have no incremental adverse impacts to EFH and may even provide benefits to EFH.

8. *Are significant social or economic impacts interrelated with significant natural or physical environmental effects?*

The social and economic impacts are interrelated with natural or physical environmental effects. However, the analyses for this action concluded that neither the natural or physical environmental effects nor the economic and social effects are significant. Based upon preliminary 2002 landings data, the management measures that would be continued by the preferred alternative may be allow some compensatory behavior by fishers. The data indicate that concurrent with decreased landing of most species, the landings of some species increased. Such a change in fishing patterns results in a decrease in both the biological and economic impact of the measures. In the context of the magnitude of the mortality reductions that would likely be necessary to fully rebuild stocks, the proposed measures, although meaningful, represent in several cases only a fraction of what may be necessary in the future. The economic and social impacts of the preferred alternative would represent a continuation of impacts already felt by the industry, and lastly, the DAS Leasing Program would allow for mitigation of some of the negative economic and social impacts. It is important to note that the impacts of the proposed interim action will likely vary from predicted because the model used to estimate the impacts of the management action did not include potential changes (either increases or decreases) in fishing income earned from species other than regulated groundfish that would normally be caught and sold along with groundfish. The No Action alternative, while it would result in increased fishing incomes relative to the preferred alternative in the short term, would also result in increased fishing mortality on groundfish stocks which would violate applicable law. Alternative 3 would probably have significant positive impacts on the natural or physical environment, but at a much greater adverse social and economic impact, concentrated in the states of Maine, New Hampshire and Massachusetts. Alternative 3 would likely combine significant economic and natural environmental effects.

9. *To what degree are the effects on the quality of human environment expected to be highly controversial?*

The measures being extended in this action would continue effects that were highly controversial when they were first implemented in August, 2002. The proposed emergency action would not be as controversial as the previous action, given that these measures would have already been

in place for approximately one year, and some of the costs to industry have been borne. While the DAS leasing Program sub-option is sonewhat controversial in concept, its effects on the human environment are not likely to be controversial. The DAS leasing program would mitigate some of the negative economic impacts of the proposed action, a desirable goal. The reductions in fishing effort on key stocks of groundfish, should be continued. Action is critical to ensure that WGOM Area Closure remains closed. This closure is a critical component of the measures needed to control F on GOM cod. This emergency action would continue measures specified in the Settlement Agreement, which was ordered to be implemented by the U.S. District Court for the District of Columbia in a Remedial Order issued on May 23, 2002.

The restrictions on the recreational fishery continue to be controversial, as do the limits on gillnet gear, that are perceived to be disproportionate. The majority of the industry appears to support the WGOM Area Closure's extension.

Factors relating to significance of an action, as specified at 40 CFR 1508.27, were also considered and determined to be consistent with a Finding of No Significant Impact.

FONSI Statement

In view of the analysis presented in this document and in the preliminary Draft Supplemental Environmental Impact Statement for Amendment 13 to the FMP, it is hereby determined that the emergency rule to reduce overfishing on major stocks of fish in the Northeast multispecies fishery through temporal extension of existing area closures, new area closures, new gear restrictions, DAS reductions, and additional restrictions on the recreational fishery will not significantly affect the quality of the human environment with specific reference to the criteria contained in NAO Order 216-6 implementing NEPA. Accordingly, the preparation of an SEIS for this interim action is not necessary.

Assistant Administrator for Fisheries, NOAA — Date

9.0 Agencies Consulted in Formulating the Action

National Marine Fisheries Service
New England Fishery Management Council

10.0 Preparers of Environmental Assessment

National Marine Fisheries Service
- Northeast Region, Gloucester, Massachusetts

- Northeast Fisheries Science Center, Woods Hole, Massachusetts
New England Fishery Management Council

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