Proposed Agency Action:
Approval of the

Type of statement:
Environmental Assessment

Lead Agency:
National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service (NOAA Fisheries)

In Consultation with the:

For further information:

April 30, 2007

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1.0 CONTENTS

1.1 List of Acronyms

ALWTRP	Atlantic Large Whale Take Reduction Plan
APA	Administrative Procedures Act
ASMFC	Atlantic States Marine Fisheries Commission
CAI	Closed Area I
CAII	Closed Area II
CC	Cape Cod
CPUE	catch per unit of effort
DAM	Dynamic Area Management
DAS	days-at-sea
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DSEIS	Draft Supplemental Environmental Impact Statement
EA	Environmental Assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
F	Fishing mortality rate
FAAS	Flexible Area Action System
FEIS	Final Environmental Impact Statement
FMP	fishery management plan
FSCS	Fisheries Scientific Computer System
FW	framework
FY	fishing year
GAMS	General Algebraic Modeling System
GB	Georges Bank
GIS	Geographic Information System
GOM	Gulf of Maine
GRT	gross registered tons/tonnage
HAPC	habitat area of particular concern
HPTRP	Harbor Porpoise Take Reduction Plan
I/O	input/output
IFQ	individual fishing quota
ITQ	individual transferable quota
IVR	interactive voice response reporting system
IWC	International Whaling Commission
LOA	letter of authorization
LPUE	landings per unit of effort
MA	Mid-Atlantic

MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MARFIN	Marine Fisheries Initiative
MEY	maximum economic yield
MMC	Multispecies Monitoring Committee
MMPA	Marine Mammal Protection Act
MPA	marine protected area
MRFSS	Marine Recreational Fishery Statistics Survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSMC	Multispecies Monitoring Committee
MSY	maximum sustainable yield
NAA	No Action Alternative
NAPA	National Academy of Public Administration
NAS	National Academy of Sciences
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NFMA	Northern Fishery Management Area (monkfish)
NLCA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NSTC	Northern Shrimp Technical Committee
NT	net tonnage
NWA	Northwest Atlantic
OBDBS	Observer database system
OLE	Office for Law Enforcement (NMFS)
OY	optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
PREE	Preliminary Regulatory Economic Evaluation
RFA	Regulatory Flexibility Act
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area
SAFE	Stock Assessment and Fishery Evaluation
SAP	Special Access Program
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SEIS	Supplemental Environmental Impact Statement

SFA	Sustainable Fisheries Act
SFMA	Southern Fishery Management Area (monkfish)
SIA	Social Impact Assessment
SNE	southern New England
SNE/MA	southern New England-Mid-Atlantic
SSB	spawning stock biomass
SSC	Social Science Committee
TAC	total allowable catch
TED	turtle excluder device
TEWG	Turtle Expert Working Group
TMGC	Trans-boundary Management Guidance Committee
TMS	ten minute square
TRAC	Trans-boundary Resources Assessment Committee
TSB	total stock biomass
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	vessel monitoring system
VPA	virtual population analysis
VTR	vessel trip report
WGOM	Western Gulf of Maine
WO	weighout
YPR	yield per recruit

2.0 INTRODUCTION AND BACKGROUND

The final rule implementing Amendment 13 to the Northeast (NE) Multispecies Fishery Management Plan (FMP) (69 CFR 22906, April 27, 2004) specified a process for the formation of sectors within the NE multispecies fishery and the allocation of TAC for a specific groundfish species (or Days-at-Sea), implemented restrictions that apply to all sectors, and specified a formula for the allocation of TACs for regulated multispecies groundfish species to Sectors. The regulations implementing Amendment 13 require prospective sectors to submit a proposal to form a sector a minimum of one year prior to the date the sector wishes to commence fishing. The sector must also submit an Environmental Assessment (EA) evaluating the potential impacts of the sector on the affected environment in order to comply with the National Environmental Policy Act.

2.1 PROPOSAL

Who is proposing and general description

Sector Membership

Characteristics of members, restrictions on membership. Does not have to list members.

Summary of operations plan for 2008-09 fishing year

The *Sector* requests allocation of ……………. . A few paragraphs explaining how the sector will operate. How will catch be controlled and allocated to members. How will sector be monitored.

2.2 Purpose, Goals and Need for the Action

2.2.1 Purpose and Need for the Proposed Action (sector allocation)

The need for this action is to provide an opportunity to mitigate negative economic impacts to Sector member vessels resulting from effort controls implemented through Amendment 13 and subsequent framework adjustments to the NE Multispecies FMP. The purpose of the action is to request initiation of a framework to authorize the Generic Sector, the process for which was specified and authorized as part of Amendment 13, that would allow Sector members to alleviate social and economic hardships while meeting biological objectives through management rules that the Sector participants agree to abide by.

More on why sector is needed and what benefits it would provide over status quo

2.2.2 Goals of the Proposed Action

For the purposes of developing Amendment 13, the NEFMC developed a set of goals and objectives. The Sector aims to achieve many of the goals and objectives set forth for the Amendment. Some of the most applicable goals and objectives for both the Amendment and Sector are listed below. Goals and objectives of Amendment 13 are excerpted from the Amendment 13 FSEIS Section 2.3:

Amendment 13 Goals:
Goal 1*:* Consistent with the National Standards and other required provisions of the Magnuson Act and other applicable law, manage the northeast multispecies complex at sustainable levels.

Goal 2: Create a management system so that fleet capacity will be commensurate with resource status so as to achieve goals of economic efficiency and biological conservation and that encourages diversity within the fishery.
Goal 3: Maintain a directed commercial and recreational fishery for northeast multispecies.
Goal 4: Minimize, to the extent practicable, adverse impacts on fishing communities and shoreside infrastructure.
Goal 6: To promote stewardship within the fishery.

Amendment 13 Objectives:
Objective 1: Achieve, on a continuing basis, optimum yield (OY) for the U.S. fishing industry.
Objective 3: Adopt fishery management measures that constrain fishing mortality to levels that are compliant with the Sustainable Fisheries Act.
Objective 4: Implement rebuilding schedules for overfished stocks, and prevent overfishing.
Objective 7: To the extent possible, maintain a diverse groundfish fishery, including different gear types, vessel sizes, geographic locations, and levels of participation.
Objective 9: Adopt measures consistent with the habitat provisions of the Magnuson Act, including identification of EFH and minimizing impacts on habitat to the extent practicable.
Objective 10*:* Identify and minimize bycatch, which include regulatory discards, to the extent practicable, and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Sector Goals: (a sample of potential sector goals below)
Goal 1: Contribute to ending overfishing and rebuilding of NE groundfish and to sustaining a viable multispecies groundfish fishery in the Gulf of Maine.
Goal 2: Increase potential to realize optimum yield of groundfish resource.
Goal 3: Reduce regulatory discards by implementing full retention of legal size fish.
Goal 4: Promote safer fishing practices.
Goal 5: Generate economic stability for fishing vessels and fishing communities including shoreside businesses that support fishing
Goal 6: Implement Stakeholder co-management in New England that can tailor management to local needs and strengthen stewardship
Goal 7: Measure and minimize bycatch of juvenile or spawning fish through gear modifications, fleet communication, voluntary closures, or other management measures.
Goal 8: Secure viability of local fishing industry to ensure availability of shore side infrastructure.

You may want to put more here describing the goals and how a sector would achieve thems.

2.3 Brief History of the Northeast Multispecies and Monkfish Fishery Management Plans

Groundfish stocks were managed under the Magnuson-Stevens Fishery Management and Conservation Act beginning with the adoption of a groundfish plan for cod, haddock, and yellowtail flounder in 1977. This plan relied on hard quotas and proved unworkable. The quota system was rejected in 1982 with the adoption of the Interim Groundfish Plan, which relied on minimum fish sizes and codend mesh regulations for the Gulf of Maine and Georges Bank to control fishing mortality. The interim plan was replaced by the Northeast Multispecies FMP in 1986, which established biological targets in terms of maximum spawning potential and continued to rely on gear restrictions and minimum mesh size to control fishing mortality. Amendment 5 was a major revision to the FMP. Adopted in 1994, it implemented reductions in time fished (days-at-sea, or DAS) for some fleet sectors and adopted year-round closures to control mortality. A more detailed discussion of the history of the management plan up to 1994 can be found in Amendment 5 (NEFMC 1994). Amendment 7 (NEFMC 1996), adopted in 1996, expanded the DAS program and accelerated the reduction in DAS first adopted in Amendment 5. Since the implementation of Amendment 7, there have been a series of amendments and smaller changes (framework adjustments) that are detailed in Amendment 13 (NEFMC 2003).

Amendment 13

Amendment 13 was developed over a four-year period to meet the M-S Act requirement to adopt rebuilding programs for stocks that are overfished and to end overfishing. Amendment 13 also brought the FMP into compliance with other provisions of the M-S Act. Subsequent to the implementation of Amendment 13, FW 40A provided opportunities to target healthy stocks, FW 40B improved the effectiveness of the effort control program, and FW 41 expanded the vessels eligible to participate in a Special Access Program (SAP) that targets GB haddock.

Excerpts from the Amendment 13 FSEIS prepared by the NEFMC describe the benefits of a sector allocation to the GB hook fleet with the following characterizations: "the creation of voluntary sectors provide an opportunity for vessels to mitigate the impacts of the management alternatives"; "by organizing into a cooperative, vessels may be able to develop more efficient ways to harvest groundfish and minimize the inefficiencies that result from the regulations"

Framework Adjustments

The NE Multispecies FMP has been subject to many additional changes since its inception. Besides the 11 amendments implemented prior to development of Amendment 13, the multispecies plan has been altered through framework adjustments 30 times since 1994.

The Council has held four annual reviews and made eight adjustments to the FMP to address Amendment 7 rebuilding needs (Frameworks 20, 24, 25, 26, 27, 30 and 33). In 1999, the Council submitted Framework 27 as the primary annual adjustment framework. At the final framework meeting on January 27-28, the Council focused on the finalizing the severe restrictions necessary to achieve the plan objectives for GOM cod and was unable to complete development of the measures needed for GB cod. It followed immediately with the development of Framework 30 to address GB cod, which was submitted to NMFS on April 30. Both Frameworks 27 and 30 contained trip limits for GOM and GB cod. In both cases, the Regional Administrator was authorized to reduce the trip limit when 75 percent of the target TAC for each stock was reached. On May 28, 1999, the Regional Administrator reduced the GOM cod limit of 200 pounds per day implemented on May 1, 1999 to 30 pounds per day, just three weeks into the fishing year. However, even before the trip limit was reduced, fishermen reported excessive discards of cod as seasonal closures ended.

On May 28, 1999, responding to widespread reports from the industry about the levels of cod discards in the western Gulf of Maine, the Council requested that the Secretary of Commerce increase the trip limit under the emergency action authority provided in §305 of the Magnuson Act. On August 3, NMFS published an interim rule that increased the trip limit from 30 pounds per day to 100 pounds per day, with a maximum possession limit of 500 pounds and modifications to the running clock. The interim rule expired on January 30, 2000. NMFS announced on July 29, 1999 that it disapproved the 30-day closure on Georges Bank proposed in Framework 30, but it approved the trip limit, which took effect on August 15. Framework 30 established a GB cod trip limit of 2,000 pounds per day/20,000 pounds maximum possession. To address potential discarding in the GOM cod fishery upon expiration of the interim rule, and to prevent repeating on Georges Bank the discarding situation that occurred in the Gulf of Maine when the trip limit was reduced, the Council submitted Framework 31 on October 14, 1999. NMFS approved the increased GOM cod trip limit on January 5, 2000, but it disapproved the change to the GB cod trip limit program that would have eliminated the authority of the Regional Administrator to make mid-season adjustments to the trip limit when 75 percent of the target TAC is reached.

Framework 33 was implemented on June 1, 2000 to reduce or maintain fishing mortality rates for the five critical stocks below fishing mortality rebuilding targets established by Amendment 7. This framework continued the status quo seasonal closures for Gulf of Maine cod, but incorporated a "trigger" for additional closures: if 50 per cent of the target TAC was landed by July 31, the Cashes Ledge Closed Area would be closed in November and Blocks 124 and 125 would be closed in January. The WGOM closure was extended for an additional year, to April 30, 2002. GOM cod trip limits were held at 400 pounds per day with a maximum possession limit of ten times the daily limit. A GB cod trip limit of 2,000 pounds per day, not to exceed 20,000 pounds per tip, was also adopted. In addition, a closure of Blocks 109-114, 98, and 99 during May was implemented. The Multispecies Monitoring Committee (MSMC) reviewed stock status in November, 2000, and concluded that Amendment 7 fishing mortality targets were likely being met for GB cod, GB haddock, GB yellowtail flounder, and SNE yellowtail flounder. The fishing mortality of GOM cod could not be determined with precision because of extensive discards that were believed to have occurred in 1999 because of the low trip limit. GB cod was assessed in June 2001 and fishing mortality was reported to be slightly above the Amendment 7 target; subsequent assessments have shown this report to be in error. GOM cod was assessed in June 2001, and fishing mortality was found to be significantly above the FMAX target for this stock. After receiving the information on GOM cod at the July, 2001 Council meeting, the Council renewed efforts to develop Framework 36. Framework 36 was completed by December 2001, but the Council did not adopt the framework and it was not submitted.

Recent Changes in the NE Multispecies Fishery: Description of Frameworks 40A, 40B, 41, and 42
Recent changes to the NE Multispecies FMP (Framework 40A) provided access (exclusive) to Closed Area I (CAI) for the GB Hook Sector in a directed haddock Special Access Program (SAP). This SAP will continue to provide a significant contribution to the Sector members' annual catch and the overall economic viability of hook fishing on Georges Bank. A paucity of cod will continue to require alternatives for the hook and line fishery on Georges Bank. Additionally, under FW 40B the eligibility criteria and allocation formula for the Sector changed. Amendment 13 established the Sector and allocates GB cod to the sector based on the history of the sector participants. As implemented, only permits with a past history of using hook gear can join the Sector, and only cod landed using hook gear is used to determine the Sector's cod allocation. FW 40B modified these requirements by allowing any vessel to join the Sector and all cod landings of Sector participants, regardless of gear, to be used to determine the Sector's allocation. Sector participants are required to use hook gear once in the Sector and the maximum share of the GB cod TAC that the Sector can be allocated is twenty percent.

Framework adjustment 41 (FW 41) allows access to the CA I SAP to non-Sector vessels. As a result, FW 41 resulted in the decline of catch and consequently revenue (approximately $2.9M in FY 2004 and approximately $2.2M in FY 2005) to the GB Hook Sector membership. In response to this decline, the Sector negotiated with common pool vessels in an attempt to maintain product value by eliminating a derby style fishery. The two sides negotiated a split season. The TAC and season was split in two. Sector and non-Sector vessels will alternate seasons on an annual basis. As the TAC grows with the haddock resource, expansion of the area and the season may be considered.

Framework adjustment 42 (FW 42) was initiated following the recent (2005) assessment of groundfish stocks (see Section 3.1 for stock status information). Eight stocks were found to be experiencing overfishing (GB Yellowtail, CC/GOM Yellowtail, SNE/MA Yellowtail, White Hake, SNE winter, GB winter, GOM cod and GB cod) and as a result, the NEFMC prepared a range of alternatives to reduce fishing mortality on these stocks. The proposed rule for the alternative chosen implements an additional reduction in days at sea and imposes 2 to 1 counting of days at sea in much of the inshore Gulf of Maine and part of Southern New England (primarily to reduce catches of Gulf of Maine cod, Cape Cod yellowtail flounder and Southern New England yellowtail flounder. It also changed trip limits on some species and imposed new trip limits on some species This proposed rule does not change the Amendment

13 GOM cod trip limit (800 lb (362.9 kg) per DAS, up to 4,000 lb (1,818.2 kg) per trip). This proposed rule would implement new trip limits for white hake and GB winter flounder, modify the existing trip limits for the three yellowtail flounder stocks (CC/ GOM, GB, and SNE/MA), and modify the haddock trip limit and the GOM cod trip limit exemption and cod overage regulations. Framework 42 renews the DAS leasing program and amends rules for permanent transfers of DAS. Framework 42 also authorizes the Georges Bank Cod Fixed Gear Sector which is the second groundfish sector to be authorized.

2.4 National Environmental Policy Act (NEPA)

NEPA provides a structure for identifying and evaluating the full spectrum of environmental issues associated with Federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is a combined framework adjustment to a fishery management plan and an environmental assessment (EA). An EA provides an analysis of a Proposed Action, the alternatives to that action that were considered, and the impacts of the action and the alternatives. An EA is prepared rather than an Environmental Impact Statement (EIS) when the impacts are not expected to be significant. The required NEPA elements for an EA are discussed in section 9. The evaluation that this action will not have significant impacts is in section 9, and the required Finding of No Significant Impact (FONSI) statement is included at the end of that section.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This Environmental Assessment presents two options including the proposed action which is formation of the Generic Sector and a No-Action alternative and analyzes the impacts of the alternatives which are described below.

3.1 Alternative 1 (No Action)

The No Action Alternative is no approval of the Generic Sector. All of the prospective Sector vessels would remain in the common pool fishing under existing regulations including effort controls, trip limits and time-area closures. The major elements include recent changes to commercial fishery measures to be implemented under Multispecies Framework 42 detailed in the following subsections.

3.1.1 Effort Controls

The ratio of Category A and Category B DAS will be the default adopted by Amendment 13 (55/45) and equates to an 8.3 percent reduction in Category A DAS available to each permit, and a similar increase in Category B DAS.

3.1.2 Differential DAS Counting

When using Category A DAS in the areas shown in Figure 2, vessels will be charged differential DAS. Vessel operators that plan to catch fish in these areas will be required to declare their intent to do so at the beginning of a trip using procedures that will be promulgated by the Regional Administrator. The required means for this notification will be via VMS, but other procedures may be authorized if necessary due to delays in implementing the VMS requirement for all vessels. A vessel that does not declare its intent to catch fish in this area is not permitted to do so on that trip. A vessel that does not declare its intent to fish in the area is not restricted from transiting the area, or being within the area (for example, to evade weather), with gear properly stowed. Differential DAS counting does not apply to the use of Category B DAS in these areas.

A vessel that declares its intent to fish in the GOM differential DAS area will be charged Category A DAS at the rate of 2:1 – that is, the vessel will be charged Category A DAS at two times the actual time underway. This rate will be charged for the entire trip, including any portions that occur outside of the differential DAS area. A vessel that declares its intent to fish in the SNE differential DAS area will be charged Category A DAS at the rate of 2:1 - that is, the vessel will be charged two times the actual time underway. This rate will be charged only for time spent in the area. While unlikely, should a vessel declare its intent to fish in both areas on the same trip, differential DAS will be charged for the entire trip, consistent with the requirements for the GOM area.

Vessels declared into the day gillnet category that declare their intent to fish in a differential DAS counting area will be charged a minimum of 15 hours for any trip that is three hours or more in length, up to and including 7.5 hours (actual time underway, regardless of whether in a differential DAS area or not). For trips that are less than three hours, day gillnet vessels will be charged DAS at the appropriate differential rate. For trips that are over 7.5 hours, day gillnet vessels fishing in the GOM differential DAS area will be charged DAS at the differential rate.

Rationale: Differential DAS counting is designed to reduce fishing mortality on several stocks, including GOM cod, CC/GOM yellowtail flounder, and SNE/MA yellowtail flounder. When combined with a daily trip limit that is based on the time underway (not the DAS charged – see section 4.2.4) this will reduce the effort on these stocks. The inshore GOM differential DAS area is adjacent to several important fishing ports and any vessel sailing from or landing in those ports must transit the area. If a vessel is allowed to fish both inside and outside the area and only be charged differential DAS while in the area, it would reduce the effectiveness of this measure. Any vessel fishing an entire trip in the area wishing to catch the maximum trip limit (4,000 lbs. at 800 lbs per DAS) would have to be absent for five DAS and would be charged ten DAS. If a vessel were to fish both inside and outside the area on the same trip and only be charged differential DAS while in the area then the DAS charged would be lower. As an example, from the eastern boundary of the inshore GOM differential DAS area to Gloucester is about 37 nautical miles, or about 3.5 hours at ten knots. Allowing for one three hour tow to "top off" to the full GOM cod trip limit the vessel could conceivably be charged differential DAS for only 6.5 hours (3.5 hours of transit time plus the 3 hours of towing time) which would add only 6.5 hours to the DAS charged for the trip (6.5 hours times 2 is thirteen hours). The vessel would thus only be charged 5 days and 6.5 hours while catching the maximum GOM cod trip limit. In essence, this reduces the differential DAS rate from 2:1 to about 1.13:1 for these trips, greatly reducing the effectiveness of this measure. It is possible that a vessel operator could reduce this even further by skirting the edge of the area and only entering to make a short tow. Given the value of cod ($1.50 to $2 per pound in late CY 2005), the size of the trip limits proposed (800 lbs per DAS), and the limited number of DAS available, if vessels are not charged differential DAS for the entire trip there will be considerable incentive for fishermen to develop practices that circumvent the intent of differential DAS counting while complying with the regulations.

Unlike the inshore GOM differential DAS area, the SNE/MA differential DAS are not adjacent to the coast and vessels do not have to transit the area enroute homeport. In addition, the trip limits under consideration for SNE/MA yellowtail flounder are lower and the potential value of diverting to "top off" a trip is thus less. For this reason, differential DAS are charged only while fishing in the area, unless VMS is not adopted for all vessels. In that case, since it is not possible to track a vessel's location unless it is equipped with VMS, a vessel that declares into the area via IVR will be charged differential DAS for the entire trip.

3.1.3 Differential DAS Counting Area

Differential DAS counting will apply in the following areas (see Figure 1):

Gulf of Maine:
Thirty minute squares 114/115/116/123/124/125/132/133/138/139/140, described by the following coordinates:

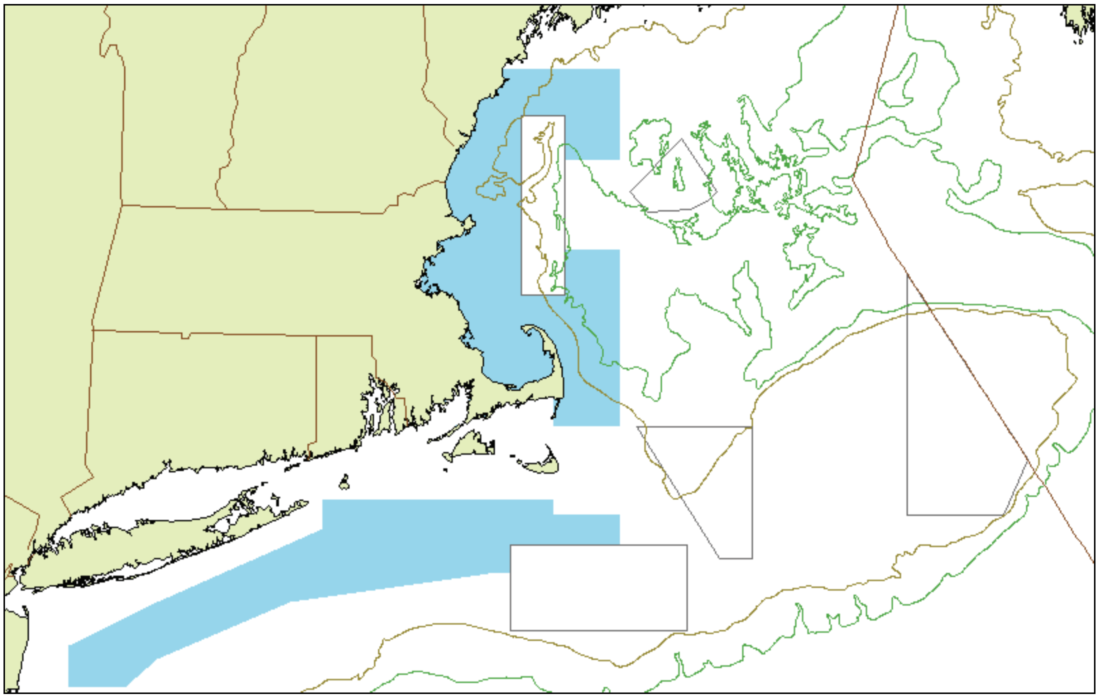
43-30N	(intersection with Maine shoreline)
43-30N	69-30W
43-00N	69-30W
43-00N	69-55W (eastern boundary, WGOM Closed Area)
42-30N	69-55W
42-30N	69-30W
41-30N	69-30W
41-30N	70-00W
(North to intersection with Cape Cod coast)	70-00W

Southern New England:
Area bounded by the following coordinates:

41-05N	71-45W
41-05N	70-00W
41-00N	70-00W
41-00N	69-30W
40-50N	69-30W
40-50N	70-20W
40-40N	70-20W
40-40N	70-30W
40-30N	72-30W
40-10N	73-00W
40-00N	73-15W
40-00N	73-40W
40-15N	73-40W
40-30N	73-00W
40-55N	71-45W
41-05N	71-45W

Rationale: The inshore GOM area is designed to reduce fishing mortality on GOM cod and CC/GOM yellowtail flounder. The area selected accounted for nearly 85 percent of GOM cod landings in FY 2004 and a similar percentage of CC/GOM yellowtail flounder. The SNE differential DAS area is designed to reduce mortality primarily on SNE/MA yellowtail flounder but may also reduce mortality on SNE/MA winter flounder. Amendment 13 proposed adopting differential DAS counting in the SNE RMA, a much larger area. Since yellowtail flounder is caught in well-defined locations, a smaller area is being proposed to allow some fishing for monkfish and winter flounder that will not be subject to differential DAS counting.

Figure 1 - Proposed Action differential DAS counting area (shaded)



3.1.4 Trip Limits

The following trip limits will be adopted. For vessels fishing in the differential DAS counting areas, trip limits are based on the time underway and not the DAS charged. With respect to the modified running clock for GOM or GB cod, vessels declared into the differential DAS area are not subject to the modified running clock.

GOM Cod:	800 lbs/day – 4,000 lbs/trip
GB Cod: 1,000 lbs/day –	10,000 lbs/trip
CC/GOM Yellowtail Flounder:	250 lbs/day – 1,000 lbs/trip
SNE/MA Yellowtail Flounder:	250 lbs/day – 1,000 lbs/trip
GB Winter Flounder:	5,000 lbs/trip
GB Yellowtail Flounder:	10,000 lbs/trip
White Hake:	1,000 lbs/day – 10,000 lbs/trip

Rationale: Trip limits for GOM cod and GB cod are unchanged. The trip limits for CC/GOM yellowtail flounder and SNE/MA yellowtail flounder are reduced to meet mortality objectives and are made identical to simplify regulations (this will remove the requirement that vessels declare into either the SNE/MA or CC/GOM yellowtail flounder stock area). A trip limit is established for GB yellowtail flounder to reduce mortality and also reduce the likelihood that the TAC will be caught early in the year. Trip limits for white hake and GB winter flounder are designed to reduce mortality on those two stocks.

The modified running clock was first adopted in an interim rule in August 1999 for GOM cod and in August 2002 for GB cod. This regulation requires vessels that land more than one day's limit of GOM or GB cod to not call-out of the DAS system until the vessel is charged the full twenty-four hours for the additional cod. A vessel landing two days of the trip limit, for example, must not call-out of the DAS system until it has been charged 48 hours on the DAS clock, and cannot depart on another trip until the full period has elapsed. The purpose of the running clock was to establish a closer link between DAS charged and the daily possession limit on multi-day trips. The application of differential DAS at a 2:1 rate removes the need for this provision. In order to land two days of the trip limit, the vessel must be underway at least twenty-four hours and one minute and will be charged just over forty-eight hours; a vessel landing three days of the limit from the differential DAS area must be underway at least forty eight hours and one minute and would be charged just over ninety-six hours on the DAS clock. The modified running clock requirement will still apply to vessels that are not fishing in the differential DAS counting area.

3.1.5 Trip Limit Adjustments

On species that have trip limits, the Regional Administrator has the authority and responsibility to monitor the catch in relationship to the target TACs and, in the event that it can be projected that at least 90% of the target TAC will not be caught in any given year, the Regional Administrator may adjust the trip limits upwards as appropriate consistent with procedures established by the Administrative Procedures Act (APA). Changes by the Regional Administrator can be made at any time, including before the start of the fishing year if necessary, in all areas (including the Eastern U.S./Canada area).

Adjustments to the GB yellowtail flounder trip limit may also be made under provisions for the U.S./CA area to prevent exceeding the TAC or to facilitate harvesting the TAC. These provisions allow this trip limit to be increased or decreased. The Regional Administrator (RA) can adjust this initial limit in FY 2007 if necessary to prevent exceeding, or to facilitate harvesting, the TAC. The Council offers the following guidance for consideration by NMFS when adjusting this trip limit (summarized in Table 1). This guidance is intended to replace the existing provision that requires a reduction of the trip limit to 1,500 lbs/DAS and 15,000 lbs per trip when 70 percent of the TAC is caught, but does not replace the Regional Administrator's authority to adjust the TAC if necessary at other times (including prior to the beginning of the fishing year):

- If 30% of the TAC is reached during the first quarter, lower to 7,500 lbs.
- If 30% of the TAC is reached during the second quarter, continue 10,000 lbs.
- If 30% of the TAC is reached during the third quarter, increase to 25,000 lbs.
- If 30% is reached during the fourth quarter, remove the GBYT trip limit

If at any time during the fishing year and prior to reaching the 30% trigger the RA determines that the TAC is not likely to be attained, the RA may alter the trip limit upwards to 15,000 or 25,000 lbs./trip. Any additional adjustments could be made at 60%.

- If 60% of the TAC is reached during the first quarter, lower to 3,000 lbs.
- If 60% of the TAC is reached during the second quarter, lower to 5,000 lbs.
- If 60% of the TAC is reached during the third quarter, continue at 10,000 lbs.
- If 60% of the TAC is reached during the fourth quarter, increase to 25,000 lbs.

If at any time during the fishing year and prior to reaching the 60% trigger the RA determines that the TAC is not likely to be attained, the RA may alter the trip limit upwards to 25,000 lbs./trip or remove the trip limit altogether. An additional adjustment could be made at 60% or when approaching the TAC.

Table 1 – GB yellowtail flounder trip limit adjustment guidance

	GB Yellowtail Flounder Trip Limit Adjustment	
Fishing Year Quarter	Catch reaches 30% of TAC during quarter	Catch reaches 60% of TAC during quarter
Quarter 1	7,500 lbs	3,000 lbs
Quarter 2	10,000 lbs	5,000 lbs
Quarter 3	25,000 lbs	10,000 lbs
Quarter 4	No limit	25,000 lbs
At any time if TAC is unlikely to be attained	Catch <= 30% of TAC 15,000 lbs to 25,000 lbs	Catch <= 60% of TAC 25,000 lbs or unlimited

Rationale: The RA is provided authority and guidance to adjust trip limits so that yield is not sacrificed. Several stocks are predicted to grow rapidly between 2006 and 2008 and target TACs to increase as a result. It may be necessary to relax trip limit restrictions to harvest the target TACs. In the case of GB yellowtail flounder, specific guidance is provided so that the industry can anticipate changes that may be made over the course of the year in order to harvest, but not exceed, the target TAC.

3.1.6 Controls on Monkfish, Skates and Dogfish

The No Action alternative also leaves Sector members subject to existing on monkfish, skates and dogfish as well as changes to Monkfish regulations to be implemented under Monkfish Framework 4.

Monkfish DAS and Trip Limits

Monkfish framework 4 will implement new restrictions on monkfish DAS limiting vessels to 31 monkfish DAS with trip limits in the Northern management areas of 1,250 lb (567 kg) tail weight per DAS for limited access monkfish Category A and C vessels, and 470 lb (213 kg) tail weight per DAS for limited access monkfish Category B and D vessels. Vessels would be restricted to using no more than 23 of their allocated 31 monkfish DAS in the SFMA. This action would also establish SFMA trip limits of 550 lb (249 kg) tail weight for limited access monkfish Category A, C, and G vessels; and 450 lb (204 kg) tail weight per DAS for limited access monkfish Category B, D, and H vessels. These are the same trip limits in effect during FY 2006.

Monkfish Framework 4 will also reduce the incidental catch limit for the NFMA. The proposed action would reduce the monkfish incidental catch limit applicable to limited access monkfish vessels (Categories A, B, C, D, F, G, and H) and open access monkfish vessels (Category E) fishing under a NE multispecies DAS in the NFMA from 400 lb (181 kg) tail weight per NE multispecies DAS, or 50 percent of the weight of fish on board, to 300 lb (136 kg) tail weight per DAS, or 25 percent of the weight of fish on board. The proposed incidental catch limit is equivalent to that implemented in the original FMP (64 FR 54732; October 7, 1999). Framework 4 does not change the incidental catch limits in the SFMA which remain at: (A) Category C, D, and F vessels. If any portion of a trip is fished only under a NE multispecies DAS, and not under a monkfish DAS, in the SFMA, a Category C, D, or F vessel may land up to 300 lb (136 kg) tail weight or 996 lb (452 kg) whole weight of monkfish per DAS if trawl gear is used exclusively during the trip, or 50 lb (23 kg) tail weight or 166 lb (75 kg) whole weight per DAS if gear other than trawl gear is used at any time during the trip.

Skate possession and landing restrictions remain as code in CFR§ 648.322

a) *Skate wing possession and landing limit.* A vessel or operator of a vessel that has been issued a valid Federal skate permit under this part, provided the vessel fishes under an Atlantic sea scallop, NE multispecies, or monkfish DAS as specified at §§648.53, 648.82, and 648.92, respectively, unless otherwise exempted under paragraph (b) of this section, may fish for, possess, and/or land up to the allowable daily and per trip limits specified as follows:

(1) Possess up to 20,000 lb (9,072 kg) of skate wings (45,400 lb (20,593 kg) whole weight) per trip of greater than 24 hours in duration; or

(2) Land up to 10,000 lb (4,536 kg) of skate wings (22,700 lb (10,296 kg) whole weight) per trip of 24 hours or less in duration.

(b) *Bait Letter of Authorization (LOA).* A skate vessel owner or operator under this part may request and receive from the Regional Administrator an exemption from the skate wing possession limit restrictions, provided that the following requirements and conditions are met:

(1) The vessel owner or operator obtains an LOA. LOAs are available upon request from the Regional Administrator.

(2) The vessel owner/operator possesses and/or lands only whole skates less than 23 inches (58.42 cm) total length.

(3) The vessel owner or operator fishes for, possesses, or lands skates only for use as bait.

(4) Vessels that fish for, possess, and/or land any combination of skate wings and whole skates less than 23 inches (58.42 cm) total length must comply with the possession limit restrictions under paragraph (a) of this section for all skates or skate parts on board.

(5) Any vessel owner/operator meets the requirements at §648.13(h).

(6) Skate bait-only possession limit LOA—The vessel owner or operator possesses and lands skates in compliance with this subpart for a minimum of 7 days.

(c) *Prohibitions on possession of skates.* All vessels fishing in the EEZ portion of the Skate Management Unit are subject to the following prohibitions:

(1) A vessel may not retain, possess, or land barndoor or thorny skates taken in or from the EEZ portion of the Skate Management Unit.

(2) A vessel may not retain, possess, or land smooth skates taken in or from the GOM RMA described at §648.80(a)(1)(i).

[68 FR 49701, Aug. 19, 2003, as amended at 69 FR 22988, Apr. 27, 2004]

Dogfish possession and landing restrictions remain as coded in CFR§ 648.235
(a) *Quota Period 1.* From May through October 31, vessels issued a valid Federal spiny dogfish permit specified under §648.4(a)(11) may:
(1) Possess up to 600 lb (272 kg) of spiny dogfish per trip; and
(2) Land only one trip of spiny dogfish per calendar day.
(b) *Quota Period 2.* From November 1 through April 30, vessels issued a valid Federal spiny dogfish permit specified under §648.4(a)(11) may:
(1) Possess up to 600 lb (272 kg) of spiny dogfish per trip; and
(2) Land only one trip of spiny dogfish per calendar day.
(c) Regulations governing the harvest, possession, landing, purchase, and sale of shark fins are found at part 600, subpart N, of this chapter.
[66 FR 22476, May 4, 2001, as amended at 67 FR 6201, Feb. 11, 2002; 69 FR 53362, Sept. 1, 2004; 71 FR 40438, July 17, 2006]

3.2 Alternative 2: Approval of Sector with TACs on stocks of concern and continued DAS controls

Alternatiave 2 would authorize the Generic Sector operating under a combination of hard TACs on stocks of concern found in the the Gulf of Maine and continued adherence to DAS controls. The sector would likely include over 10active multispecies permits with “A” days. Most of these permits are used by vessels fishing otter trawl gear. The sector expects to receive allocations of cod (GOM), yellowtail flounder (GOM-CC), and white hake. The Sector expects allocations to be less than 20% of the overall commercial share to the target TAC.

The sector requests that it be exempted from other regulations designed to control fishing mortality on stock of concern for which the Sector has been allocated a TAC. Under this alternative the sector requests exceptions from:

- Trip limits on GOM cod, GOM-CC, and white hake
- Differential DAS counting
- Rolling closures in the Gulf of Maine

The specific operational rules of the Sector will be detailed and analyzed in when the operations plan is submitted for the sector. Sector members will be subject to a legally binding Membership Agreement that will delineate the interaction of members within the Sector, including governance, monitoring, enforcement, and penalties for non-compliance. The self-governance and monitoring of the Sector will allow members to maintain stewardship of the resource they depend upon and it will create a sense of interconnectedness between fishermen that will encourage compliance with the Sector Membership Agreement and Operations Plan. The Sector envisions assigning each permit in the sector a specific allocation of the overall allocation of each of the species-stocks for which the Sector receives an allocation. Sector members will be free to utilize these allocations on their vessels or transfer them to other vessels within the sector upon notification and approval by the sector manager.

The Sector prefers Alternative 3 under which it would receive allocations of all regulated groundfish species as well as monkfish and skates and to request exemption of groundfish and monkfish DAS, trip limits on groundfish and monkfish, and seasonal closures. However, it is not clear whether regulations governing monkfish and skates will allow the Sector to receive an allocation of monkfish or skates. Without exemptions from current and prospective (FW 4) regulations for monkfish, Sector vessels will be required to use a groundfish day in conjunction with a monkfish day when targeting monkfish and Sector vessels may be required to utilize a groundfish day in order to be able to land an incidental catch of up to 300 pounds tailweight or 25% of their total catch. They will also be required to utilize groundfish days when landing skates. This alternative is included for consideration in case it is determined that the Sector can not be excempted from multispecies and monkfish DAS controls and monkfish trip limits.

3.2.1 Area, Vessel and Gear Limitations

The sector proposes to restrict the operations of member vessels to the Gulf of Maine, specifically to statistical areas 511, 512, 513, 514 and 515.

The prospective Sector members currently use mobile gear; however, it the Sector may wish to include members using fixed gear in future. The sector does not propose any additional restrictions on gear or vessel characteristics beyond current restrictions associated with current permit restrictions.

3.2.2 Allocations on GOM cod, GOM-CC Yellowtail flounder and White Hake

Under this alternative the Sector would receive allocations of Gulf of Maine cod, Cape Cod – Gulf of Maine yellowtail flounder and white hake. Allocations for all of these species would be based on the ratio of the Sector members' total catch by species and stock relative to the total commercial catch of each species and stock during the period running from May 1, 2002 through April 30, 2007. The Sector expects allocations to be less than 20% of the overall commercial share to the target TAC.

3.2.3 Full Retention of Legal Sized Groundfish

Sector members will be required to retain all legal sized groundfish.

3.2.4 Exemptions from regulations directed at controlling mortality on stocks of concern

The sector requests exemptions from trip limits on cod (GOM), yellowtail flounder (CC-GOM) and white hake. Since total catch of the stocks by Sector members will be strictly limited by hard TACs, these trip limits are unnecessary and potentially wasteful.

The sector request exemption from differential DAS counting. The Sector will be operating under hard TACs for the stocks of concern. The rationale for differential DAS counting is to limit mortality on these stocks of concern. Since contributions to mortality on these stocks by Sector members will be strictly controlled by hard TACs, differential counting is an unnecessary additional management measures for Sector members.

The Sector requests exemptions from restrictions on fishing in the GOM rolling closures and from the May Seasonal closures on Georges Bank. As with trip limits and differential counting, the primary purpose of the rolling closures is to limit mortality on stocks of concern. Since contributions to mortality on these stocks by Sector members will be strictly controlled by hard TACs, differential counting is an unnecessary additional management measure for Sector members.

3.2.5 Other management controls remaining in place

Under this alternative the Sector will not be exempt from standard multispecies DAS limitations detailed in section 3.1.1 above. DAS limitations would continue to serve to limit catches of stocks for which the Sector is not granted an allocation including monkfish and skate. The constraints imposed by TACs of cod, yellowtail flounder, winter flounder and hake together with a no-discard policy for groundfish species will also serve to constrain the catch of species for which the Sector has not been granted a specific allocation.

Sector members would be free to lease days at sea within the sector subject to the current regulations regarding the relative size of the lessor and leasee vessel, and the maximum number of days that can be leased.

Sector members will continue to be subject to the same DAS controls and trip limits on monkfish in both Northern and Southern Areas and possession limits for skate and dogfish as under the No-Action alternative as described in Section 3.1.6.

3.3 Alternative 3: Approval of Sector with TACs on all regulated groundfish, monkfish, skates and dogfish and elimination of DAS controls (Preferred Alternative)

Under alternative 3, which is the preferred alternative, the Sector would receive allocations of all regulated groundfish species, monkfish, skates and dogfish. The groundfish stock for which allocations are requested include: GOM cod, GOM haddock, Cape Cod – GOM yellowtail flounder, witch flounder, American plaice, GOM winter flounder, white hake, Pollock, Acadian redfish, ocean pout, northern windowpane flounder, and Atlantic halibut. Allocations for all of these species would be based on the ratio of the Sector members' total catch by species and stock relative to the total commercial catch of each species and stock during the period running from May 1, 2002 through April 30, 2007. Sector members would be required to retain all legal sized fish of regulated species for which the Sector has received an allocation.

Because the catch of all managed species would be constrained by hard TACs, the sector requests that it be exempted from other regulations designed specifically to control fishing mortality. Under this alternative the sector requests exemptions from:

- Northeast Multispecies Days at Sea (DAS) controls and reporting requirements
- Monkfish DAS controls and reporting requirements
- Trip limits on cod, yellowtail flounder, winter flounder and white hake
- Possession and landing limits on monkfish, skates and dogfish
- Gulf of Maine Rolling closures

The specific operational rules of the Sector will be detailed and analyzed in when the operations plan is submitted for the sector. Sector members will be subject to a legally binding Membership Agreement that will delineate the interaction of members within the Sector, including governance, enforcement, and penalties for non-compliance. The self-governance and monitoring of the Sector will allow members to maintain stewardship of the resource they depend upon and it will create a sense of interconnectedness between fishermen that will encourage compliance with the Sector Membership Agreement and Operations Plan. The Sector envisions assigning each permit in the sector a specific allocation of the overall allocation of each of the species-stocks for which the Sector receives and allocation. Sector members will be free to utilize these allocations on their vessels or transfer them to other vessels within the sector upon notification and approval by the sector manager.

3.3.1 Area, Vessel and Gear Limitations

The sector proposes to restrict the operations of member vessels to the Gulf of Maine, specifically to statistical areas 511, 512, 513, 514 and 515.

The prospective Sector members currently use mobile gear; however, it the Sector may wish to include members using fixed gear in future. The sector does not propose any additional restrictions on gear or vessel characteristics beyond current restrictions associated with current permit restrictions.

3.3.2 Allocations on Groundfish, Monkfish, Skates and Dogfish

Under this alternative the Sector would receive allocations of GOM cod, GOM haddock, Cape Cod – GOM yellowtail flounder, witch flounder, American plaice, GOM winter flounder, white hake, Pollock, Acadian redfish, ocean pout, northern windowpane flounder, and Atlantic halibut, Northern monkfish, skates and dogfish. Allocations for all of these species would be based on the ratio of the Sector members' total catch by species and stock relative to the total commercial catch of each species and stock during the period running from May 1, 2002 through April 30, 2007. The Sector expects allocations to be less than 20% of the overall commercial share to the target TAC.

3.3.3 Full Retention of Legal Sized Groundfish

Sector members will be required to retain all legal sized groundfish and monkfish.

3.3.4 Exemptions from regulations directed at controlling mortality on stocks of concern

The sector requests excemptions from multispecies and monkfish DAS limits and reporting.

The sector requests exemptions from trip limits on cod (GOM), yellowtail flounder (CC-GOM) and white hake. The Sector also request excemptions from landing and possession limits for monkfish, skates and dogfish. Since total catch of the stocks by Sector members will be strictly limited by hard TACs, these trip limits are unnecessary and potentially wasteful.

The Sector requests exemptions from restrictions on fishing in the GOM rolling closures. As with trip limits and differential counting, the primary purpose of the rolling closures is to limit mortality on groundfish. Since contributions to mortality on these stocks by Sector members will be strictly controlled by hard TACs, differential counting is an unnecessary additional management measures for Sector members.

3.3.5 Other management controls remaining in place

The sector will continue to be subject to the same restrictons on year-round closed areas and on gear as other multispeices vessels.

3.4 Comparison of Alternatives

The table presented below identifies and compares those elements of the Operations Plan that are specific to the Sector (Preferred Alternative) to those elements of current regulations that would pertain to hook vessels in the Common Pool.

Table 2- Comparison of management measures for Sector alternatives and No Action Alternative

	Alternative 1 No Action	Alternative 2	Alternative 3 (Preferred Alternative)
Hard TACs for species with trip limits (white hake, GB and GOM cod, GOM-CC yellowtail flounder, GB Winter flounder).	No	Yes	Yes
Hard TACs for other regulated multispecies stocks	No	No	Yes
Hard TACs for monkfish, skates and dogfish	No	No	Yes
Multispecies DAS Allocations and reporting requirements	Yes	Yes	No
External Multispecies DAS Transfer/Lease:	Yes	No	No
Multispecies DAS Leasing within sector	Yes	Yes	No
Differential Multispecies DAS counting	Yes	No	No
Monkfish DAS allocations and report requirements	Yes	Yes	No
Full retention of legal sized regulated groundfish	No	Yes	Yes
Species Trip Limits for regulated groundfish	Yes	No	No
GB Seasonal Closure - May	Yes	No	No
GOM Rolling Closures	Yes	No	No
Year-round Closed Areas	Yes	Yes	Yes

4.0 AFFECTED HUMAN ENVIRONMENT

4.1 Physical Environment

Amendment 13 included a thorough description of the physical environment of the Northeast multispecies fishery, including oceanographic and physical habitat conditions in the Gulf of Maine – Georges Bank region and the area south of New England. Some of the information presented in this section was originally included in the EA for the Omnibus EFH Amendment (NEFMC 1998a). The Northeast Shelf Ecosystem (Figure 3) has been described as including the area from the Gulf of Maine south to North Carolina, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream (Sherman et al. 1996). The continental slope of this region includes the area east of the shelf, out to a depth of 2000 m. A number of distinct sub-systems comprise the region, including the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. Occasionally another subsystem, Southern New England, is described; however, Amendment 13 incorporated the distinctive features of this region into the descriptions of Georges Bank and the Mid-Atlantic Bight. The following summary highlights the major elements of the physical environment discussed in Amendment 13.

The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. Highly productive, well-mixed waters and strong currents characterize it. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley and in areas of glacially rafted hard bottom.

The broad-scale hydrography of the Gulf of Maine – Georges Bank region is strongly influenced by variation in the major water mass fluxes into the Gulf of Maine. The two key sources of inflows to the Gulf of Maine are Scotian Shelf water, which is relatively cool and fresh, and slope water, which is relatively warm and more saline. The volume ratio of Scotian Shelf water to slope water was roughly 1:2 during the 1980s, while during the 1990s, the volume ratio has been roughly 2:1 (Pers. Comm. Dr. David Mountain, Northeast Fisheries Science Center, 166 Water Street, Woods Hole, MA 02543). As a result of these broad-scale changes in inputs, water salinity has been lower in the Gulf of Maine during the 1990s.

Changes in the relative salinity of the Gulf of Maine have been indexed by salinity anomalies on the northwest flank of Georges Bank during 1975-2001. The observed salinity anomaly index shows cyclic variation on a 3-5 year time scale. During the 1990s, the salinity anomaly index has been low. In particular, salinity was very low during the 1996-1999 period. Since 1999, the salinity index has returned to normal levels. Based on some recent research, it appears that when salinity is low during autumn, chlorophyll levels in the subsequent spring tend to be higher than average, indicating higher primary production in the Gulf of Maine. Whether this higher primary production funnels upward through the food web to improve growth of commercially exploited fishes is not known, however.

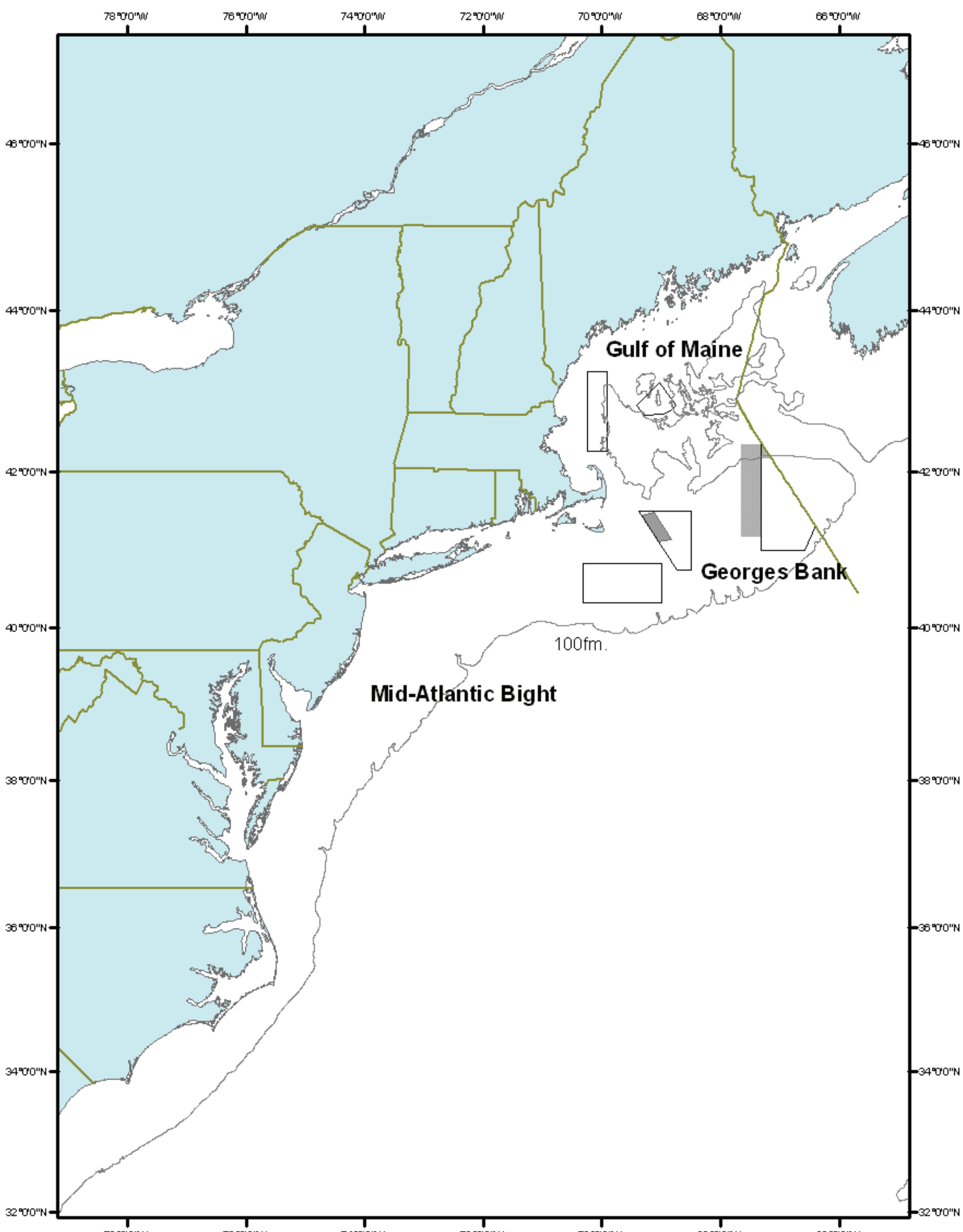
During 1998, there was an unusual influx of Labrador slope water (LSW) into the Gulf of Maine (Pers. Comm. Dr. David Mountain, Northeast Fisheries Science Center, 166 Water Street, Woods Hole, MA 02543). The event began in January and was detectable through the autumn of 1998. Labrador slope water is cooler and fresher than the "normal" water mass of slope water that flows into the Gulf. Thus, the influx of LSW reduced water temperatures, on average, in 1998. This event was also notable because it was the first time since the 1960s that a LSW mass was observed in the Gulf of Maine. The unusual influx of LSW likely corresponds to a delayed response of local ocean conditions to the dramatic change in the North Atlantic Oscillation Index, a broad-scale measure of winter atmospheric pressure, during 1995-1996.

Interestingly, recruitment of several groundfish stocks in the Gulf of Maine was above recent average levels in 1998. In particular, the 1998 year classes of white hake, American plaice, witch flounder, and Gulf of Maine cod were larger than might be expected given recent low levels of recruitment. In addition, the 1998 and 1999 year classes of Georges Bank haddock were large in comparison to recent levels. Overall, it appears that the LSW event of 1998 may have had a positive effect on larval survival of several groundfish stocks, as measured by recruitment estimates taken from stock assessments.

While fishing activity under Category A DAS and the Category B (regular) DAS program can occur through the geographic range of the fishery, the CAI Hook Gear Haddock SAP and the Eastern U.S./Canada Haddock SAP are limited to two well-defined areas. The CAI Hook Gear Haddock SAP takes place in the northwestern corner of CAI. Depths in this area generally range from fifty to eighty fathoms, though there are some shallower depths along the southern and southeastern boundaries. The sediment in most of this area is gravelly sand, with some small patches that are primarily sand in the northwest and southeast corners. While there are some gravel areas in CAI, they are outside of the SAP area. The total area for the SAP is 221 sq. nm., while the area for CAI is 1,148 sq. nm.

The Eastern U.S./CA Area Haddock SAP takes place in and near CAII. Only a small portion of the SAP – 45 sq. nm., only four percent of the total SAP area – is actually inside CAII (total area 2,650 sq. nm). Depths in the area of the SAP range from under ten fathoms on several ridges to the west of CAII, to over 110 fathoms at the northern end of the area. Much of the sediment in the area is sand. There are, however, a series of gravel and/or gravelly sand ridges that run northwest to southeast in the middle of the area west of CAII. There is also an area of mud in the deep water at the northwestern corner.

Figure 3 - U.S. Northeast Shelf Ecosystem, showing multispecies year round mortality closed areas and current SAP areas (shaded)



4.2 Biological Environment

The biological environment for the Northeast multispecies fishery is described in section 9.2 of Amendment 13. The management unit for the fishery is described in Amendment 7 and 9. No changes are proposed. Life history and habitat characteristics of the stocks managed by this FMP can be found in the Essential Fish Habitat source documents (series) published as NOAA Technical Memorandums and available at http://www.nefsc.noaa.gov/nefsc/habitat/efh/. This section described stock status for the regulated groundfish stocks, monkfish, and skates, the species most likely to be affected by the proposed management measures.

4.2.1 Regulated Groundfish Stock Status

4.2.1.1 Summary of Groundfish Stock Status in 2004

The 2005 Groundfish Assessment Review Meeting (NEFSC 2005) was held in August 2005 to update the status of nineteen New England groundfish stocks through 2004. This section summarizes the stock status in terms of biomass (B) and fishing mortality (F) as reported in NEFSC (2005), with the exception of Gulf of Maine cod which includes a minor revision to the assessment made in October 2005. Note that, for the Georges Bank yellowtail flounder stock, results of two assessment models (Base Case and Major Change) are presented. Both Georges Bank yellowtail flounder models were put forward by the 2005 Transboundary Resource Assessment Committee to show the uncertainty in stock status under alternative model scenarios.

The GARM 2005 results show which groundfish stocks were overfished or experiencing overfishing in 2004 (Table 3). A total of 13 stocks were overfished (B less than ½ B_{MSY}) while 6 stocks were not overfished. Similarly, a total of 8 stocks were experiencing overfishing (F greater than F_{MSY}) while 10 stocks were not experiencing overfishing. Overfishing status of one stock, Atlantic halibut, was unknown. Overall, the majority of groundfish stocks were overfished (68%) in 2004 while most stocks were not experiencing overfishing (53%).

Retrospective changes in estimates of spawning biomass and fishing mortality were also evaluated in GARM 2005 for a total of 9 age-structured stock assessments. In this evaluation, assessment models were rerun after deleting the most recent year of data and corresponding estimates of the current year spawning biomass and fishing mortality were compared. The average of the one-year retrospective changes calculated for the five pairs of years 2004/2003, 2003/2002, 2002/2001, 2001/2000, and 2000/1999 was used to judge whether a retrospective pattern was apparent. Average changes of less than ±10% were considered to show no pattern. Average changes of ±10% to 20% were considered to exhibit a moderate retrospective pattern while changes over ±20% were considered to have a strong retrospective pattern. A positive retrospective pattern indicated that, on average, the estimated value of spawning biomass or fishing mortality increased when another year of data was added to the assessment. Last, note that the appearance of a retrospective pattern in the past provides no guarantee that the pattern will persist in the future.

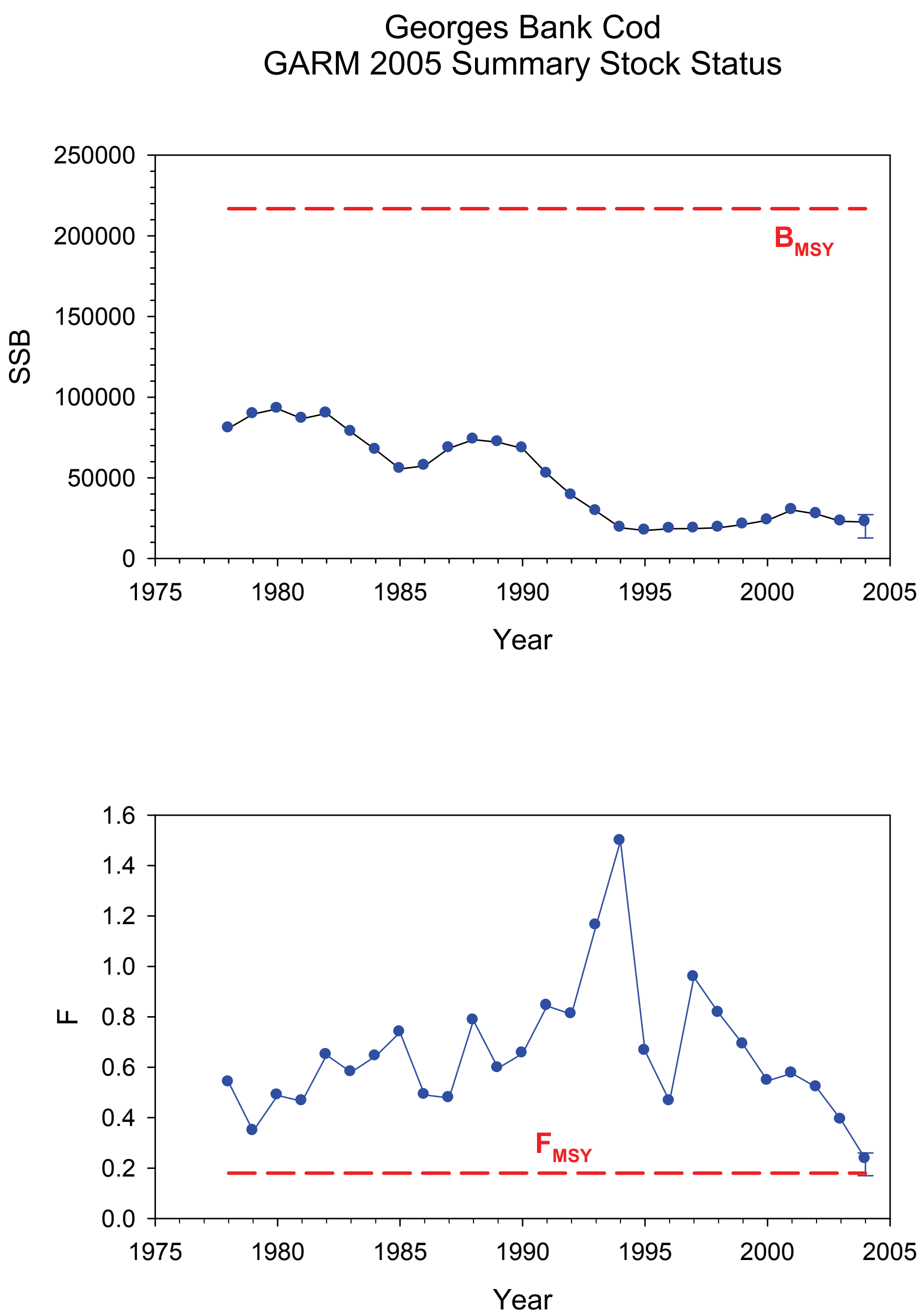
Table 3 - Summary of groundfish stock status in 2004. Biomass values are in metric tons (with exception of index-based stocks noted below).

Stock	Estimated F in 2004	Fmsy or proxy	Percent F Reduction to Fmsy	Biomass in 2004	Bmsy or Proxy	Percent Change in Biomass to achieve Bmsy	2004 Overfished Status	2004 Overfishing Status
Georges Bank cod	0.24	0.18	25%	22564	216800	861%	Overfished	Overfishing
Georges Bank haddock	0.24	0.26	none	116800	250300	114%	Overfished	No Overfishing
Georges bank Yellowtail	1.19 (Base Case)	0.25	376%	15700 (Base Case)	58800	275%	Overfished	Overfishing
	1.75 (Major Change)		600%	8500 (Major Change)		592%	Overfished	Overfishing
Southern New England-Mid Atlantic Yellowtail	0.99	0.26	74%	695	69500	9900%	Overfished	Overfishing
Cape Cod-Gulf of Maine yellowtail	0.75	0.17	77%	1100	12600	1045%	Overfished	Overfishing
Gulf of Maine cod	0.58	0.23	60%	20549	82800	303%	Overfished	Overfishing
Witch flounder	0.2	0.23	none	21200	25248	19%	Not Overfished	No Overfishing
American plaice	0.15	0.17	none	14149	28600	102%	Overfished	No Overfishing
Gulf of Maine winter flounder	0.13	0.43	none	3436	4100	19%	Not Overfished	No Overfishing
Southern New England-Mid-Atlantic winter flounder	0.38	0.32	16%	3938	30100	664%	Overfished	Overfishing
Georges Bank winter flounder (see note)	1.86	1	46%	6692	10100	51%	Not Overfished	Overfishing
white hake	1.18	0.55	53%	3.01	7.7	156%	Overfished	Overfishing
pollock	3.51	5.88	none	1.99	3.00	51%	Not Overfished	No Overfishing
Acadian redfish	0.002	0.04	none	175800	236700	35%	Not Overfished	No Overfishing
ocean pout	0.003	0.31	none	1.78	4.9	175%	Overfished	No Overfishing
northern windowpane	0.02	1.11	none	0.78	0.94	21%	Not Overfished	No Overfishing
southern windowpane	0.44	0.98	none	0.1	0.92	820%	Overfished	No Overfishing
Gulf of Maine haddock	0.18	0.23	none	5.79	22.17	283%	Overfished	No Overfishing
Atlantic halibut			no estimate	288	5400	1775%	Overfished	Unknown

Fmsy and Bmsy index values are listed for Gulf of Maine haddock, pollock, white hake, ocean pout, southern and northern windowpane, and Atlantic halibut. For GB winter flounder, values shown are ratio of F/Fmsy.

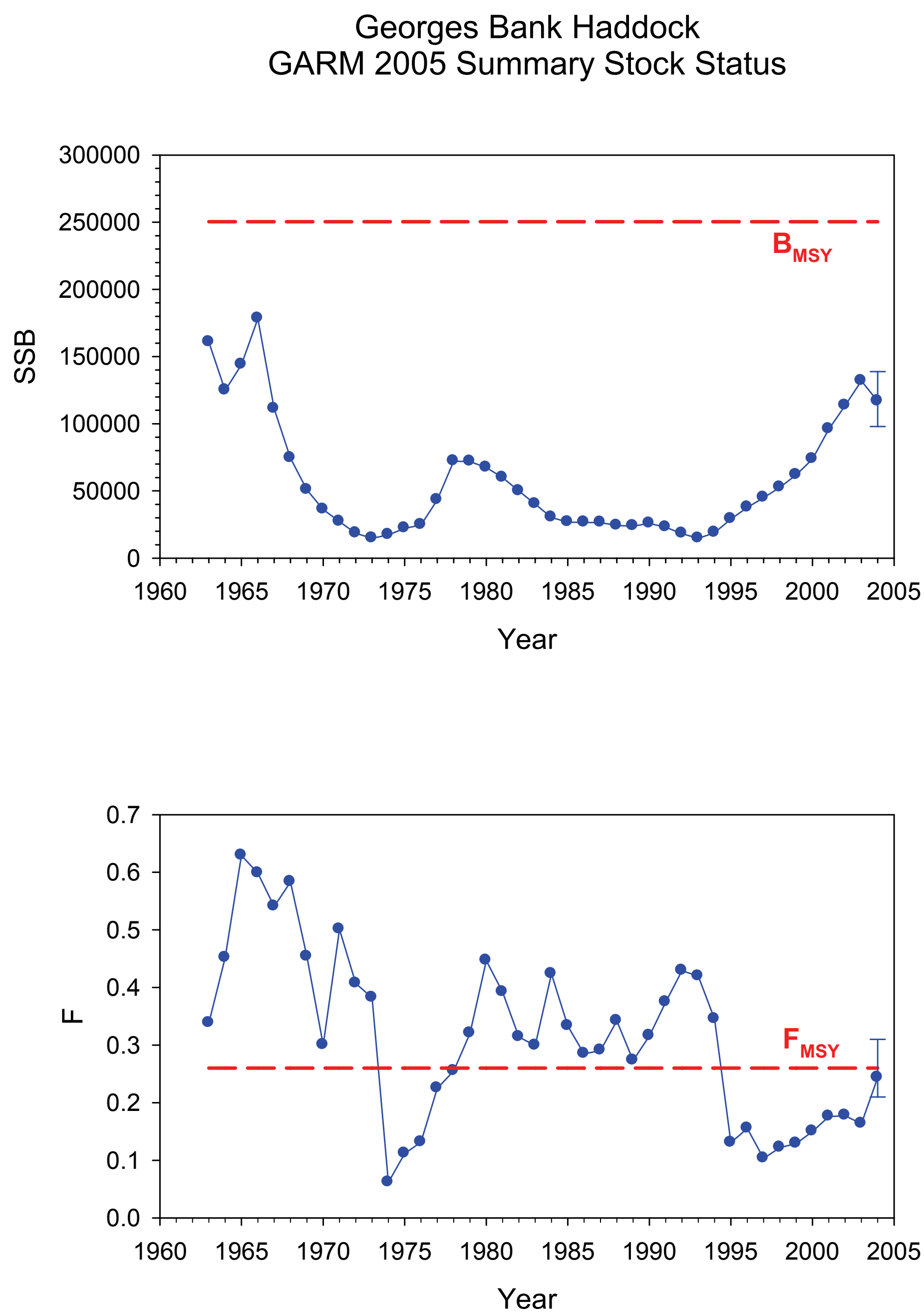
A. Georges Bank cod was overfished and was experiencing overfishing in 2004. Spawning biomass has been relatively low and stable since 1994. Fishing mortality has been decreasing since 1997. SSB estimates have no retrospective pattern; F estimates have a strong positive retrospective pattern.

Figure 4 - Georges Bank cod spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1978-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



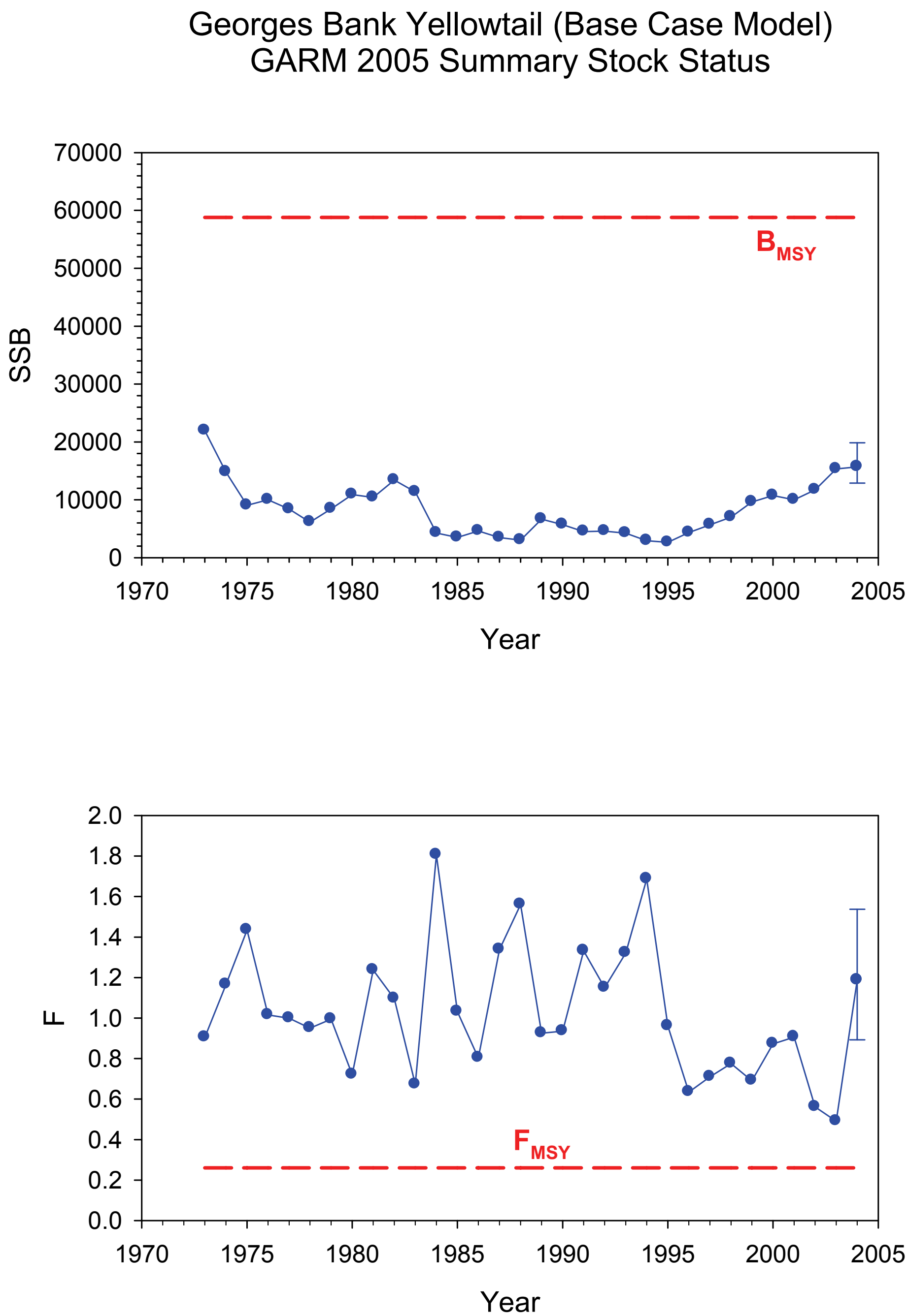
<u>B. Georges Bank haddock was overfished and was not experiencing overfishing in 2004.</u> Spawning biomass has increased since 1993, with the exception of 2004. Fishing mortality has had an increasing trend since 1997. SSB and F estimates have no retrospective pattern.

Figure 5 - Georges Bank haddock spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1963-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



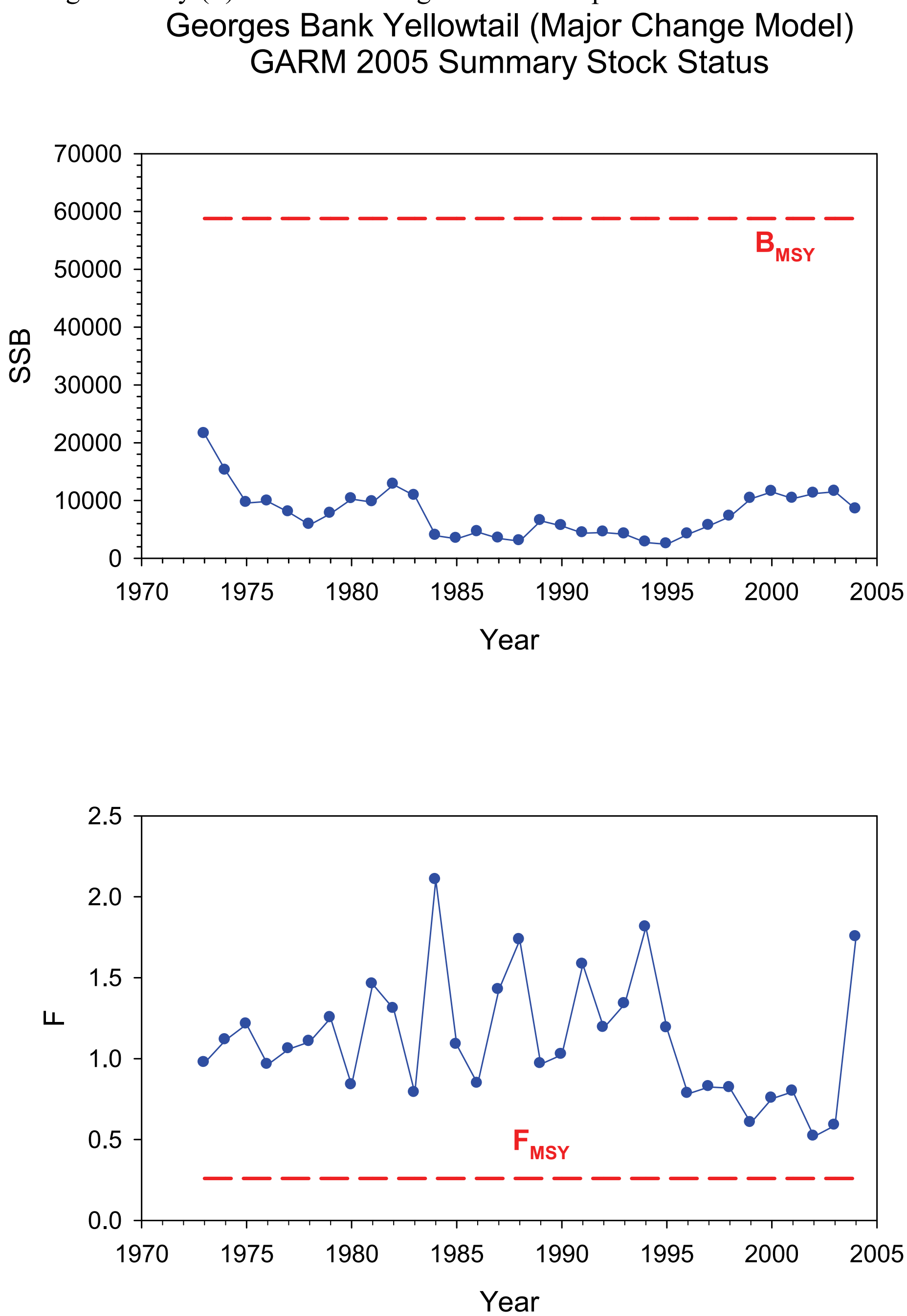
C1. Georges Bank yellowtail flounder was overfished and was experiencing overfishing in 2004 under the Base Case Model. Spawning biomass has steadily increased since 1995. Fishing mortality has fluctuated above F_{MSY} since 1996 with a substantial increase in 2004. SSB estimates have a strong negative retrospective pattern; F estimates have a strong positive retrospective pattern.

Figure 6 - Georges Bank yellowtail flounder Base Case Model spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1973-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



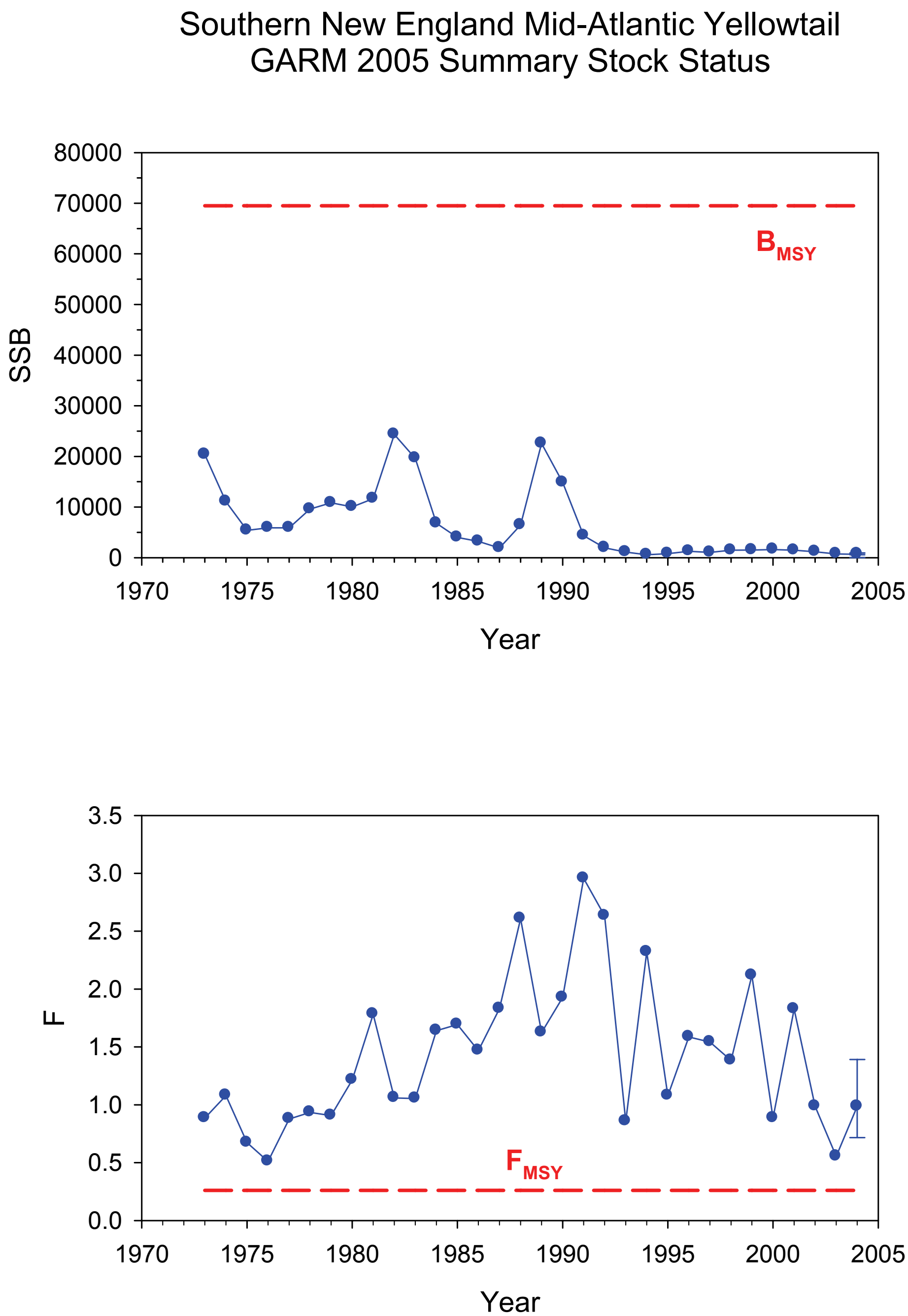
<u>C2. Georges Bank yellowtail flounder was overfished and was experiencing overfishing in 2004 under the Major Change Model.</u> Spawning biomass increased from 1995 to 2000 and fluctuated since then. Fishing mortality has had a decreasing trend since 1994 with the exception of a substantial increase in 2004. SSB and F estimates have no retrospective pattern.

Figure 7 - Georges Bank yellowtail flounder Major Change Model spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1973-2004 reported in GARM 2005.



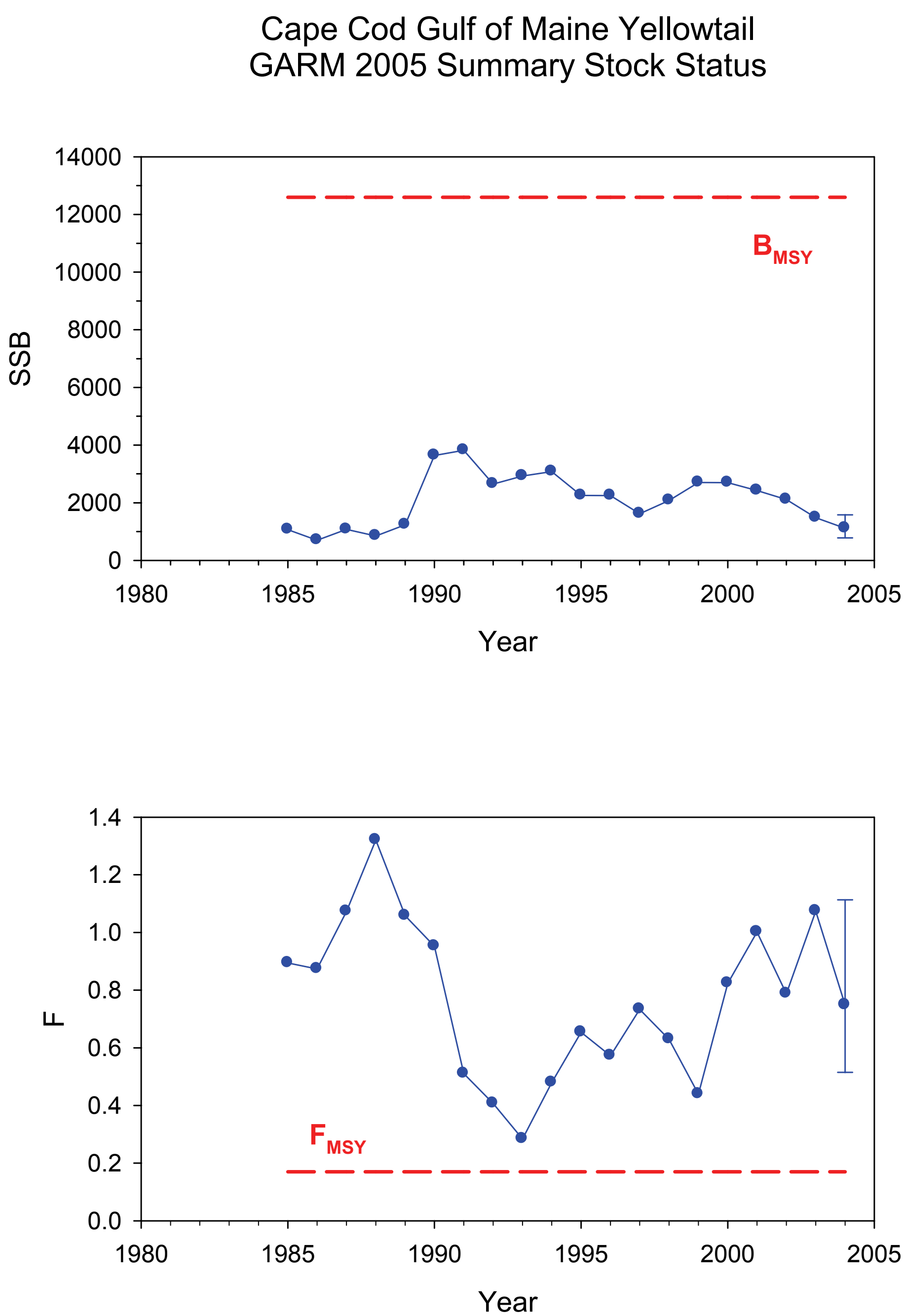
D. Southern New England/Mid-Atlantic yellowtail flounder was overfished and was experiencing overfishing in 2004. Spawning biomass has been low with no trend since 1992. Fishing mortality has had a decreasing trend since 1991 but remains well above F_{MSY}. SSB estimates have a moderate negative retrospective pattern; F estimates have a strong positive retrospective pattern.

Figure 8 - Southern New England/Mid-Atlantic yellowtail flounder spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1973-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



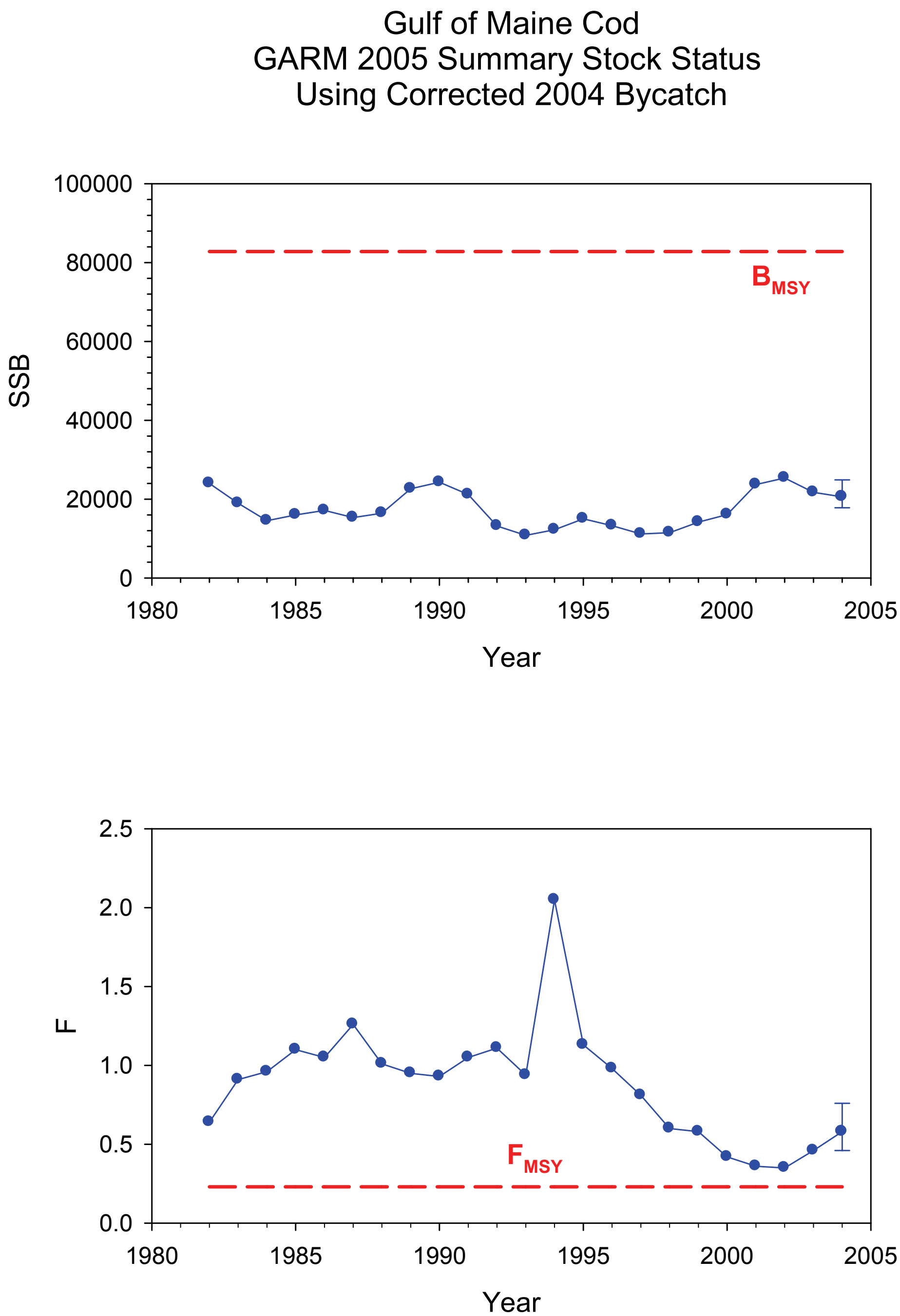
E. Cape Cod/Gulf of Maine yellowtail flounder was overfished and was experiencing overfishing in 2004. Spawning biomass has decreased since 2000. Fishing mortality has had an increasing trend since 1993, although F decreased in 2004. SSB estimates have a moderate negative retrospective pattern; F estimates have a moderate positive retrospective pattern.

Figure 9 - Cape Cod/Gulf of Maine yellowtail flounder spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1985-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



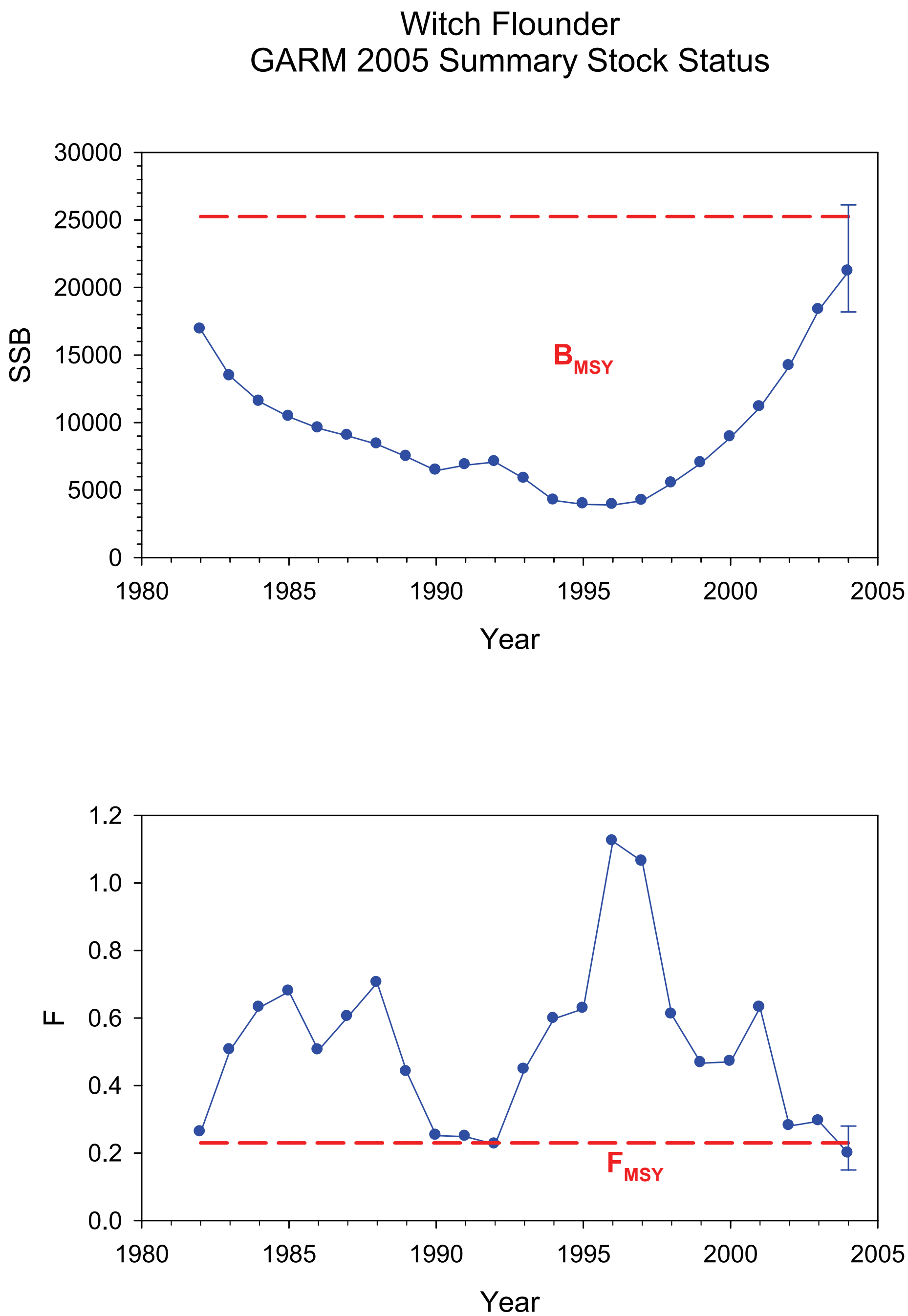
<u>F. Gulf of Maine cod was overfished and was experiencing overfishing in 2004.</u> Spawning biomass increased during 1998-2002 with a moderate decrease since 2002. Fishing mortality decreased from 1994 to 2002 but has increased since then. SSB and F estimates have no retrospective pattern.

Figure 10 - Gulf of Maine cod spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1982-2004 using GARM 2005 data and corrected 2004 bycatch estimate along with 80% confidence intervals for 2004 estimates.



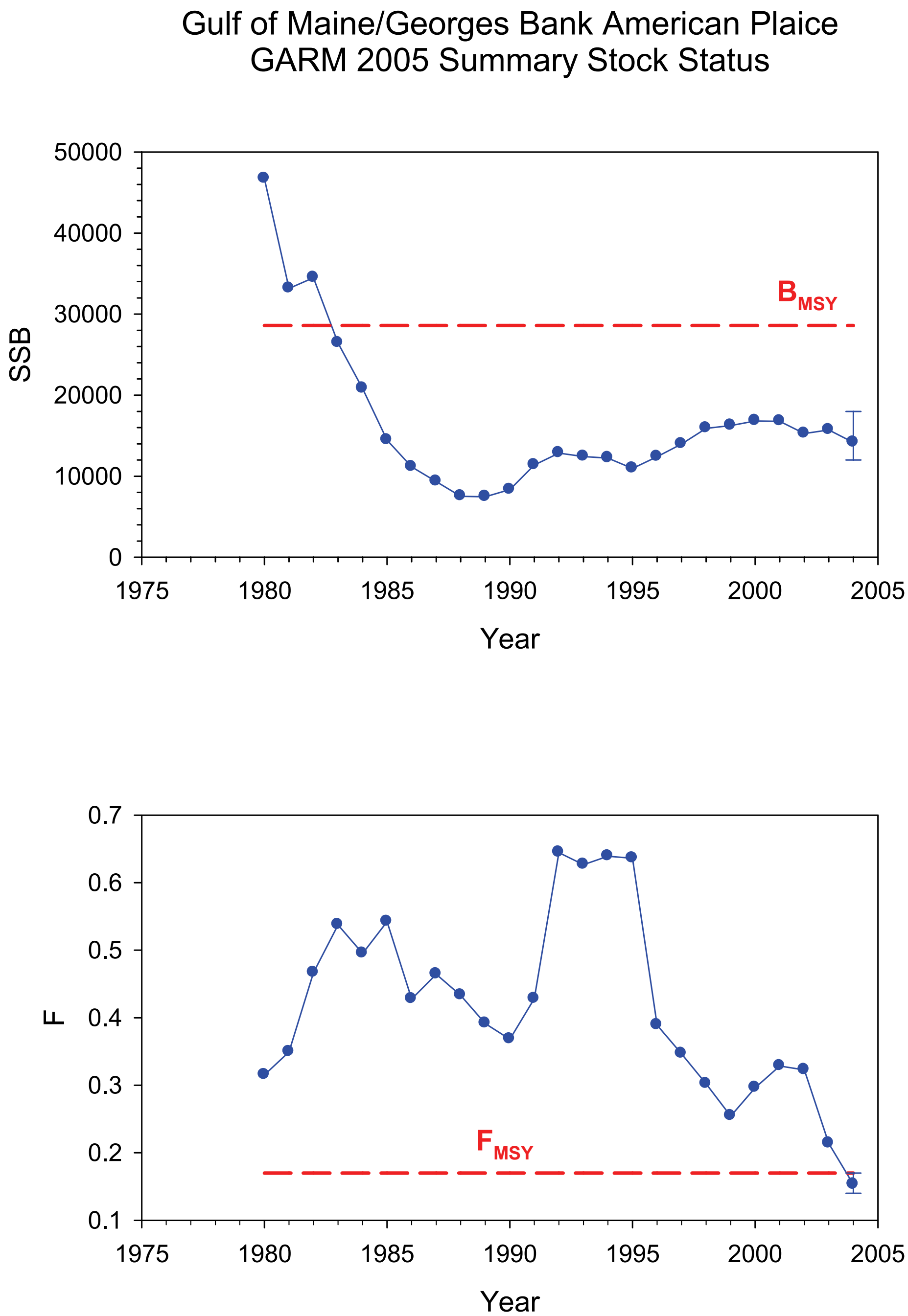
<u>G. Witch flounder was not overfished and was not experiencing overfishing in 2004.</u> Spawning biomass has increased since 1996 to a record high in 2004. Fishing mortality has decreased since 1996. SSB estimates have a moderate negative retrospective pattern; F estimates have a strong positive retrospective pattern.

Figure 11 - Witch yellowtail flounder spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1982-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



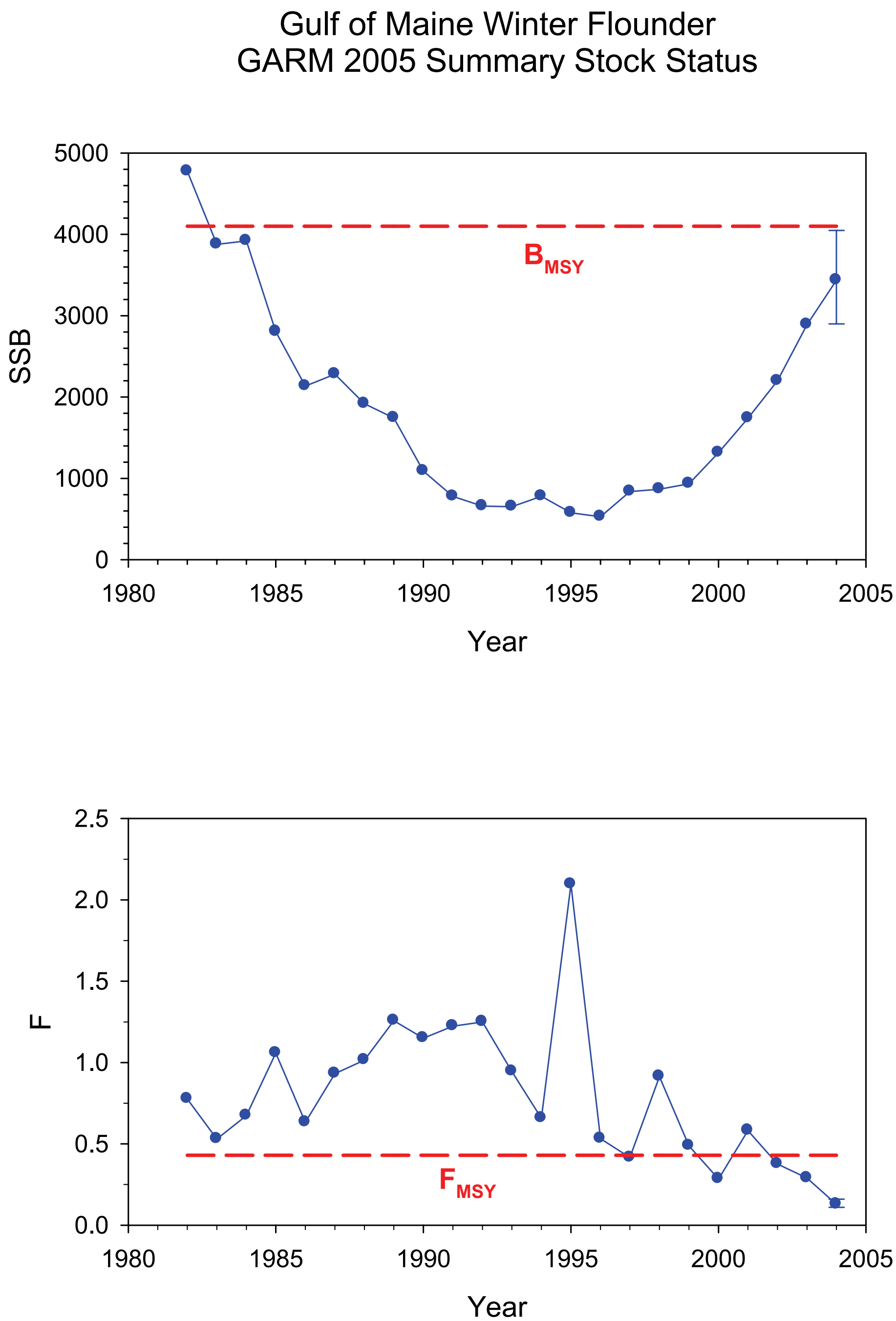
H. American plaice was overfished and was not experiencing overfishing in 2004. Spawning biomass has been low with no trend since 1998. Fishing mortality has had a decreasing trend since 1995. SSB and F estimates have no retrospective pattern.

Figure 12 - American plaice spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1980-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



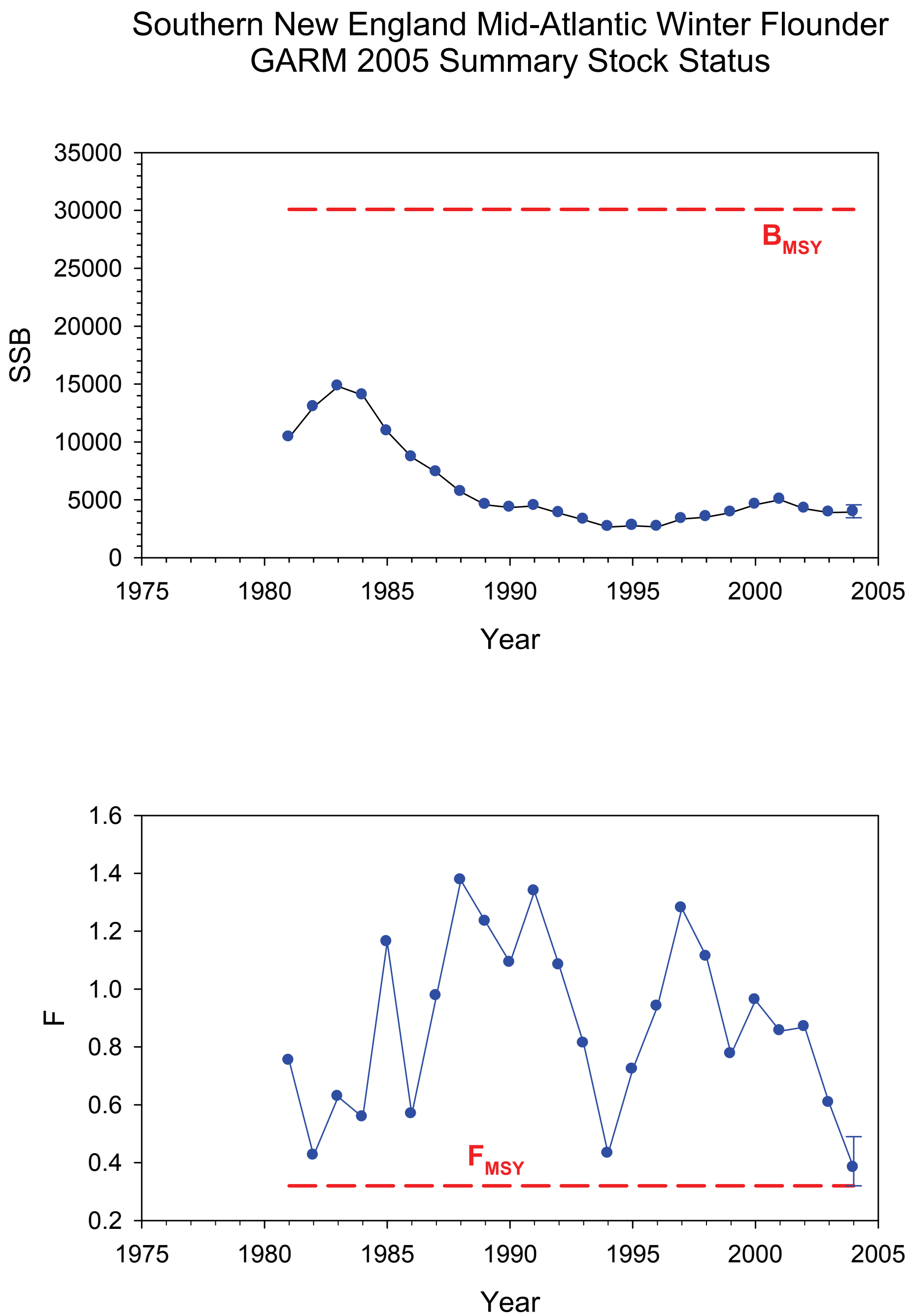
I. Gulf of Maine winter flounder was not overfished and was not experiencing overfishing in 2004. Spawning biomass has increased since 1996 and is approaching B_{MSY}. Fishing mortality has decreased since 2001. SSB estimates have a strong negative retrospective pattern; F estimates have a strong positive retrospective pattern.

Figure 13 - Gulf of Maine winter flounder spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1982-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



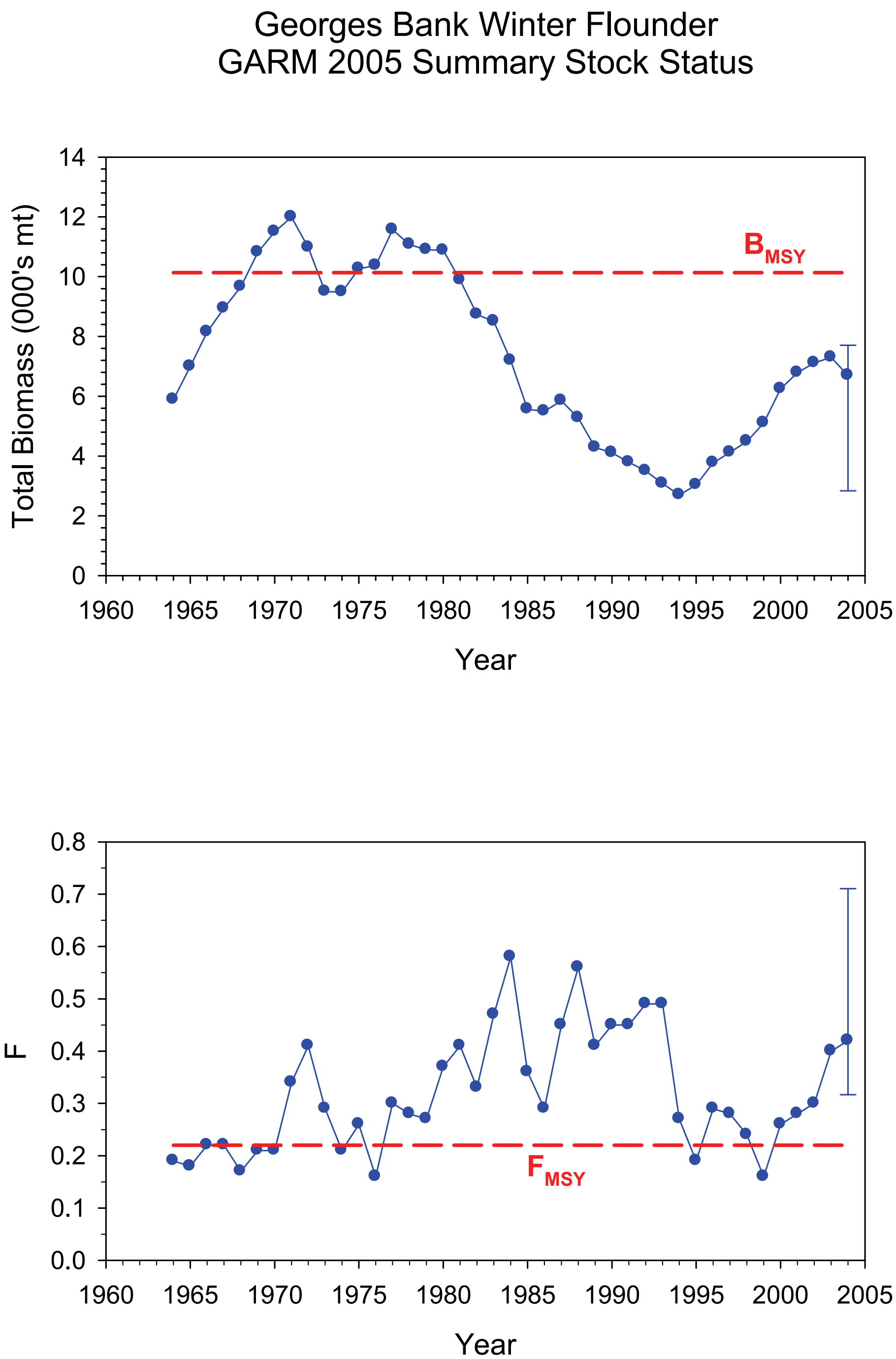
J. Southern New England/Mid-Atlantic winter flounder was overfished and was experiencing overfishing in 2004. Spawning biomass has been low and stable since the late-1980s. Fishing mortality has had a decreasing trend since 1997. SSB estimates have a moderate negative retrospective pattern; F estimates have a strong positive retrospective pattern.

Figure 14 - Southern New England/Mid-Atlantic winter flounder spawning stock biomass (SSB, mt) and fishing mortality (F) estimates during 1980-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



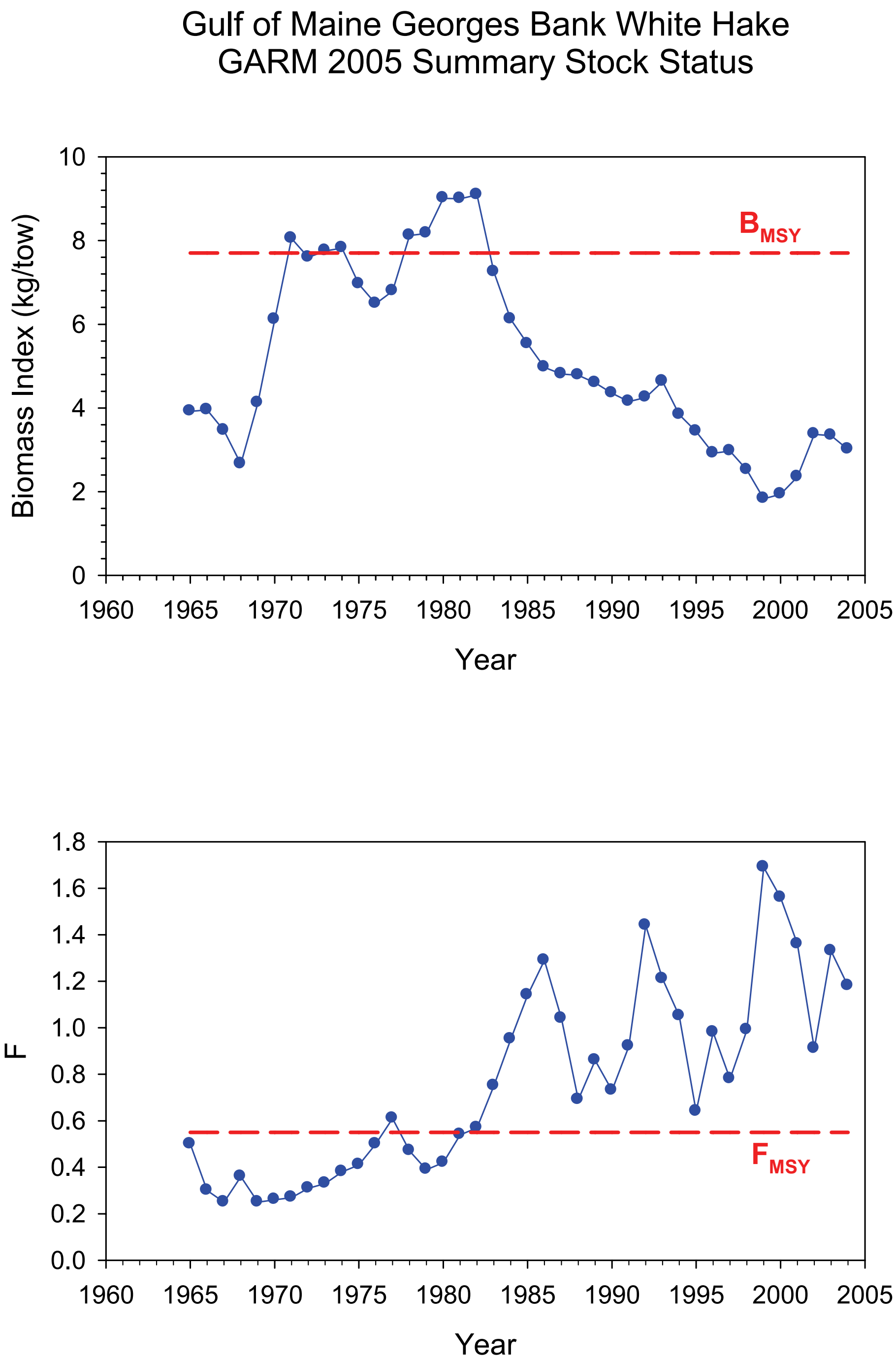
K. Georges Bank winter flounder was not overfished and was experiencing overfishing in 2004. Biomass has increased since 1994, with the exception of 2004. Fishing mortality has had an increasing trend since 1999. This figure shows fishing mortality as a numerical estimate rather than the ratio of F/Fmsy .

Figure 15 - Georges Bank winter flounder total biomass (B, 1,000's mt) and fishing mortality (F) estimates during 1963-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates.



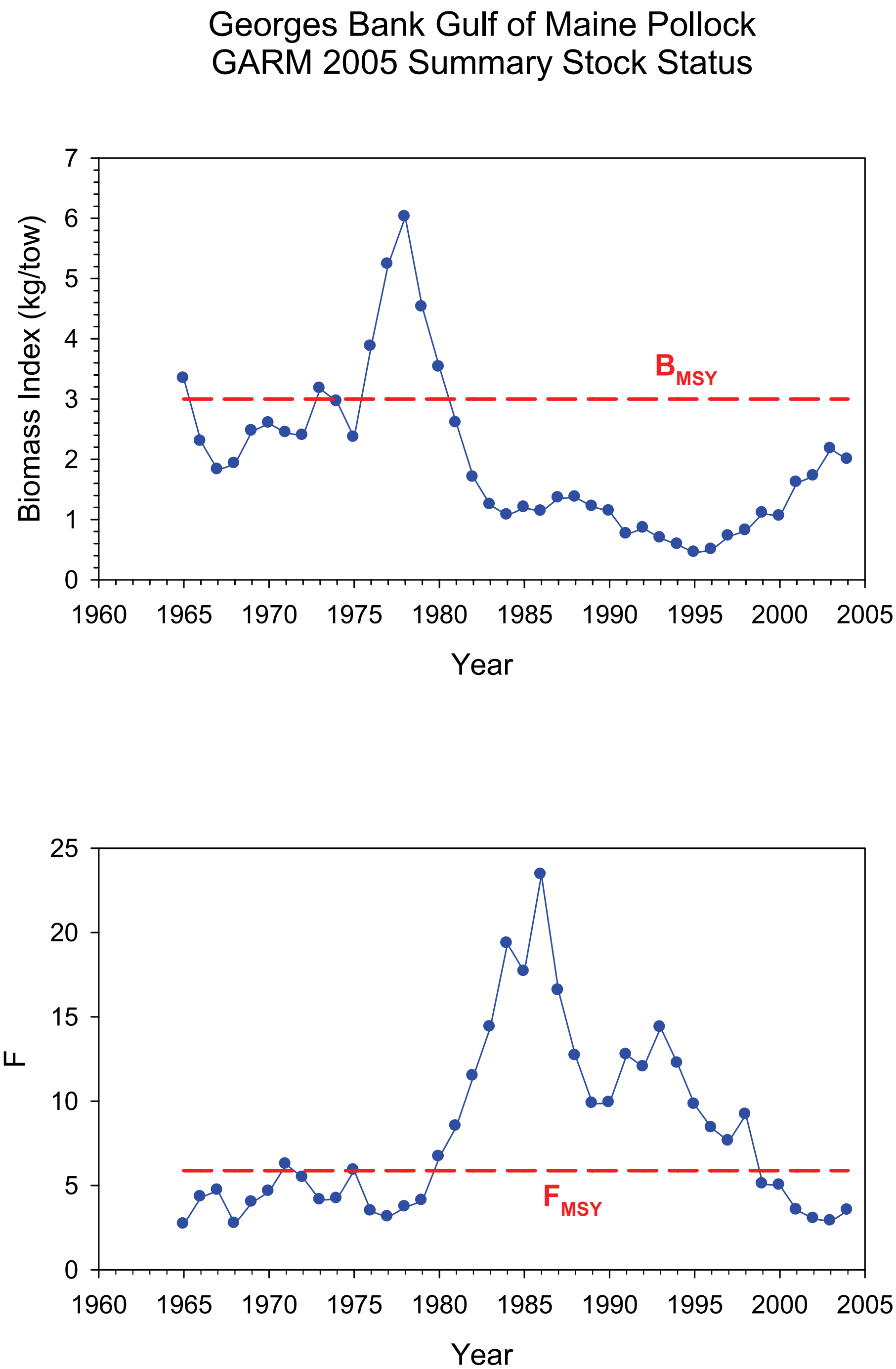
L. White hake was overfished and was experiencing overfishing in 2004. Biomass increased during 1999-2002 and decreased slightly in 2003-2004. Fishing mortality has fluctuated above F_{MSY} since 1982.

Figure 16 - Georges Bank/Gulf of Maine white hake biomass (B, kg/tow) and exploitation rate (F) indices during 1963-2004 reported in GARM 2005.



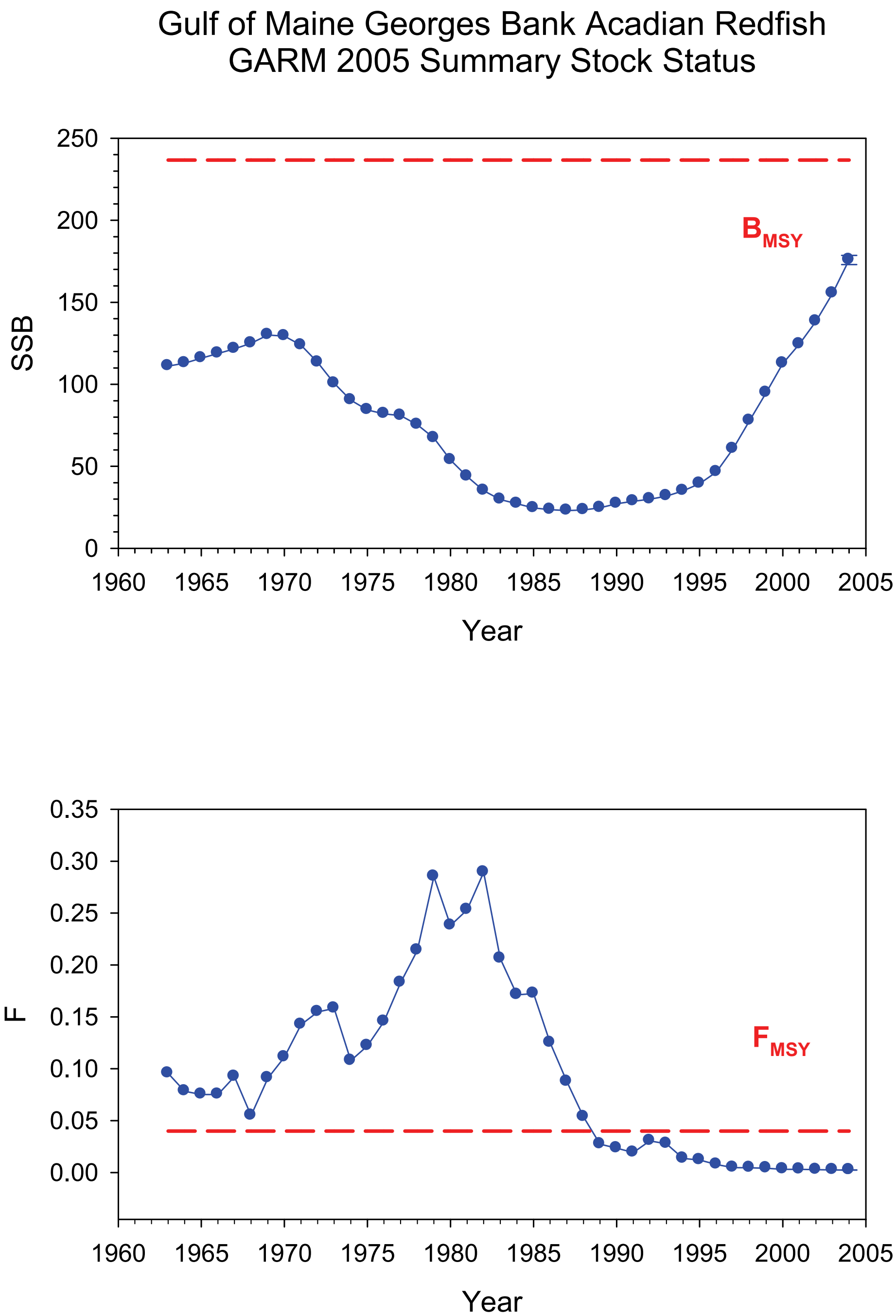
M. Pollock was not overfished and was not experiencing overfishing in 2004. Biomass has increased since 1995, with the exception of 2004. Fishing mortality has decreased since 1993, with the exception of 2004.

Figure 17 - Georges Bank/Gulf of Maine pollock biomass (B, kg/tow) and exploitation rate (F) indices during 1963-2004 reported in GARM 2005.



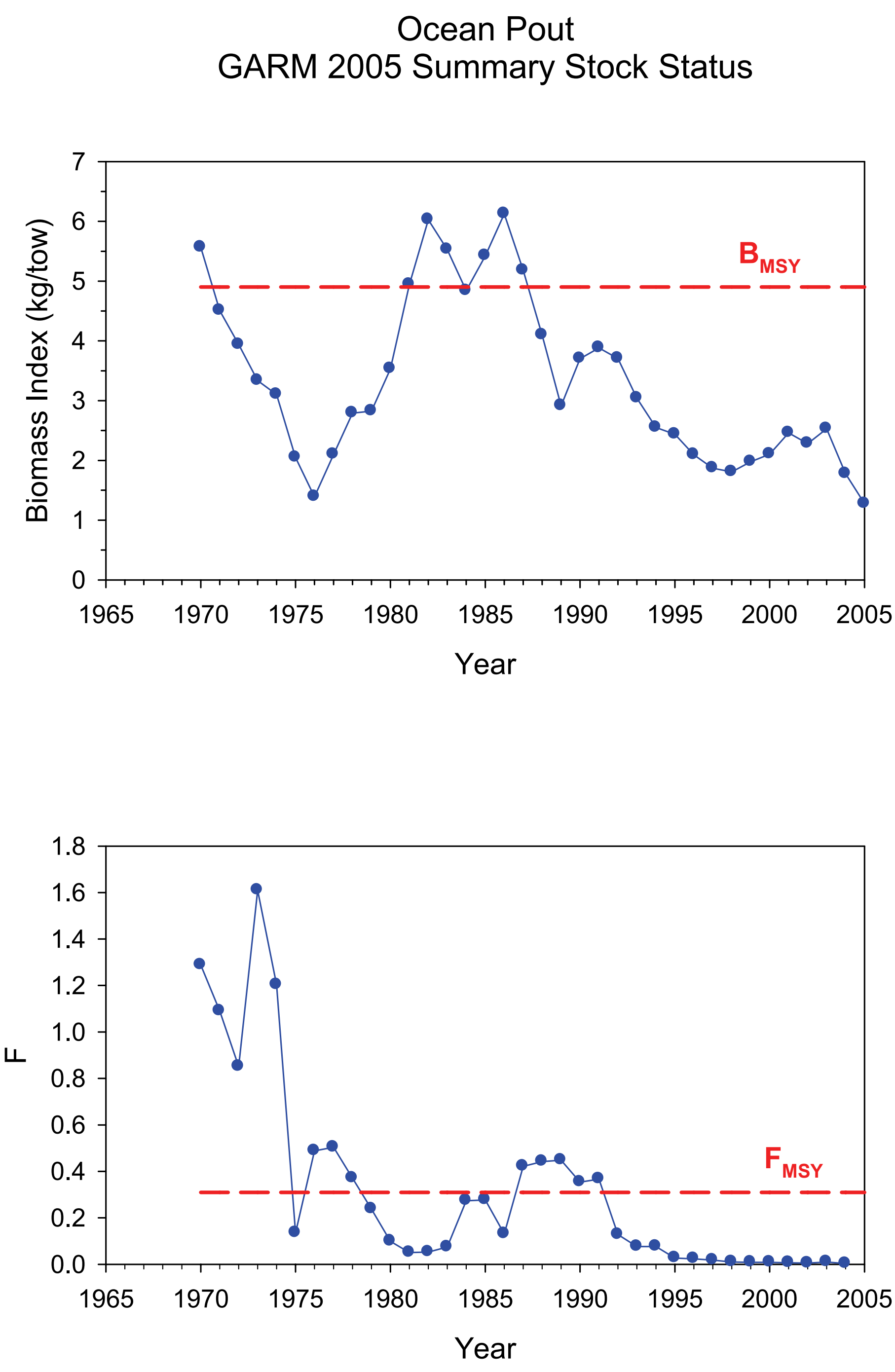
<u>N. Acadian redfish was not overfished and was not experiencing overfishing in 2004.</u> Spawning biomass has increased substantially since the mid-1990s. Fishing mortality has been below F_{MSY} since 1989.

Figure 18 - Gulf of Maine/Georges Bank Acadian redfish spawning stock biomass (SSB. 1,000's mt) and fishing mortality (F) estimates during 1963-2004 reported in GARM 2005 along with 80% confidence intervals for 2004 estimates..



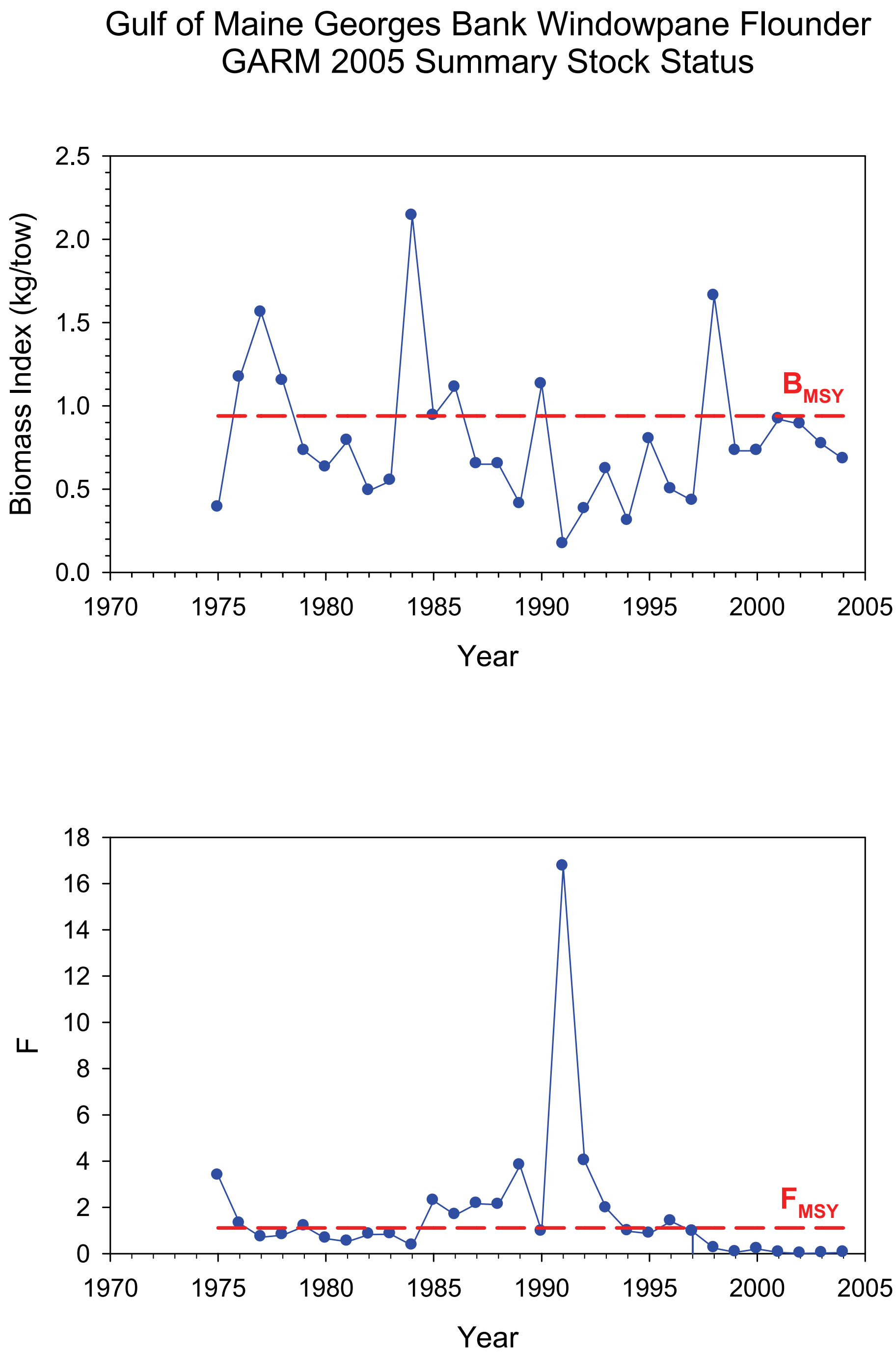
O. Ocean pout was overfished and was not experiencing overfishing in 2004. Biomass has had a decreasing trend since 1986. Fishing mortality has been well below F_{MSY} since 1992.

Figure 19 - Ocean pout biomass (B, kg/tow) and exploitation rate (F) indices during 1968-2005 reported in GARM 2005.



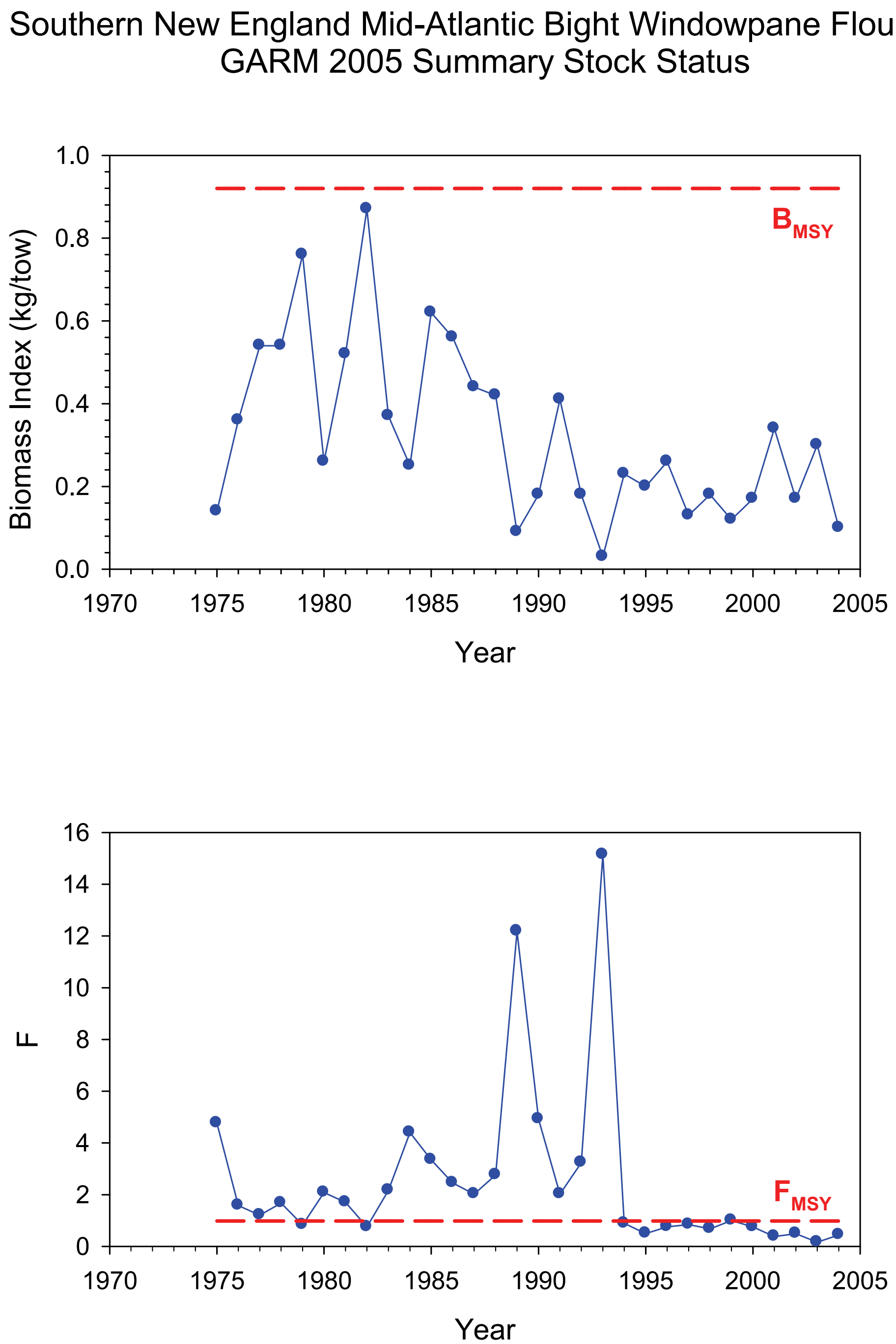
P. Northern windowpane flounder was not overfished and was not experiencing overfishing in 2004. Biomass has decreased since 2001. Fishing mortality has been well below F_{MSY} since 1998.

Figure 20 - Gulf of Maine/Georges Bank windowpane flounder biomass (B, kg/tow) and exploitation rate (F) indices during 1975-2004 reported in GARM 2005.



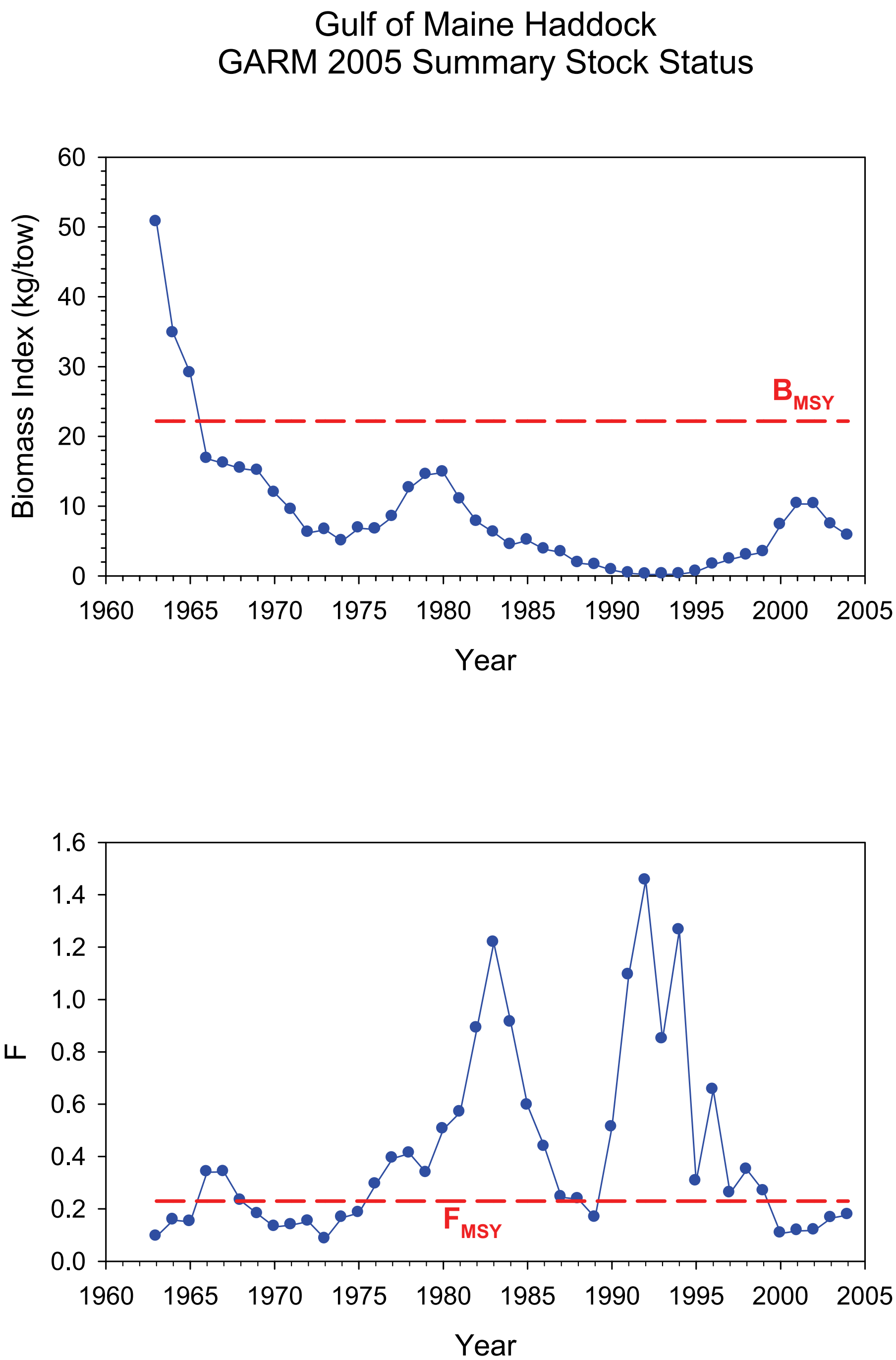
Q. Southern windowpane flounder was overfished and was not experiencing overfishing in 2004.
Biomass has been low and fluctuated without trend since the late-1980s. Fishing mortality has been at or below F_{MSY} since 1994.

Figure 21 - Southern New England/Mid-Atlantic windowpane flounder biomass (B, kg/tow) and exploitation rate (F) indices during 1975-2004 reported in GARM 2005.



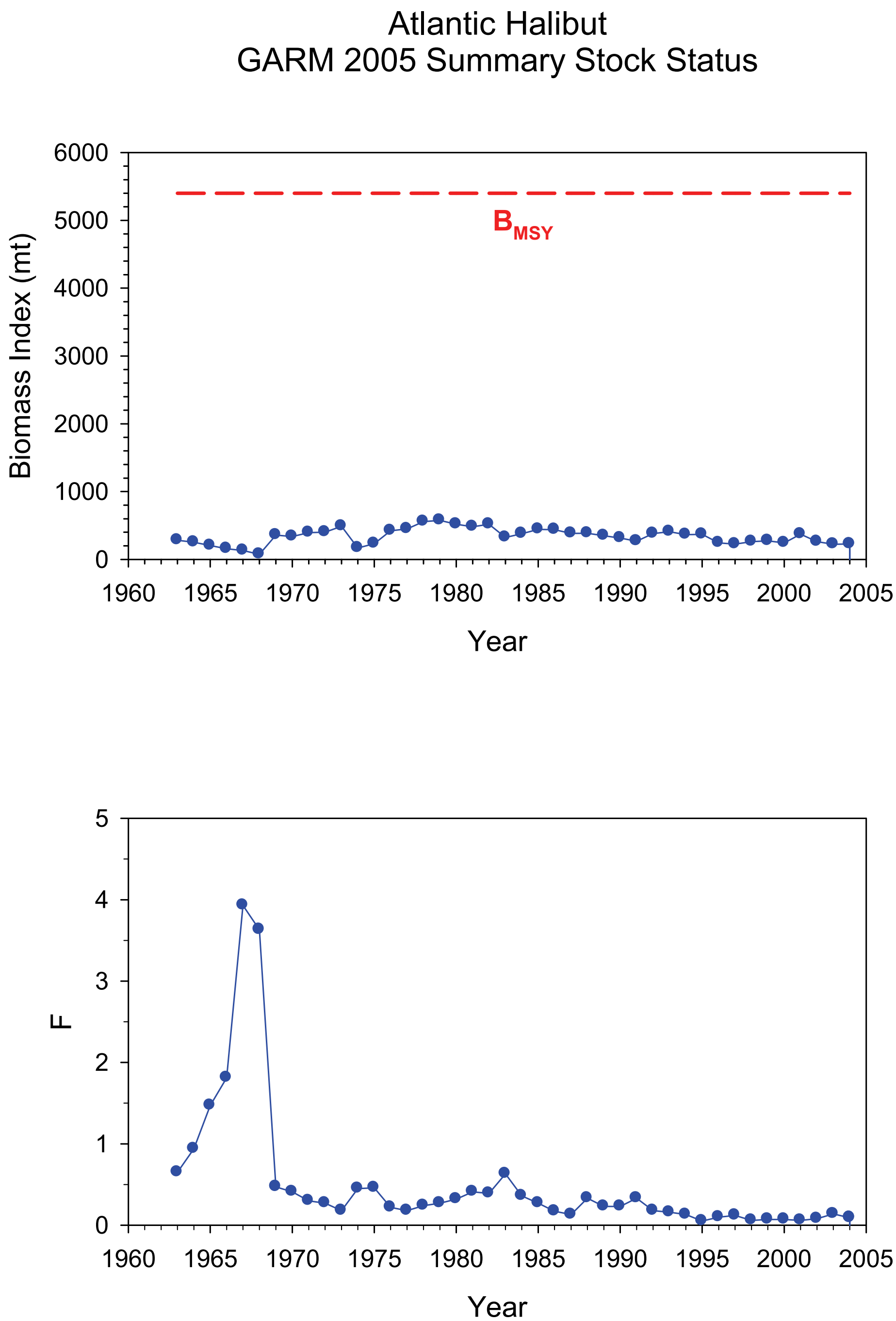
R. Gulf of Maine haddock was overfished and was not experiencing overfishing in 2004. Biomass increased during 1994-2002 and has decreased since then. Fishing mortality decreased from 1992-2000 and has increased since then.

Figure 22 - Gulf of Maine haddock biomass (B, kg/tow) and exploitation rate (F) indices during 1963-2004 reported in GARM 2005.



S. Atlantic halibut was overfished in 2004. It is unknown whether the stock was experiencing overfishing in 2004. Biomass has been stable and well below B_{MSY} since 1963. Fishing mortality has had a decreasing trend since the early 1990s.

Figure 23 - Atlantic halibut biomass (B, mt) and exploitation rate (F) indices during 1963-2004 reported in GARM 2005.



4.2.1.2 Estimates of Stock Status in 2005

Since GARM II (NEFSC 2005) provided estimates of fishing mortality for calendar year 2004, the results do not reflect the impacts of Amendment 13 management measures for a full year of implementation. The Groundfish PDT used the results of the GARM II and an estimate of catch in 2005 to determine fishing mortality for 2005.

Preliminary commercial landings were available for the first six months of the calendar year. Using this information, an estimate of calendar year catch was calculated for each stock based on the percentage of landings taken in the first six months in recent years. Since it is possible that Amendment 13 measures may affect the distribution of landings over the year, two percentages were used: an average over several years and the percentages in 2004. Using the two estimates, two estimates of landings for 2005 were developed. For stocks that include discards in the assessment results, these landings were increased by the discard to kept ratio reported in GARM II. For GOM cod and SNE/MA winter flounder the average recreational harvest over the last three years was added. The largest estimate of catch was then used in a short-term projection to estimate fishing mortality in CY 2005 for stocks that use an age-based assessment model. This approach is subject to the following uncertainties:

- Estimates of calendar year catch may be inaccurate due to a change in the seasonal distribution of catch. In recent years the percentage of the annual catch taken in the first six months has shown little variation, but this could change as the result of numerous factors, including regulatory changes.
- The GARM II annual discard to kept ratio reflects only eight months under Amendment 13 measures. Changes in the regulations may have increased or decreased discard ratios.
- Short-term projections are subject to several sources of uncertainty, including errors in the estimates of 2004 stock size and fishing mortality. The assessment of some stocks exhibits a retrospective pattern – that is, terminal year estimates of stock size and mortality are in error. In many cases, the pattern tends to under-estimate mortality in the terminal year. If fishing mortality in 2004 is under-estimated, then mortality in 2005 as estimated here may also be under-estimated.

The derived catch estimates are shown in Table 4, with the resulting estimate of fishing mortality in the final column. Mortality estimates were not developed with this method for the stocks assessed through index methods, or for GB winter flounder (assessed by a surplus production model). An estimate was not calculated for GOM winter flounder because GARM II (NEFSC 2005) recommended against short-term projections due to assessment uncertainty.

Table 4 – Derivation of estimated catch for CY 2005. Total catch incorporates Canadian and recreational catch, where appropriate

	Prelim. Landings, Jan-Jun				Jan-Jun Prelim Landings, Percent of Total		CY 2005 Projected Catch		Maximum estimate		
Stock	2004	2005	Discards as % of Landings	Estimated Catch, Jan-Jun CY 2005	Average, 2002-2004 (Column A)	2004 (Column B)	(based on Column A)	(based Column B)	US Commercial Catch, CY 2005	Projected Total Catch, CY 2005	Predicted CY 2005 F
GB Cod	2,458	1,862		1,862	68%	70%	2,738	2,660	2,738	3,498	0.16
GB Haddock	4,274	4,447	8%	4,798	63%	59%	7,616	8,133	8,133	23,533	0.18
GB Yellowtail(1)	3,106	1,396	9%	1,522	67%	50%	2,271	3,043	3,043	3,543	0.20
SNE/MA Yellowtail	78	85	76%	150	68%	47%	220	318	318	318	0.58
CC/GOM Yellowtail	491	373	16%	433	50%	61%	865	709	865	865	0.48
GOM Cod	1,360	1,489	23%	1,824	43%	37%	4,242	4,930	4,930	6,430	0.34
Witch Flounder	1,388	1,429	8%	1,542	52%	48%	2,965	3,212	3,212	3,212	0.13
Plaice	705	654	25%	816	48%	41%	1,699	1,989	1,989	1,989	0.14
GOM Winter Flounder	266	152		152	46%	48%	330	317	330	330	
SNE/MA Winter Flounder	631	489	2%	499	36%	38%	1,386	1,313	1,386	1,636	0.27
GB Winter Flounder	1,261	1,054		1,054	50%	42%	2,108	2,510	2,510	2,510	
White Hake	1,760	1,359	5%	1,427	49%	51%	2,912	2,798	2,912	2,912	
Pollock	2,348	2,835		2,835	50%	47%	5,670	6,032	6,032	6,032	
Redfish	177	305		305	53%	44%	575	693	693	693	.004
Ocean Pout				0							
GOM/GB Windowpane				0							
SNE/MAB Windowpane				0							
GOM Haddock	556	495		495	53%	58%	934	853	934	934	

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4.2.2 Monkfish Stock Status

4.2.2.1 Stock Assessment (SAW 40)

The Northeast Fisheries Science Center (NEFSC) held a monkfish stock assessment in the fall of 2004 (SAW 40). The data used in the 2004 assessment included NEFSC research survey data, data from the 2001 and 2004 Cooperative Monkfish Surveys, commercial fishery data from vessel trip reports, dealer landings records, and observer data. In summary, the Stock Assessment Review Committee concluded:

> *Based on existing reference points, the resource is not overfished in either stock management area (north or south). Fishing mortality rates (F) estimated from NEFSC and Cooperative survey data are currently not sufficiently reliable for evaluation of F with respect to the reference points.*

With respect to recruitment, the report noted evidence of increased recruitment in the NFMA during the 1990s, particularly for the 1999 year class. Conversely, the SAW 40 report noted that in the SFMA, recruitment appears to have fluctuated without trend during the 1990s. However, there are some indications that the 2002 year class in the SFMA may be above average.

In regards to estimates of stock biomass, the SAW 40 report noted that the current 3-year moving average (2001-2003) of the survey index was above $B_{threshold}$ in the NFMA and equivalent to $B_{threshold}$ in the SFMA. Due to the timing of data availability, the assessment was not able to use 2004 cooperative survey trawl efficiency analysis to calculate swept area biomass estimates. Assuming intermediate trawl efficiencies from the 2001 cooperative survey, however, and 2004 nominal tow distances, swept area biomass estimates for the NFMA from the 2004 cooperative survey were 25-percent less than the 2001 cooperative swept area biomass estimates for this survey, while swept area biomass estimates for the SFMA from the 2004 cooperative survey were 66-percent higher than the 2001 estimates.

4.2.2.2 2005 Fall Survey Results

The Monkfish FMP uses the NMFS fall bottom trawl survey to determine monkfish stock status (biomass) relative to management reference points. To smooth out year-to-year variability in the survey, a three-year running average is used to evaluate the stock against the MSY proxy target, and minimum biomass reference points. As shown in Table 5 both northern and southern stock components are below the minimum biomass threshold, and are, therefore, overfished. This is a change of status from 2004 when both stocks were not overfished.

Table 5 2000 – 2005 NMFS autumn bottom trawl survey indices of monkfish abundance and biomass reference points.

kg/tow	2000	2001	2002	2003	2004	2005	3-yr. Ave.	Bthreshold	Btarget
NFMA	2.495	2.052	2.103	1.925	0.638	1.078	1.214	1.25	2.5
SFMA	0.477	0.708	1.253	0.828	0.742	0.765	0.778	0.93	1.86

Framework 2, adopted in 2003, established a method for evaluating on an annual basis the rebuilding progress of the fishery. That method compares the three-year running average of the biomass index to annual biomass targets which are ten equal increments between the 1999 observed value (at the start of the 10-year rebuilding program) and the 2009 target (Btarget). The relationship of the observed 3-year average to the annual target value is applied to the previous year's landings to set target TACs for the upcoming year. The annual targets and the 1999-2005 observed values are shown in Figure 24 and Figure 25 for the NFMA and SFMA, respectively. The northern and southern stocks are approximately 34% and 40% below their 2005 targets.

Figure 24 - NFMA biomass index (2005 three-year running average) relative to annual rebuilding targets

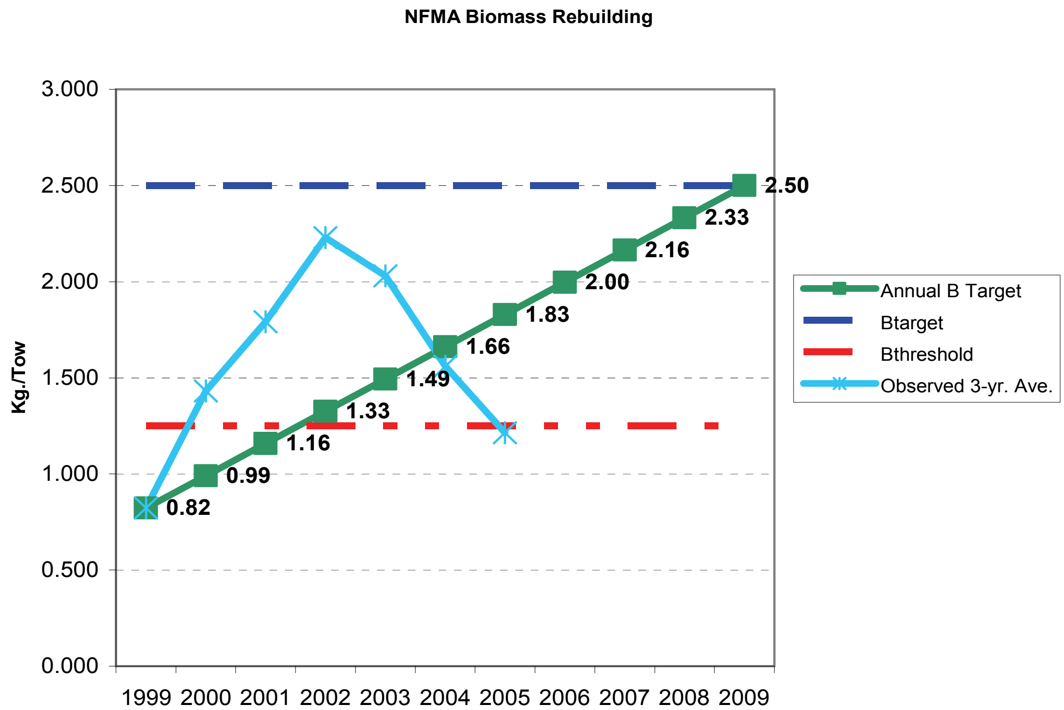

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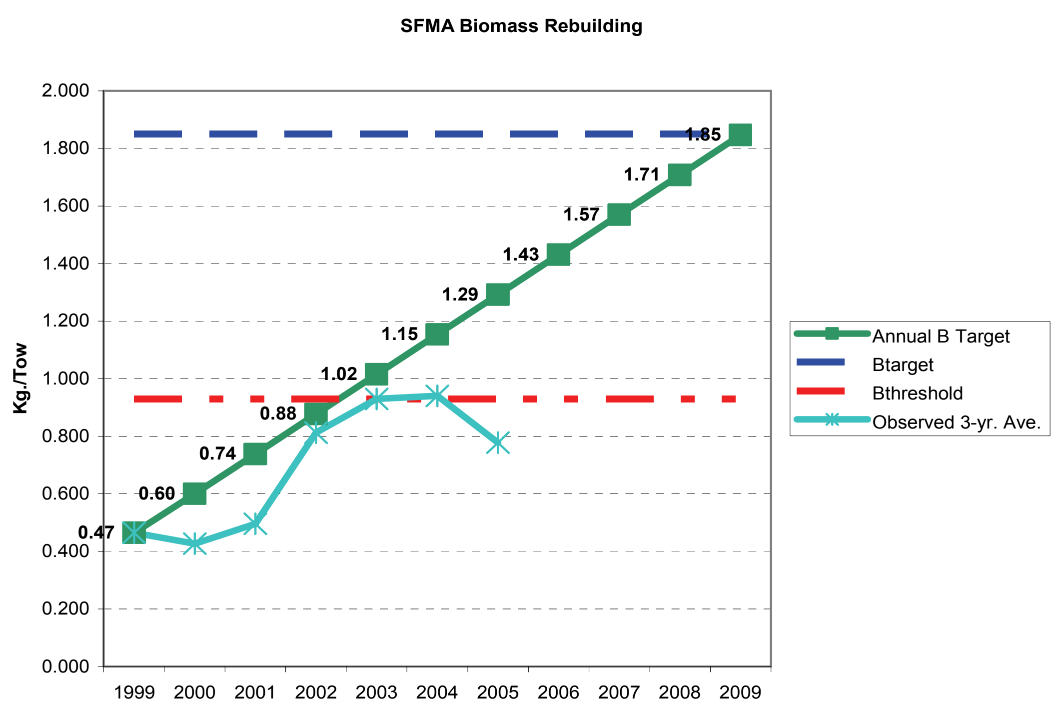
Figure 25- SFMA biomass index (2005 three-year running average) relative to annual rebuilding targets.

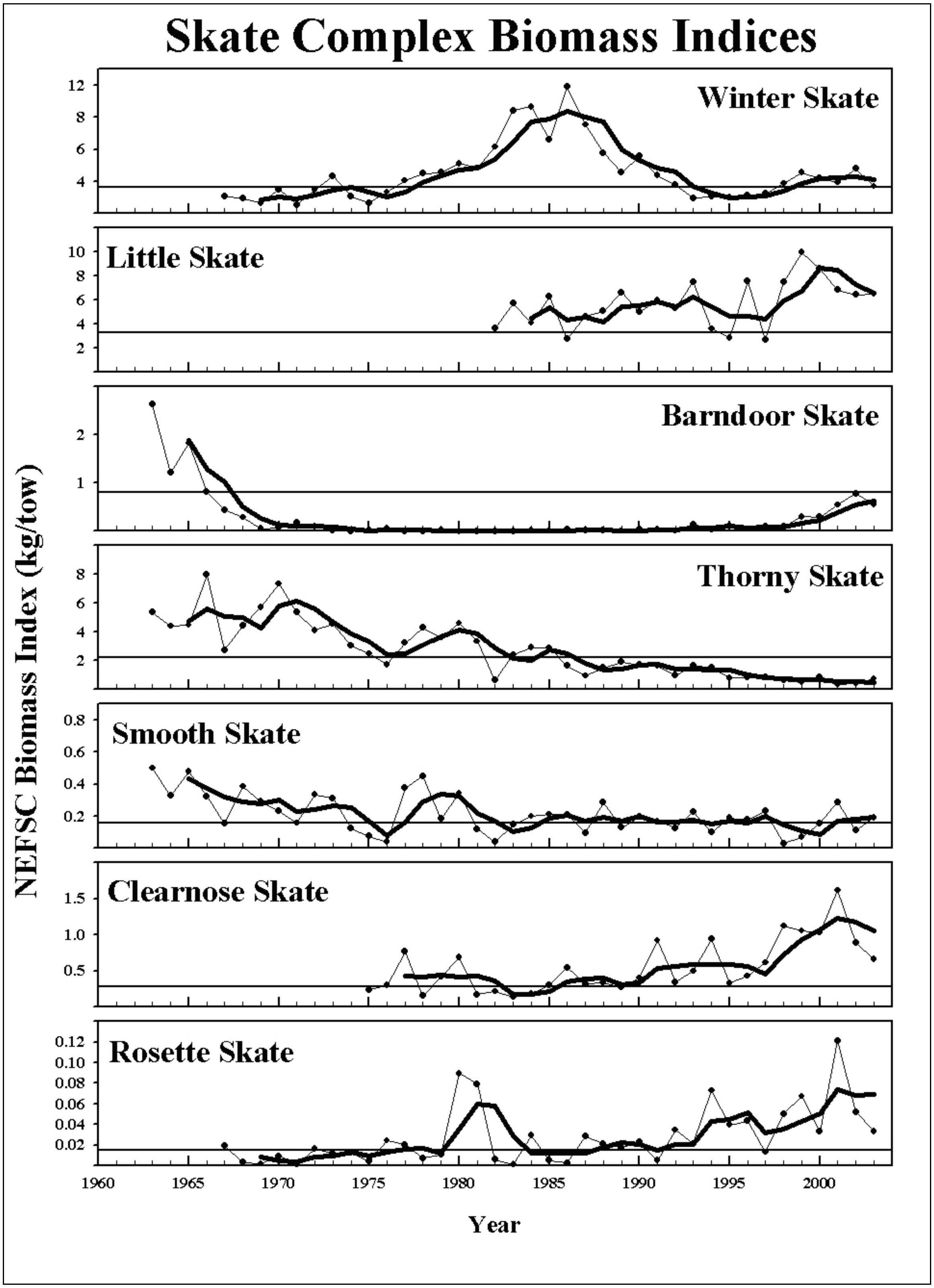


4.2.3 Skates Stock Status

The Category B (regular) DAS Pilot Program may be used by vessels to target several species of skates, which are managed by the Skate Fishery Management Plan. Skate life history and habitat characteristics are also described in an EFH source document available at http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

Figure 26 summarizes the status of seven skate species. Prior to the implementation of the Skate FMP, skate landings and bycatch were not reported by species, and 99% of skates landed were reported as "unclassified". Furthermore, because skates were not formally incorporated into a federal FMP, the fishery information was incomplete. Therefore, the benchmark assessment completed in 1999 concluded that there were insufficient data on age and growth to determine fishing mortality rates or fishing mortality reference points for most of the seven skate species (excluding winter and little skate). Therefore, the Skate FMP established overfishing definitions based on a percentage decline in the NEFSC trawl survey. The overfishing definitions vary for each species, but in general they are based on the three-year moving average of the survey mean weight per tow. The horizontal line for each species that is shown in Figure 26 represents the minimum biomass threshold (a stock is overfished below this line).

Figure 26 – Status of seven skate species



4.2.4 Spiny Dogfish Stock Status

Spiny dogfish are caught by most gear used to target regulated groundfish, and as a result are an incidental catch and bycatch in this groundfish fishery. The Northwest Atlantic spiny dogfish stock continues to be classified as overfished; however, overfishing is not occurring. Recent population projections suggest a time span of 15 to 20 years before the stock will have fully recovered. An assessment of this stock is scheduled for spring, 2006.

4.3 Habitat

The area affected by the Proposed Action has been identified as EFH for species managed under 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 (NMFS 2002). Specific text descriptions and accompanying maps detailing EFH by species and life stage are included in the Omnibus EFH Amendment.

From a biological perspective, habitats provide living things with the basic life requirements of nourishment and shelter. With regards to the species included in the northeast multispecies fishery management unit, Amendment 13 provided a detailed description of the physical and biological habitat characteristics of the area affected by the multispecies fishery, throughout its range. Framework 42 proposes measures that will impact the Gulf of Maine broadly and specific areas on George's Bank. Since the Category B (regular) DAS Pilot Program is not limited to a specific area, the entire geographic area described in Amendment 13 (the Northeast Region) is applicable to the Proposed Action. Key elements of that description are highlighted below.

With regards to the Monkfish FMP, Amendment 2 to the Monkfish FMP provided a detailed description of habitats potentially affected by the monkfish fishery. To summarize, fishing for monkfish occurs across the designated essential fish habitat (EFH) of all NEFMC- and MAFMC-managed species (see Amendment 13). EFH designated for species managed under the Secretarial Highly Migratory Species FMPs are not affected by this action, nor is any EFH designated for species managed by the South Atlantic Council, as all of the relevant species (i.e. species with EFH designated within the Northeast Region) are pelagic and not directly affected by benthic habitat impacts associated with the groundfish fishery.

Section 5.1 of the FSEIS to Monkfish Amendment 2 and Section 9.0 of the FEIS to Multispecies Amendment 13 described benthic habitats that exist within the range of these two fisheries, physical and biological characteristics of regional oceanographic sub-systems, and assemblages of fish and benthic organisms. They also included a description of canyon habitats on the edge of the continental shelf. Details relating to the Gulf of Maine, Georges Bank, and southern New England/Mid-Atlantic Bight sub-systems are provided in the following three sections. The EFH text descriptions and map designations for the various life stages of monkfish and groundfish complex species were defined in the Habitat Omnibus Amendment (NEFMC 1998a). Essential fish habitat designations which summarize the environmental needs and distribution of monkfish are contained below. Designations for species included in the Multispecies fishery management unit can be found in Section 3.0 of the 1998 Habitat Omnibus Amendment (www.nefmc.org). For more information on monkfish and groundfish complex species EFH refer to the Habitat Omnibus Amendment (NEFMC 1998a).

A description of the physical environment of the Northeast multispecies fishery, including oceanographic and physical habitat conditions in the Gulf of Maine – Georges Bank region and the area south of New England is found in Section 9.1 of Amendment 13. Some of the information presented in this section was originally included in the EA for the Omnibus EFH Amendment (NEFMC 1998a).

4.3.1 Habitat Associations

4.3.1.1 Gulf of Maine

The Gulf of Maine's geologic features, when coupled with the vertical variation in water properties, result in a great diversity of habitat types. The greatest number of invertebrates in this region is classified as mollusks, followed by annelids, crustaceans, echinoderms and other (Theroux and Wigley 1998). By weight, the order of taxa changes to echinoderms, mollusks, other, annelids and crustaceans. Watling (1998) used numerical classification techniques to separate benthic invertebrate samples into seven types of bottom assemblages. These assemblages are identified in and their distribution is depicted in . This classification system considers benthic assemblage, substrate type and water properties. Several authors have examined the species assemblages and related them to habitat areas or physical characteristics. For example, Overholtz & Tyler (1985) identified five assemblages for this region (Table 6).

Table 6 - Gulf of Maine benthic assemblages as identified by Watling (1998)

Benthic Assemblage	Benthic Community Description
1	Comprises all sandy offshore banks, most prominently Jeffreys Ledge, Fippennies Ledge, and Platts Bank; depth on top of banks about 70 m; substrate usually coarse sand with some gravel; fauna characteristically sand dwellers with an abundant interstitial component.
2	Comprises the rocky offshore ledges, such as Cashes Ledge, Sigsbee Ridge and Three Dory Ridge; substrate either rock ridge outcrop or very large boulders, often with a covering of very fine sediment; fauna predominantly sponges, tunicates, bryozoans, hydroids, and other hard bottom dwellers; overlying water usually cold Gulf of Maine Intermediate Water.
3	Probably extends all along the coast of the Gulf of Maine in water depths less than 60 m; bottom waters warm in summer and cold in winter; fauna rich and diverse, primarily polychaetes and crustaceans; probably consists of several (sub-) assemblages due to heterogeneity of substrate and water conditions near shore and at mouths of bays.
4	Extends over the soft bottom at depths of 60 to 140 m, well within the cold Gulf of Maine Intermediate Water; bottom sediments primarily fine muds; fauna dominated by polychaetes, shrimp, and cerianthid anemones.
5	A mixed assemblage comprising elements from the cold water fauna as well as a few deeper water species with broader temperature tolerances; overlying water often a mixture of Intermediate Water and Bottom Water, but generally colder than 7° C most of the year; fauna sparse, diversity low, dominated by a few polychaetes, with brittle stars, sea pens, shrimp, and cerianthid also present.
6	Comprises the fauna of the deep basins; bottom sediments generally very fine muds, but may have a gravel component in the offshore morainal regions; overlying water usually 7 to 8° C, with little variation; fauna shows some bathyal affinities but densities are not high, dominated by brittle stars and sea pens, and sporadically by a tube-making amphipod.
7	The true upper slope fauna that extends into the Northeast Channel; water temperatures are always above 8° and salinities are at least 35 ppt; sediments may be either fine muds or a mixture of mud and gravel.

Figure 27 - Distribution of the seven major benthic assemblages in the Gulf of Maine as determined from both soft bottom quantitative sampling and qualitative hard bottom sampling.

The assemblages are characterized as follows: 1. Sandy offshore banks; 2. Rocky offshore ledges; 3. Shallow (<50 m) temperate bottoms with mixed substrate; 4. Boreal muddy bottom, overlain by Maine Intermediate Water, 50 – 160 m (approx.); 5. Cold deep water, species with broad tolerances, muddy bottom; 6. Deep basin warm water, muddy bottom; 7. Upper slope water, mixed sediment. Source: Watling 1998.

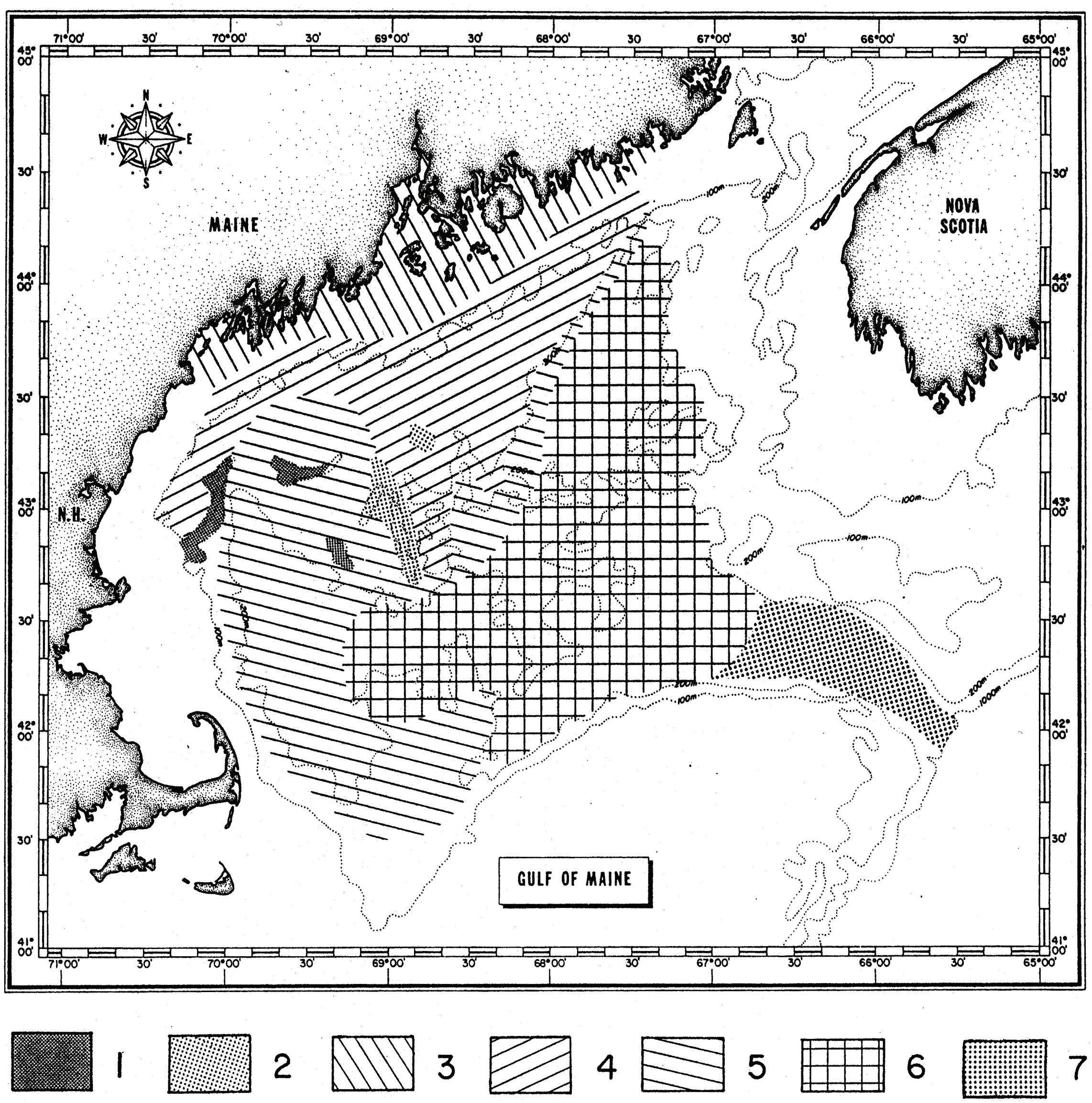


Table 7 - Comparison of demersal fish assemblages of Georges Bank and Gulf of Maine identified by Overholtz and Tyler (1985) and Gabriel (1992).

Gabriel analyzed a greater number of species and did not overlap assemblages.

Overholtz & Tyler (1985)		**Gabriel (1992)**	
Assemblage	**Species**	**Species**	**Assemblage**
Slope & Canyon	offshore hake blackbelly rosefish Gulf stream flounder fourspot flounder monkfish, whiting white hake, red hake	offshore hake blackbelly rosefish Gulf stream flounder fawn cusk-eel, longfin hake, armored sea robin	**Deepwater**
Intermediate	whiting red hake monkfish Atlantic cod, haddock, ocean pout, yellowtail flounder, winter skate, little skate, sea raven, longhorn sculpin	whiting red hake monkfish short-finned squid, spiny dogfish, cusk	**Combination of Deepwater Gulf of Maine/Georges Bank & Gulf of Maine-Georges Bank Transition**
Shallow	Atlantic cod haddock pollock whiting white hake red hake monkfish ocean pout yellowtail flounder windowpane winter flounder winter skate little skate longhorn sculpin summer flounder sea raven, sand lance	Atlantic cod haddock pollock yellowtail flounder windowpane winter flounder winter skate little skate longhorn sculpin	**Gulf of Maine-Georges Bank Transition Zone** **Shallow Water Georges Bank-Southern New England**
Gulf of Maine-Deep	white hake American plaice witch flounder thorny skate whiting, Atlantic cod, haddock, cusk Atlantic wolffish	white hake American plaice witch flounder thorny skate, redfish	**Deepwater Gulf of Maine-Georges Bank**
Northeast Peak	Atlantic cod haddock pollock ocean pout, winter flounder, white hake, thorny skate, longhorn sculpin	Atlantic cod haddock pollock	**Gulf of Maine-Georges Bank Transition Zone**

4.3.1.2 Georges Bank

The interaction of several environmental factors including availability and type of sediment, current speed and direction, and bottom topography have been found to combine to form seven sedimentary provinces on eastern Georges Bank (Valentine et al. 1993), which are outlined in Table 8 and depicted in Figure 28.

Theroux and Grosslein (1987) identified four macrobenthic invertebrate assemblages that corresponded with previous work in the geographic area. They noted that it is impossible to define distinct boundaries between assemblages because of the considerable intergrading that occurs between adjacent assemblages; however, the assemblages are distinguishable. Their assemblages are associated with those identified by Valentine et al. (1993).

The Western Basin assemblage (Theroux and Grosslein 1987) is found in the upper Great South Channel region at the northwestern corner of the bank, in comparatively deep water (150-200 m) with relatively slow currents and fine bottom sediments of silt, clay and muddy sand. This is the general area of the CAI Hook Gear Haddock SAP. Fauna are comprised mainly of small burrowing detritivores and deposit feeders, and carnivorous scavengers. Representative organisms include bivalves (*Thyasira flexuosa, Nucula tenuis, Musculus discors*), annelids (*Nephtys incisa, Paramphinome pulchella, Onuphis opalina, Sternaspis scutata*), the brittle star (*Ophiura sarsi*), the amphipod *Haploops tubicola*, and red crab (*Geryon quedens*). Valentine et al. 1993 did not identify a comparable assemblage; however, this assemblage is geographically located adjacent to Assemblage 5 as described by Watling (1998) .

The Northeast Peak assemblage is found along the Northern Edge and Northeast Peak, which varies in depth and current strength and includes coarse sediments, mainly gravel and coarse sand with interspersed boulders, cobbles and pebbles. This is the general area of part of the CAII Haddock SAP, though the assemblage also extends to the east into Canadian waters. Fauna tend to be sessile (coelenterates, brachiopods, barnacles, and tubiferous annelids) or free-living (brittlestars, crustaceans and polychaetes), with a characteristic absence of burrowing forms. Representative organisms include amphipods (*Acanthonotozoma serratum, Tiron spiniferum*), the isopod *Rocinela americana*, the barnacle *Balanus hameri*, annelids (*Harmothoe imbricata, Eunice pennata, Nothria conchylega,* and *Glycera capitata*), sea scallops (*Placopecten magellanicus*), brittlestars (*Ophiacantha bidentata, Ophiopholis aculeata*), and soft corals (*Primnoa resedaeformis*, *Paragorgia arborea*).

The Central Georges assemblage occupies the greatest area, including the central and northern portions of the bank in depths less than 100 m. This area is included in both the CAII Haddock SAP (the portion of the SAP area west of CAII) and the Western U.S./Canada area. Medium grained shifting sands predominate this dynamic area of strong currents. Organisms tend to be small to moderately large in size with burrowing or motile habits. Sand dollars (*Echinarachnius parma*) are most characteristic of this assemblage. Other representative species include mysids (*Neomysis americana*, *Mysidopsis bigelowi*), the isopod *Chiridotea tuftsi*, the cumacean *Leptocuma minor*, the amphipod *Protohaustorius wigleyi*, annelids (*Sthenelais limicola, Goniadella gracilis, Scalibregma inflatum*), gastropods (*Lunatia heros*, *Nassarius trivittatus*), the starfish *Asterias vulgaris*, the shrimp *Crangon septemspinosa* and the crab *Cancer irroratus*.

The Southern Georges assemblage is found on the southern and southwestern flanks at depths from 80 m to 200 m, where fine grained sands and moderate currents predominate. Many southern species exist here at the northern limits of their range. Dominant fauna include amphipods, copepods, euphausiids and starfish genus *Astropecten*. Representative organisms include amphipods (*Ampelisca compressa, Erichthonius rubricornis, Synchelidium americanum*), the cumacean *Diastylis quadrispinosa,* annelids

(*Aglaophamus circinata, Nephtys squamosa, Apistobranchus tullbergi*), crabs (*Euprognatha rastellifera, Catapagurus sharreri*) and the shrimp *Munida iris*.

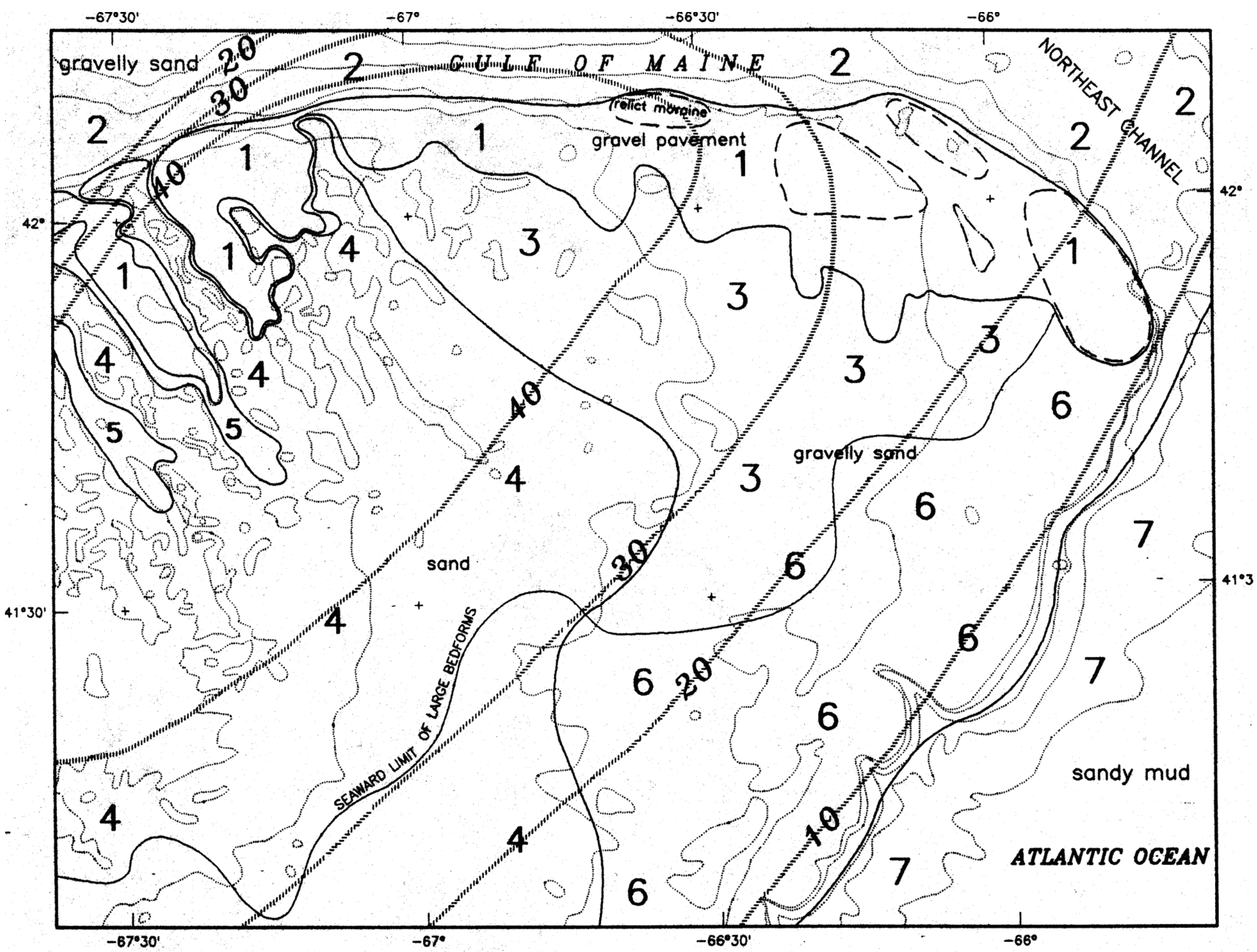
Along with high levels of primary productivity, Georges Bank has been historically characterized by high levels of fish production. Several studies have attempted to identify demersal fish assemblages over large spatial scales. Overholtz and Tyler (1985) found five depth-related groundfish assemblages for Georges Bank and the Gulf of Maine that were persistent temporally and spatially. Depth and salinity were identified as major physical influences explaining assemblage structure. Gabriel identified six assemblages, which are compared with the results of Overholtz & Tyler (1984) in .Mahon et al. (1998) found similar results.

Table 8- Sedimentary provinces of Georges Bank, as defined by Valentine *et al.* (1993) and Valentine and Lough (1991) with additional comments by Valentine (personal communication) and Benthic Assemblages assigned from Theroux and Grosslein (1987).

Sedimentary Province	**Depth (m)**	**Description**	**Benthic Assemblage**
Northern Edge / Northeast Peak (1)	40-200	Dominated by gravel with portions of sand, common boulder areas, and tightly packed pebbles. Representative epifauna (bryozoa, hydrozoa, *anemones,*and *calcareous* worm tubes) are abundant in areas of boulders. *Strong tidal and storm currents.*	Northeast Peak
Northern Slope & Northeast Channel (2)	200-240	Variable sediment type (gravel, gravel-sand, and sand) scattered bedforms. This is a transition zone between the northern edge and southern slope. *Strong tidal and storm currents.*	Northeast Peak
North / Central Shelf (3)	60-120	Highly variable sediment type (ranging from gravel to sand) with rippled sand, large bedforms, and patchy gravel lag deposits. *Minimal epifauna on gravel due to sand movement. Representative epifauna in sand areas include amphipods, sand dollars, and burrowing anemones.*	Central Georges
Central & Southwestern Shelf - *shoal ridges* (4)	10-80	Dominated by sand (fine and medium grain) with large sand ridges, dunes, waves, and ripples. Small bedforms in southern part. *Minimal epifauna on gravel due to sand movement. Representative epifauna in sand areas include amphipods, sand dollars, and burrowing anemones.*	Central Georges
Central & Southwestern Shelf - *shoal troughs* (5)	40-60	Gravel (including gravel lag) and gravel-sand between large sand ridges. Patch large bedforms. Strong currents. (Few samples – submersible observation noted presence of gravel lag, rippled gravel-sand, and large bedforms.) *Minimal epifauna on gravel due to sand movement. Representative epifauna in sand areas include amphipods, sand dollars, and burrowing anemones.*	Central Georges
Southeastern Shelf (6)	80-200	Rippled gravel-sand (medium and fine-grained sand) with patchy large bedforms and gravel lag. Weaker currents; *ripples are formed by intermittent storm currents. Representative epifauna include sponges attached to shell fragments and amphipods.*	Southern Georges
Southeastern Slope (7)	400-2000	Dominated by silt and clay with portions of sand (medium and fine) with rippled sand on shallow slope and smooth silt-sand deeper.	none

Figure 28 - Sedimentary provinces of eastern Georges Bank based on criteria of sea floor morphology, texture, sediment movement and bedforms, and mean tidal bottom current speed (cm/sec).

Relict moraines (bouldery sea floor) are enclosed by dashed lines. Source: Valentine and Lough (1991).



4.3.1.3 Southern New England/Mid-Atlantic Bight

Three broad faunal zones related to water depth and sediment type were identified for the Mid-Atlantic by Pratt (1973). The "sand fauna" zone was defined for sandy sediments (1% or less silt) which are at least occasionally disturbed by waves, from shore out to 50 m. The "silty sand fauna" zone occurred immediately offshore from the sand fauna zone, in stable sands containing at least a few percent silt and slightly more (2%) organic material. Silts and clays become predominant at the shelf break and line the Hudson Shelf Valley, and support the "silt-clay fauna."

Demersal fish assemblages were described at a broad geographic scale for the continental shelf and slope from Cape Chidley, Labrador to Cape Hatteras, North Carolina (Mahon *et al.* 1998) and from Nova Scotia to Cape Hatteras (Gabriel 1992). Factors influencing species distribution included latitude and depth.

Results of these studies were similar to an earlier study confined to the Mid-Atlantic Bight continental shelf (Colvocoresses and Musick 1983). In this study, there were clear variations in species abundances, yet they demonstrated consistent patterns of community composition and distribution among demersal fishes of the Mid-Atlantic shelf. This is especially true for five strongly recurring species associations that varied slightly by season. The boundaries between fish assemblages generally followed isotherms and isobaths. The assemblages were largely similar between the spring and fall collections, with the most notable change being a northward and shoreward shift in the temperate group in the spring.

Table 9 - Major Recurrent Demersal Finfish Assemblages of the Mid-Atlantic Bight During Spring and Fall as Determined by Colvocoresses and Musik (1983).

Season	**Species Assemblage**				
	Boreal	**Warm temperate**	**Inner shelf**	**Outer shelf**	**Slope**
Spring	Atlantic cod little skate sea raven monkfish winter flounder longhorn sculpin ocean pout whiting red hake white hake spiny dogfish	black sea bass summer flounder butterfish scup spotted hake northern searobin	windowpane	fourspot flounder	shortnose greeneye offshore hake blackbelly rosefish white hake
Fall	white hake whiting red hake monkfish longhorn sculpin winter flounder yellowtail flounder witch flounder little skate spiny dogfish	black sea bass summer flounder butterfish scup spotted hake northern searobin smooth dogfish	windowpane	fourspot flounder fawn cusk eel gulf stream flounder	shortnose greeneye offshore hake blackbelly rosefish white hake witch flounder

4.3.2 Gear Effects

Section 10.3.1.2.4 of Amendment 13 describes the general effects of trawls and dredges on benthic marine habitats, as reported in three recent reports (ICES 2000, Johnson 2002, and NRC 2002). (The report by Morgan and Chuenpagdee was not available when this summary was written: it generally confirms the findings of the other three reports). All four of these reports are international or national in scope and include information on the effects of types of trawls and dredges not used in the Northeast region of the U.S. (e.g., beam trawls and toothed scallop dredges) and affected habitats not found in the NE region (e.g, coral reefs and maerl beds). The conclusions reached are, nevertheless, pertinent to an evaluation of potential adverse impacts of the types of trawls and dredges used in this region. To re-iterate, the four major types of habitat modification caused by bottom trawls that are identified in the ICES (2001) report are the following:

- Loss or dispersal of physical features such as peak banks or boulder reefs (<u>changes are always permanent</u> and lead to an overall change in habitat diversity, which can in turn lead to the local loss of species and species assemblages dependant on such features);

- Loss of structure-forming organisms such as bryozoans, tube-dwelling polychaetes, hydroids, seapens, sponges, mussel beds, and oyster beds (<u>changes may be permanent</u> and can lead to an overall change in habitat diversity which can in turn lead to the local loss of species and species assemblages dependant on such biogenic features);

- Reduction in complexity caused by redistributing and mixing of surface sediments and the degradation of habitat and biogenic features, leading to a decease in the physical patchiness of the sea floor (<u>changes are not likely to be permanent</u>);

- Alteration of the detailed physical features of the sea floor by reshaping seabed features such as sand ripples and damaging burrows and associated structures which provide important habitats for smaller animals and can be used by fish to reduce their energy requirements (<u>changes are not likely to be permanent</u>).

The NRC (2002) report also identified three major effects of trawling and dredging, the first two of which are also mentioned in the ICES (2001) report:

- Reduced habitat complexity;
- Discernible changes in benthic communities (caused by repeated trawling and dredging);
- Reduced productivity of benthic habitats.

The four effects of trawling identified in the ICES (2001) report are listed in order of decreasing permanence. Given the MSA definition of “adverse” as “more than minimal and not temporary,” the first effect is clearly adverse. The second effect may be permanent and the other two are not likely to be permanent. However, they are still considered as potential adverse impacts since they are effects that could persist in certain habitats that are exposed to more or less continual, or frequently repeated, trawling activity. Furthermore, given the similarity in the habitat effects of dredges and trawls noted in the NRC (2002) and Morgan and Chuenpagdee (2003) reports, all of these potential adverse effects are considered to apply equally well to both gear types.

Looking at the effects of bottom trawls, scallop dredges, and hydraulic clam dredges in the NE region, there is more specific information to evaluate. According to the October 2001 workshop report (NREFHSC 2002), otter trawls had greater overall impacts than scallop dredges, but affected physical and biological structure equally. Effects on biological structure scored higher than effects on physical structure for both gears. In addition, trawls were judged to have some effects on major physical features.

Additional information is provided in this report on the recovery times for each type of impact for all three gears in mud, sand, and gravel habitats ("gravel" includes other hard-bottom habitats). This information makes it possible to rank these three substrates in terms of their vulnerability to the effects of bottom trawling and dredging, bearing in mind that other factors such as frequency of disturbance from fishing and from natural events are also important. Otter trawls and scallop dredges were assigned higher impact scores in gravel, mud ranked second for trawls (and sand third), and sand ranked second for scallop dredges (this gear is not used in mud habitats). Clam dredges had low impacts compared to scallop dredges and trawls and are only used in sand and not used to target groundfish stocks.

Effects of trawls on major physical features in mud (deep-water clay-bottom habitats) and gravel bottom were described as permanent, and impacts to biological and physical structure were given recovery times of months to years in mud and gravel. Impacts of trawling on physical structure in sand were of shorter duration (days to months) given the exposure of most continental shelf sand habitats to strong bottom currents and/or frequent storms.

For scallop dredges in gravel, recovery from impacts to biological structure was estimated to take several years and, for impacts to physical structure, months to years. In sand, biological structure was estimated to recover within months to years and physical structure within days to months.

Results of a comprehensive review of available gear effect studies published through the summer of 2002 (Stevenson et al. 2004) that were relevant to the NE region of the U.S. are summarized in Section 10.3.1.2.4.2 of Amendment 13. Positive and negative effects of otter trawls and scallop dredges from these publications are listed by substrate type in Amendment 13 along with recovery times (when known). Without more information on recovery times, it is difficult to be certain which of the negative effects listed in these tables last for, say, more than a month or two. In fact, it is difficult to conclude in some cases (e.g., furrows produced by trawl doors) whether the habitat effect is positive, negative, or just neutral. Despite these shortcomings in the information, the scientific literature for the NE region does provide some detailed results that confirm the previous determinations of potential adverse impacts of trawls and dredges that were based on the ICES (2001), NRC (2002), and Morgan and Chuenpagdee (2003) reports.

A final step in the process of assessing the potential adverse impacts of fishing on benthic EFH that was taken for this amendment is the determination of which of the 39 federally-managed species in the Northeast region have EFH which is vulnerable to the adverse impacts of otter trawls. Based on information originally included in Stevenson et al (2004), the Council concluded, for Amendment 13, that the use of otter trawls has more than a minimal or temporary adverse effect on benthic EFH for the following species (and life stages) EFH: American plaice (Juvenile (J), Adult (A)), Atlantic cod (J, A), Atlantic halibut (J, A), haddock (J, A), ocean pout (E, L, J, A), red hake (J, A), redfish (J, A), white hake (J), silver hake (J), winter flounder (A), witch flounder (J, A), yellowtail flounder (J, A), red crab (J, A), black sea bass (J, A), scup (J), tilefish (J, A), barndoor skate (J, A), clearnose skate (J, A), little skate (J, A), rosette skate (J, A), smooth skate (J, A), thorny skate (J, A), and winter skate (J, A). (Note: A: adults; J: juveniles; L: larvae; E: eggs). Based on the results of the November 2001 Gear Effects Workshop (NREFHSC 2001), the gear effects analysis performed in Amendment 13 concluded that fixed bottom-tending gear types such as bottom longlines and gill nets (in the context of the Northeast Multispecies fishery) have minimal adverse effects on EFH in this region.

Table 10. Species and life stages determined to be adversely impacted by otter trawls in Amendment 13. *(Bold: species within the Multispecies fishery management unit). Those species with moderate or high vulnerability rankings were determined to be adversely impacted in a manner that is more than minimal and less than temporary in nature.)*

Species	Lifestage	Otter Trawl Vuln.
American Plaice	A	High
American Plaice	J	Moderate
Atlantic Cod	A	Moderate
Atlantic Cod	J	High
Atlantic Halibut	A	Moderate
Atlantic Halibut	J	Moderate
Haddock	A	High
Haddock	J	High
Ocean Pout	A	High
Ocean Pout	J	High
Ocean Pout	L	High
Ocean Pout	E	High
Pollock	A	Moderate
Red Hake	A	Moderate
Red Hake	J	High
Redfish	A	Moderate
Redfish	J	High
Silver Hake	J	Moderate
White Hake	J	Moderate
Winter Flounder	A	Moderate
Witch Flounder	A	Moderate
Witch Flounder	J	Moderate
Yellowtail Flounder	A	Moderate
Yellowtail Flounder	J	Moderate
Barndoor Skate	A	Mod
Barndoor Skate	J	Mod
Black Sea Bass	A	High
Black Sea Bass	J	High
Clearnose Skate	A	Mod
Clearnose Skate	J	Mod
Little Skate	A	Mod
Little Skate	J	Mod
Rosette Skate	A	Mod
Rosette Skate	J	Mod
Scup	J	Mod
Smooth Skate	A	High
Smooth Skate	J	Mod
Thorny Skate	A	Mod
Thorny Skate	J	Mod
Tilefish	A	High
Tilefish	J	High
Winter Skate	A	Mod
Winter Skate	J	Mod

In order to minimize and mitigate the adverse effects of the fishery on EFH, under Amendment 13, the Council implemented Habitat Alternative 2 (Benefits of other Amendment 13 alternatives), Alternative 7 (Expand the list of gears prohibited in year-round closed areas to include clam dredges), and Alternative 10b (Compromise Habitat Closure Areas). Habitat Alternative 10b prohibited bottom-tending mobile gear (includes most gear capable of catching groundfish gear) from fishing in vulnerable areas containing the above benthic habitat types. This measure applied to approximately 2,811 square nautical miles within the EEZ. Alternative 7 prohibited clam dredges from accessing portions of groundfish closed areas they were permitted to access in the past. Additionally, Alternatives 2, which include effort reductions and additional groundfish closed areas, were implemented to further mitigate the adverse effects of the fishery on EFH.

Because the monkfish fishery overlaps significantly with the groundfish fishery in the northern fishery management area and the habitat closed areas extend into the southern fishery management area, measures to protect habitat in Amendment 10 and Amendment 13 assist in minimizing the effect of fishing on EFH in the monkfish fishery. The alternatives implemented in Monkfish Amendment 2 focus on those areas (offshore/shelf slope/canyons) and gears modifications (trawl mesh) where the monkfish fishery operations do not overlap (spatially or gear use) with the groundfish or scallop fisheries. The Councils closed Oceanographer and Lydonia Canyons deeper than 200 meters, a total closure of 116 square nautical miles, to vessels on a monkfish DAS to minimize the impacts of the directed monkfish fishery on deepwater canyon, hard bottom communities.

The management measures, implemented through Amendment 13 and Amendment 2, minimized the adverse effects of fishing on EFH, to the extent practicable pursuant to Section 303(A)(7) of the MSA).

4.4 Endangered and Other Protected Species

As discussed in Amendment 13 to the Northeast Multispecies FMP (NEFMC 2003), the following protected species are found in the environment utilized by the fisheries regulated by the amendment. A number of them are listed under the Endangered Species Act of 1973 (ESA) as endangered or threatened, while others are identified as protected under the Marine Mammal Protection Act of 1972 (MMPA). Two right whale critical habitat designations are located in the area of the multispecies fishery. While much of the information provided in this section is also included in the Amendment 13 Final Supplemental Environmental Impact Statement, a number of species descriptions have been updated.

Cetaceans

Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella* spp.)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected

Seals	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Phoca groenlandica*)	Protected
Sea Turtles	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Fish	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered

Critical Habitat Designations
Right whale Cape Cod Bay
Great South Channel

Although all of the species listed above may be found in the general geographical area covered by the Multispecies FMP, not all are affected by the fishery. Some species may inhabit areas other than those in which the fishery is prosecuted, prefer a different depth or temperature zone, or may migrate through the area at times when the fishery is not in operation. In addition, certain protected species may not be vulnerable to capture or entanglement with the gear used in the fishery. Therefore, protected species are divided into two groups. The first contains those species not likely to be affected by Amendment 13 or measures included in this framework, while the second group is the subject of a more detailed assessment because of potential or documented interactions with protected species.

4.4.1 Protected Species Not Likely to be Affected by the Multispecies FMP

Following a review of the current information available on the distribution and habitat needs of the endangered, threatened, and otherwise protected species listed above in relation to the action being considered, the Council considers that multispecies fishing operations and the measures proposed in Framework 42 to the Northeast Multispecies FMP are unlikely to affect the shortnose sturgeon, the Gulf of Maine distinct population segment (DPS) of Atlantic salmon, and the hawksbill sea turtle, all of which are species listed under the ESA. As discussed in Amendment 13, because of preferred habitat and distribution, there is little overlap between these species and the multispecies fishery making the likelihood of encounters relatively rare events.

Several cetaceans protected under the MMPA are found in the waters fishery by the NE multispecies fishery, Risso's dolphin *(Grampus griseus)*, spotted and striped dolphins *(Stenella spp.)*, and coastal forms of the Atlantic bottlenose dolphin *(Tursiops truncatus)*. Although these species may occasionally become entangled or otherwise entrapped in certain fishing gear such as pelagic longline and mid-water trawls, these gear types are not used in the multspecies fishery.

No evidence to date suggests that operation of the fishery adversely affects the value of critical habitat designated to protect right whales. Right whale critical habitat, therefore, it is not discussed further in this document.

4.4.2 Protected Species Potentially Affected by the Multispecies FMP

The status information below is a summary of information provided in the Amendment 13 documents and describes the threatened and endangered species that are potentially affected by the Proposed Action, as well as those accorded protection by the Marine Mammal Protection Act. All have previously been discussed in more detail in the Amendment 13 Final Supplemental Environmental Impact Statement. That information is incorporated herein by reference. The following sections containing updated information on right whales, as well as loggerhead leatherback, Kemp's ridley and green sea turtles, were excerpted from draft Biological Opinions (Opinions) provided by NOAA Fisheries Northeast Regional Office.

Northern Right Whale

Scientific literature on right whales has historically recognized distinct eastern and western populations or subpopulations in the North Atlantic Ocean (IWC 1986). Current information on the eastern stock is lacking and it is unclear whether a viable population in the eastern North Atlantic still exists (Brown 1986, NMFS 1991). Photo-identification work has shown that some of the whales observed in the eastern Atlantic were previously identified as western Atlantic right whales (Kenney 2002). The following will focus on the western North Atlantic subpopulation of right whales which occurs in the action area.

Habitat and Distribution

Northern right whales in the western North Atlantic (hereafter referred to as "right whales") generally occur from the southeast U.S. to Canada (*e.g.*, Bay of Fundy and Scotian Shelf) (Kenney 2002; Waring *et al.* 2002). Like other right whale species, they follow an annual pattern of migration between low latitude winter calving grounds and high latitude summer foraging grounds (Perry *et al.* 1999; Kenney 2002). Previous NOAA Fisheries Biological Opinions for the lobster fishery described right whale movements and habitat use as follows:

They are most abundant in Cape Cod Bay between February and April (Hamilton and Mayo 1990; Schevill *et al.* 1986; Watkins and Schevill 1982) and in the Great South Channel in May and June (Kenney *et al.* 1986; Payne *et al.* 1990) where they have been observed feeding predominantly on copepods, largely of the genera *Calanus* and *Pseudocalanus* (Waring *et al.* 1999). Right whales also frequent Stellwagen Bank and Jeffrey's Ledge, as well as Canadian waters including the Bay of Fundy and Browns and Baccaro Banks in the spring through fall. The distribution of right whales in summer and fall seems linked to the distribution of their principal zooplankton prey (Winn *et al.* 1986). Calving occurs in the winter months in coastal waters off of Georgia and Florida (Kraus *et al.* 1988).

While right whales are known to congregate in the aforementioned areas, the description is an oversimplification of right whale movements and habitats; much is still not known or understood. Telemetry data have shown lengthy and somewhat distant excursions into deep water off of the continental shelf (Mate *et al.* 1997) as well as extensive movements over the continental shelf during the summer foraging period (Mate *et al.* 1997; Baumgartner and Mate 2005). Photo-identification data have also indicated excursions of animals as far as Newfoundland, the Labrador Basin, southeast of Greenland (Knowlton *et al.* 1992), and Norway (Best *et al.* 2001). In the winter, only a portion of the known right whale population is seen on the calving grounds. The winter distribution of the remaining right whales remains uncertain (Waring *et al.* 2002). Results from winter surveys and passive acoustic studies suggest that animals may be dispersed in several areas including Cape Cod Bay (Brown *et al.* 2002) and offshore waters of the southeastern U.S. (Waring *et al.* 2002).

Other unknowns about right whale habitat also persist. For example, some female right whales have never been observed on the Georgia/Florida calving grounds but have been observed with a calf on the summer foraging grounds (Best *et al.* 2001). It is unknown whether these females are calving in an unidentified calving area or have just been missed during surveys off of Florida and Georgia (Best *et al.* 2001). The absence of some known (photo-identified) whales from identified habitats for months or years at a time suggests the presence of an unknown feeding ground (Kenney 2002). Finally, while behavior suggestive of mating is frequently observed on the foraging grounds, conception is not likely to occur at that time given the known length of gestation in other baleen whales. More likely, mating and conception occur in the winter (Kenney 2002). Based on genetics data, it has been suggested that two mating areas may exist with a somewhat different population composition (Best *et al.* 2001). The location of the mating area(s) is unknown.

Critical habitat for right whales has been designated in accordance with the ESA. Following a petition from the Right Whale Recovery Team, NMFS designated three critical habitat areas for right whales in 1994. These areas are: (1) portions of Cape Cod Bay and Stellwagen Bank, (2) the Great South Channel, and (3) coastal waters off of Georgia and Florida's east coast. Right whale critical habitat in Northeast waters were designated for their importance as right whale foraging sites while the southeast critical habitat area was identified for its importance as a calving and nursery area. In 2002, NMFS received a petition to revise designated critical habitat for right whales by combining and expanding the existing Cape Cod Bay and Great South Channel critical habitats in the Northeast and by expanding the existing critical habitat in the Southeast. In response to the petition, NMFS recognized that there was new information on right whale distribution in areas outside of the designated critical habitat. However, the ESA requires that critical habitat be designated based on identification of specific habitat features essential to the conservation of the species rather than just known distribution. NMFS, therefore, concluded that more analyses of the sightings data and their environmental correlates are necessary to define and designate these areas as critical habitat.

Abundance estimates and trends
It is well known and documented that there are relatively few right whales remaining in the western North Atlantic. As is the case with most wild animals, an exact count cannot be obtained. However, abundance can be reasonably estimated as a result of the extensive study of this subpopulation. IWC participants from a 1999 workshop agreed that it was reasonable to state that the number of northern right whales in the western North Atlantic as of 1998 was probably around 300 (+/- 10%) (Best *et al.* 2001). This conclusion was principally based on a photo-identification catalog that, as of July 1999, was comprised of more than 14,000 photographed sightings of 396 individuals, 11 of which were known to be dead and 87 of which had not been seen in more than 6 years. In addition, it was noted that relatively few new non-calf whales (whales that were never sighted and counted in the population as calves) had been sighted in recent years (Best *et al.* 2001), which suggests that the 396 individuals was a close approximation of the entire population.

A total of 125 right whale calves has been observed since the 1999 workshop, including a record calving season in 2000/2001 with 31 right whale births (B. Pike, New England Aquarium, pers. comm.). Calving numbers have been sporadic, with large differences among years. The three calving years (1997-2000) prior to the record year in 2000/2001 provided low recruitment with only 10 calves born, while the last five calving seasons (2000-2005) have been remarkably better with 31, 21, 19, 16, and 28 births, respectively. The calf count of 28 animals for the calving season (2004/2005) is still preliminary (additional calves may be observed on the summer foraging grounds), as is the initial count of 19 calves for 2006 (B. Zoodsma, SERO, pers. comm.) with some mortalities already noted. However, the subpopulation has also continued to experience losses of calves, juveniles and adults. As of December 1, 2004, there were 459 individually identified right whales in the photo-identification catalog of which 18 were known to be dead, and 330 had been sighted during the previous six years (B. Pike pers. comm.). (Note these data do not include four known dead right whales reported during the time period of January 2005 through June 2005.)

As is the case with other mammalian species, there is an interest in monitoring the number of females in this right whale subpopulation since their numbers will affect the subpopulation trend (whether declining, increasing or stable). Participants at the 1999 IWC workshop reviewed the sex composition of the right whale subpopulation based on sighting and genetics data (Best *et al.* 2001). Of the 385 right whales presumed alive at the end of 1998 (excludes the 11 known to have died but includes the 87 that had not been seen in at least 6 years), 157 were males, 153 were females, and 75 were of unknown sex (Best *et al.* 2001).

Sightings data were also used to determine the number of presumably mature females (females known to be at least 9 years old) in the subpopulation and the number of females who had been observed with a calf at least once. For the period 1980-1998, there were at least 90 (presumed live) females age 9 years or greater. Of these, 75 had produced a calf during that same period (Best *et al.* 2001; Kraus *et al.* 2001). As described above, the 2000/2001 - 2004/2005 calving seasons have had relatively high calf production (31, 21, 19, 16, and at least 28 calves, respectively) and have included additional first time mothers (*e.g.*, eight new mothers in 2000/2001). These potential "gains" have been offset, however, by continued losses to the subpopulation including the death of mature females as a result of anthropogenic mortality (Cole *et al.* 2005). Eight additional mortalities were reported for the period 2004 through July 1, 2005 (Kraus *et al*. 2005).

Information on the 2004 mortalities is provided in Cole *et al*. (2006). Briefly, ship strikes were assigned as the primary cause of death for two adult female right whales in 2004, while the death of a third adult female is believed to be due to entanglement in fishing gear (Cole *et al*. 2006). The 2005 mortalities have been documented by NMFS; however, this information has not been fully examined and verified by the ASRG process. A determination of the total levels of anthropogenic mortality and serious injury for 2005 will be made following the ASRG's review of all of the available data and information.

Abundance estimates are an important part of assessing the status of the species. However, for Section 7 purposes, the population trend (*i.e.,* whether increasing or declining) provides better information for assessing the effects of a proposed action on the species. As described in previous NOAA Fisheries Opinions, data collected in the 1990s suggested that right whales were experiencing a slow but steady recovery (Knowlton *et al.* 1994). However, Caswell *et al.* (1999) used photo-identification data and modeling to estimate survival and concluded that right whale survival decreased from 1980 to 1994. Modified versions of the Caswell *et al.* (1999) model as well as several other models were reviewed at the 1999 IWC workshop (Best *et al.* 2001). Despite differences in approach, all of the models indicated a decline in right whale survival in the 1990s relative to the 1980s with female survival, in particular, apparently affected (Best *et al.* 2001; Waring *et al.* 2002). In 2002, NMFS' NEFSC hosted a workshop to review right whale population models to examine: (1) potential bias in the models and (2) changes in the subpopulation trend based on new information collected in the late 1990s (Clapham *et al.* 2002). Three different models were used to explore right whale survivability and to address potential sources of bias. Although biases were identified that could negatively affect the results, all three modeling techniques resulted in the same conclusion; survival has continued to decline and seems to be focused on females (Clapham *et al.* 2002).

Reproductive Fitness
While modeling work suggests a decline in right whale abundance as a result of reduced survival, particularly for females, some researchers have also suggested that the subpopulation is being affected by a decreased reproductive rate (Best *et al.* 2001; Kraus *et al.* 2001). Kraus *et al.* (2001) reviewed

reproductive parameters for the period 1980-1998 and found that calving intervals increased from 3.67 years in 1992 to 5.8 years in 1998. In addition, as of 1999, only 70% of presumably mature females (females aged 9 years or older) were known to have given birth (Best *et al.* 2001).

Factors that have been suggested as affecting the right whale reproductive rate include reduced genetic diversity, pollutants, and nutritional stress. However, there is currently no evidence available to determine their potential effect, if any, on right whales. The subpopulation size of northern right whales in the western North Atlantic at the termination of whaling is unknown but is generally believed to have been very small. Such an event may have resulted in a loss of genetic diversity, which could affect the ability of the current population to successfully reproduce (*i.e.*, decreased conceptions, increased abortions, and increased neonate mortality). Studies by Schaeff *et al.* (1997) and Malik *et al.* (2000) indicate that northern right whales in the western North Atlantic are less genetically diverse than southern right whales. However, several apparently healthy populations of cetaceans, such as sperm whales and pilot whales, have even lower genetic diversity than observed for northern right whales in the western North Atlantic (IWC 2001).

Similarly, while contaminant studies have confirmed that right whales are exposed to and accumulate contaminants, researchers could not conclude that these contaminant loads were negatively affecting right whale reproductive success since concentrations were lower than those found in marine mammals proven to be affected by PCBs and DDT (Weisbrod *et al.* 2000). Finally, although northern right whales in the western North Atlantic seem to have thinner blubber than southern right whales (Kenney 2000), there is no evidence at present to demonstrate that the decline in birth rate and increase in calving interval is related to a food shortage. Nevertheless, a connection among right whale reproduction and environmental factors may yet be found. Modeling work by Caswell *et al.* (1999) and Fujiwara and Caswell (2001) suggests that the North Atlantic Oscillation (NAO), a naturally occurring climactic event, does affect the survival of mothers and the reproductive rate of mature females, and it also seems to affect calf survival (Clapham *et al.* 2002).

Anthropogenic Mortality
There is general agreement that right whale recovery is negatively affected by anthropogenic mortality. Fifty -five right whale mortalities were reported from Florida to the Canadian Maritimes during the period of 1970-2003 (Moore *et al*. 2004; Cole *et al*. 2005). As described above, eight additional mortalities were reported for the period 2004 through July 1, 2005 (Kraus *et al*. 2005). This represents an absolute minimum number of the right whale mortalities for this period. Given the range and distribution of right whales in the North Atlantic, it is highly unlikely that all carcasses will be observed.

Considerable effort has been made to examine right whale carcasses for the cause of death (Moore *et al*. 2004), although it is often a very difficult undertaking. Some carcasses are discovered floating at sea and cannot be retrieved. Others are in such an advanced stage of decomposition when discovered that a complete examination is not possible. Wave action and post-mortem predation by sharks can also damage carcasses, and preclude a thorough examination of all body parts. Moore *et al.* (2004) provide information on the examination of 30 right whale carcasses during the period of 1970-2002. Cole *et al*. (2005) provides supporting information for some of these as well as for the right whale mortality documented in 2003. Briefly, of the 31 animals examined, ship strike was identified as the cause of death or probable cause of death for 15 (11 adults/juveniles; 4 calves) and entanglement in fishing gear was identified as the cause of death for 4 (all adults/juveniles) (Moore *et al*. 2004; Cole *et al*. 2005). A cause of death was undeterminable for 12 animals, 8 of which were calves (Moore *et al*. 2004). As described in Cole *et al*. (2006), ship strikes have been assigned as the primary cause of deaths for two adult female right whales in 2004 and fishing gear entanglement was assigned as the primary cause of death for a third adult female in 2004. Preliminary information on the right whale mortalities for 2005 has been released (Kraus *et al.* 2005; SEIT 2005). Ship strikes and entanglement in fishing gear are suggested as the primary cause of death for some of these (Kraus *et al.* 2005). However, the ASRG has not yet made a final determination for these mortalities.

Ship strikes and entanglements are not always fatal to right whales. Based on photographs of catalogued animals from 1935 through 1995, Hamilton *et al.* (1998) estimated that 61.6 percent of right whales exhibit injuries caused by entanglement, and 6.4 percent exhibit signs of injury from vessel strikes. In addition, several whales have apparently been entangled on more than one occasion. Right whales may suffer long-term effects of such interactions even when they survive the initial interaction. For example, some right whales that have been entangled were subsequently involved in ship strikes (Hamilton *et al.* 1998) suggesting that the animal may have become debilitated to such an extent that it was less able to avoid a ship.

Humpback Whale
Humpback whales calve and mate in the West Indies and migrate to feeding areas in the northwestern Atlantic during the summer months. Six separate feeding areas are utilized in northern waters (Waring et al. 2004). Only one of these feeding areas, the Gulf of Maine, lies within U.S. waters contained within the management unit of the FMP. Most of the humpbacks that forage in the Gulf of Maine visit Stellwagen Bank and the waters of Massachusetts and Cape Cod Bays. Sightings are most frequent from mid-March through November between 41º N and 43º N, from the Great South Channel north along the outside of Cape Cod to Stellwagen Bank and Jeffreys Ledge (CeTAP 1982), and peak in May and August. However, small numbers of individuals may be present in this area year-round. They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by filtering large amounts of water through their baleen to capture prey (Wynne and Schwartz 1999).

Humpback whales use the Mid-Atlantic as a migratory pathway. Observations of juvenile humpbacks since 1989 in the Mid-Atlantic have been increasing during the winter months, peaking January through March (Swingle et al. 1993). Biologists theorize that non-reproductive animals may be establishing a winter-feeding range in this area since they are not participating in reproductive behavior in the Caribbean. The whales in the mid-Atlantic area were found to be residents of the Gulf of Maine and Atlantic Canada (Gulf of St. Lawrence and Newfoundland) feeding groups, suggesting a mixing of different feeding stocks in the mid-Atlantic region.

New information has become available on the status and trends of the humpback whale population in the North Atlantic that indicates the population is increasing. However, it has not yet been determined whether this increase is uniform across all six feeding stocks (Waring et al. 2004). For example, although the overall rate of increase has been estimated at 9.0% (CV=0.25) by Katona and Beard (1990), Barlow and Clapham (1997) reported a 6.5% rate through 1991 for the Gulf of Maine feeding group.

A variety of methods have been used to estimate the North Atlantic humpback whale population. However, the photographic mark-recapture analyses from the Years of the North Atlantic Humpback (YONAH) project gave a North Atlantic basin-wide estimate of 11,570 (CV= 0.069) is regarded as the best available estimate for that population, although caveat are associated with this estimate (Waring et al. 2004).

The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear such as the sink gillnet gear used to catch multispecies, and ship strikes. Based on photographs of the caudal peduncle of humpback whales, Robbins and Mattila (1999) estimated that between 48% and 78% of animals in the Gulf of Maine exhibit scarring caused by entanglement.

Fin Whale
Fin whales inhabit a wide range of latitudes between 20-75° N and 20-75° S (Perry et al. 1999). Fin whales spend the summer feeding in the relatively high latitudes of both hemispheres, particularly along the cold eastern boundary currents in the North Atlantic and North Pacific Oceans and in Antarctic waters (IWC 1992). Most migrate seasonally from relatively high-latitude Arctic and Antarctic feeding areas in the summer to relatively low-latitude breeding and calving areas in the winter (Perry et al. 1999).

In the North Atlantic today, fin whales are widespread and occur from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic pack ice (NMFS 1998b). A number of researchers have suggested the existence of fin whale subpopulations in the North Atlantic. Mizroch et al. (1984) suggested that local depletions resulting from commercial over harvesting supported the existence of North Atlantic fin whale subpopulations. Others have used genetic information to support the existence of multiple subpopulations of fin whales in the North Atlantic and Mediterranean (Bérubé et al. 1998). Although the IWC's Scientific Committee proposed seven stocks for North Atlantic fin whales, it is uncertain whether these stock boundaries define biologically isolated units (Waring et al. 2004).

Various estimates have been provided to describe the current status of fin whales in western North Atlantic waters. The latest published SAR (Waring et al. 2004) gives a best estimate of abundance for fin whales of 2,814 (CV = 0.21). However, this is considered an underestimate, as too little is known about population structure, and the estimate is derived from surveys over a limited portion of the western North Atlantic. There is also not enough information to estimate population trends.

The major known sources of anthropogenic mortality and injury of fin whales include ship strikes and entanglement in commercial fishing gear such as the sink gillnet gear used to catch multispecies. However, many of the reports of mortality cannot be attributed to a particular source. Of 18 fin whale mortality records collected between 1991 and 1995, four were associated with vessel interactions, although the true cause of mortality was not known. Although several fin whales have been observed entangled in fishing gear, with some being disentangled, no mortalities have been attributed to gear entanglement.

In general, known mortalities of fin whales are less than those recorded for right and humpback whales. This may be due in part to the more offshore distribution of fin whales where they are either less likely to encounter entangling gear, or are less likely to be noticed when gear entanglements or vessel strikes do occur.

The overall distribution of fin whales may be based on prey availability. This species preys opportunistically on both zooplankton and fish (Watkins et al. 1984). The predominant prey of fin whales varies greatly in different geographical areas depending on what is locally available. In the western North Atlantic fin whales feed on a variety of small schooling fish (i.e., herring, capelin, sand lance) as well as squid and planktonic crustaceans (Wynne and Schwartz 1999). As with humpback whales, fin whales feed by filtering large volumes of water for their prey through their baleen plates. Photo identification studies in western North Atlantic feeding areas, particularly in Massachusetts Bay, have shown a high rate of annual return by fin whales, both within years and between years (Seipt et al. 1990).

Sei Whale
Sei whales are a widespread species in the world's temperate, subpolar and subtropical and even tropical marine waters, although they appear to be more restricted to temperate waters than other balaenopterids (Perry et al. 1999). Mitchell and Chapman (1977) suggested that the sei whale population in the western North Atlantic consists of two stocks, a Nova Scotian Shelf stock and a Labrador Sea stock. The Nova Scotian Shelf stock includes the continental shelf waters of the Northeast Region, and extends northeastward to south of Newfoundland. The IWC boundaries for this stock are from the U.S. east coast

to Cape Breton, Nova Scotia and east to 42°W longitude (Waring et al. 2004). This is the only sei whale stock within the management unit of this FMP.

Sei whales occur in deep water throughout their range, typically over the continental slope or in basins situated between banks (NMFS 1998a). In the northwest Atlantic, the whales travel along the eastern Canadian coast in autumn on their way to and from the Gulf of Maine and Georges Bank where they occur in winter and spring. Within the Northeast Region, the sei whale is most common on Georges Bank and into the Gulf of Maine/Bay of Fundy region during spring and summer. Individuals may range as far south as North Carolina. It is important to note that sei whales are known for inhabiting an area for weeks at a time then disappearing for year or even decades. This has been observed all over the world, including in the southwestern Gulf of Maine in 1986, but the basis for this phenomenon is not clear.

Although sei whales may prey upon small schooling fish and squid in the Northeast Region, available information suggests that calanoid zooplankton are the primary prey of this species. There are occasional influxes of sei whales further into Gulf of Maine waters, presumably in conjunction with years of high copepod abundance inshore.

There are insufficient data to determine trends of the sei whale population. Because there are no abundance estimates within the last 10 years, a minimum population estimate cannot be determined for management purposes (Waring et al. 2004). Abundance surveys are problematic because this species is difficult to distinguish from the fin whale and too little is known of the sei whale's distribution, population structure and patterns of movement.

No instances of injury or mortality of sei whales due to entanglements in fishing gear have been recorded in U.S. waters, possibly because sei whales typically inhabit waters further offshore than most commercial fishing operations, or perhaps entanglements do occur but are less likely to be observed. However, due to the overlap of this species observed range with the multispecies fishery areas that use sink gillnet gear, the potential for entanglement does exist. As noted in Waring, et al. (2004), sei whale movements into inshore areas have occurred historically. Similar impacts noted above for other baleen whales may also occur. Due to the deep-water distribution of this species, interactions that do occur are less likely to be observed or reported than those involving right, humpback, and fin whales that often frequent areas within the continental shelf.

Blue Whale

Like the fin whale, blue whales occur worldwide and are believed to follow a similar migration pattern from northern summering grounds to more southern wintering areas (Perry et al. 1999). Of the three subspecies have been identified, only *B. musculus* occurs in the northern hemisphere. Blue whales range in the North Atlantic from the subtropics to Baffin Bay and the Greenland Sea

NMFS recognizes a minimum population estimate of 308 blue whales within the Northeast Region (Waring et al. 2002). Blue whales are only occasional visitors to east coast U.S. waters. They are more commonly found in Canadian waters, particularly the Gulf of St. Lawrence where they are present for most of the year, and in other areas of the North Atlantic. It is assumed that blue whale distribution is governed largely by food requirements which, at least in the Gulf of St. Lawrence, appear to include predominantly copepod species (NMFS 1998b).

Entanglements in fishing gear such as the sink gillnet gear used in the multispecies fishery and ship strikes are believed to be the major sources of anthropogenic mortality and injury of blue whales, however, confirmed deaths or serious injuries are few. NOAA Fisheries 2003 Biological Opinion for the monkfish fishery references an incident in 1987, when, concurrent with an unusual influx of blue whales into the Gulf of Maine, one report was received from a whale watch boat that spotted a blue whale in the southern Gulf of Maine entangled in gear described as probable lobster pot gear. A second animal found in the Gulf of St. Lawrence apparently died from the effects of an entanglement.

Sperm Whale
Sperm whales inhabit all ocean basins, from equatorial waters to the polar regions (Perry et al. 1999). In the western North Atlantic they range from Greenland to the Gulf of Mexico and the Caribbean. The sperm whales that occur in the western North Atlantic are believed to represent only a portion of the total stock (Blaylock et al. 1995). Total numbers of sperm whales off the USA or Canadian Atlantic coast are unknown, although eight estimates from selected regions of the habitat do exist for select time periods. The best estimate of abundance for the North Atlantic stock of sperm whales is 4,702 (CV=0.36) (Waring et al. 2002).

Sperm whales generally occur in waters greater than 180 meters in depth with a preference for continental margins, seamounts, and areas of upwelling, where food is abundant (Leatherwood and Reeves 1983). Sperm whales in both hemispheres migrate to higher latitudes in the summer for feeding and return to lower latitude waters in the winter where mating and calving occur. Mature males typically range to higher latitudes than mature females and immature animals but return to the lower latitudes in the winter to breed (Perry et al. 1999). Waring et al. (2002) suggest sperm whale distribution is closely correlated with the Gulf Stream edge with a migration to higher latitudes during summer months where they are concentrated east and northeast of Cape Hatteras. Distribution is described as extending further northward to areas north of Georges Bank and the Northeast Channel region in summer and then south of New England in fall, back to the mid-Atlantic Bight (Waring et al. 2002).

Sperm whales, especially mature males in higher latitude waters, have been observed to take significant quantities of large demersal and deep water sharks, multispecies, and bony fishes.

Few instances of injury or mortality of sperm whales due to human impacts have been recorded in U.S. waters. Because of their generally more offshore distribution and their benthic feeding habits, sperm whales are less subject to entanglement than are right or humpback whales. However, the multispecies fishery is conducted near the shelf edge and utilizes fixed sink gillnet gear that may pose a threat to sperm whales. Documented takes primarily involve offshore fisheries such as the offshore lobster pot fishery and pelagic driftnet and pelagic longline fisheries. Ships also strike sperm whales. Due to the offshore distribution interactions (both ship strikes and entanglements) that do occur are less likely to be reported than those involving right, humpback, and fin whales that more often occur in nearshore areas.

Minke Whale
Minke whales have a cosmopolitan distribution in polar, temperate, and tropical waters. The Canadian east coast population is one of four populations recognized in the North Atlantic. Minke whales off the eastern coast of the U.S. are considered to be part of the population that extends from Davis Strait off Newfoundland to the Gulf of Mexico. The species is common and widely distributed along the U.S. continental shelf. They show a certain seasonal distribution with spring and summer peak numbers, falling off in the fall to very low winter numbers. Like all baleen whales, the minke whale generally occupies the continental shelf proper.

Minke whales are known to be taken in sink gillnet gear that is also used to catch multispecies finfish. Takes have also been documented in trawl fisheries. Waring et al. (2004) has described the estimated total take of minkes in all fisheries to be below the PBR established for that species.

Harbor Porpoise

Harbor porpoise are found primarily in the Gulf of Maine in the summer months. However, they migrate seasonally through regions where multispecies finfish are caught. For example, they move through the southern New England area where the multispecies fishery occurs in the spring (March and April). Harbor porpoise also move through the Massachusetts Bay and Jeffrey's Ledge region in the spring (April and May) and the fall (October November).

Harbor porpoise are taken in sink gillnet gear used in the multispecies fishery. The historic level of serious injury and mortality of this species in this gear was known to be high relative to the estimated population level. The Harbor Porpoise Take Reduction Plan (HPTRP) was implemented in 1998 to reduce takes in the Northeast and Mid-Atlantic gillnet fisheries through a series of time/area closures and required use of acoustical deterrents that have reduced the take to acceptable levels.

According to the most recent stock information available (Waring, 2005), the mean incidental mortality for harbor porpoise in U.S. waters for 1999-2003 was 417 animals. The best estimate of abundance is 89,700 (CV=0.22). The minimum population estimate for the Gulf of Maine/Bay of Fundy harbor porpoise is 74,695, and the potential biological removal (PBR) is set at 747. The stock assessment report further states that this is currently not a strategic stock because average annual fishery-related mortality and serious injury does not exceed PBR.

Atlantic White-Sided Dolphin

White-sided dolphins are found in the temperate and sub-polar waters of the North Atlantic, primarily on the continental shelf waters out to the 100-meter depth contour. The species is distributed from central western Greenland to North Carolina, with the Gulf of Maine stock commonly found from Hudson Canyon to Georges Bank and into the Gulf of Maine to the Bay of Fundy. A minimum population estimate for the white-sided dolphin 37,904 has been derived for U.S. waters (Waring et al. 2004) from several survey estimates.

White-sided dolphins have been observed taken in sink gillnets, pelagic drift gillnets, and several mid-water and bottom trawl fisheries. Waring et al. (2004) described the estimated total take of white-sided dolphins in all fisheries (including those that catch multispecies) to be below the PBR established for that species.

Pelagic Delphinids (Pilot whales, offshore bottlenose and common dolphins)

The pelagic delphinid complex is made up of small odontocete species that are broadly distributed along the continental shelf edge where depths range from 200 - 400 meters. They are commonly found in large schools feeding on schools of fish. The minimum population estimates for each species number in the tens of thousands. They are known to be taken in pelagic and sink gillnets gear as well as mid-water and bottom trawl gear. Takes have occurred in the bottom trawl fishery and gillnet fisheries, although their pelagic prey species suggest they do not forage near the bottom. Because of the frequency of interactions, they will be the subject of a Trawl Take Reduction Plan in the near future.

Loggerhead sea turtle

Loggerhead sea turtles are a cosmopolitan species, found in temperate and subtropical waters and inhabiting pelagic waters, continental shelves, bays, estuaries and lagoons. They are the most abundant species of sea turtle in U.S. waters. Since the action area is a portion of the Northwest Atlantic, this and discussions of other sea turtles will focus only on Atlantic populations of leatherback, Kemp's ridley, and green sea turtles, and the Atlantic subpopulations of loggerhead sea turtles.

Loggerheads commonly occur throughout the inner continental shelf from Florida through Cape Cod, Massachusetts although their presence varies with the seasons due to changes in water temperature (Braun and Epperly 1996; Epperly *et al.* 1995a, Epperly *et al.* 1995b; Shoop and Kenney 1992). Aerial surveys of loggerhead turtles north of Cape Hatteras indicate that they are most common in waters from 22 to 49 meters deep although they range from the beach to waters beyond the continental shelf (Shoop and Kenney 1992). The presence of loggerhead turtles in an area is also influenced by water temperature. Loggerheads have been observed in waters with surface temperatures of 7-30°C but water temperatures of <11°C are more favorable to sea turtles (Epperly *et al.* 1995b; Shoop and Kenney 1992). Within the action area of this consultation, loggerhead sea turtles occur year round in offshore waters off of North Carolina where water temperature is influenced by the Gulf Stream. As coastal water temperatures warm in the spring, loggerheads begin to migrate to North Carolina inshore waters (*e.g.*, Pamlico and Core Sounds) and also move up the coast (Braun-McNeill and Epperly 2004; Epperly *et al.* 1995a; Epperly *et al.* 1995b; Epperly *et al.* 1995c), occurring in Virginia foraging areas as early as April and on the most northern foraging grounds in southern New England waters (around Cape Cod) in June. The trend is reversed in the fall as water temperatures cool. The large majority leave the northern foraging grounds by mid-September but some may remain in Mid-Atlantic and Northeast areas until late fall. By December loggerheads have migrated from inshore North Carolina waters and more northern coastal waters to waters offshore of North Carolina, particularly off of Cape Hatteras, and waters further south where the influence of the Gulf Stream provides temperatures favorable to sea turtles (Epperly *et al.* 1995b; Shoop and Kenney 1992).

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. There are at least five western Atlantic subpopulations, divided geographically as follows: (1) a northern nesting subpopulation, occurring from North Carolina to northeast Florida at about 29° N; (2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast; (3) a Florida Panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida; (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Márquez 1990; TEWG 2000); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (NMFS SEFSC 2001). The fidelity of nesting females to their nesting beach is the reason these subpopulations can be differentiated from one another. Genetic analyses conducted at these nesting sites indicate that they are distinct subpopulations (TEWG 2000). Cohorts from three of these, the south Florida, Yucatán, and northern subpopulations, are known to occur within the action area of this consultation (Bass *et al.* 2004; Rankin-Baransky *et al.* 2001) and there is genetics evidence that cohorts from the other two also likely occur within the action area (Bass *et al*. 2004).

Loggerheads mate in late March-early June, and eggs are laid throughout the summer, with a mean clutch size of 100-126 eggs in the southeastern United States. Individual females nest multiple times during a nesting season, with a mean of 4.1 nests/individual (Murphy and Hopkins 1984). Nesting migrations for an individual female loggerhead are usually on an interval of 2-3 years, but can vary from 1-7 years (Dodd 1988).

A number of stock assessments (Heppell *et al.* 2003; NMFS SEFSC 2001; TEWG 1998; 2000) have examined the stock status of loggerheads in the waters of the United States, but have been unable to develop any reliable estimates of absolute population size. Due to the difficulty of conducting comprehensive population surveys away from nesting beaches, nesting beach survey data are used to index the status and trends of loggerheads (USFWS and NMFS 2003).

Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182, annually with a mean of 73,751 (TEWG 2000). The south Florida nesting group is the largest known loggerhead nesting assemblage in the Atlantic and one of only two loggerhead nesting assemblages worldwide that has greater than 10,000 females nesting per year (USFWS and NMFS 2003; USFWS Fact Sheet). Annual nesting totals have ranged from 48,531 - 83,442 annually over the past decade (USFWS and NMFS 2003). South Florida nests make up the majority (90.7%) of all loggerhead nests counted along the U.S. Atlantic and Gulf coasts during the period 1989-1998.

The northern subpopulation is the second largest loggerhead nesting assemblage within the United States but much smaller than the south Florida nesting group. Of the total number of nests counted along the U.S. Atlantic and Gulf coasts during the period 1989-1998, 8.5% were attributed to the northern subpopulation. The number of nests for this subpopulation have ranged from 4,370 - 7,887 for the period 1989-1998, for an average of approximately 1,524 nesting females per year (USWFS and NMFS 2003). The remaining three subpopulations (the Dry Tortugas, Florida Panhandle, and Yucatán) are much smaller subpopulations. Annual nesting totals for the Florida Panhandle subpopulation ranged from 113-1,285 nests for the period 1989-2002 (USFWS and NMFS 2003). The Yucatán nesting group was reported to have had 1,052 nests in 1998 (TEWG 2000). Nest counts for the Dry Tortugas subpopulation ranged from 168-270 during the 9-year period from 1995-2003.

While nesting beach data can be a useful tool for assessing sea turtle populations, the detection of nesting trends requires consistent data collection methods over long periods of time (USFWS and NMFS 2003). In 1989, a statewide sea turtle Index Nesting Beach Survey (INBS) program was developed and implemented in Florida, and similar standardized daily survey programs have been implemented in Georgia, South Carolina, and North Carolina (USFWS and NMFS 2003). Although not part of the INBS program, nesting survey data are also available for the Yucatán Peninsula, Mexico (USFWS and NMFS 2003).

The currently available nesting data, however, is still too limited to indicate statistically reliable trends for these loggerhead subpopulations. To date, analysis of nesting data from the INBS program, indicate that there is no discernable trend for the south Florida, northern or Florida Panhandle subpopulations (website information from Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide and Index Nesting Beach Survey Programs downloaded January 6, 2006; USFWS and NMFS 2003). Nesting surveys for the Dry Tortugas subpopulation are conducted as part of Florida's statewide survey program.

Survey effort has been relatively stable during the 9-year period from 1995-2003 (although the 2002 year was missed) but given the relatively short period of survey effort, no conclusion can be made at this time on the trend of this subpopulation (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide Nesting Beach Survey Data). Similarly, although Zurita *et al.* (2003) did find significant increases in loggerhead nesting on seven beaches at Quintana Roo, Mexico, nesting survey effort overall has been inconsistent among the Yucatán nesting beaches and no trend can be determined for this subpopulation given the currently available data.

More reliable nesting trend information is available from some south Florida and northern subpopulation nesting beaches that have been surveyed for longer periods of time. Using the information gathered from these select south Florida and northern subpopulation nesting beaches, the Turtle Expert Working Group (TEWG) concluded that the south Florida subpopulation was increasing based on nesting data over the last couple of decades, and that the northern subpopulation was stable or declining (TEWG 2000).

Sea turtle biologists are cautiously watching nest counts for the subpopulations. Loggerheads do exhibit a cyclical pattern to nesting such that in some years nest counts are high while in others they are low (*e.g.*, not all mature females nest in a year). Natural events, such as the hurricane seasons of 2004 and 2005, can also destroy many nests thereby influencing nesting trends since a majority of the nests are destroyed in any particular year. It is unknown at this time whether the nest counts over the past five years represent an actual decline in the loggerhead subpopulations or not.

In addition, since nest counts are a reflection of only one sex and age class in the subpopulation (mature females), using nesting trend data to make conclusions about the status of the entire subpopulation requires making certain assumptions. These are that the current impacts to mature females are experienced to the same degree amongst all age classes regardless of sex, and/or that the impacts that led to the current abundance of nesting females are affecting the current immature females to the same extent. While there is no current evidence to support or refute these assumptions, multiple management actions have been implemented in the United States that either directly or indirectly address the known sources of mortality for loggerhead sea turtles (*e.g.*, fishery interactions, power plant entrainment, destruction of nesting beaches, etc.).

One of the difficulties associated with using loggerhead nesting trend data as an indicator of subpopulation status is the late age to maturity for loggerhead sea turtles. Past literature gave an estimated age at maturity for loggerhead sea turtles of 21-35 years (Frazer and Ehrhart 1985; Frazer *et al.* 1994) with the benthic immature stage lasting at least 10-25 years. New data from tag returns, strandings, and nesting surveys suggested estimated ages of maturity ranging from 20-38 years and the benthic immature stage lasting from 14-32 years (NMFS SEFSC 2001). Caution must still be exercised, however, when defining the benthic immature stage. Like other sea turtles, loggerhead hatchlings enter the pelagic environment upon leaving the nesting beach.

It had previously been thought that after approximately 7-12 years in the pelagic environment, immature loggerheads entered the benthic environment and undertook seasonal north and south migrations along the coast. However, the use of pelagic and benthic environments by loggerhead sea turtles is now suspected of being much more complex (Witzell 2002). Loggerheads may remain in the pelagic environment for longer periods of time or move back and forth between the pelagic and benthic environment (Witzell 2002). Captures of sea turtles in the U.S. pelagic longline fishery have shown that large loggerhead sea turtles (mature and/or immature) routinely inhabit offshore habitats during non-winter months in the northwest North Atlantic Ocean (Witzell 2002). It has been suggested that some of these turtles might be associated with warm water fronts and eddies and might form offshore feeding aggregations in areas of high productivity (Witzell 2002; 1999).

In 2001, NMFS SEFSC reviewed and updated the stock assessment for loggerhead sea turtles of the western Atlantic (NMFS SEFSC 2001). The assessment reviewed and updated information on nesting abundance and trends, estimation of vital rates (including age to maturity), evaluation of genetic relationships between populations, and evaluation of available data on other anthropogenic effects on these populations since the TEWG reports (2000; 1998). In addition, the assessment also looked at the impact of the U.S. pelagic longline fishery on loggerheads with and without the proposed changes in the Turtle Excluder Device (TED) regulations for the shrimp fishery using a modified population model from Heppell *et al*. (2003). NMFS SEFSC (2001) modified the model developed by Heppell *et al*. (2003) to include updated vital rate information (*e.g.*, new estimates of the duration of life stages and time to maturity) and, unlike Heppell *et al*. (2003), also considered sex ratios other than 1:1 (NMFS SEFSC 2001).

NMFS SEFSC (2001) constructed four different models that differed based on the duration of life stages. Each model was run using three different inputs for population growth, and three different sex ratios (35%, 50%, and 80% female) for a total of 36 model runs. The models also included a 30% decrease in small benthic juvenile mortality based on research findings of (existing) TED effectiveness (Crowder *et al*. 1995; NMFS SEFSC 2001; Heppell *et al*. 2003). The results of the modeling indicated that the proposed change in the TED regulations that would allow larger benthic immature loggerheads and sexually mature loggerheads to escape from shrimp trawl gear would have a positive or at least stabilizing influence on the subpopulation (depending on the estimated growth rate of the subpopulation and proportion of females) in nearly all scenarios.

Coupling the anticipated effect of the proposed TED changes with changes in the survival rate of pelagic immature loggerheads revealed that subpopulation status would be positive or at least stable when pelagic immature survival was changed by 0 to +10% in all but the most conservative model scenarios. As described below, measures to improve the effectiveness of TEDs in the shrimp trawl fishery and measures to improve the survival of immature loggerhead sea turtles affected by operation of the U.S. Atlantic longline fishery for swordfish have been implemented. However, given the late age at maturity for loggerhead sea turtles and the normal fluctuations in nesting, changes in populations size as a result of the larger TED requirements and pelagic longline measures are unlikely to be evident in loggerhead nesting beach censuses for many years to come.

Anthropogenic effects to loggerhead sea turtles
The diversity of a sea turtle's life history leaves them susceptible to many natural and human impacts, including impacts while they are on land, in the benthic environment, and in the pelagic environment. Hurricanes are particularly destructive to sea turtle nests. Sand accretion and rainfall that result from these storms as well as wave action can appreciably reduce hatchling success. For example, in 1992, all of the eggs over a 90-mile length of coastal Florida were destroyed by storm surges on beaches that were closest to the eye of Hurricane Andrew (Milton *et al.* 1994). Other sources of natural mortality include cold stunning and biotoxin exposure.

Anthropogenic factors that impact hatchlings and adult female turtles on land, or the success of nesting and hatching include: beach erosion, beach armoring and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; beach driving; coastal construction and fishing piers; exotic dune and beach vegetation; and poaching. An increased human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, feral hogs, dogs and an increased presence of native species (*e.g.*, raccoons, armadillos, and opossums) which raid and feed on turtle eggs. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (in areas like Merritt Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection. Sea turtle nesting and hatching success on unprotected high density east Florida nesting beaches from Indian River to Broward County are affected by all of the above threats.

Sea turtles, including loggerhead sea turtles, are affected by a completely different set of anthropogenic threats in the marine environment. These include oil and gas exploration, coastal development, and transportation; marine pollution; underwater explosions; hopper dredging, offshore artificial lighting; power plant entrainment and/or impingement; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; poaching, and fishery interactions.
In the pelagic environment loggerheads are exposed to a series of longline fisheries that include the U.S. Atlantic tuna and swordfish longline fisheries, a Japanese longline fleet, Chinese longline fleet, an Azorean longline fleet, a Spanish longline fleet, and various fleets in the Mediterranean Sea (Aguilar *et al.* 1995; Bolten *et al.* 1994; Crouse 1999). Globally, the number of loggerhead sea turtles captured in pelagic longline fisheries is significant (Lewison *et al.* 2004). The effects of the U.S. tuna and swordfish longline fisheries on loggerhead sea turtles have been assessed through section 7 consultation on the Highly Migratory Species Fishery Management Plan (HMS FMP). In it, NMFS estimates that 1,869 loggerheads will be captured in the pelagic longline fishery (no more than 438 mortalities) for the 3-year period from 2004-2006. For each subsequent 3-year period, 1,905 loggerheads are expected to be taken with no more than 339 mortalities (NMFS 2004).

In the benthic environment in waters off the coastal U.S., loggerheads are exposed to a suite of fisheries in federal and state waters including trawl, purse seine, hook and line, gillnet, pound net, longline, and trap fisheries. Perhaps the most well documented U.S. fishery with respect to interactions with sea turtles, including loggerheads, is the U.S. shrimp fishery. NMFS continues to address the effects of this fishery on loggerheads as well as other sea turtle species. Turtle Excluder Devices have proven to be effective at excluding Kemp's ridley sea turtles and some age classes of loggerhead and green sea turtles from shrimp trawls. However, it was apparent that TEDs were not effective at excluding large benthic immature and sexually mature loggerheads (as well as large greens) from shrimp trawls (Epperly and Teas 2002). Therefore, on February 21, 2003, NMFS issued a final rule that required increasing the size of TED escape openings to allow larger loggerheads (and green sea turtles) to escape from shrimp trawl gear. As a result of the new rules, annual loggerhead mortality from capture in shrimp trawls is expected to decline from 62,294 to 3,947 turtles (Epperly *et al.* 2002).

Power plants can also pose a danger of injury and mortality for benthic loggerheads. In Florida, thousands of sea turtles have been entrained in the St. Lucie Nuclear Power Plant's intake canal over the past couple of decades (Bresette *et al*. 2003). From May 1976 - November 2001, 7,795 sea turtles were captured in the intake canal (Bresette *et al*. 2003). Approximately 57% of these were loggerheads (Bresette *et al*. 2003). Procedures are in place to capture the entrained turtles and release them. This has helped to keep mortality below 1% since 1990 (Bresette *et al*. 2003). The Oyster Creek Nuclear Generating Station in New Jersey is also known to capture sea turtles although the numbers are far less than those observed at St. Lucie, FL. As is the case at St. Lucie, procedures are in place for checking for the presence of sea turtles and rescuing sea turtles that are found within the intake canals.

Summary of Status for Loggerhead Sea Turtles
There are at least five western Atlantic loggerhead subpopulations (NMFS SEFSC 2001; TEWG 2000; Márquez 1990). Cohorts from all of these, are expected to occur within the action area of this consultation (Bass *et al*. 2004). The south Florida nesting group is the largest known loggerhead nesting assemblage in the Atlantic and one of only two loggerhead nesting assemblages worldwide that have greater than 10,000 females nesting per year (USFWS and NMFS 2003; USFWS Fact Sheet). The northern subpopulation is the second largest loggerhead nesting assemblage within the United States. The remaining three subpopulations (the Dry Tortugas, Florida Panhandle, and Yucatán) are much smaller subpopulations with nest counts ranging from roughly 100 - 1,000 nests per year.

Loggerheads are a long-lived species and reach sexual maturity relatively late; 20-38 years (NMFS SEFSC 2001). The INBS program helps to track loggerhead status through nesting beach surveys. However, given the cyclical nature of loggerhead nesting, and natural events that sometimes cause destruction of many nests in a nesting season, multiple years of nesting data are needed to detect relevant nesting trends in the population. The INBS program has not been in place long enough to provide statistically reliable information on the subpopulation trends for western Atlantic loggerheads. In addition, given the late age of maturity for loggerhead sea turtles, nesting data represents effects to female loggerheads that have occurred through the various life stages over the past couple of decades. Therefore, caution must be used when interpreting nesting trend data since they may not be reflective of the current subpopulation trend if effects to the various life stages have changed.

NMFS SEFSC (2001) took an alternative approach for looking at trends in loggerhead subpopulations. Using multiple model scenarios that varied based on differences in starting growth rates, sex ratios, and age to maturity, the model looked at the relative change in the subpopulation trend when mortality of pelagic immature, benthic immature, and mature loggerhead sea turtles was reduced as a result of changes to the U.S. shrimp trawl fishery and the U.S. Atlantic pelagic longline fishery for swordfish.

The modeling work suggests that western Atlantic loggerhead subpopulations should increase as a result of implementation of the new TED regulations that substantially reduce mortality of large, benthic immature and sexually mature loggerheads combined with a reduction in mortality of pelagic immature loggerheads resulting from implementation of new measures for the U.S. pelagic longline fishery. Even in the absence of a reduction in pelagic immature mortality from changes to the pelagic longline fishery, the model work supports the conclusion that the trend for western Atlantic loggerhead subpopulations will move from declining to stable (with an initial growth rate of 0.97, average age to maturity of 39 years, and a sex ratio of 35% females) or from declining to increasing (with an initial growth rate of 0.97, average age to maturity of 39 years, and female sex ratio of 50%) (NMFS SEFSC 2001) given the reduction in mortality of large benthic immature and mature loggerheads as a result of changes to the TED requirements for the shrimp trawl fishery.

Leatherback sea turtle
Leatherback sea turtles are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic and Pacific Oceans, the Caribbean Sea, and the Gulf of Mexico (Ernst and Barbour 1972). Leatherback sea turtles are the largest living turtles and range farther than any other sea turtle species. Their large size and tolerance of relatively low temperatures allows them to occur in northern waters such as off Labrador and in the Barents Sea (NMFS and USFWS 1995). In 1980, the global population of adult female leatherbacks was estimated at approximately 115,000 (Pritchard 1982). By 1995, this global population of adult females had declined to 34,500 (Spotila *et al.* 1996).

Evidence from tag returns and strandings in the western Atlantic suggests that adult leatherback sea turtles engage in routine migrations between boreal, temperate and tropical waters (NMFS and USFWS 1992). A 1979 aerial survey of the outer Continental Shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia showed leatherbacks to be present throughout the area with the most numerous sightings made from the Gulf of Maine south to Long Island. Leatherbacks were sighted in water depths ranging from 1-4151 m but 84.4% of sightings were in waters less than 180 m (Shoop and Kenney 1992). Leatherbacks were sighted in waters within a sea surface temperature range similar to that observed for loggerheads; from 7-27^{o}C (Shoop and Kenney 1992). However, they appear to have a greater tolerance for colder waters in comparison to loggerhead sea turtles since more leatherbacks were found at the lower temperatures as compared to loggerheads (Shoop and Kenney 1992).

The aerial survey estimated the leatherback population for the northeastern U.S. at approximately 300-600 animals (from near Nova Scotia, Canada to Cape Hatteras, North Carolina). However, the estimate was based on turtles visible at the surface and does not include those that were below the surface out of view. Therefore, it likely underestimates the leatherback population for the northeastern U.S. Estimates of leatherback abundance of 1,052 turtles (C.V.= 0.38) and 1,174 turtles (C.V.= 0.52) were obtained from surveys conducted from Virginia to the Gulf of St. Lawrence in 1995 and 1998, respectively (Palka 2000). However, since these estimates were also based on sightings of leatherbacks at the surface, the author considered the estimates to be negatively biased with true abundance of leatherbacks perhaps being 4.27 times the estimates (Palka 2000).

Leatherbacks are a long-lived species (> 30 years). They mature at a younger age than loggerhead turtles, with an estimated age at sexual maturity of about 13-14 years for females with 9 years reported as a likely minimum (Zug and Parham 1996) and 19 years as a likely maximum (NMFS SEFSC 2001). In the U.S. and Caribbean, female leatherbacks nest from March through July. They nest frequently (up to 7 nests per year) during a nesting season and nest about every 2-3 years. They produce 100 eggs or more in each clutch/nest (Schultz 1975). However, a significant portion (up to approximately 30%) of the eggs can be infertile. Thus, the actual proportion of eggs that can result in hatchlings is less than this seasonal estimate. As is the case with other sea turtle species, leatherback hatchlings enter the water soon after hatching. Based on a review of all sightings of leatherback sea turtles of <145 cm curved carapace length

(CCL), Eckert (1999) found that leatherback juveniles remain in waters warmer than 26°C until they exceed 100 cm CCL.

Leatherbacks are predominantly a pelagic species and feed on jellyfish (*i.e.*, *Stomolophus, Chryaora*, and *Aurelia* (Rebel 1974)), and tunicates (salps, pyrosomas). Leatherbacks may come into shallow waters if there is an abundance of jellyfish nearshore. For example, leatherbacks occur annually in Cape Cod Bay and Vineyard and Nantucket Sounds during the summer and fall months.

Data collected in southeast Florida clearly indicate increasing numbers of nests for the past twenty years (9.1-11.5% increase), although it is critical to note that there was also an increase in the survey area in Florida over time (NMFS SEFSC 2001). The largest leatherback rookery in the western Atlantic remains along the northern coast of South America in French Guiana and Suriname. More than half the present world leatherback population is estimated to be nesting on the beaches in and close to the Marowijne River Estuary in Suriname and French Guiana (Hilterman and Goverse 2004). Nest numbers in Suriname have shown an increase and the long-term trend for the Suriname and French Guiana nesting group seems to show an increase (Hilterman and Goverse 2004). In 2001, the number of nests for Suriname and French Guiana combined was 60,000, one of the highest numbers observed for this region in 35 years (Hilterman and Goverse 2004). Studies by Girondot *et al*. (in press) also suggest that the trend for the Suriname - French Guiana nesting population over the last 36 years is stable or slightly increasing.

Tag return data emphasize the link between these South American nesters and animals found in U.S. waters. For example, a nesting female tagged May 29, 1990, in French Guiana was later recovered and released alive from the York River, VA. Another nester tagged in French Guiana on June 21, 1990, was later found dead in Palm Beach, Florida (STSSN). Many other examples also exist. For example, leatherbacks tagged at nesting beaches in Costa Rica have been found in Texas, Florida, South Carolina, Delaware, and New York (STSSN database). Leatherback turtles tagged in Puerto Rico, Trinidad, and the Virgin Islands have also been subsequently found on U.S. beaches of southern, Mid-Atlantic and northern states (STSSN database).

Of the Atlantic turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear. This susceptibility may be the result of their body type (large size, long pectoral flippers, and lack of a hard shell), and their attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, and perhaps to the lightsticks used to attract target species in longline fisheries. They are also susceptible to entanglement in gillnets (used in various fisheries) and capture in trawl gear (*e.g.*, shrimp trawls). Sea turtles entangled in fishing gear generally have a reduced ability to feed, dive, surface to breathe or perform any other behavior essential to survival (Balazs 1985). They may be more susceptible to boat strikes if forced to remain at the surface, and entangling lines can constrict blood flow resulting in tissue necrosis.

Leatherbacks are exposed to pelagic longline fisheries in many areas of their range. According to observer records, an estimated 6,363 leatherback sea turtles were caught by the U.S. Atlantic tuna and swordfish longline fisheries between 1992-1999, of which 88 were released dead (NMFS SEFSC 2001). Since the U.S. fleet accounts for only 5-8% of the hooks fished in the Atlantic Ocean, adding up the under-represented observed takes of the other 23 countries actively fishing in the area would likely result in annual take estimates of thousands of leatherbacks over different life stages (NMFS SEFSC 2001). Leatherbacks are susceptible to entanglement in the lines associated with trap/pot gear used in several fisheries. From 1990-2000, 92 entangled leatherbacks were reported from New York through Maine (Dwyer *et al.* 2002). Additional leatherbacks stranded wrapped in line of unknown origin or with evidence of a past entanglement (Dwyer *et al.* 2002). A review of leatherback mortality documented by the STSSN in Massachusetts suggests that vessel strikes and entanglement in fixed gear (primarily lobster pots and whelk pots) are the principal sources of this mortality (Dwyer *et al.* 2002). Fixed gear fisheries in the Mid-Atlantic have also contributed to leatherback entanglements. For example, in North Carolina, two leatherback sea turtles were reported entangled in a crab pot buoy inside Hatteras Inlet (D. Fletcher, pers. comm. to Sheryan Epperly, NMFS SEFSC 2001). A third leatherback was reported entangled in a crab pot buoy in Pamlico Sound off of Ocracoke. This turtle was disentangled and released alive (D. Fletcher, pers. comm. to Sheryan Epperly, NMFS SEFSC 2001). However, lacerations on the front flippers from the lines were evident (D. Fletcher, pers. comm. to Sheryan Epperly, NMFS SEFSC 2001).

In the Southeast, leatherbacks are vulnerable to entanglement in Florida's lobster pot and stone crab fisheries as documented on stranding forms. In the U.S. Virgin Islands, where one of five leatherback strandings from 1982 to 1997 were due to entanglement (Boulon 2000), leatherbacks have been observed with their flippers wrapped in the line of West Indian fish traps (R. Boulon, pers. comm. to Joanne Braun-McNeill, NMFS SEFSC 2001). Since many entanglements of this typically pelagic species likely go unnoticed, entanglements in fishing gear may be much higher.

Leatherback interactions with the southeast shrimp fishery, which operates from North Carolina through southeast Florida (NMFS 2002), are also common. The National Research Council (NRC) Committee on Sea Turtle Conservation identified incidental capture in shrimp trawls as the major anthropogenic cause of sea turtle mortality (NRC 1990). Leatherbacks are likely to encounter shrimp trawls working in the coastal waters off the Atlantic coast (from Cape Canaveral, Florida through North Carolina) as they make their annual spring migration north. For many years, TEDs that were required for use in the southeast shrimp fishery were less effective for leatherbacks as compared to the smaller, hard-shelled turtle species, because the TED openings were too small to allow leatherbacks to escape. To address this problem, on February 21, 2003, NMFS issued a final rule to amend the TED regulations. Modifications to the design of TEDs are now required in order to exclude leatherbacks as well as large benthic immature and sexually mature loggerhead and green turtles.

Other trawl fisheries are also known to interact with leatherback sea turtles although on a much smaller scale. In October 2001, for example, a fisheries observer documented the take of a leatherback in a bottom otter trawl fishing for *Loligo* squid off of Delaware. TEDs are not required in this fishery.

Gillnet fisheries operating in the nearshore waters of the Mid-Atlantic states are also suspected of capturing, injuring and/or killing leatherbacks when these fisheries and leatherbacks co-occur. Data collected by the NEFSC Fisheries Observer Program from 1994 through 1998 (excluding 1997) indicate that a total of 37 leatherbacks were incidentally captured (16 lethally) in drift gillnets set in offshore waters from Maine to Florida during this period. Observer coverage for this period ranged from 54% to 92%. In North Carolina, a leatherback was reported captured in a gillnet set in Pamlico Sound in the spring of 1990 (D. Fletcher, pers.comm. to Sheryan Epperly, NMFS SEFSC 2001). It was released alive by the fishermen after much effort. Five other leatherbacks were released alive from nets set in North Carolina during the spring months: one was from a net (unknown gear) set in the nearshore waters near the North Carolina/Virginia border (1985); two others had been caught in gillnets set off of Beaufort Inlet (1990); a fourth was caught in a gillnet set off of Hatteras Island (1993), and a fifth was caught in a sink net set in New River Inlet (1993). In addition to these, in September 1995 two dead leatherbacks were removed from a large (11-inch) monofilament shark gillnet set in the nearshore waters off of Cape Hatteras, North Carolina (STSSN unpublished data reported in NMFS SEFSC 2001).

Poaching is not known to be a problem for nesting populations in the continental U.S. However, the NMFS SEFSC (2001) noted that poaching of juveniles and adults was still occurring in the U.S. Virgin Islands. In all, four of the five strandings in St. Croix were the result of poaching (Boulon 2000). A few cases of fishermen poaching leatherbacks have been reported from Puerto Rico, but most of the poaching is on eggs.

Leatherback sea turtles may be more susceptible to marine debris ingestion than other species due to their pelagic existence and the tendency of floating debris to concentrate in convergence zones that adults and juveniles use for feeding areas and migratory routes (Lutcavage *et al.* 1997; Shoop and Kenney 1992). Investigations of the stomach contents of leatherback sea turtles revealed that a substantial percentage (44% of the 16 cases examined) contained plastic (Mrosovsky 1981). Along the coast of Peru, intestinal contents of 19 of 140 (13%) leatherback carcasses were found to contain plastic bags and film (Fritts 1982). The presence of plastic debris in the digestive tract suggests that leatherbacks might not be able to distinguish between prey items and plastic debris (Mrosovsky 1981). Balazs (1985) speculated that the object may resemble a food item by its shape, color, size or even movement as it drifts about, and induce a feeding response in leatherbacks.

It is important to note that, like marine debris, fishing gear interactions and poaching are problems for leatherbacks throughout their range. Entanglements are common in Canadian waters where Goff and Lien (1988) reported that 14 of 20 leatherbacks encountered off the coast of Newfoundland/Labrador were entangled in fishing gear including salmon net, herring net, gillnet, trawl line and crab pot line. Leatherbacks are known to drown in fish nets set in coastal waters of Sao Tome, West Africa (Castroviejo *et al.* 1994; Graff 1995). Gillnets are one of the suspected causes for the decline in the leatherback sea turtle population in French Guiana (Chevalier *et al.* 1999), and gillnets targeting green and hawksbill turtles in the waters of coastal Nicaragua also incidentally catch leatherback turtles (Lagueux *et al.* 1998). Observers on shrimp trawlers operating in the northeastern region of Venezuela documented the capture of six leatherbacks from 13,600 trawls (Marcano and Alio 2000). An estimated 1,000 mature female leatherback sea turtles are caught annually in fishing nets off of Trinidad and Tobago with mortality estimated to be between 50-95% (Eckert and Lien 1999). However, many of the turtles do not die as a result of drowning, but rather because the fishermen butcher them in order to get them out of their nets (NMFS SEFSC 2001).

Summary of Leatherback Status
The largest leatherback rookery in the western Atlantic remains along the northern coast of South America in French Guiana and Suriname. More than half the present world leatherback population is estimated to be nesting on the beaches in and close to the Marowijne River Estuary in Suriname and French Guiana (Hilterman and Goverse 2004). Nest numbers in Suriname have shown an increase and the long-term trend for the Suriname and French Guiana nesting group seems to show an increase (Hilterman and Goverse 2004). In 2001, the number of nests for Suriname and French Guiana combined was 60,000, one of the highest numbers observed for this region in 35 years (Hilterman and Goverse 2004). Studies by Girondot *et al*. (in press) also suggest that the trend for the Suriname - French Guiana nesting population over the last 36 years is stable or slightly increasing.

Some of the same factors that led to precipitous declines of leatherbacks in the Pacific also affect leatherbacks in the Atlantic. Leatherbacks are captured and killed in many kinds of fishing gear and interact with fisheries in U.S. state and federal waters as well as in international waters. Poaching is a problem and affects leatherbacks that occur in U.S. waters. Leatherbacks also appear to be more susceptible to death or injury from ingesting marine debris than other turtle species.

Kemp's Ridley Sea Turtle
The Kemp's ridley is one of the most endangered of the worlds sea turtle species. The only major nesting site for ridleys is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). Estimates of the adult female nesting population reached a low of 300 in 1985. Conservation efforts by Mexican and U.S. agencies have aided this species by eliminating egg harvest, protecting eggs and hatchlings, and reducing at-sea mortality through fishing regulations. From 1985 to 1999, the number of nests observed at Rancho Nuevo, and nearby beaches increased at a mean rate of 11.3% (95% C.I. slope = 0.096-0.130) per year. Current totals exceed 3000 nests per year, allowing cautious optimism that the

population is on its way to recovery (TEWG 2000). Nevertheless, the estimated 2,000 nesting females in the current population is still far below historical numbers (Stephens and Alvarado-Bremer 2003).

Kemp's ridley nesting occurs from April through July each year. Little is known about mating but it is believed to occur at or before the nesting season in the vicinity of the nesting beach. Hatchlings emerge after 45-58 days. Once they leave the beach, neonates presumably enter the Gulf of Mexico where they feed on available sargassum and associated infauna or other epipelagic species (USFWS and NMFS 1992). The presence of juvenile turtles along both the Atlantic and Gulf of Mexico coasts of the U.S., where they are recruited to the coastal benthic environment, indicates that post-hatchlings are distributed in both the Gulf of Mexico and Atlantic Ocean (TEWG 2000). The location and size classes of dead turtles recovered by the STSSN suggests that benthic immature developmental areas occur in many areas along the U.S. coast and that these areas may change given resource quality and quantity (TEWG 2000).

Next to loggerheads, Kemp's ridleys are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June (Keinath *et al.* 1987; Musick and Limpus 1997). In the Chesapeake Bay, where the juvenile population of Kemp's ridley sea turtles is estimated to be 211 to 1,083 turtles (Musick and Limpus 1997), ridleys frequently forage in submerged aquatic grass beds for crabs (Musick and Limpus 1997). Kemp's ridley's consume a variety of crab species, including *Callinectes* sp., *Ovalipes* sp., *Libinia* sp., and *Cancer* sp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal 1997). Upon leaving Chesapeake Bay in autumn, juvenile ridleys migrate down the coast, passing Cape Hatteras in December and January (Musick and Limpus 1997). These larger juveniles are joined there by juveniles of the same size from North Carolina sounds and smaller juveniles from New York and New England to form one of the densest concentrations of Kemp's ridleys outside of the Gulf of Mexico (Musick and Limpus 1997; Epperly *et al.* 1995a; Epperly *et al.* 1995b).

Kemp's ridleys face many of the same natural threats as loggerheads, including destruction of nesting habitat from storm events, natural predators at sea, and oceanic events such as cold-stunning. Although cold-stunning can occur throughout the range of the species, it may be a greater risk for sea turtles that utilize the more northern habitats of Cape Cod Bay and Long Island Sound. For example, in the winter of 1999/2000, there was a major cold-stunning event where 218 Kemp's ridleys, 54 loggerheads, and 5 green turtles were found on Cape Cod beaches (R. Prescott, pers. comm.). Annual cold stun events do not always occur at this magnitude; the extent of episodic major cold stun events may be associated with numbers of turtles utilizing Northeast waters in a given year, oceanographic conditions and the occurrence of storm events in the late fall. Although many cold-stun turtles can survive if found early enough, cold-stunning events can represent a significant cause of natural mortality.

Like other turtle species, the severe decline in the Kemp's ridley population appears to have been heavily influenced by a combination of exploitation of eggs and impacts from fishery interactions. From the 1940s through the early 1960s, nests from Ranch Nuevo were heavily exploited (USFWS and NMFS 1992), but beach protection in 1966 helped to curtail this activity (USFWS and NMFS 1992). Following World War II, there was a substantial increase in the number of trawl vessels, particularly shrimp trawlers, in the Gulf of Mexico where the adult Kemp's ridley turtles occur. Information from fishers helped to demonstrate the high number of turtles taken in these shrimp trawls (USFWS and NMFS 1992). Subsequently, NMFS has worked with the industry to reduce turtle takes in shrimp trawls and other trawl fisheries, including the development and use of TEDs.

Although changes in the use of shrimp trawls and other trawl gear has helped to reduce mortality of Kemp's ridleys, this species is also affected by other sources of anthropogenic impacts similar to those discussed above. For example, in the spring of 2000, a total of five Kemp's ridley carcasses were recovered from the same North Carolina beaches where 275 loggerhead carcasses were found. Cause of death for most of the turtles recovered was unknown, but the mass mortality event was suspected to have been from a large-mesh gillnet fishery operating offshore in the preceding weeks. The five ridley carcasses that were found are likely to have been only a minimum count of the number of Kemp's ridleys that were killed or seriously injured as a result of the fishery interaction since it is unlikely that all of the carcasses washed ashore.

Summary of Kemp's Ridley Status
The only major nesting site for ridleys is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). From 1985 to 1999, the number of nests observed at Rancho Nuevo, and nearby beaches increased at a mean rate of 11.3% per year. Current totals exceed 3000 nests per year (TEWG 2000). Kemp's ridleys mature at an earlier age (7 - 15 years) than other chelonids, thus 'lag effects' as a result of unknown impacts to the non breeding life stages would likely have been seen in the increasing nest trend beginning in 1985 (USFWS and NMFS 1992). While there is cautious optimism that the Kemp's ridley sea turtle population is increasing, the estimated 2,000 nesting females in the current population is still far below historical numbers (Stephens and Alvarado-Bremer 2003). Anthropogenic impacts to the Kemp's ridley population are similar to those discussed above for loggerhead sea turtles.

Green Sea Turtles
Green turtles are distributed circumglobally in tropical and subtropical waters (NMFS and USFWS 1998b). Juveniles are also known to occur seasonally in temperate waters (Musick and Limpus 1997; Morreale and Standora 1998). Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas, shifting to a chiefly herbivorous diet but may also consume jellyfish, salps, and sponges (Bjorndal 1997).

Green sea turtle populations have declined in many areas. A review of 32 Index Sites (all the major known nesting areas and some lesser areas for which quantitative data is available) distributed globally revealed a 48% to 67% decline in the number of mature females nesting annually over the last 3-generations (Seminoff 2004).

In the western Atlantic, green sea turtles range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean (Wynne and Schwartz 1999). Green turtles were traditionally highly prized for their flesh, fat, eggs, and shell, and directed fisheries in the United States and throughout the Caribbean are largely to blame for the decline of the species. In the Gulf of Mexico, green turtles were once abundant enough in the shallow bays and lagoons to support a commercial fishery. In 1890, over one million pounds of green turtles were taken in the Gulf of Mexico green sea turtle fishery (Doughty 1984). However, declines in the turtle fishery throughout the Gulf of Mexico were evident by 1902 (Doughty 1984).

In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). Occasional nesting has been documented along the Gulf coast of Florida, at southwest Florida beaches, as well as the beaches on the Florida Panhandle (Meylan *et al.* 1995). More recently, green turtle nesting occurred on Bald Head Island, North Carolina just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Certain Florida nesting beaches have been designated index beaches. Index beaches were established to standardize data collection methods and effort on key nesting beaches. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the ten years of regular monitoring since establishment of the index beaches in 1989, perhaps due to increased protective legislation throughout the Caribbean (Meylan *et al.* 1995). Seminoff (2004) reviewed the population estimates for green sea turtles at five western Atlantic nesting sites. All of these showed increased nesting compared to prior estimates with the exception of nesting at Aves Island, Venezuela (Seminoff 2004).

Some of the principal green sea turtle foraging areas in the western Atlantic Ocean include the upper west coast of Florida and the northwestern coast of the Yucatán Peninsula. Additional important foraging areas in the western Atlantic include the Mosquito and Indian River Lagoon systems and nearshore wormrock reefs between Sebastian and Ft. Pierce Inlets in Florida, Florida Bay, the Culebra archipelago and other Puerto Rico coastal waters, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). In North Carolina, green turtles are known to occur in estuarine and oceanic waters and to nest in low numbers along the entire coast. The summer developmental habitat for green turtles also encompasses estuarine and coastal waters of Chesapeake Bay and as far north as Long Island Sound (Musick and Limpus 1997).

Green turtles face many of the same natural threats as loggerhead and Kemp's ridley sea turtles. In addition, green turtles appear to be susceptible to fibropapillomatosis, an epizootic disease producing lobe-shaped tumors on the soft portion of a turtles body. Juveniles are most commonly affected. The occurrence of fibropapilloma tumors may result in impaired foraging, breathing, or swimming ability, leading potentially to death. Stranding reports indicate that between 200-400 green turtles strand annually along the Eastern U.S. coast from a variety of causes most of which are unknown (STSSN database).

As with the other sea turtle species, fishery mortality accounts for a large proportion of annual human-caused mortality outside the nesting beaches, while other activities like dredging, pollution, and habitat destruction account for an unknown level of other mortality. Sea sampling coverage in the pelagic driftnet, pelagic longline, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles.

Summary of Green Sea Turtle Status
Green sea turtle populations have declined in many areas; as much as a 48% to 67% decline in the number of mature females nesting annually over the last 3-generations (Seminoff 2004). Seminoff (2004) concluded that declines in green turtle nesting were evident for many of the Indian Ocean Index Sites. While several of these had not demonstrated further declines in the more recent past, only the Comoros Island Index Site in the Western Indian Ocean showed evidence of increased nesting (Seminoff 2004).

In the Pacific, green turtles continue to be affected by poaching, fishing gear interactions, habitat degradation, and disease (notably fibropappillomatosis) (NMFS and USFWS 1998b; NMFS 2004). Green turtles face many of the same threats in the Atlantic. In the western Atlantic, green turtles range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean (Wynne and Schwartz 1999) and are exposed to many of the same anthropogenic threats as loggerhead and Kemp's ridley sea turtles. In addition, Atlantic green turtles are also susceptible to fibropapillomatosis which can result in death. In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the ten years of regular monitoring since establishment of index beaches in 1989. However, age at sexual maturity is estimated to be between 20 to 50 years (Balazs 1982; Frazer and Ehrhart 1985). Thus, caution is warranted about over interpreting nesting trend data collected for less than 15 years.

Harbor seal
Harbor seals are year-round inhabitants of the coastal waters of eastern Canada and Maine, and occur seasonally along the southern New England and New York coasts from September through late-May. However, breeding and pupping normally occur only in waters north of the New Hampshire/Maine

border. Since passage of the MMPA in 1972, the number of seals found along the New England coast has increased nearly five-fold with the number of pups seen along the Maine coast increasing at an annual rate of 12.9 percent during the 1981-1997 period (Gilbert and Guldager 1998). The minimum population estimate for the harbor seal is 30,990 based on uncorrected total counts along the Maine coast in 1997 (Waring et al. 2004).

Harbor seals are taken in sink gillnet gear used in the groundfish fishery. Waring et al. (2004) has described the estimated total take of harbor seals in all fisheries (972) to be below the PBR of 5,493 established for that species.

Gray seal
The gray seal is found on both sides of the North Atlantic, with the western North Atlantic population occurring from New England to Labrador. There are two breeding concentrations in eastern Canada; one at Sable Island and one that breeds on the pack ice in the Gulf of St. Lawrence. There are several small breeding colonies on isolated islands along the coast of Maine and on outer Cape Cod and Nantucket Island in Massachusetts (Waring et al. 2004). The population estimates for the Sable Island and Gulf of St Lawrence breeding groups was 143,000 in 1993. The gray seal population in Massachusetts has increased from 2,010 in 1994 to 5,611 in 1999, although it is not clear how much of this increase may be due to animals emigrating from northern areas. Approximately 150 gray seals have been observed on isolated islands off Maine.

Gray seals are taken in sink gillnet gear. Waring et al. (2004) has described the estimated total fishery-related takes of gray seals in U.S. waters relative to population size as unknown, but likely very low.

Harp seal
The harp seal occurs throughout much of the North Atlantic and Arctic Oceans, and has been increasing off the East Coast of the United States from Maine to New Jersey. Harp seals are usually found off the U.S. from January to May when the western stock of harp seals is at their most southern point of migration (Waring et al. 2004). This species congregates on the edge of the pack ice in February through April when breeding and pupping takes place. The harp seal is highly migratory, moving north and south with the edge of the pack ice. Non-breeding juveniles will migrate the farthest south in the winter, but the entire population moves north toward the Artic in the summer. The minimum population estimate for the western North Atlantic is 5.2 million seals.

A large number of harp seals are killed in Canada, Greenland and the Artic. The Canadian kill is controlled by DFO who set the allowed kill at 275,000 in 1997. Mortality in Greenland and the Artic may exceed 100,000 (Waring et al. 2004). Harp seals are also taken in sink gillnet gear used to catch multispecies. Waring et al. (2004) has described the estimated total take of harp seals from 1959 to 1999 in all fisheries to range between 78 and 694 animals depending on the location of the pack ice edge which drives the seals farther south into the range of the sink gillnet fishery. Even with the highest takes observed, the take is well below the PBR of 156,000 established for that species.

4.4.3 Actions to Minimize Interactions with Protected Species

Many of the factors that serve to mitigate the impacts of the multispecies fishery on protected species are currently being implemented in the Northeast Region under either the Atlantic Large Whale Take Reduction Plan (ALWTRP) or the Harbor Porpoise Take Reduction Plan (HPTRP). In addition, the Multispecies FMP has undergone repeated consultations pursuant to Section 7 of the Endangered Species Act (ESA), with the most recent Biological Opinion dated June 14, 2001. The conclusion in that Opinion states that the multispecies fishery is likely to jeopardize the continued existence of the North Atlantic right whale, and required NMFS to implement a set of Reasonable and Prudent Alternatives (RPAs) to remedy the jeopardy finding. As described below, the regulatory measures of the ALWTRP and the HPTRP have been implemented in direct response to the impacts of fishing operations taking place under the Multispecies FMP (and others) and must be adhered to by any vessel fishing for multispecies.

4.4.3.1 Harbor Porpoise Take Reduction Plan

NMFS published the rule implementing the Harbor Porpoise Take Reduction Plan on December 1, 1998. The HPTRP includes measures for gear modifications and area closures, based on area, time of year, and gillnet mesh size. In general, the Gulf of Maine component of the HPTRP includes time and area closures, some of which are complete closures; others are closures to gillnet fishing unless pingers (acoustic deterrent devices) are used in the prescribed manner. The Mid-Atlantic component includes time and area closures in which gillnet fishing is prohibited regardless of the gear specifications.

4.4.3.2 Atlantic Large Whale Take Reduction Plan

The ALWTRP contains a series of regulatory measures designed to reduce the likelihood of fishing gear entanglements of right, humpback, fin, and minke whales in the North Atlantic. The main tools of the plan include a combination of broad gear modifications and time/area closures (which are being supplemented by progressive gear research), expanded disentanglement efforts, extensive outreach efforts in key areas, and an expanded right whale surveillance program to supplement the Mandatory Ship Reporting System.

Key regulatory changes implemented in 2002 included: 1) new gear modifications; 2) implementation of a Dynamic Area Management system (DAM) of short-term closures to protect unexpected concentrations of right whales in the Gulf of Maine; and 3) establishment of a Seasonal Area Management system (SAM) of additional gear modifications to protect known seasonal concentrations of right whales in the southern Gulf of Maine and Georges Bank.

The most recent change to the ALWTRP, which became effective on September 25, 2003, allows lobster trap and anchored gillnet gear in a DAM zone once a closure is triggered, but specifies additional gear modifications designed to reduce the risk of entanglements of northern right whales.

4.4.3.3 NMFS Rule to Conserve Sea Turtles

NMFS published a final rule (67 *FR* 71895, December 3, 2002), effective January 2, 2003, that enacted a series of seasonal closures to the use of large mesh gillnets in the EEZ off the coast of Virginia and North Carolina. The purpose of the closures is to reduce the impact of the monkfish fishery on endangered and threatened species of sea turtles. This final rule followed several temporary actions taken by NMFS since 2000 in response to sea turtle strandings. Federal waters between Oregon Inlet and the North Carolina/South Carolina border are closed year round, while three other areas to the north (up to Chincoteague, VA) are closed from March 16, April 1, and April 16, respectively, to January 14 each year.

NMFS is currently reviewing a proposed rule that would require that the gillnet gear restrictions from the North Carolina/South Carolina border to Chincoteague be extended into state waters that are seaward of the COLREGS lines. It also proposes to make the gillnet gear restriction applicable to gillnets with 7" or greater stretched mesh (rather than
the current larger than 8-inch stretched mesh). The proposed rule can be found at http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm.

4.4.3.4 Atlantic Trawl Take Reduction Team

On April 29, 2003, the Center for Biological Diversity (CBD) and the National Marine Fisheries Service entered into a settlement agreement concerning claims that NMFS violated section 118 of the Marine Mammal Protection Act (MMPA). CBD's claim focused on two distinct fisheries – the pelagic longline and Atlantic squid, mackerel and butterfish fisheries. As part of the settlement agreement, NMFS agreed to convene a TRT for the Atlantic pelagic longline fishery with regard to incidental mortality and serious injury of pilot whales no later than June 30, 2005. NMFS also agreed to convene a TRT for the Atlantic squid, mackerel, butterfish trawl fishery with regard to incidental mortality and serious injury of pilot whales and common dolphins no later than September 30, 2006. The Southeast Region was designated the lead for the Atlantic pelagic longline TRT and the Northeast Region (NER) was designated the lead for the Atlantic squid, mackerel, butterfish trawl TRT.

The final makeup of the TRT will be determined after the appropriate observer and stock assessment information has been completed and analyzed as outlined in the settlement agreement. Since sea turtles have documented takes in many of the trawl gear configurations being considered for the new TRT, the NER and Northeast Fisheries Science Center intend to work with sea turtle managers to incorporate the sea turtle management strategy into the new trawl TRT process. Consequently, the NER and NEFSC will be implementing a broader based TRT that encompasses several configurations of trawl gear that have known incidental moralities and serious injuries of sea turtles as well as marine mammals.

4.5 Human Communities and the Fishery

4.5.1 Overview

The Affected Human Environment of the multispecies fishery was described in detail in section 9.4 of Amendment 13. That discussion described the Northeast Multispecies fishery from FY 1994 (the year of implementation of Amendment 5) through 2001 since, for the most part, data was only available to describe the fishery through FY 2001. The information provided in that discussion is useful for understanding the response of the fishery to past management actions and in predicting how the fishery may respond to the management actions implemented by Amendment 13. That discussion also helps meet the M-S Act requirement to take into account the importance of fishery resources to fishing communities in order to provide for the sustained participation of those communities, and, consistent with the conservation requirements of the M-S Act, to the extent practicable, minimize the adverse economic impacts on such communities. Section 9.4 of Amendment 13 also helps fill a NEPA requirement to consider the interactions of the natural and human environments and the impacts on both systems of any changes due to governmental actions or policies.

Similarly, the Affected Human Environment of the monkfish fishery was detailed in Section 5.3 of the FSEIS for Amendment 2 to the Monkfish FMP, and has been updated through fishing year 2003 in the annual Stock Assessment and Fishery Evaluation (SAFE) Report. The Council is preparing a 2004 SAFE Report concurrent with the annual adjustment procedure for the 2006 fishing year. Since about 75% of the monkfish limited access permit holders also hold multispecies limited access permits, and since Framework 3 only directly affects vessels with both monkfish and multispecies limited access permits the Affected Human Environment discussion below, applies to the vessels and communities affected by Framework 3. A separate discussion is provided, however, to highlight the vessels' and community dependence on the monkfish fishery for the subset of affected monkfish vessels.

Substantial changes took place in the multispecies fishery after FY 2001. In FY 2002 and 2003, the fishery was managed under provisions implemented as a result of a lawsuit (*Conservation Law Foundation et al v. Donald Evans*) that imposed additional restrictions that were not in place in FY 2001: reductions in effort, additional closed areas, changes in gear, mesh size, etc. The impacts of these additional restrictions could not be fully described in Amendment 13 because the data were not available when the document was prepared. Amendment 13 was implemented in FY 2004, and data summarized in the following sections describes the impacts on the human environment in the first year after implementation.

Amendment 13 specified target TACs for regulated groundfish stocks. These target TACs were established using target fishing mortality rates and stock conditions as of the most recent assessment. While the final measure of biological success for the FMP are the fishing mortality rates, target TACs are used to monitor the effectiveness of the management program between assessments. Table 27 compares the estimated catch in FY 2004 to the target TACs established by Amendment 13. Since GARM II calculated catch for the calendar year and not the fishing year, estimated catch was calculated using preliminary commercial landing statistics published by NMFS. Where appropriate, discards were added using the annual discard to kept ratio calculated for a stock as reported in GARM II. For GOM cod and SNE/MA winter flounder, an estimate of recreational harvest was added based on the average of the last three years. For GB yellowtail flounder, the catch shown was calculated by NMFS NERO while monitoring the U.S./Canada area fishery.

This table shows that catch in FY 2004 was less than or equal to the target TAC for almost all major regulated groundfish stocks. The sole exception is GOM cod. Overall, the fishery harvested sixty-two percent of the total target TACs. However target fishing mortality rates were not achieved for all stocks and as a result additional restrictions were required leading to FW 42.

Table 11 – FY 2004 estimated catch compared to FY 2004 target TACs for major groundfish species (mt, live weight)

(1) FY 2004 commercial landings from NERO preliminary landing stats. Final values may be differ.
(2) D/K ratios from GARM II, only used if included in calculating TAC
(3) GOM cod total catch includes 1500 mt recreational catch (average of last three years)
(4) SNE/MA winter flounder includes 300 mt of recreational catch (average of last three years)
(5) GB haddock, GB cod, and GB YTF TACs shown are for U.S. only
(6) Components of catch compared to the TACs are the same as used to calculate the TAC
(7) Pollock TAC includes Canadian catch of this stock, but shares are not allocated
(8) Ocean pout, halibut, N/S windowpane not shown
(9) GB yellowtail flounder FY 2004 catch calculated by NMFS NERO and reported to 2005 TRAC

Stock	**FY 2003 Landings**	**FY 2004 Landings**	**D/K**	**Total Comm.**	**Total Catch**	**FY 2004 Target TAC**	**Percent of TAC**
GB Cod	5,116	2,943		2,943	2,943	2,949	100%
GB Haddock	5,925	6,903	8%	7,448	7,448	14,955	50%
GB Yellowtail					5,776	6,000	96%
SNE/MA Yellowtail	137	156	76%	275	275	707	39%
CC/GOM Yellowtail	1,404	689	16%	799	799	881	91%
GOM Cod	3,325	3,723	15%	4,281	5,781	4,850	119%
Witch Flounder	3,065	2,888	8%	3,116	3,116	5,174	60%
Plaice	2,061	1,656	25%	2,065	2,065	3,695	56%
GOM Winter Flounder	677	473		473	473	3,286	14%
SNE/MA Winter Flounder	1,818	1,226	2%	1,251	1,551	2,860	54%
GB Winter Flounder	2,970	2,783		2,783	2,783	3,000	93%
White Hake	3,848	3,162	5%	3,320	3,320	3,839	86%
Pollock	4,298	5,456		5,456	5,456	10,584	52%
Redfish	383	486		486	486	1,632	30%
GOM Haddock	1,006	916		916	916	4,831	19%
Totals	24,992	23,614			43,188	69,243	62%

4.5.2 Commercial Harvesting Sector

The multispecies fishery in the Northeastern United States consists of a commercial and recreational harvesting sector. The commercial sector consists of a wide range of vessels of different sizes using different gear types. These vessels are homeported in several coastal states, with most vessels claiming homeports in Maine, New Hampshire, Massachusetts, and Rhode Island. Gears that are typically used in the fishery include otter trawls, sink gillnets, bottom longlines, and hook gear. Detailed descriptions of these gears, and their impacts on EFH, are provided in section 9.2.3 of Amendment 13.

Since the implementation of Amendment 5 in 1994, all vessels that land regulated groundfish for commercial sale have been required to have a permit. Moratorium - commonly called limited access - permits were granted to vessels based on fishing history during a defined period. Limited access permit holders land most regulated groundfish. The only new limited access permits granted since 1994 have been to a small number of handgear vessels, but the ownership of many vessels issued permits has changed. Most limited access permits are restricted in the number of DAS that can be fished. In addition, there have been open access permit categories. Open access permits can be requested at any time, with the limitation that a vessel cannot have a limited access and open access permit at the same time. Permits are issued in different categories, depending on the activity and history of the vessel. There have been several changes in the defined permit categories, as Amendment 5, Amendment 7, and Amendment 13 all changed the category definitions (see section 6.5.2.1.1). For this reason, when examining fishing activity based on permit category, care must be taken to make comparisons to similar permits. Many groundfish vessels have permits for, and participate in, other fisheries. For some vessels groundfish revenues are only a small part of total fishing revenues.

In 2004, there were 752 monkfish limited access vessels, of which 343 were Category C permits holding limited access permits in either a Multispecies (61%) or Scallop (48%) fisheries, and 355 were Category D permits, primarily (98%) holding limited access Multispecies permits. Overall, 74% of monkfish limited access permit holders also hold multispecies limited access permits. Vessels in all four monkfish permit categories also hold limited access permits in a number of New England and Mid-Atlantic fisheries.

The FMP also provides an open-access permit (Category E) for vessels that did not qualify for a limited access permit so those vessels can land monkfish caught incidentally in other fisheries. Table 29 shows that the number of category E permits increased during the first few years of the FMP but has remained relatively steady since 2001.

Amendment 13 provided a comprehensive review of the commercial groundfish harvesting sector from FY 1994 through FY 2001. Landings and revenues for vessels with groundfish permits were reported for each fishing year, aggregated by permit category, vessel length, homeport state, and gear type. In addition, since one of the primary effort controls used in the fishery is limits on the DAS fished, similar categories were used to describe the allocation and use of DAS by limited access vessels. This section will provide a brief overview of that information, updated with data for FY 2002 through FY 2004. Detailed information on monkfish landings and revenues through FY 2004 is currently being prepared for the annual adjustment and SAFE Report. A summary of those data are provided in a subsection below. Information on landings and revenues for FY 2004 is preliminary.

In addition to information on landings and revenues, this section includes brief overviews of several management programs that were adopted in Amendment 13 or subsequent frameworks and are being considered for modification or renewal in this action. These programs include the DAS leasing program, the CAII yellowtail flounder SAP, the CAI Hook Gear Haddock SAP, and the Eastern U.S./CA Area Haddock SAP.

Table 12 – Number and Percent of monkfish limited access vessels also issued a limited access permit in other fisheries in 2004, by permit category

MONKFISH PERMIT CATEGORY	NUMBER OF MONKFISH PERMITS	NUMBER OF MONKFISH VESSELS ALSO ISSUED A LIMITED ACCESS PERMIT FOR:									
		BLACK SEA BASS	SUMMER FLOUNDER	LOBSTER	MULTI-SPECIES	OCEAN QUAHOG	RED CRAB	SCALLOP	SCUP	SQUID/ MACKEREL/ BUTTERFISH	TILEFISH
A	13	7	3	8	0	0	0	0	5	2	1
B	41	20	5	17	1	0	0	0	12	0	3
C	343	129	257	281	209	0	0	163	145	109	1
D	355	123	202	311	349	0	0	20	154	106	6
TOTAL	752	279	467	617	559	0	0	183	316	217	11

MONKFISH PERMIT CATEGORY	NUMBER OF MONKFISH PERMITS	PERCENT OF MONKFISH VESSELS ALSO ISSUED A LIMITED ACCESS PERMIT FOR:									
		BLACK SEA BASS	SUMMER FLOUNDER	LOBSTER	MULTI-SPECIES	OCEAN QUAHOG	RED CRAB	SCALLOP	SCUP	SQUID/ MACKEREL/ BUTTERFISH	TILEFISH
A	13	54%	23%	62%	0%	0%	0%	0%	38%	15%	8%
B	41	49%	12%	41%	2%	0%	0%	0%	29%	0%	7%
C	343	38%	75%	82%	61%	0%	0%	48%	42%	32%	0%
D	355	35%	57%	88%	98%	0%	0%	6%	43%	30%	2%
TOTAL	752	37%	62%	82%	74%	0%	0%	24%	42%	29%	1%

Table 13 – Monkfish open-access (Category E) permits issued each year since implementation of the FMP in 1999.

The total is the number of unique Category E permits issued since inception of the plan.

Fishing Year	Number of permits
1999	1466
2000	1882
2001	1991
2002	2142
2003	2120
2004	2256
2005	2258
TOTAL	3501

4.5.2.1 DAS Allocations and Use

One of the principal management measures used to control groundfish fishing mortality is limits on the amount of time that permit holders can fish for regulated groundfish. Most permits are allocated a fixed number of DAS. As mentioned previously, Amendment 13 reduced overall DAS allocations and categorizes DAS into four categories. Category A DAS can be used to fish for any regulated groundfish stock and are similar to the DAS that were allocated before Amendment 13. Category B (regular) and (reserve) DAS can only be used to target healthy groundfish stocks within specific management programs that include controls on the incidental catch of unhealthy stocks. Category C DAS cannot be used until some point in the future.

In FY 2004, approximately 44,492 Category A DAS were allocated to 1,484 permit holders. This includes DAS allocated to permits in the Confirmation of Permit History (CPH) category, as well as permits that may not have been renewed by the end of the fishing year, and is the net allocation after any transfers, sanctions, etc. Of these allocated DAS, just over 30,000, or 68 percent, were used. While this is a nine percent higher rate of use of allocated DAS than in FY 2003, fewer DAS were used than were assumed in Amendment 13 when estimating biological impacts of the proposed management measures. Category A DAS use by month was similar to recent years (Table 14). There are only minor variations in the number of DAS used in each month, with April remaining the month with the most Category A DAS used.

DAS use by permit category is summarized in Table 15. Fewer vessels used DAS in FY 2004 than in any recent year – only 773 permits, a decline of seventeen percent from the previous year. While the number of DAS used by combination permit holders increased from FY 2003 to FY 2004, all other permit categories used fewer DAS in FY 2004. Individual permit DAS use declined by 28 percent compared to FY 2003 Individual and Fleet permits combined, large mesh permit DAS use declined by 74 percent, and hook gear permits DAS use declined by 41 percent.

DAS use by vessel length group is summarized in Table 16. All length groups used fewer DAS in FY 2004 than in FY 2003. DAS use by the smallest vessels declined by 54 percent, for vessels between 30 and 50 feet it declined by 31 percent, for vessels between 50 and 75 feet it declined by 29 percent, and for vessels 75 feet and over it declined by 23 percent. The distribution of DAS use by length group in FY 2004 differs slightly from that in FY 2003, with the two middle length groups each accounting for just under 40 percent of DAS used, the largest length group accounts for just over 20 percent, and the smallest group accounts for one percent or less in both years.

DAS use by homeport state (as recorded on the permit application) is summarized in Table 17. For the principal groundfish fishing states detailed there were only minor changes in the number of permits allocated DAS. Since FY 2002, the number of boats listing Maine as a homeport increased and is now 16 percent higher than in FY 2002. The number of vessels listing New Hampshire or Rhode Island as homeport also increased since FY 2002, while the number declined for other states. All states experienced a decline in both allocated and used DAS. The decline in allocated DAS was similar for Maine (32 percent), New Hampshire (33 percent), and Massachusetts (34 percent), as was the decline in used DAS (Maine – 21 percent, New Hampshire – 23 percent, Massachusetts – 24 percent). Reductions in allocated and used DAS were higher for the other states listed, with vessels listing New Jersey homeports experiencing the largest decline in allocated DAS at 62 percent, and a 59 percent decline in used DAS.

DAS use by the principal gear listed on a permit's groundfish permit application is summarized in 18. Note that this may not be the gear used while fishing for groundfish. All gear types received fewer allocated DAS in FY 2004 compared to FY 2003, and all gear types used fewer DAS as well. DAS used by permits claiming otter trawl as principal gear declined by 27 percent, DAS use by gillnets declined by 33 percent and DAS use by longlines declined 35 percent. DAS use by handline vessels declined by 37 percent.

Information from these same tables can be used to characterize the DAS that were not used in FY 2004. This may be helpful in assessing whether DAS are likely to be re-activated. Most of the unused DAS are held by vessels with a Category A permit (85 percent, or about 12,100 DAS). The largest number of unused DAS were held by vessels in the 30 to less than 50 ft. length group (54 percent, or about 7,800 DAS). The 50 ft. to less than 75 ft length class held 3,975 unused DAS (28 percent) while vessels 75 feet and over held 1,303 unused Category A DAS (nine percent). With respect to homeport state, most unused DAS were held by vessels that listed Massachusetts as homeport (8,377 DAS, or 58 percent). Only 28 percent of the unused DAS are held by vessels that did not use any DAS; 72 percent, or over 14,400 DAS, are held by vessels that used DAS during FY 2004.

In addition to Category A DAS, Category B (regular) (1,707) and Category B (reserve) (1,291) DAS were also used in FY 2004. Nearly all were used by vessels 50 feet and over in length, reflective of the fact that most opportunities to use these DAS were on Georges Bank (Table 19). 92 percent of the Category B (regular) DAS and 83 percent of the Category B (reserve) DAS were used by vessels that listed a Massachusetts homeport on their permit applications.

Table 14 – Category A DAS use by month, FY 2001- FY 2004

	2001 Fishing Year		2002 Fishing Year		2003 Fishing Year*		2004 Fishing Year	
	DAS Used	% Total DAS Used	DAS Used	% Total DAS Used	DAS Used	% Total DAS Used	DAS Used	% Total DAS Used
May	5,722	9	2,543	6	2,766	7	1,757	6
June	7,675	12	3,964	10	4,471	11	2,700	9
July	5,411	8	3,197	8	4,100	10	2,785	9
August	4,494	7	3,041	7	3,734	9	2,640	9
September	3,930	6	2,938	7	3,175	7	2,709	9
October	3,750	6	2,680	6	3,155	7	2,123	7
November	4,509	7	3,172	8	3,415	8	2,591	9
December	6,396	10	4,052	10	3,333	8	2,488	8
January	5,509	8	3,143	8	2,382	6	2,034	7
February	4,382	7	2,687	6	2,857	7	2,050	7
March	5,455	8	4,718	11	3,985	9	2,816	9
April	8,116	12	5,572	13	4,974	12	3,359	11
Total DAS Used:	65,347	100	41,707	100	42,347	100	30,052	100
Total DAS Allocated**	156,233	42	71,270	59	71,344	59	44,492	68

Table 15 – DAS allocated and used by limited access permit category, FY 2001- FY 2004 (Source: NMFS DAS, permit databases)

		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Categories		Total Number of Permitted Vessels	Total Days-at-Sea Allocated	Number of Permitted Vessels that Called In	DAS Allocated to Vessels that Called In	Total DAS Used	% of DAS Used by Permitted Vessels ((5)/(2)*100)	% of DAS Used by Permitted Vessels that Called In ((5)/(4)*100)
2001	Individual	137	17,819	132	17,356	16,347	92	94
	Fleet	1,169	111,737	789	76,277	40,690	36	53
	Combination	47	2,348	23	1,681	1,102	47	66
	Hook Gear	174	16,646	95	9,104	2,356	14	26
	Large Mesh	62	7,682	58	7,171	4,853	63	68
	Total	**1,589**	**156,233**	**1,097**	**111,589**	**65,347**	**42**	**59**
2002	Individual	138	13,888	131	13,629	12,400	89	91
	Fleet	1,041	48,063	734	40,882	24,878	52	61
	Combination	47	1,637	16	962	705	43	73
	Hook Gear	120	3,649	61	2,432	875	24	36
	Large Mesh	56	4,033	50	3,858	2,849	71	74
	Total	**1,402**	**71,270**	**992**	**61,763**	**41,707**	**59**	**68**
2003	Individual	139	14,247	132	13,908	12,994	91	93
	Fleet	1,047	48,468	683	39,192	25,492	53	65
	Combination	47	1,651	15	928	727	44	78
	Hook Gear	115	3,466	54	2,127	760	22	36
	Large Mesh	56	3,511	47	3,178	2,374	68	75
	Total	**1,404**	**71,344**	**931**	**59,334**	**42,347**	**59**	**71**
2004	Individual	1,188	40,111	692	36,982	27,924	70	76
	Small Vessel Exemption	7	20	0		0	0	0
	Combination	37	1,509	25	1,450	1,090	72	75
	Hook Gear	115	1,374	38	1,085	455	33	42
	Large Mesh	57	987	17	766	617	68	88
	N/A	80	492	1	33	10	2	30
	Total	**1,484**	**44,492**	**773**	**40,317**	**30,096**	**68%**	**75**

Table 16 - DAS allocated and used by vessel length group, FY 2001- FY 2004 (Source: NMFS DAS, permit databases)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Categories		Total Number of Permitted Vessels	Total Days-at-Sea Allocated	Number of Permitted Vessels that Called In	DAS Allocated to Vessels that Called In	Total DAS Used	% of DAS Used by Permitted Vessels ((5)/(2)*100)	% of DAS Used by Permitted Vessels that Called In ((5)/(4)*100)
2001	1 - 29 feet	122	11,293	66	6,404	1,474	13	23
	30 - 49 feet	890	87,062	588	58,365	30,365	35	52
	50 - 74 feet	407	40,666	321	33,250	23,144	57	70
	75+ feet	170	17,212	122	13,571	10,364	60	76
	Total	**1,589**	**156,233**	**1,097**	**111,589**	**65,347**	**42**	**59**
2002	1 - 29 feet	93	2,546	43	1,497	527	21	35
	30 - 49 feet	751	33,815	525	28,562	16,895	50	59
	50 - 74 feet	393	24,008	303	21,839	16,035	67	73
	75+ feet	165	10,901	121	9,864	8,250	76	84
	Total	**1,402**	**71,270**	**992**	**61,763**	**41,707**	**59**	**68**
2003	1 - 29 feet	102	3,115	41	1,419	500	16	35
	30 - 49 feet	762	33,928	492	27,424	17,176	51	63
	50 - 74 feet	382	23,442	288	20,742	16,267	69	78
	75+ feet	158	10,859	110	9,750	8,403	77	86
	Total	**1,404**	**71,344**	**931**	**59,334**	**42,347**	**59**	**71**
2004	1 - 29 feet	162	1,264	24	563	231	18%	41
	30 - 49 feet	743	19,650	405	17,534	11,841	60%	68
	50 - 74 feet	361	15,546	248	14,757	11,571	74%	78
	75+ feet	159	7,757	96	7,463	6,454	83%	86
	Unknown	**59**	**275**			**0**	**0%**	**0**
	Total	1,484	44,492	749	40,317	30,096	68%	75%

Table 17 – DAS allocations and use by homeport state, FY 2001 –FY 2004 (Source: NMFS DAS, permit databases)

State (Homeport)		Total Number of Permitted Vessels	Total Days-at-Sea Allocated	Number of Permitted Vessels that Called In	DAS Allocated to Vessels that Called In	Total DAS Used	% of DAS Used by Permitted Vessels	% of DAS Used by Permitted Vessels that Called In
2001	Maine	213	21,141	130	13,517	9,397	44	70
	New Hampshire	77	7,791	62	6,331	4,647	60	73
	Massachusetts	847	83,956	629	64,591	39,617	47	61
	Rhode Island	127	12,452	86	8,510	4,701	38	55
	Connecticut	17	1,606	13	1,214	647	40	53
	New York	155	14,932	94	9,138	3,248	22	36
	New Jersey	89	8,367	50	4,990	1,428	17	29
	Other	64	5,988	33	3,299	1,664	28	50
	Total	**1,589**	**156,233**	**1,097**	**111,589**	**65,347**	**42**	**59**
2002	Maine	180	9,615	118	8,136	5,957	62	73
	New Hampshire	73	4,266	56	3,816	2,615	61	69
	Massachusetts	752	40,589	567	36,275	24,725	61	68
	Rhode Island	107	5,848	83	5,187	3,761	64	73
	Connecticut	17	871	12	732	370	43	51
	New York	136	5,084	91	4,139	2,112	42	51
	New Jersey	79	2,866	41	2,013	1,108	39	55
	Other	58	2,131	24	1,465	1,059	50	72
	Total	**1,402**	**71,270**	**992**	**61,763**	**41,707**	**59**	**68**
2003	Maine	187	10,394	119	8,680	6,898	66	79
	New Hampshire	68	4,220	53	3,714	2,733	65	74
	Massachusetts	752	40,347	522	34,465	24,226	60	70
	Rhode Island	115	5,975	84	5,264	4,044	68	77
	Connecticut	17	848	13	716	400	47	56
	New York	129	4,713	76	3,406	1,928	41	57
	New Jersey	85	2,965	46	1,949	1,213	41	62
	Other	51	1,882	18	1,141	905	48	79
	Total	**1,404**	**71,344**	**931**	**59,334**	**42,347**	**59**	**71**
2004	Maine	209	7,053	98	6,521	5,477	78%	84%
	New Hampshire	75	2,836	47	2,577	2,101	74%	82%
	Massachusetts	744	26,765	451	24,835	18,388	69%	74%
	Rhode Island	116	3,146	67	2,899	1,997	63%	69%
	Connecticut	19	436	12	393	250	57%	64%
	New York	128	1,934	56	1,506	792	41%	53%
	New Jersey	83	1,129	33	901	499	44%	55%
	Other	110	1,194	9	686	592	50%	86%
	Total	**1,484**	**44,492**	**110**	**40,317**	**30,096**	**68%**	**75%**

Table 18 – DAS allocations and use by principal gear designation, FY 2001 – FY 2004 (Source: NMFS DAS, permit databases)

Categories		Total Number of Permitted Vessels	Total Days-at-Sea Allocated	Number of Permitted Vessels that Called In	DAS Allocated to Vessels that Called In	Total DAS Used	% of DAS Used by Permitted Vessels	% of DAS Used by Permitted Vessels that Called In
2001	Bottom Trawl	841	82,442	650	66,458	44,011	53	66
	Midwater Trawl	3	294	2	196	130	44	66
	Other Trawl	12	1,215	8	823	558	46	68
	Longlines	222	21,368	115	11,064	4,217	20	38
	Hand line	170	16,363	84	8,145	1,960	12	24
	Gillnet	321	32,593	228	23,925	14,044	43	59
	Pots and Traps	12	1,176	5	490	72	6	15
	Other	8	782	5	488	356	46	73
	Total	**1,589**	**156,233**	**1,097**	**111,589**	**65,347**	**42**	**59**
2002	Bottom Trawl	787	45,473	620	41,454	29,183	64	70
	Midwater Trawl	4	182	3	164	69	38	42
	Other Trawl	11	549	8	495	336	61	68
	Longlines	170	5,746	87	4,061	1,801	31	44
	Hand line	124	3,494	56	2,156	866	25	40
	Gillnet	287	15,069	207	12,819	9,115	60	71
	Pots and Traps	13	372	5	228	78	21	34
	Other	6	385	6	385	260	67	67
	Total	**1,402**	**71,270**	**992**	**61,763**	**41,707**	**59**	**68**
2003	Bottom Trawl	793	45,954	574	39,904	29,909	65	75
	Midwater Trawl	5	254	3	179	118	46	66
	Other Trawl	10	524	7	449	322	61	72
	Longlines	170	5,759	75	3,647	1,553	27	43
	Hand line	124	3,484	57	2,047	769	22	38
	Gillnet	285	14,692	207	12,621	9,400	64	74
	Pots and Traps	12	354	3	163	71	20	43
	Other	5	324	5	324	206	64	64
	Total	**1,404**	**71,344**	**931**	**59,334**	**42,347**	**59**	**71**
2004	Bottom Trawl	794	30,463	502	28,338	21,739	71%	77%
	Midwater Trawl	6	131	2	109	30	23%	28%
	Other Trawl	10	279	6	278	230	82%	82%
	Longlines	163	2,621	59	2,065	1,014	39%	49%
	Hand line	133	1,332	35	964	481	36%	50%
	Gillnet	282	8,817	160	8,174	6,337	72%	78%
	Pots and Traps	11	85	2	85	50	58%	58%
	Other	85	764	7	303	215	28%	71%
	Total	**1,484**	**44,492**	**773**	**40,317**	**30,096**	**68%**	**75%**

Table 19 – Category B DAS use, FY 2004 (Source: NMFS DAS, permit databases)

Length Group	B (regular)	B (reserve)
0 to less than 30	8	2
30 to less than 50	38	87
50 to less than 75	666	651
75 and Over	995	551
Unknown	0	0
Grand Total	1,707	1,291

4.5.2.1.1 Monkfish DAS

Starting in Year 2 of the Monkfish FMP (May, 2000 –April, 2001) limited access monkfish vessels (Categories A, B, C, and D) were allocated 40 monkfish DAS. By definition, Category A and B vessels do not qualify for limited access multispecies or scallop permits, and Category C and D vessels must use either a multispecies or scallop DAS while on a monkfish DAS. In the NFMA, however, there is no monkfish trip limit when a vessel is on either a combined (monkfish/multispecies or monkfish/scallop) DAS or a multispecies-only DAS, and, consequently, multispecies vessels in Categories C and D and fishing in the NMFA do not call-in monkfish DAS.

Therefore, DAS usage has been well below the total DAS allocated (Table 20), and primarily reflects monkfish fishing activity in the SFMA. In FY 2004 call-in vessels (that is those fishing primarily in the SFMA) only 35% of their allocated DAS, or 59%, 39%, 32% and 33% for Categories A though D, respectively. For comparison, in FY 2003, Category A and B call-in vessels used 70% and 55% of their allocated DAS, respectively, while Category B and D call-in vessels used 46% and 41%. The decline is usage rates is directly the result of the reduced number of DAS (28) that vessels were allowed to use in the SFMA in FY 2004, even though their overall allocation remained at 40 DAS. DAS usage by Category C and D vessels that also hold a multispecies limited access permit increased from FY 2001 to FY 2003, but declined in FY 2004 (Figure 29).

Table 20 – Monkfish DAS usage, FY 2004

Permit Category	All Vessels		Call-In Vessels	
	DAS Allocated	DAS Used	DAS Allocated	DAS Used
A	625	316	535	316
B	2,038	607	1,538	607
C	17,429	939	2,936	939
D	18,027	1,691	5,143	1,691
TOTAL	**38,118**	**3,553**	**10,151**	**3,553**

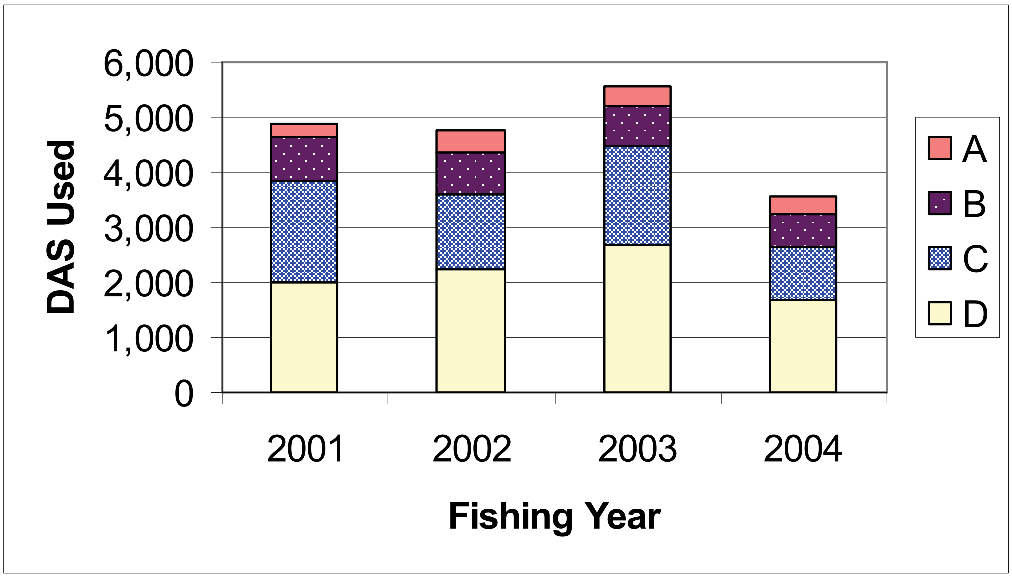
Source: NMFS Days-at-Sea (DAS) database via onboard Vessel Monitoring Systen

Table 21 - Monkfish-only, Monkfish/Multispecies and Monkfish/Scallop DAS Usage by call-in vessels (vessels fishing in the SFMA), FY 2004.

Permit Category	DAS Allocated	DAS Used				
		Monkfish	Monkfish/ Multispecies	Monkfish/ Scallop	Total	% Used
A	535	316	0	0	316	59%
B	1,538	607	0	0	607	39%
C	2,936	0	939	0	939	32%
D	5,143	0	1,691	0	1,691	33%
TOTAL	**10,151**	**923**	**2,630**	**0**	**3,553**	35%

Source: NMFS Days-at-Sea (DAS) database via onboard Vessel Monitoring Systems (VMS)

Figure 29 - DAS used by permit category, FY 2001 – 2004



4.5.2.2 Landings and Revenues

Landings and revenues by fishing year were summarized in Amendment 13, FW 40A, FW 40B, and FW 41. This section updates this information for FY 2001 through 2004. Minor differences exist between the information previously reported and this section due to updates to the databases and revisions to data queries. The data are also reported in different categories than in previous reports in order to capture changes in permit categories and changes in landings and revenues in communities. Landings and revenues for FY 2004 should be considered preliminary, as not all data may be reported and there may be corrections or revisions to the database in the future. There is also evidence that recent changes to the dealer reporting system have introduced uncertainty into the calendar year 2004 and 2005 data.

Regulated groundfish (cod, haddock, yellowtail flounder, winter flounder, witch flounder, windowpane flounder, plaice (dabs), pollock, redfish, Atlantic halibut, white hake, red/white hake mixed) and ocean pout landings and revenues are summarized in Table 22. This table includes all landings reported to the NMFS dealer database system, regardless of whether the landings can be attributed to a multispecies permit. It includes aggregate landings reported by states and landings that cannot be attributed to a permit as well as landings by vessels that did not possess a federal multispecies permit (i.e. landings from state registered vessels fishing in state waters). Regulated groundfish landings declined from 106 million pounds in FY 2001 to 79.6 million pounds (landed weight) in FY 2004, or 24.9 percent. Nominal revenues declined by 20.5 percent from FY 2001 ($106.1 million) to FY 2004 ($84.4 million), but revenues in constant 1999 dollars declined from $101.2 million in FY 2001 to $73.8 million in FY 2004, or 27 percent. The following sections summarize landings and revenues for groundfish permit holders only.

Table 22– Regulated groundfish landings and revenues, FY 2001 – FY 2004

Source: NMFS CFDBS. Prices adjusted to constant 1999 dollars using BLS PPI series WPUSOP3110

	Fishing Year			
	2001	2002	2003	2004
Landed weight (lbs.)	106,310,403	85,769,787	83,140,192	79,673,224
Live weight (lbs.)	116,673,620	94,560,545	91,691,778	87,071,413
Nominal revenues	$106,184,220	$102,167,428	$91,348,689	$84,413,555
Revenues (constant 1999 dollars)	$101,291,941	$98,120,698	$83,171,680	$73,789,602

4.5.2.2.1 Landings and Revenues By Permit Category

Adopted in 1996, Amendment 7 implemented several different limited and open access permit categories in the multispecies fishery that were in effect in through FY 2003. The limited access permit categories were:

- Individual
- Fleet
- Small vessel exemption
- Hook gear
- Combination vessel
- Large mesh individual DAS
- Large mesh fleet DAS

The open access categories were:

- Handgear permit
- Scallop multispecies possession limit permit
- Non-regulated multispecies permit
- Charter/party (vessels cannot sell their catch and this is not considered a commercial permit)

Amendment 13 modified groundfish permit categories by eliminating the Fleet DAS category, creating a limited access Handgear A category, and changing the designation of open-access handgear permits to a Handgear B permit category. The current limited access permit categories are:

- Individual
- Small vessel exemption
- Hook Gear
- Combination Vessel
- Large Mesh Individual DAS
- Handgear A

The open access categories are:

- Handgear B
- Scallop multispecies possession limit permit
- Non-regulated multispecies permit
- Charter/party (vessels cannot sell their catch and this is not considered a commercial permit)

Unlike previous reports, this section does not combine handgear permits with other permit categories so that the trends in groundfish landings by this category can be identified. In addition, both large mesh permit categories (fleet and individual DAS) are combined so that comparisons can be made before and after implementation of Amendment 13. Totals do not include data that cannot be reported due to confidentiality concerns.

Total landings by Individual and Fleet DAS permit holders (the primary components of the multispecies fleet) declined from 298 million pounds in FY 2001 to 243 million pounds in FY 2004, or about 18 percent. Landings by hook gear permit holders increased from 2.8 million pounds in FY 2001 to 8.6 million pounds in FY 2004. Large mesh permit holder landings increased from 8.3 million pounds to 12.7 million pounds during the same period. Total revenues did not follow the same patterns. While revenues for Individual and Fleet DAS permits declined from $183.7 million to $161.9 million, and hook gear revenues increased from $2.8 million to $3.8 million, large mesh permit holder revenues declined from $9.4 million to $6.5 million even though landings increased.

The number of groundfish permits landing regulated groundfish declined from 1,308 in FY 2001 to 937 in FY 2004, a decline of 28 percent. Regulated groundfish landings by permit holders declined from 103.4 million pounds in FY 2001 to 75.9 million pounds in FY 2004, a decline of 26.5 percent. All limited access permit categories landed less regulated groundfish in FY 2004 than in FY 2001. Hook gear, large mesh, and handgear (combined) categories showed increased landings from FY 2003 to FY 2004, while other permit categories experienced a decline. Groundfish revenues (in constant 1999 dollars) for permit holders declined from $98.7 million in FY 2001 to $70 million in FY 2004, or 29 percent. All limited access permit categories experienced a decline in groundfish revenues.

Average groundfish revenues for each permit remained nearly constant from FY 2001 ($75,464) to FY 2004 ($74,745). After an increase in FY 2002, average revenues were nearly the same in FY 2003 and FY 2004. Within limited access permit categories, the combined Individual and Fleet DAS permit holder average revenues declined from $104,503 in FY 2001 to $95,208 in FY 2004 (9 percent). Average groundfish revenues for hook gear permits increased from $15,553 to $24,192, while large mesh permit holder average revenues declined from $54,656 to $49,638. By combining DAS used with groundfish revenues, the average revenue per DAS by permit category can be estimated. Revenues per DAS peaked in FY 2002 for most categories, but are still higher in FY 2004 than in FY 2001 except for combination permits (Table 29).

Table 23 – Total landings (lbs., all species) by groundfish permit category (Source: NMFS dealer, permit databases)

	Fishing Year			
	2001	2002	2003	2004
Individual DAS	67,082,886	60,555,258	55,545,268	242,773,256
Fleet DAS	231,268,872	188,132,355	186,143,621	0
Small Vessel Exemption	Conf.	Conf.	Conf.	Conf.
Hook Gear	2,770,964	1,675,134	1,818,524	8,659,676
Combination Vessel	12,926,924	13,218,161	17,743,414	14,555,114
Large Mesh (Fleet and Ind.)	8,311,976	7,415,139	7,791,124	12,734,249
Handgear Open Access	126,761,476	72,361,485	143,865,251	Conf.
Handgear - A				2,237,854
Handgear - B				150,143,857
Open Access Combined	157,128,632	96,729,305	100,873,093	119,729,642
Total	606,251,730	440,086,837	513,780,295	550,833,648

Table 24 – Total revenues (1999 dollars) by permit category (Source: NMFS dealer, permit databases)

	2001	2002	2003	2004
Individual DAS	63,025,664	61,769,572	52,776,163	161,945,545
Fleet DAS	120,749,118	117,187,974	112,618,249	0
Small Vessel Exemption	Conf.	Conf.	Conf.	Conf.
Hook Gear	2,852,290	2,672,061	2,440,599	3,798,156
Combination Vessel	27,875,232	31,506,542	33,722,798	40,415,922
Large Mesh (Fleet and Ind.)	9,347,921	8,204,011	6,963,215	6,526,920
Handgear Open Access	28,876,200	24,430,067	28,567,536	Conf.
Handgear - A				1,329,704
Handgear - B				28,527,679
Open Access Combined	140,463,059	158,064,966	185,315,284	244,981,305
Total	393,189,483	403,835,192	422,403,844	487,525,230

Table 25 – Number of multispecies permits landing regulated groundfish by permit category

	Fishing Year			
	2001	2002	2003	2004
Individual DAS	132	131	131	690
Fleet DAS	734	676	649	
Small Vessel Exemption	4	1	1	2
Hook Gear	81	53	48	34
Combination Vessel	32	22	18	16
Large Mesh Ind. DAS	3	2	3	27
Large Mesh Fleet DAS	45	40	26	1
Handgear Open Access	226	179	156	0
Handgear - A				44
Handgear - B				75
Other open access	51	34	54	48
Total	1308	1138	1086	937

Table 26 – Regulated groundfish landings (lbs., landed weight), by permit category (Source: NMFS dealer, permit databases)

	2001	2002	2003	2004
Individual DAS	50,301,967	40,864,820	38,216,342	71,514,984
Fleet DAS	45,007,575	38,017,046	37,911,377	
Small Vessel Exemption	Conf.	Conf.	Conf.	Conf.
Hook Gear	1,098,050	528,342	478,978	627,033
Combination Vessel	3,820,879	2,465,981	2,839,056	1,884,694
Large Mesh (Fleet and Ind.)	2,679,578	1,352,573	1,303,702	1,523,528
Handgear Open Access	454,907	178,787	136,244	Conf.
Handgear - A				243,634
Handgear - B				68,427
Open Access Combined	49,841	69,615	137,776	100,601
Total	103,412,797	83,477,164	81,023,475	75,962,901

Table 27 – Regulated groundfish revenues (1999 dollars) by permit category (Source: NMFS dealer, permit databases)

	2001	2002	2003	2004
Individual DAS	47,350,276	45,337,884	36,329,010	65,693,764
Fleet DAS	43,149,345	44,378,189	39,425,668	0
Small Vessel Exemption	Conf.	Conf.	Conf.	Conf.
Hook Gear	1,259,791	762,448	645,149	822,541
Combination Vessel	3,817,705	2,910,922	2,966,103	1,757,455
Large Mesh (Fleet and Ind.)	2,623,493	1,609,948	1,185,943	1,389,876
Handgear Open Access	462,223	244,098	169,916	Conf.
Handgear - A				177,486
Handgear - B				89,749
Open Access Combined	44,313	82,499	128,340	105,183
Total	98,707,146	95,325,990	80,850,130	70,036,055

Table 28 – Average regulated groundfish revenues (1999 dollars) by permit category

	Fishing Year			
	2001	2002	2003	2004
Individual DAS	358,714	346,091	277,321	95,208
Fleet DAS	58,787	65,648	60,748	
(Combined Individual and Fleet)	104,503	111,172	97,121	
Small Vessel Exemption	Conf.	Conf.	Conf.	Conf.
Hook Gear	15,553	14,386	13,441	24,192
Combination Vessel	119,303	132,315	164,784	109,841
Large Mesh (Fleet and Ind.)	54,656	38,332	40,895	49,638
Handgear Open Access	2,045	1,364	1,089	
Handgear - A				4,034
Handgear - B				1,197
Open Access Combined	869	2,426	2,377	2,191
Total	75,464	83,766	74,448	74,745

Table 29 – Average groundfish revenues (1999 dollars) per DAS for limited access DAS permit categories

	2001	2002	2003	2004
Individual DAS	2,897	3,656	2,796	2,353
Fleet DAS	1,060	1,784	1,547	
(Individual and Fleet Combined)	1,587	2,407	1,968	
Hook Gear	535	871	849	1,808
Combination Vessel	3,464	4,129	4,080	1,612
Large Mesh (Fleet and Ind.)	541	565	500	2,253
Total	1,503	2,278	1,902	2,105

4.5.2.2.2 Landings and Revenues by Vessel Length

Data was summarized for groundfish permit holders by vessel length. While length is an imperfect proxy for fishing power, it is a readily understandable measure. Total landings increased between FY 2001 and FY 2004 for vessels less than 30 ft. and vessels between 30 and 50 ft., and declined for the two other size classes. Total revenues declined for vessels in the 30 to 50 ft. group and increased for all others.

Permitted vessels 75 feet an over in length landed 39 percent of regulated groundfish, vessels 50 to 75 feet landed 40 percent, vessels 30 to 50 feet landed 20 percent, and vessels under 30 feet landed less than one percent. Regulated groundfish landings declined for all length groups. The percentage of decline was inversely related to length group size. Less than 30 ft. vessels experienced a 43 percent decline, vessels 30 to less than 50 ft. saw a 36 percent declined, vessels 50 to less than 75 ft. saw a 29.5 percent decline, and vessels 75 ft. an over saw a 16.2 percent decline. Similar patterns are evident for the changes in groundfish revenues.

Table 30– Total landings (lbs., all species) by vessel length group (Source: NMFS dealer, permit databases)

	FY			
Length_Group	2001	2002	2003	2004
Less than 30	1,495,389	1,014,569	803,224	1,762,725
30 to less than 50	52,543,920	45,049,181	48,202,346	47,152,085
50 to less than 75	151,531,804	136,713,383	129,204,193	172,834,208
75 and over	400,687,205	257,309,891	335,571,309	329,131,596
Grand Total	606,258,318	440,087,024	513,781,072	550,880,614

Table 31 – Total revenues (1999 dollars, all species) by vessel length group (Source: NMFS dealer, permit databases)

	FY			
Length_Group	2001	2002	2003	2004
Less than 30	1,424,591	1,118,139	1,168,695	1,963,784
30 to less than 50	56,990,900	52,382,614	50,111,408	50,488,564
50 to less than 75	122,166,309	126,437,970	127,060,363	135,028,741
75 and over	212,614,975	223,896,710	244,064,599	300,105,034
Grand Total	393,196,775	403,835,433	422,405,065	487,586,122

Table 32 – Regulated groundfish landings by vessel length group (Source: NMFS dealer, permit databases)

	FY			
Length_Group	2001	2002	2003	2004
Less than 30	839,251	396,167	354,991	482,878
30 to less than 50	23,905,156	17,927,058	18,436,523	15,305,823
50 to less than 75	43,518,214	34,342,719	32,791,598	30,707,862
75 and over	35,155,672	30,811,275	29,440,367	29,467,357
Grand Total	103,418,293	83,477,219	81,023,479	75,963,920

Table 33 – Regulated groundfish revenues (1999 dollars) by vessel length group (Source: NMFS dealer, permit databases)

	FY			
Length_Group	2001	2002	2003	2004
Less than 30	941,506	569,663	460,279	519,821
30 to less than 50	23,414,935	21,908,376	19,405,092	16,612,189
50 to less than 75	40,378,809	37,929,211	32,015,334	26,188,956
75 and over	33,977,527	34,918,806	28,969,430	26,716,303
Grand Total	98,712,777	95,326,056	80,850,136	70,037,268

4.5.2.2.3 Landings and Revenue by Gear

Summaries of landings and revenues by gear were also prepared. Reported gear in the dealer database is subject to error. With changes to the system in 2004 there is evidence that more landings and revenues are attributed to the incorrect gear code or are assigned to an “unknown” gear category (note the increase in the “all other gear” category for FY 2004). For these reasons, it is not clear that summaries by gear for FY 2004 are comparable to earlier years.

Bottom trawls accounted for 70 percent of regulated groundfish landings in FY 2004, but experienced a 36.7 percent decline in landings since FY 2001. Sink gillnet vessels account for 11.6 percent of groundfish landings by groundfish permitted vessels; their landings declined 34.3 percent since FY 2001. In FY 2004, nearly 10 percent of groundfish landings could not be attributed to a specific gear based on dealer data.

Table 34 – Total landings (lbs., landed weight) by gear (Source: NMFS dealer database)

	Fishing Year			
	2001	2002	2003	2004
Bottom Trawl	188,228,972	168,717,219	165,567,712	199,822,344
Bottom Longline	7,278,587	4,734,742	4,249,204	10,753,969
Handline/Rod/Reel	2,029,456	1,162,090	1,384,449	23,201,144
Sink Gillnet	33,552,326	28,087,121	36,058,742	23,574,454
Midwater Trawl(inc. pair)	250,058,561	124,735,845	186,731,452	110,915,255
Shrimp Trawl	1,369,085	3,104,192	2,634,737	356,845
Scallop dredge	43,250,450	45,266,061	52,767,095	61,563,855
Lobster Trap	4,608,975	4,238,146	4,054,289	467,676
All Other	75,881,906	60,041,608	60,333,392	120,225,072
Total	606,258,318	440,087,024	513,781,072	550,880,614

Table 35 – Total revenues (1999 dollars) by gear (Source: NMFS dealer database)

	Fishing Year			
	2001	2002	2003	2004
Bottom Trawl	150,395,653	149,682,769	138,326,407	128,900,649
Bottom Longline	6,901,615	4,856,465	3,969,346	10,814,727
Handline/Rod/Reel	2,464,644	1,709,897	3,315,590	12,223,525
Sink Gillnet	32,581,184	28,559,046	27,640,682	20,716,331
Midwater Trawl(inc. pair)	15,140,466	8,294,244	12,802,395	10,117,934
Shrimp Trawl	2,940,742	4,204,671	1,689,768	901,269
Scallop dredge	145,908,250	171,634,498	198,627,537	256,031,824
Lobster Trap	11,056,443	10,002,216	9,822,531	1,122,663
All Other	25,807,778	24,891,627	26,210,809	46,757,200
Total	393,196,775	403,835,433	422,405,065	487,586,122

Table 36 – Regulated groundfish landings (lbs., landed weight) by gear (Source: NMFS dealer database)

	Fishing Year			
	2001	2002	2003	2004
Bottom Trawl	84,308,295	71,062,949	67,531,231	53,399,152
Bottom Longline	2,755,125	1,017,788	1,128,411	2,042,216
Handline/Rod/Reel	1,646,085	758,320	567,999	1,695,734
Sink Gillnet	13,460,168	10,390,033	11,656,348	8,844,219
Midwater Trawl(inc. pair)	0	0	0	770,843
Shrimp Trawl	2,015	1,243	4,001	0
Scallop dredge	341,310	146,469	11,645	1,682,405
Lobster Trap	11,478	18,279	7,261	19,843
All Other	893,817	82,138	116,583	7,509,508
Total	103,418,293	83,477,219	81,023,479	75,963,920

Table 37 – Regulated groundfish revenues (1999 dollars) by gear (Source: NMFS dealer database)

	Fishing Year			
	2001	2002	2003	2004
Bottom Trawl	80,484,892	80,500,707	67,660,828	47,833,115
Bottom Longline	3,213,608	1,509,437	1,365,583	2,559,638
Handline/Rod/Reel	1,893,695	1,092,070	807,927	2,123,995
Sink Gillnet	11,976,846	11,942,517	10,875,049	8,028,378
Midwater Trawl(inc. pair)	0	0	0	840,800
Shrimp Trawl	3,045	1,070	6,665	0
Scallop dredge	292,442	140,050	11,791	1,768,909
Lobster Trap	10,093	18,275	8,740	26,406
All Other	838,155	121,929	113,553	6,856,027
Total	98,712,777	95,326,056	80,850,136	70,037,268

4.5.2.2.4 Landings and Revenue by Homeport State

Permit holders list a homeport state on their application. This information was used to summarize landings and revenues by state as an indication of the communities that may benefit from groundfish revenues. Note that the homeport state is not necessarily the port of landing or the home of the owner or operator of the vessel.

Most groundfish landings revenues are attributed to vessels that list homeport as Massachusetts, Maine, Rhode Island, or New Hampshire. Landings for groundfish permit holders from all four of these states declined between FY 2001 and FY 2004. Groundfish landings for Maine vessels declined 22 percent, for New Hampshire vessels declined 31 percent, for Massachusetts vessels declined 26.3 percent, and for Rhode Island vessels declined 15.8 percent. Groundfish revenues for Maine vessels declined 24.7 percent, for New Hampshire vessels declined 26.3 percent, for Massachusetts vessels declined 27.6 percent, and for Rhode Island vessels declined 31.5 percent.

Table 38 – Total landings (lbs., landed weight) by homeport state (Source: NMFS dealer, permit databases)

	Fishing Year			
	2001	2002	2003	2004
ME	78,724,996	59,323,936	57,293,476	54,335,286
NH	13,367,647	5,642,063	12,581,323	40,061,562
MA	283,227,205	198,514,601	255,231,528	266,992,307
RI	75,348,434	38,070,333	43,504,270	45,785,822
CT	363,090	439,728	1,436,588	1,828,590
NY	30,724,670	27,716,785	26,217,127	22,378,153
NJ	88,004,781	70,218,101	77,464,613	74,989,884
DE	1,263,676	885,613	973,135	1,221,721
MD	1,124,305	1,109,931	911,642	1,090,051
VA	11,467,791	11,450,314	11,345,162	11,748,455
NC	19,079,500	23,031,633	22,944,851	26,319,436
FL	507,722	531,941	569,839	699,280
Other	3,054,501	3,152,045	3,307,518	3,430,067
Total	606,258,318	440,087,024	513,781,072	550,880,614

Table 39 – Total revenues (1999 dollars) by homeport state (Source: NMFS dealer, permit databases)

	Fishing Year			
	2001	2002	2003	2004
ME	26,648,572	24,719,144	23,272,408	24,774,454
NH	8,418,482	7,075,586	6,090,693	9,153,546
MA	195,412,584	204,127,976	203,417,148	225,806,766
RI	30,800,864	28,547,281	31,463,327	30,256,897
CT	614,571	731,416	3,001,739	5,092,783
NY	26,409,700	25,138,900	23,452,497	20,898,353
NJ	44,299,399	47,744,846	58,019,883	77,080,772
DE	1,277,520	1,037,867	1,171,139	1,466,165
MD	980,506	899,123	861,470	1,065,106
VA	30,689,328	32,978,205	35,881,338	44,606,046
NC	20,075,649	24,658,834	28,596,262	36,901,704
FL	1,578,050	1,931,351	2,106,040	3,276,680
Other	5,991,550	4,244,904	5,071,122	7,206,850
Total	393,196,775	403,835,433	422,405,065	487,586,122

Table 40 – Regulated groundfish landings (lbs., landed weight) by homeport state (Source: NMFS dealer, permit databases)

	Fishing Year			
	2001	2002	2003	2004
ME	15,319,317	11,649,857	12,854,761	12,015,318
NH	4,712,053	3,313,107	3,445,717	3,262,416
MA	67,392,307	54,942,388	50,527,509	49,674,945
RI	7,239,855	7,225,382	7,596,776	6,101,959
CT	115,152	206,295	205,084	164,476
NY	4,199,723	3,589,125	3,373,185	1,722,828
NJ	854,198	502,831	658,452	681,537
DE	795,924	510,232	520,868	738,535
MD	2,115	2,437	423	459
VA	847,588	149,890	271,458	166
NC	1,254,276	866,766	1,010,968	1,356,422
FL	0	636	250	0
Other	685,785	518,273	558,028	244,859
Total	103,418,293	83,477,219	81,023,479	75,963,920

Table 41 – Regulated groundfish revenues (1999 dollars) by homeport state (Source: NMFS dealer, permit databases)

	Fishing Year			
	2001	2002	2003	2004
ME	14,098,122	12,316,308	11,474,684	10,624,622
NH	4,341,833	3,710,667	3,313,121	3,201,731
MA	65,043,154	64,172,777	52,134,291	47,097,741
RI	6,988,306	8,171,293	7,470,966	4,792,014
CT	100,283	214,740	229,318	162,007
NY	4,076,850	4,135,699	3,361,342	1,600,170
NJ	709,112	513,519	718,432	686,280
DE	793,705	550,726	531,451	732,119
MD	2,399	2,851	160	442
VA	835,778	211,224	249,159	115
NC	1,112,987	854,578	888,794	913,906
FL	0	1,005	106	0
Other	610,249	470,669	478,311	226,121
Total	98,712,777	95,326,056	80,850,136	70,037,268

4.5.2.2.5 Landings and Revenues by Landed Port Groups

Amendment 13 identified port groups that participated in the groundfish fishery and described changes in landings and revenues over time for those port groups. This section partially updates that information. The data in this section summarize landings and revenues by groundfish permit holders that occurred in a port group, regardless of the homeport of the vessel that landed the catch. It does not include landings of groundfish by vessels that did not have a groundfish permit (state registered vessels fishing in state waters).

The port group with the most groundfish landings in both FY 2001 and FY 2004 was the New Bedford Coast group, followed by Gloucester and the North Shore and Lower Mid-Coast Maine (which includes Portland). While these are the same three port groups that accounted for the most landings in FY 2001, since then there has been a slight shift and Gloucester and the North Shore has overtaken Lower Mid-Coast Maine. New Bedford landings declined 23.1 percent, Gloucester and the North Shore landings declined 23.7 percent, and Lower Mid-Coast Maine landings declined 25.9 percent. The only port group that saw an increase in groundfish landings was Southern Maine (+54 percent), but this group accounts for a miniscule part of total groundfish landings (less than 0.1 percent).

The New Bedford coast, Gloucester and the North Shore, and Lower Mid-Coast Maine are also the three largest port groups in terms of groundfish revenues. All three saw revenues decline from FY 2001 to FY 2004: New Bedford Coast -33 percent, Gloucester and the North Shore -20 percent, and Lower Mid-Coast Maine -28.3 percent. Southern Maine, Northern Coastal NJ, and Southern Coastal NJ increased groundfish revenues between FY 2001 and FY 2004, but these three groups account for only a small part of groundfish revenues.

Table 42 – Total landings (lbs., landed weight) by state and port group of landing (Source: NMFS dealer database)

		Fishing Year			
		2001	2002	2003	2004
Maine	DOWNEAST ME	Conf.	Conf.	1,370,037	1,274,174
	UPPER MID_COAST ME	45,475,509	20,846,839	21,739,636	33,528,959
	LOWER MID_COAST ME	86,291,510	48,763,435	57,138,362	45,978,105
	SOUTHERN ME	409,035	424,372	374,822	931,542
Maine Total		132,176,054	70,034,646	79,252,820	80,438,606
New Hampshire	COASTAL NH	13,944,028	18,220,967	23,343,645	19,849,330
New Hampshire Total		13,944,028	18,220,967	23,343,645	19,849,330
Massachusetts	GLOUCESTER AND NORTH SHORE	114,314,736	55,069,635	98,413,636	74,246,256
	BOSTON AND SOUTH SHORE	10,456,302	9,540,137	8,317,949	6,839,322
	CAPE AND ISLANDS	18,744,749	14,965,246	12,666,623	40,818,905
	NEW BEDFORD COAST	81,867,937	82,353,878	101,154,939	128,434,197
	Other MA	111,659	17,697	82,387	1,531
Massachusetts Total		225,495,383	161,946,593	220,635,534	250,340,211
Rhode Island	COASTAL RI	79,009,995	49,433,268	50,983,080	46,635,969
	Other RI	0	114,000	650,822	285,212
Rhode Island Total		79,009,995	49,547,268	51,633,902	46,921,181
Connecticut	COASTAL CT	0	147,133	1,327,493	1,902,366
Connecticut Total		0	147,133	1,327,493	1,902,366
New York	LONG ISLAND NY	22,558,582	20,447,040	18,375,148	16,475,538
	Other NY	Conf.	4,422	5,647	Conf.
New York Total		22,558,582	20,451,462	18,380,795	16,475,538
New Jersey	NORTHERN COASTAL NJ	24,017,723	22,609,450	19,766,855	19,487,126
	SOUTHERN COASTAL NJ	49,755,926	55,551,760	61,286,494	76,677,688
	Other NJ	Conf.	226,238	12,589	7,082
New Jersey Total		73,773,649	78,387,448	81,065,938	96,171,896
All Other		57,379,970	40,839,368	36,770,908	36,736,451
Total		604,337,661	439,574,885	512,411,035	548,835,579

Table 43 – Total revenues (1999 dollars) by state and port group of landing (Source: NMFS Dealer database)

		Fishing Year			
		2001	2002	2003	2004
Maine	DOWNEAST ME	Conf.	Conf.	1,567,200	1,096,791
	UPPER MID_COAST ME	5,523,321	3,983,693	3,642,532	3,499,187
	LOWER MID_COAST ME	26,966,607	24,222,250	21,479,155	20,572,472
	SOUTHERN ME	363,990	462,818	355,724	882,347
Maine Total		32,853,919	28,668,760	25,477,412	24,954,006
New Hampshire	COASTAL NH	7,933,548	7,013,721	5,707,132	7,356,352
New Hampshire Total		7,933,548	7,013,721	5,707,132	7,356,352
Massachusetts	GLOUCESTER AND NORTH SHORE	31,314,685	27,527,827	30,362,625	24,928,648
	BOSTON AND SOUTH SHORE	8,781,966	10,808,050	9,208,720	8,087,513
	CAPE AND ISLANDS	19,555,467	16,007,622	15,003,572	12,684,748
	NEW BEDFORD COAST	137,487,702	153,752,423	155,937,851	189,795,661
	Other MA	135,757	54,339	57,798	9,575
Massachusetts Total		197,275,578	208,150,261	210,570,566	235,506,145
Rhode Island	COASTAL RI	33,099,343	29,064,260	30,491,931	31,471,621
	Other RI	0	10,151	37,918	31,942
Rhode Island Total		33,099,343	29,074,411	30,529,849	31,503,562
Connecticut	COASTAL CT	0	14,813	1,827,501	4,364,964
Connecticut Total		0	14,813	1,827,501	4,364,964
New York	LONG ISLAND NY	18,953,727	17,190,332	15,878,884	15,169,063
	Other NY	Conf.	5,571	5,133	Conf.
New York Total		18,953,727	17,195,903	15,884,016	15,169,063
New Jersey	NORTHERN COASTAL NJ	23,191,525	24,438,418	26,242,579	30,149,723
	SOUTHERN COASTAL NJ	26,446,866	28,905,303	37,073,019	56,671,323
	Other NJ	Conf.	215,737	17,953	4,694
New Jersey Total		49,638,391	53,559,458	63,333,551	86,825,740
All Other		50,696,457	58,297,079	67,507,837	80,325,348
Total		390,450,962	401,974,407	420,837,865	486,005,180

Table 44 – Regulated groundfish landings (lbs., landed weight) by state and port group of landing (Source: NMFS dealer database)

		Fishing Year			
		2001	2002	2003	2004
Maine	DOWNEAST ME	Conf.	Conf.	0	0
	UPPER MID_COAST ME	1,776,235	1,495,340	1,453,711	645,998
	LOWER MID_COAST ME	18,548,510	14,065,240	13,844,756	13,757,184
	SOUTHERN ME	360,248	261,089	299,639	554,850
Maine Total		20,684,993	15,821,669	15,598,106	14,958,032
New Hampshire	COASTAL NH	3,881,879	2,625,237	2,926,183	3,441,705
New Hampshire Total		3,881,879	2,625,237	2,926,183	3,441,705
Massachusetts	GLOUCESTER AND NORTH SHORE	18,390,780	15,808,691	16,777,975	14,049,048
	BOSTON AND SOUTH SHORE	5,974,231	5,907,806	5,650,258	4,969,629
	CAPE AND ISLANDS	8,140,487	4,992,069	4,346,465	3,736,423
	NEW BEDFORD COAST	40,733,040	34,236,222	31,697,104	31,340,361
	Other MA	94,503	8,979	0	0
Massachusetts Total		73,333,041	60,953,767	58,471,802	54,095,461
Rhode Island	COASTAL RI	3,582,482	3,224,566	2,859,158	2,546,180
	Other RI	0	0	0	0
Rhode Island Total		3,582,482	3,224,566	2,859,158	2,546,180
Connecticut	COASTAL CT	0	0	6,003	127,971
Connecticut Total		0	0	6,003	127,971
New York	LONG ISLAND NY	1,319,273	584,058	658,362	347,996
	Other NY	Conf.	1,746	0	Conf.
New York Total		1,319,273	585,804	658,362	347,996
New Jersey	NORTHERN COASTAL NJ	578,599	262,028	498,746	432,743
	SOUTHERN COASTAL NJ	5,217	2,238	1,278	2,691
	Other NJ	Conf.	0	0	0
New Jersey Total		583,816	264,266	500,024	435,434
All Other		3,601	1,620	3,841	10,031
Total		103,389,085	83,476,929	81,023,479	75,962,810

Table 45 - Regulated groundfish revenues (1999 dollars) by state and port group of landing (Source: NMFS dealer database)

		Fishing Year			
		2001	2002	2003	2004
Maine	DOWNEAST ME	Conf.	Conf.	0	0
	UPPER MID_COAST ME	1,536,473	1,544,274	1,314,704	546,146
	LOWER MID_COAST ME	17,084,498	14,938,683	12,529,905	12,250,829
	SOUTHERN ME	316,389	290,933	258,734	580,032
Maine Total		18,937,361	16,773,890	14,103,342	13,377,006
New Hampshire	COASTAL NH	3,669,818	3,124,968	2,818,639	3,369,105
New Hampshire Total		3,669,818	3,124,968	2,818,639	3,369,105
Massachusetts	GLOUCESTER AND NORTH SHORE	18,337,004	18,679,739	18,018,063	14,689,080
	BOSTON AND SOUTH SHORE	5,890,936	7,127,134	6,328,123	5,235,644
	CAPE AND ISLANDS	8,333,940	6,426,246	4,909,361	4,542,185
	NEW BEDFORD COAST	38,403,153	38,447,516	30,465,904	25,732,581
	Other MA	104,023	16,085	0	0
Massachusetts Total		71,069,056	70,696,720	59,721,451	50,199,489
Rhode Island	COASTAL RI	3,305,880	3,712,060	2,874,182	2,088,983
	Other RI	0	0	0	0
Rhode Island Total		3,305,880	3,712,060	2,874,182	2,088,983
Connecticut	COASTAL CT	0	0	5,033	106,222
Connecticut Total		0	0	5,033	106,222
New York	LONG ISLAND NY	1,216,979	698,168	740,911	374,781
	Other NY	Conf.	1,617	0	Conf.
New York Total		1,216,979	699,785	740,911	374,781
New Jersey	NORTHERN COASTAL NJ	485,958	315,221	583,554	507,516
	SOUTHERN COASTAL NJ	2,186	1,986	1,277	3,219
	Other NJ	Conf.	0	0	0
New Jersey Total		488,144	317,207	584,831	510,735
All Other		1,483	1,136	1,745	10,201
Total		98,688,720	95,325,765	80,850,136	70,036,522

4.5.2.2.6 Landings and Revenues for Primary Groundfish Ports

Amendment 13 identified eight primary groundfish ports (see section 6.5.5). This section summarizes recent activity in those ports. All eight ports experienced a decline in the number of vessels with groundfish permits that landed regulated groundfish. The smallest decline was in Portland ME, which experienced a 5 percent decline in the number of permitted vessels landing regulated groundfish. Chatham/Harwichport experienced a 53 percent decline, the largest in any port over this period. Gloucester and New Bedford/Fairhaven, two other large ports, respectively experienced a 22 percent and a 21 percent decline.

Most ports experienced a decline in total landings between FY 2001 and FY 2004, with New Bedford the sole exception. Boston, New Bedford/Fairhaven, and Pt. Judith saw an increase in total revenues, while all other ports experienced a decline. Groundfish landings declined in all ports, with Boston experiencing the least decline (8 percent) and Eastern Long Island the largest (71 percent). Groundfish landings declined 22 percent in Portland, 19 percent in Gloucester, and 23 percent in New Bedford/Fairhaven. Landings declined 59 percent in Chatham/Harwichport.

Table 46 – Number of vessels with multispecies permits landing regulated groundfish in principal groundfish ports (Source: NMFS dealer, permit databases)

	2001	2002	2003	2004
Portland ME	117	111	105	111
Portsmouth NH	67	62	33	41
Gloucester MA	261	235	226	202
Boston MA	36	27	30	24
Chatham/Harwichport MA	248	179	150	116
New Bedford/Fairhaven	230	219	229	182
Pt Judith, RI	105	85	83	75
Eastern Long Island, NY	112	94	88	69

Table 47 – Total landings for principal groundfish ports (Source: NMFS dealer, permit databases)

	2001	2002	2003	2004
Portland ME	75,554,441	46,867,048	56,192,626	44,330,373
Portsmouth NH	4,290,244	2,639,830	5,447,754	3,622,453
Gloucester MA	112,723,002	53,717,051	97,359,033	73,215,332
Boston MA	7,835,595	6,245,445	5,619,980	5,449,678
Chatham/Harwichport MA	11,284,149	7,675,769	8,832,267	7,244,056
New Bedford/Fairhaven	80,549,608	81,599,048	99,865,857	112,039,634
Pt Judith, RI	35,696,124	37,656,523	38,237,745	33,777,861
Eastern Long Island, NY	20,953,207	18,458,011	16,745,447	14,291,397

Table 48 – Total revenues (1999 dollars) for principal groundfish ports (Source: NMFS dealer, permit databases

	2001	2002	2003	2004
Portland ME	24,495,657	22,416,205	20,442,786	19,587,623
Portsmouth NH	4,337,506	3,429,332	2,590,320	3,338,005
Gloucester MA	29,675,671	25,623,278	28,958,880	24,271,485
Boston MA	6,161,785	7,265,831	5,995,997	6,410,317
Chatham/Harwichport MA	9,192,985	6,963,426	7,505,361	7,520,297
New Bedford/Fairhaven	135,591,155	152,755,151	154,775,657	187,712,337
Pt Judith, RI	21,626,251	20,462,169	21,108,156	22,410,212
Eastern Long Island, NY	17,521,760	15,704,951	14,470,985	13,579,044

Table 49 – Groundfish landings for principal groundfish ports (Source: NMFS dealer, permit databases)

	2001	2002	2003	2004
Portland ME	17,127,475	13,120,369	13,248,132	13,336,041
Portsmouth NH	2,292,399	1,249,678	1,574,926	1,604,137
Gloucester MA	16,995,463	14,766,480	15,911,942	13,755,265
Boston MA	4,179,936	4,023,466	3,614,632	3,846,639
Chatham/Harwichport MA	6,568,867	3,621,805	3,385,319	2,742,502
New Bedford/Fairhaven	40,730,450	34,234,701	31,693,225	31,340,092
Pt Judith, RI	2,206,179	1,863,781	1,602,789	1,685,393
Eastern Long Island, NY	1,163,630	546,352	615,226	337,261

Table 50 – Groundfish revenues for principal groundfish ports (Source: NMFS dealer, permit databases)

	2001	2002	2003	2004
Portland ME	15,841,728	13,957,569	11,956,071	11,835,434
Portsmouth NH	1,953,759	1,285,313	1,266,358	1,371,651
Gloucester MA	16,918,799	17,330,635	16,944,675	14,317,266
Boston MA	4,212,193	4,864,040	3,859,636	3,948,158
Chatham/Harwichport MA	6,826,782	4,805,410	3,795,130	3,412,989
New Bedford/Fairhaven	38,400,108	38,445,632	30,463,853	25,732,374
Pt Judith, RI	2,055,422	2,157,415	1,697,689	1,425,866
Eastern Long Island, NY	1,084,559	658,862	698,401	363,752

4.5.2.2.7 Landings and Revenues Summary

Groundfish landings and revenues declined substantially in FY 2004, coincident with the implementation of regulations adopting Amendment 13. When evaluated based on constant 1999 dollars, regulated groundfish revenues by groundfish permit holders were the lowest experienced during any year between FY 1994 and FY 2001. At just over $70 million, they were 30 percent lower than in FY 2001 and 15 percent lower than in FY 1997. Landing and revenue declines were widespread throughout the fishery and, with the exception of some minor port groups, occurred across almost all examined categories of groundfish permit holders. Major groundfish landing ports all experienced similar declines in landings and revenues. Average per vessel revenues did not change appreciably during this period because of the decline in permit holders landing regulated groundfish.

The changes in revenue for the fishery as a whole are similar to those that Amendment 13 estimated would occur, with a caveat. Analyses in Amendment 13 estimated changes in groundfish revenues based on average revenues over a baseline period (1998-2001) and predicted a twenty-five percent decline in nominal groundfish revenues as a result of restrictions on Category A DAS. Groundfish revenues declined thirty percent in FY 2004 from the 1998-2001 average (see Appendix V).

4.5.2.3 Days-At-Sea Leasing and Transfer Programs

Amendment 13 implemented two programs that allowed the transfer of DAS between permit holders. The DAS transfer program provided an opportunity for the permanent transfer of DAS from one groundfish permit to another. Through November of 2005, no DAS transfers had occurred. The DAS leasing program provided an opportunity for the temporary transfer of DAS from one permit to another. This program was frequently used. Appendix I provides a summary and analysis for this program in FY 2004. Major elements of that report are summarized below.

From May 2, 2004, through April 30, 2005, over 6,000 DAS were leased, at a value of $2.5 million. This is roughly fourteen percent of all Category A DAS that were allocated. Most DAS were leased by trawl vessels, although there were some leases by gillnet vessels. In terms of ports, vessels from Portland leased roughly 26 percent of the total, New Bedford vessels leased 18 percent, and Gloucester vessels leased 13 percent. Most DAS were leased by those vessels that were allocated between 48.3-98.4 Category A DAS – in other words, vessels that have been the most active in the groundfish fishery. Most leased DAS were actually used (5,615 used out of over 6,000 leased). This does not mean that lessees used all allocated DAS, however, since leased DAS are assumed to be used first. Leasing appears to have helped mitigate the economic impacts of Amendment 13, as it allowed many lessees to obtain enough DAS to continue to fish, meet overhead expenses, and pay crew.

The biological impacts of leasing are difficult to separate from the impacts of other Amendment 13 measures. Total DAS use (see section 6.5.2.1) in FY 2004 was less than anticipated in Amendment 13, even though more leased DAS were used than allowed for in that analysis. The biological impacts do not appear to be conservation neutral, but they also do not appear to be the same for all stocks. As a result of DAS leasing, mortality appears to have increased for many stocks, but appears to have declined for SNE/MA yellowtail flounder and redfish. Overall, the biological impacts of leasing in FY 2004 do not appear to have been substantial.

The DAS leasing program resulted in an active market in the exchange of DAS, with nearly 15 percent of the baseline allocations being transferred through the leasing program. The primary users of the program were those vessels that received the highest DAS allocations in FY 2004, showing that the leasing market was mainly used by active groundfish vessels, the group predicted to have the largest reduction in fishing revenues under Amendment 13. The leasing program provided regulatory relief which allowed lessee vessels, on average, to fish enough to cover their overhead and crew expenses. Consistent with the analysis of Amendment 13, DAS tended to move to the primary groundfish fishing states of Maine and Massachusetts. While the leasing program may have benefited some southern New England and mid-Atlantic stocks, it may have contributed to increased catches of several GOM and GB stocks. The differing impacts on different stocks illustrate the difficulty in levying a conservation tax in order to attain conservation neutrality. The levy would need to be stock or area specific and would have unintended consequences for other stocks. Additionally, other management measures that are implemented and their expected impact on the fleet would need to be considered.

These analyses are subject to the following sources of uncertainty:

- The price paid for a leased DAS is reported by the lessee vessel and may not accurately reflect the actual price paid. There is anecdotal information that some lease agreements are based on a share of the catch, which would not yet be known when the lease report is provided to NMF.
- It is difficult to separate the biological impacts of other management measures from the impacts of the DAS leasing program.
- A key assumption when estimating biological impacts is that all fishing activity of a lessee vessel takes place in the broad management area (GOM/GB/SNE) where most of the vessel's trips occurred. This will bias the results. As additional data become available, it may be possible to refine this analysis.

Preliminary information for FY 2005 (through January) suggests that the DAS leasing market is more active than in FY 2004. Through January leases resulted in the transfer of 33 percent more DAS than during the same period in FY 2004. Average price per DAS appears to have declined by about 30 percent (from $579 to $388 per DAS). It is not clear if this will result in an increase in leasing activity for the entire fishing year, or is just an indication that vessels are executing leases earlier in the year.

Table 51 – Comparison of FY 2004 and FY 2005 DAS leasing activity through January, 2006 (Source: NMFS DAS database)

	DAS Leased		Revenues	
Month	FY 2004	FY 2005	FY 2004	FY 2005
05	504	916	461,856	656,156
06	318	641	333,969	271,797
07	514	553	302,786	210,102
08	741	879	266,544	515,395
09	586	567	440,434	162,395
10	681	660	386,615	119,403
11	381	774	142,540	210,934
12	536	903	136,003	215,285
01	742	784	246,159	228,991
Grand Total	5,004	6,677	2,716,906	2,590,458

4.5.2.4 Closed Area II Yellowtail Flounder Special Access Program

Amendment 13 implemented a SAP that allowed fishing in CAII to target GB yellowtail flounder while using Category B DAS. This program was subject to strict conditions, including a maximum possession limit, a limit on the number of trips each vessel could take in a month, and a maximum number of trips for the program. The program began June 1, 2004 and ended September 3, 2004 when the limit on trips was achieved. A detailed summary of catches and revenues in the program is summarized in Appendix II.

According to NMFS, there were 319 trips in the SAP that caught 8.3 million pounds of yellowtail flounder. Vessels were charged a total of 1,485 Category B DAS (both regular and reserve) while underway 1,995 days (vessels were not charged DAS to and from the SAP area). By combining information from the VTR, dealer, and DAS databases, landings and revenue information for 207 of the 319 trips were estimated. Yellowtail flounder (8.0 million lbs.), haddock (1.0 million lbs.), winter flounder (622,280 lbs.), skates and skate wings (720,000 lbs.), grey sole (226,000 lbs.), plaice (171,000 lbs.), lobster (159,000 lbs.), monkfish (various products, 271,000 lbs.) and scallops (106,000 lbs) were the primary species landed. The average catch per trip for yellowtail flounder was 24,348 lbs, haddock was 4,237 lbs, winter flounder was 2,057 lbs, and skates 7,400 lbs.

Revenues were estimated for 307 (out of 319 trips) that could be clearly linked in the dealer, VTR, and DAS databases. Estimated total revenues for these 307 trips were $7.2 million. Yellowtail flounder accounted for $3.45 million, haddock $929,000, lobster $645,000, scallops $501,000, and winter flounder $495,000. The overall average price received for yellowtail flounder in this SAP was $0.43 per pound. In comparison, the average price received for yellowtail flounder (all gear, all ports) between May and September 2003 was $0.92 per pound (3.8 million pounds landed worth $3.4 million). The average price for haddock on SAP trips was $0.89 per pound, while for the same period in 2003 it was $1.27 per pound (4.8 million pounds landed worth $6.1 million). Overall yellowtail flounder landings from May through September in FY 2004 were 11.9 million pounds worth $6.3 million, for an average price of $0.52 per pound. Overall haddock landings from May through September 2004 totaled 6.3 million lbs. worth $6.4 million, for an average price of $1.03 per pound.

There was considerable criticism that the SAP resulted in a derby fishery that reduced the economic benefits from the program. As shown in the previous paragraph, average price per pound for yellowtail flounder declined in FY 2004 during the SAP when compared to the same period the previous year. At the same time, the SAP resulted in a tripling in yellowtail landings and a sixty percent increase in yellowtail flounder revenues in FY 2004 when compared to the same period in FY 2003. An analysis of average revenue per trip showed that 80 percent of the identified trips earned more than $15,000 and 20 percent earned more than $30,000. About 80 percent of the trips earned more than $2,000 per day absent, about 60 percent earned more than $2,500 per day absent, and about 10 percent earned more than $5,000 per day absent. In comparison, Amendment 13 estimated the mean revenue per day for trawl vessels on trips that were not in the Gulf of Maine. For vessels between 50 and 70 feet in length, the mean revenue was $2,271 per day, while that for trawl vessels over 70 feet in length was $3,571.

Yellowtail flounder discards in the SAP were reviewed to determine the cause. Thirty-one (out of 319, or 9.7 percent) trawl trips in the CAII Yellowtail Flounder SAP were observed. Yellowtail flounder (600,805 lbs.), haddock (156,378 lbs.), sea scallops (88,634 lbs.), monkfish (68,417 lbs.), and winter skates (47,517 lbs.) were the top five kept species on these observed trips. The top discarded species were skates (704,205 lbs., all species), sea scallops (32,610 lbs.), yellowtail flounder (30,290 lbs.), and haddock (22,178 lbs.). The primary reason for yellowtail flounder discards on observed trips was that the fish were smaller than the regulatory minimum size (21,289 lbs., or 70 percent of observed discards). Vessels that had filled their quota discarded another 3,409 lbs. on observed trips, while 4,081 lbs. were discarded due to market conditions.

4.5.2.5 Category B (regular) DAS Pilot Project

FW 40A implemented a pilot project which allowed the use of Category B (regular) DAS to target healthy stocks. This program ran for four consecutive quarters, from November 19, 2004 to its termination on October 6, 2005. The program included strict reporting requirements, limits on the incidental catch of unhealthy stocks, and a limit on the total number of DAS used in each quarter. A review of the first three quarters of the program is included in Appendix III. Data from the final quarter was not available when this report was prepared.

A total of 600 trips were taken in the Category B (regular) DAS pilot program from November 2004 through July 2005 (Table 68). Trips were evenly distributed throughout the three quarters: Nov-Jan (31%), Feb05-April 05 (36%) and May-July 05 (33%). Most trips (459) were taken on Multispecies (77%) and 141 were taken for monkfish (24%) on a Multispecies DAS. Trips for Multispecies appeared to be distributed uniformly across quarters: Nov-Jan (36%), Feb05-April 05 (38%) and May-July 05 (26%). Monkfish trips were not distributed uniformly with 56% of the total monkfish trips were taken in May-July 05 quarter.

A total of 2,021 B (regular) DAS was used in the pilot B (regular) DAS program (Table 52). B (regular)-DAS usage was similar in Nov 04-Jan 05 (600 DAS) and Feb 05-April 05 (521 DAS) period but was higher in May05-July 05 (900 DAS). Overall, 34% of the B (regular) DAS trips were observed with 36% coverage of Multispecies trips and 27% coverage of Monkfish trips. The percentage of total trips observed by quarter ranged from 24% to 45%.

Total catches taken on a B (regular) DAS pilot program is listed by species in Table 54. Six species accounted for approximately 85% of the total catch: skates (21%), monkfish (16%), haddock (15%), yellowtail (13%) winter skate (11%) and winter flounder (9%).

The regulations for the Pilot Project require a vessel to "flip" from a Category B DAS to a Category A DAS if catch of an unhealthy stock exceeds the trip limit. Overall, 37% of all trips were flipped from a B (regular)-DAS to an A-DAS. Flipping rates on observed trips (46% flipped, 90% CI= 405-52%) were higher than non-observed trips (32% flipped, 90% CI=28%-36%) during the entire Nov-July time period. The observed flipping rate was higher for observed trips than non-observed trips in every quarter. A contingency table analysis indicates that flipping rate was not independent of whether a trip was observed or not for the Nov-July data set (N=535 trips, P<0.0014) and November-January period (N=128, P=0.036). The flipping rate was substantially higher for observed than non-observed in May-July period (N-206, P=.058). The flipping rate in February-April period (N=201, P=.20) was not statistically significantly. The available data suggests that flipping rates during the multispecies Category B (regular) DAS reported from Nov-2004 to July 2005 were not independent of whether an observer is present on the trip. Further, the effect of having an observer onboard increased the observed flipping rate by a substantial amount in November-January and May-July period and a moderate amount in the February-April period.

Table 52 - Total number of B (regular) DAS trips by quarter.

Number of B (regular) DAS trips for Northeast multispecies **Quarter**	**Nov04- Jan 05**	**Feb 05- April 05**	**May 05- July 05**	**Total Nov 04- July 05**
Total trips	**164**	**175**	**120**	**459**
Observed trips	**49**	**77**	**37**	**163**
% of trips observed	**30%**	**44%**	**31%**	**36%**
Number of B (regular) DAS trips for Monkfish using multispecies DAS				
Total trips	**24**	**38**	**79**	**141**
Observed trips	**9**	**18**	**11**	**38**
% of trips observed	**38%**	**47%**	**14%**	**27%**
Total number of B (regular) DAS trips				
Total trips	**188**	**213**	**199**	**600**
Observed trips	**58**	**95**	**48**	**201**
% of trips observed	**31%**	**45%**	**24%**	**34%**
% of total trips for multispecies	**87%**	**82%**	**60%**	**77%**
% of total trips for Monkfish	**13%**	**18%**	**40%**	**24%**

Table 53 - Distribution of B DAS used in the pilot B (regular) DAS program

	Nov04- Jan 05	**Feb 05- April 05**	**May 05- July 05**	**Nov 04- July 05**
B (regular) DAS	**600**	**521**	**900**	**2021**
% of total B (regular) DAS	**30%**	**26%**	**45%**	

Table 54 - Estimated catch (live pounds) from B (regular)-DAS pilot program for unflipped trips. Catch includes discards for cod, haddock, yellowtail, American Plaice, winter flounder, witch flounder, and white hake.

Species	Multispecies	Multispecies/monkfish	total catch
SKATES	2,111,637	696,145	2,807,782
MONKFISH	1,768,599	472,597	2,241,195
HADDOCK	1,955,847	81,496	2,037,343
YELLOWTAIL FLOUNDER	1,702,956	282	1,703,238
WINTER SKATE	997,125	568,019	1,565,144
WINTER FLOUNDER	1,258,213	5,810	1,264,023
POLLOCK	711,855	27,644	739,500
SUMMER FLOUNDER (FLUKE)	132,970	140,836	273,806
SEA SCALLOP	232,619	7,721	240,340
COD	196,203	1,380	197,583
LOBSTER	132,962	261	133,223
OCEAN REDFISH	129,212	2,796	132,007
WITCH FLOUNDER (GRAY SOLE)	84,851	1,107	85,958
AMERICAN PLAICE (DAB)	73,980	329	74,310
WHITE HAKE	63,028	267	63,296
WINDOWPANE	28,940	0	28,940
HORSESHOE CRAB	0	7,412	7,412
ATLANTIC WOLFFISH	5,520	0	5,520
CUSK	5,084	21	5,104
THORNY SKATE	2,258	89	2,347
CHAIN DOGFISH	1,052	0	1,052
ATLANTIC HALIBUT	817	0	817
BLUEFISH	458	200	658
TILEFISH,UNC	81	0	81
TILEFISH (GOLDEN TILEFISH)	52	0	52
TAUTOG	0	16	16
FISH, OTHER	0	12	12
LONG FINNED SQUID (LOLIGO)	2	0	2
total	11,596,321	2,014,439	13,610,760

4.5.2.6 Closed Area 1 Hook Gear Haddock SAP

FW 40A implemented an SAP that allowed vessels to use hook gear while targeting GB haddock in a small area inside CAI. As implemented this SAP was only available to members of the GB Cod hook sector in FY 2004. FW 41 extended the program to non-sector vessels in FY 2005.

While data is not yet available from the SAP in FY 2005, information is available for FY 2004. The CAI Hook Gear Haddock SAP (as implemented, only available to GB Cod Hook Sector vessels) closed on December 31, 2004 after landing 1,038,776 pounds of haddock on 217 trips (an average of 4,786 lbs./trip landed). An additional 2,351 pounds of haddock were discarded. Only 20,265 pounds of cod were caught for a haddock/cod ratio of over 51:1.

4.5.2.7 Eastern U.S./CA Area Haddock SAP

In FY 2005, there were 58 trips in the Eastern U.S./CA Haddock SAP between May 1 and August 26, 2005 when the Eastern U.S./CA area was closed. 42 trips were to the Eastern U.S./CA Haddock SAP, while 16 trips were declared to the SAP and the Eastern U.S./CA area combined. Vessels were charged 269 DAS on these trips including 112 Category A DAS and 157 Category B DAS. The average number of DAS/trip in the SAP area alone was 4.5, while for trips that fished in both the SAP area and the Eastern U.S./CA area it was 5.1. Note that vessels were not charged DAS enroute the area, so actual trip length was longer than the average.

For trips to the SAP area only, 9 of the 42 trips were observed (21 percent). Of the nine observed trips, three flipped to a Category A DAS and six did not flip (33 percent flipping rate). There were no instances when an unobserved trip flipped to a Category A DAS. An analysis was performed to determine if there were significant differences in flipping rates between the observed and unobserved trips (see Appendix V for details). Because of the limited number of observed trips, the analysis used two tests for independence of the two factors (flipping and presence of an at-sea observer). The hypothesis tested was that the probability of flipping was independent of the presence of an observer. Both tests indicated that the hypothesis of independence should be rejected (Table 55, Likelihood Ratio Chi-Square Test, $P<0.01$). The evidence indicates that the processes of having a trip flipped and having a trip observed were dependent for the Eastern US/Canada Haddock SAP in FY 2005. No confidence intervals for the proportions of flipped trips on observed versus non-observed trips could be evaluated since all of the flipped trips occurred with an observer ($p=100\%$) and no trips were flipped without an observer.

In order to characterize the landings and revenues from this SAP, the DAS and VTR databases were examined to determine landed catches on SAP trips. As of December 19, 2005, VTR data was only reported for 41 of the 58 trips (71 percent). These trips were made by twenty-two different vessels. Thus, the information here does not represent a complete census of all SAP trips but does give a preliminary indication of the species and quantities landed in this SAP. These forty-one trips landed 1.3 million pounds of various species (Table 56, top twenty-five species landed shown). Haddock accounted for 471,542 pounds, while winter flounder, pollock, and plaice were the other principal regulated groundfish species landed. For trips declared into both programs, the ratio of haddock to cod landed was 14:1, while haddock to winter flounder landed was 2:1. Note that while cod landings were limited by a trip limit, winter flounder landings were not. Trips in the SAP only were required to use a haddock separator trawl at all times, yet landed over 167,000 lbs. of winter flounder with a haddock to winter flounder ratio of less than 2:1. This was not anticipated by FW 40A, which expected that the separator trawl would catch few flounders. Indeed, if all flounders are summed together, the catch of flounders in this program in the SAP only area exceeded the catch of the target species (haddock).

The average quantity kept of all species on these trips was over 32,000 lbs. There was a wide range in haddock catch rates per day absent (days absent include transit time, and is not the same as DAS charged). Several trips caught less than 100 lbs. of haddock per day absent, while at the other extreme several trips caught more than 4,500 lbs. per day absent. All of these trips landed in one of four ports: New Bedford MA, Gloucester MA, Portland ME, or Pt. Judith RI.

This information includes landed catch and does not include discards. NMFS estimated cod discards in this SAP as 47,511 pounds through October 6, 2005. Estimates of discards of other species are not yet available, though a following section provides information on catches and discards on observed trips using a haddock separator trawl.

Table 55- Contingency Table Analysis of FY 2005 Eastern US/Canada Haddock SAP Trip Flipping Rates

```
Contingency Table Analysis of Flipping Rates in 2005 Eastern US/CAN Haddock
SAP 1
  Null hypothesis: Observed flipping rate is independent of at-sea
observation
                           14:12 Friday, December 23, 2005
                               The FREQ Procedure
                                Table of a by b

                      a(FLIPPED TRIP)     b(OBSERVED TRIP)
                      Frequency|YES     |NO      |  Total
                      ---------+--------+--------+
                      YES      |      3 |      0 |      3
                      ---------+--------+--------+
                      NO       |      6 |     30 |     36
                      ---------+--------+--------+
                      Total           9       30       39

                         Statistics for Table of a by b
             Statistic                     DF       Value      Prob
             ------------------------------------------------------
             Chi-Square                     1     10.8333    0.0010
             Likelihood Ratio Chi-Square    1      9.6955    0.0018
             Continuity Adj. Chi-Square     1      6.6475    0.0099
             Mantel-Haenszel Chi-Square     1     10.5556    0.0012
             Phi Coefficient                       0.5270
             Contingency Coefficient               0.4663
             Cramer's V                            0.5270

              WARNING: 50% of the cells have expected counts less
                       than 5. Chi-Square may not be a valid test.

                            Fisher's Exact Test
                       ----------------------------------
                       Cell (1,1) Frequency (F)         3
                       Left-sided Pr <= F          1.0000
                       Right-sided Pr >= F         0.0092
                       Table Probability (P)       0.0092
                       Two-sided Pr <= P           0.0092

                                Sample Size = 39
```

Table 56 – Species landed on 41 trips in the Eastern U.S./CA Haddock SAP in FY 2005 (Source: NMFS VTR and DAS databases as of December 19, 2005)

	ACCESS_AREA		
Species	SAP Only	SAP and Eastern Area	Grand Total
COD	23,340	9,685	33,025
CUSK	849	60	909
FLOUNDER, AMERICAN PLAICE	67,042	5,425	72,467
FLOUNDER, WINDOWPANE		670	670
FLOUNDER, SUMMER	485	380	865
FLOUNDER, WINTER / BLACKBACK	167,125	68,570	235,695
FLOUNDER, WITCH / GRAY SOLE	48,297	5,835	54,132
FLOUNDER, YELLOWTAIL	54,094	131,199	185,293
HADDOCK	318,237	153,305	471,542
HAKE, MIX RED / WHITE, ROUND	6,253		6,253
HAKE, SILVER / WHITING	3,800		3,800
HAKE, WHITE	700	900	1,600
HALIBUT, ATLANTIC	287		287
LOBSTER, AMERICAN	13,210	2,210	15,420
MONK TAILS	19,565	1,950	21,515
MONKFISH / ANGLERFISH	23,063	3,440	26,503
POLLOCK	160,483	2,400	162,883
REDFISH / OCEAN PERCH	3,162	400	3,562
SCALLOP, SEA		501	501
SKATE UNCLASSIFIED	2,565	28,895	31,460
SKATE WINGS UNCLASSIFIED	7,176	3,300	10,476
WINTER SKATE WINGS	2,000	1,500	3,500
WOLFFISH / OCEAN CATFISH	218	20	238
Grand Total	921,951	420,645	1,342,596

4.5.2.8 Haddock Separator Trawl

This action proposes two measures that require use of the haddock separator trawl: an extension of the Eastern U.S./CA Haddock SAP, and a proposal to require the use of the separator trawl when participating in the Category B (regular) DAS Program (which may be renewed). There are a limited number of observed trips by vessels using the separator trawl which can be used to supplement experimental data on the performance of the trawl.

The observer (OBDBS) database was queried to identify trawl trips that used a separator panel (excluder device='3') in CY 2005. A total of 20 observed trips were identified in the database as of December 14, 2005. Additional observed trips may have occurred but may not yet be entered into the database. Fourteen trips were recorded as U.S./CA area trips while six trips were recorded as Category B (regular) DAS trips. This designation is made by the observer, and it is possible that they are not exclusive (e.g. a Category B (regular) program trip may occur in the U.S./CA area). Seven trips made tows both with and without the panel. Most trips used the separator panel in the Eastern U.S./Canada area (SAs 561 and 562). (Table 57)

Catches (kept and discarded) of the top twenty-five species on tows using a separator panel are shown in Table 58. Regulated groundfish accounted for sixty-five percent of the catch, with haddock, yellowtail flounder, cod, and winter flounder as the four largest regulated groundfish components. Combined catches of skates (207,136 lbs.) exceeded the haddock catch (199,634 lbs.). The overall ratio of haddock to yellowtail flounder was 2.6:1, the ratio of haddock to cod was 4.2:1, and the ratio of haddock to winter flounder was 3.2:1. Monkfish, witch flounder, and plaice were also caught in substantial quantities.

The ratio of haddock to other species was compared for trips identified as occurring in the Category B (regular) DAS program and trips identified as taking place in the U.S./CA area. With only five observed trips using the separator trawl in the Category B (regular) DAS program these results should not be considered definitive. While the ratio of haddock to winter flounder in both programs was similar (3.1:1 in the U.S./CA area, 3.4:1 in the Category B(regular) DAS program), the ratio of haddock to yellowtail flounder was 4.1:1 in the U.S./CA program but 1.1:1 in the Category B (regular) DAS Pilot Program. The ratio of haddock to cod in the U.S./CA program was 3.8:1, while it was 7:1 in the Category B (regular) DAS program. The ratio of haddock to monkfish was similar in both programs.

Haddock discards accounted for six percent of the haddock catch (12,466 lbs.), with almost all discards due to the fish being smaller than the regulatory minimum. Cod discards accounted for fifty percent (21,504 lbs.) of the cod catch; sixty-seven percent of these discards were due to a filled vessel quota, twenty-three percent were due to high grading, and various other reasons were given for the remaining discards. Ninety-four percent of the skates caught were discarded, totaling 193,937 pounds. Winter skate (49,716 lbs.) and little skates (54,369 lbs.) were the largest components identified by species, but an additional 78,711 lbs. was identified as skates (NK). There were also 10,609 lbs. of barndoor skates caught, all discarded, and 532 lbs. of smooth skates.

Catch composition on tows using the separator trawl was examined by trip, focusing on regulated groundfish. All twenty trips caught haddock and cod while using a separator trawl, seventeen trips caught yellowtail, winter flounder, or monkfish, fifteen trips caught plaice, and thirteen trips caught grey sole (witch flounder). The ratio of haddock to cod for the twenty trips ranged from 0.2:1 to 22.4:1. For the seventeen observed trips that caught winter flounder, the ratio of haddock to winter flounder ranged from 0.1:1 to 186.8:1. For the trips that caught yellowtail flounder, the ratio of haddock to yellowtail flounder ranged from 0.1:1 to 5,230:1.

There were a total of 405 observed tows that used a separator trawl on these fifteen trips. Over these tows, haddock was caught on 370 tows (ninety-one percent), cod on 309 tows (seventy-six percent), yellowtail flounder on 266 tows (sixty-six percent), and winter flounder on 243 tows (sixty percent). The average catch of haddock per tow was 493 lbs., yellowtail flounder was 189 lbs., cod was 117 lbs., and winter flounder was 156 lbs. In comparison to the observed data, FW 40A estimated that the cod catch per tow would be between 47 and 92 lbs. and the haddock catch per tow would be 765 lbs. There was considerable variation in the catch of regulated groundfish between trips and tows. For example, four trips did not have any tows catching yellowtail flounder, four trips had occasional tows that caught small amounts, one trip had yellowtail catches decline as the trip passed, and six trips had frequent tows catching sizeable amounts of yellowtail flounder.

As reported earlier, seven trips made tows both with and without the separator trawl. These trips were examined to contrast the performance of tows using the separator trawl with tows that did not use the separator trawl by vessels that used both on the same trip. While this approach reduces the likelihood that any differences are due to differences between vessels, it does not resolve the issue that catches may be the result not just of the gear used, but numerous other factors: location, depth fished, etc. Catch composition differed: haddock accounted for twelve percent of the catch on tows without the separator trawl, and thirty-three percent of the catch on tows with the trawl (Table 59). Overall, the ratio of haddock to cod for these trips, while not using the separator trawl, was 1.4:1, the ratio of haddock to yellowtail flounder was 0.7:1, the ratio of haddock to winter flounder was 11.8:1, and the ratio of haddock to monkfish was 1:1. While using a separator trawl, for these vessels the ratio of haddock to cod on the same trip was 2.5:1, the ratio of haddock to yellowtail flounder was 7.4:1, the ratio of haddock to winter flounder was 3.1:1, and the ratio of haddock to monkfish was 6.3:1. In an effort to reduce the influence of tows in different areas, five trips were examined that fished in SA 561 and 562. The results, while not detailed here, were similar.

Table 57 – Observed trips using a separator panel, CY 2005 (OBDBS data available as of December 14, 2005)

Program	Month	521	522	525	561	562	Total
US/CA	01	0	0	0	0	1	1
	03	1	0	0	4	3	5
	05	0	1	0	5	5	5
	06	0	0	1	0	2	2
	07	0	0	1	1	1	1
Sub-Total		1	1	1	10	10	14
CAT B (regular)	03	1	1	0	0	0	1
	05	0	0	1	0	2	2
	06	2	2	1	0	0	2
	07	0	1	0	0	0	1
Sub-Total		3	3	2	0	4	6
Grand Total		4	4	3	10	14	20

Table 58 – Catches (pounds, live weight, kept and discarded) by statistical area on observed tows using a haddock separator trawl, CY 2005

COMNAME	521	522	525	552	561	562	Grand Total
HADDOCK	8,445	31,152	142	18	47,946	140,234	227,937
SKATE, LITTLE	25	83,432	1,977	500	5,975	44,916	136,825
FLOUNDER, YELLOWTAIL	1	1,375	4,633	30	3,834	91,623	101,496
MONKFISH (ANGLER, GOOSEFISH)	9,368	43,446	341	0	23,475	14,187	90,817
SKATE, WINTER (BIG)	2,105	10,700	357	693	21,087	51,773	86,715
SKATE, NK	1,770	235	1,500	0	8,766	70,805	83,076
FLOUNDER, WINTER (BLACKBACK)	5	174	67	420	9,461	54,546	64,673
COD, ATLANTIC	12,712	1,591	41	339	32,955	16,339	63,977
FLOUNDER, AMERICAN PLAICE	876	2,681	54	0	24,635	1,898	30,144
FLOUNDER, WITCH (GREY SOLE)	14,813	1,415	105	0	9,583	3,331	29,247
LOBSTER, AMERICAN	1,785	2,130	34	0	13,902	3,776	21,627
SKATE, BARNDOOR	98	434	306	0	515	10,369	11,722
CRAB, JONAH	11	9,310	0	0	24	157	9,502
POLLOCK	873	1,344	0	0	6,226	238	8,681
HAKE, WHITE	191	930	0	0	4,400	9	5,530
FLOUNDER, SAND DAB (WINDOWPANE)	0	3	136	15	70	3,813	4,037
SCALLOP, SEA	0	112	1	0	303	3,289	3,705
RAVEN, SEA	114	114	217	10	711	2,515	3,681
DOGFISH, SPINY	185	186	0	0	2,895	201	3,467
FLOUNDER, FOURSPOT	0	42	210	0	51	2,238	2,541
HAKE, RED (LING)	8	7	138	0	1,393	218	1,764
HERRING, ATLANTIC	0	1,482	0	0	4	0	1,486
STARFISH, SEASTAR,NK	6	717	2	0	11	713	1,449
FLOUNDER, SUMMER (FLUKE)	0	89	80	10	24	955	1,158
OCEAN POUT	9	41	8	0	128	804	990
Grand Total	53,400	193,142	10,349	2,035	218,374	518,947	996,247

Table 59 – Catch composition (pounds, live weight) for seven trips that made tows with and without the separator panel, CY 2005 (Source: NMFS OBDBS as of December 12, 2005)

COMNAME	Without Separator	With Separator	Grand Total
HADDOCK	17,679	40,893	58,572
SKATE, WINTER (BIG)	21,960	14,207	36,167
FLOUNDER, YELLOWTAIL	23,750	5,560	29,310
COD, ATLANTIC	12,920	16,146	29,066
MONKFISH (ANGLER, GOOSEFISH)	17,117	6,489	23,606
SKATE, LITTLE	14,346	5,754	20,100
SKATE, NK	2,875	14,163	17,038
FLOUNDER, WINTER (BLACKBACK)	1,494	13,209	14,703
FLOUNDER, AMERICAN PLAICE	10,462	1,416	11,878
LOBSTER, AMERICAN	7,109	3,359	10,468
FLOUNDER, WITCH (GREY SOLE)	4,135	1,715	5,850
POLLOCK	4,300	623	4,923
HAKE, WHITE	3,490	469	3,959
SCALLOP, SEA	2,766	150	2,916
DOGFISH, SPINY	1,893	98	1,991
HAKE, RED (LING)	1,410	0	1,410
SKATE, BARNDOOR	1,083	24	1,107
RAVEN, SEA	365	394	759
FLOUNDER, FOURSPOT	618	1	619
FLOUNDER, SAND DAB (WINDOWPANE)	48	407	455
OCEAN POUT	213	101	314
LUMPFISH	276	12	288
HALIBUT, ATLANTIC	0	263	263
FLOUNDER, SUMMER (FLUKE)	50	63	113
WOLFFISH, ATLANTIC	25	33	58
Grand Total	150,384	125,549	275,933

4.5.3 Recreational Harvesting Sector

This recreational sector consists of two main components: recreational fishermen who access the resource either from shore or through the use of privately-owned vessels, and recreational fishermen who access the resource by using a vessel that carries passengers for hire. The latter group is referred to as "party/charter" vessels. The distinction between the two is that party vessels carry large numbers of passengers and are generally licensed and inspected by the Coast Guard to carry passengers for hire, while charter vessels are usually smaller vessels that carry up to six passengers. Only party/charter vessels are required to have a permit issued under the multispecies FMP. Recreational fishermen generally target cod, haddock, pollock, and winter flounder, though they catch other regulated groundfish species.

Recreational catch of monkfish is only incidental and minimal, so the following discussion pertains only to groundfish fisheries. The targeted stocks include GOM and GB cod, GOM and GB haddock, and GOM and SNE/MA winter flounder. The recreational groundfish fishery with access to these resources is concentrated between southern Maine and Rhode Island, though winter flounder is targeted by recreational fishermen as far south as New Jersey.

Amendment 13 provided a detailed description of the recreational harvesting sector. Since this action considers measures that will affect the recreational fishery for GOM cod in the Gulf of Maine, the following discussion updates information on the recreational fishery for that stock during the period FY 2002 through FY 2004. The two primary sources of information on the recreational sector are the Marine Recreational Fisheries Statistical Survey (MRFSS) and VTRs submitted by party/charter vessels that possess a federal multispecies permit. The MRFSS system provides information on catches (including species and size distribution), passengers, and numbers of trips for all modes of recreational fishing. MRFSS only provides broad-scale information on area fished and is usually summarized by calendar year and not fishing year. Party/charter VTRs can be used to provide information on catches and number of trips. In addition, party/charter VTRs include information on the location of fishing activity. There are some differences in the data obtained from these two sources, though trends over time are similar.

According to MRFSS, in CY 2004 the number of GOM cod harvested by recreational fishermen was 50 percent fewer than were harvested in CY 2001 (Figure 42). This was true for both private boat and party/charter modes. The private boat mode accounts for about two-thirds of the total recreational GOM cod catch. For party/charter vessels, VTR data typically results in higher estimates of GOM Cod harvest than are produced by MRFSS (Figure 43). MRFSS values are used in the assessments. The number of angler trips harvesting GOM cod did not decline as much as the harvest, with the private mode showing a decline of 47 percent and the party/charter boat mode shows a decline of 43 percent (Figure 44). VTR information on the number of party/charter trip and passengers does not show as large a decline between FY 2001 and FY 2004, while the VTR estimates of kept cod declined by 45 percent, similar to the MRFSS estimates (Figure 45). According to MRFSS data, the kept catch accounts for less than half the total catch (Figure 46).

The number of vessels participating in the party/charter industry and landing GOM cod can also be determined from VTRs. These data show that the number of operating units has remained relatively constant between FY 2001 and FY 2004. After a nine percent increase in operating units in 2003 compared to 2001, the number of units operating in 2004 was only one percent higher than in 2001. (Figure 47).

MRFSS was also queried to determine the seasonal distribution of GOM cod catches by both private boat and party/charter modes. For the years 2001 through 2004, over 90 percent of GOM cod caught by the private boat mode is harvested between March and September (Figure 48). For the party/charter mode, the primary season extends into October (Figure 49). The MRFSS data is consistent with VTR data for the party/charter mode, showing little catch in the months of December through February (Figure 50). Further evidence of the seasonal nature of the party/charter fishery is offered by the number of trips that kept cod or haddock, by month, from FY 2001 to FY 2004 (Figure 51).

The size distribution of the GOM cod catch can also be estimated from MRFSS data. In 2004, 17 percent of the private boat harvest was less than the 22-inch minimum size that was in effect. About 45 percent of the catch by these vessels was larger than 24 inches (Figure 52). Party/charter vessels had a better compliance rate with the minimum size regulation. Only 10 percent of this catch was less than the minimum size limit, and about 40 percent was larger than 24 inches (Figure 53).

The catch of cod per angler on trips landing GOM cod is different between the private boat and party/charter modes based on MRFSS data. Private boats caught half of their GOM cod at a rate of six fish or fewer in 2004, with about 1 percent of the catch coming from trips that landed more than the bag limit (Figure 54). In CY 2004, half the GOM cod catch by party/charter boats was at less than three fish per angler. About 2 percent of the catch was above the bag limits that were in effect in FY 2004 (Figure 55).

MRFSS does not provide information on location of catches, other than whether it came from state or federal waters. Party/charter operators with federal permits are required to report the location of fishing activity on VTRs. This information was used to assign catches of GOM cod to thirty-minute squares or the WGOM closed area. Note that while the WGOM closed area overlaps several thirty-minute squares, the analysis was done in such a way that the catches as reported are independent (catches in the WGOM closed area are not assigned to a thirty-minute square). In FY 2004, 46.4 percent of the cod harvested by party charter vessels was reported caught form the WGOM closed area, 19.2 percent was caught from block 132 outside the WGOM closed area, and 12 percent was caught from block 124. Less than 10 percent was caught from blocks 125 and 133, and the remaining 11.7 percent was caught from various other areas (Figure 56).

While GOM cod is the primary recreational groundfish target, other species are harvested. Recent years have seen an increase in the catch of GOM haddock, most noticeable in FY 2004. The haddock fishery is also seasonal, with little haddock caught between October and April (according to VTRs) (Figure 57).

Figure 42 – Calendar year GOM Cod harvest by mode (MRFSS)

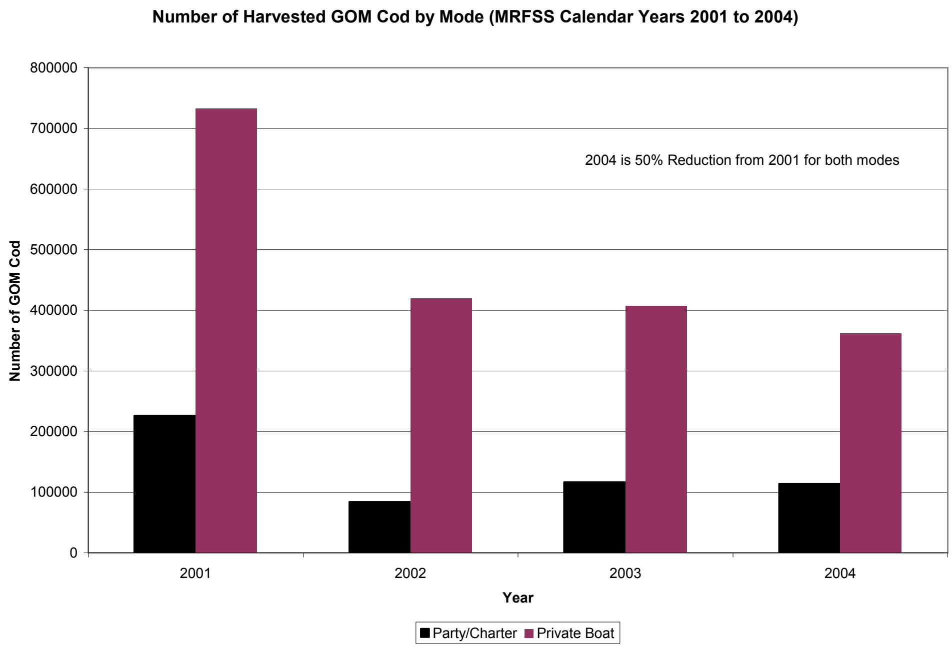


Figure 43 – FY 2001 – FY 2004 party/charter reported GOM cod kept (VTR)

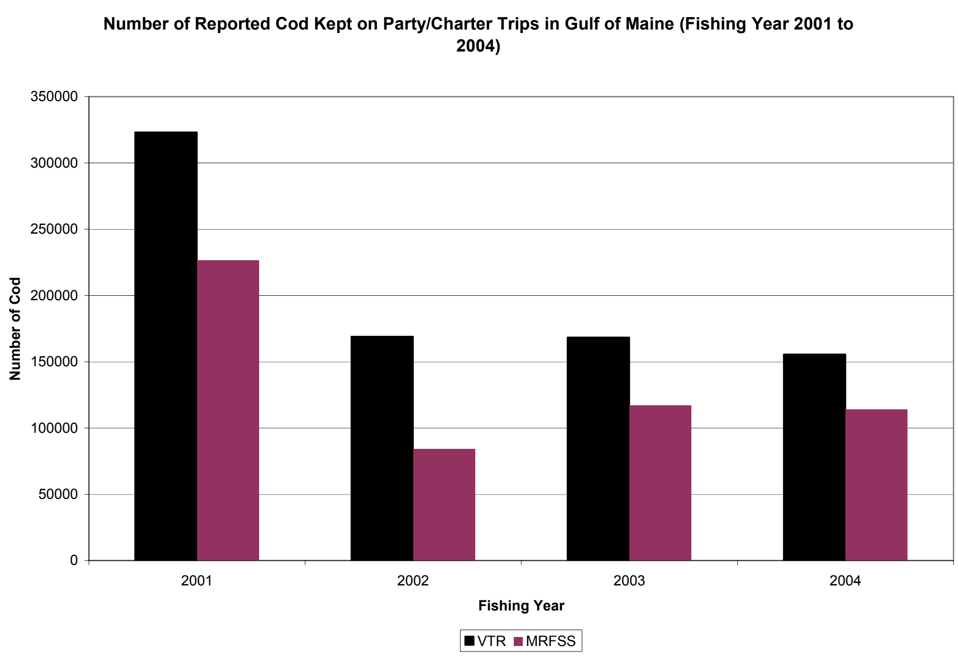


Figure 44 – Calendar year angler trips harvesting GOM cod (MRFSS)

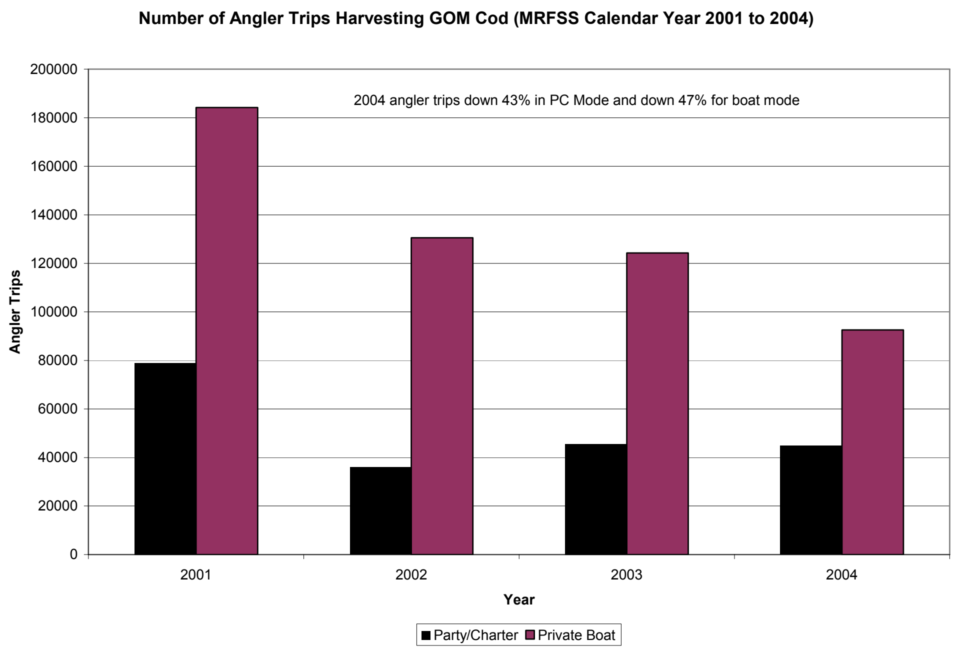


Figure 45 – Party/charter passengers, trips, and GOM cod kept (VTR)

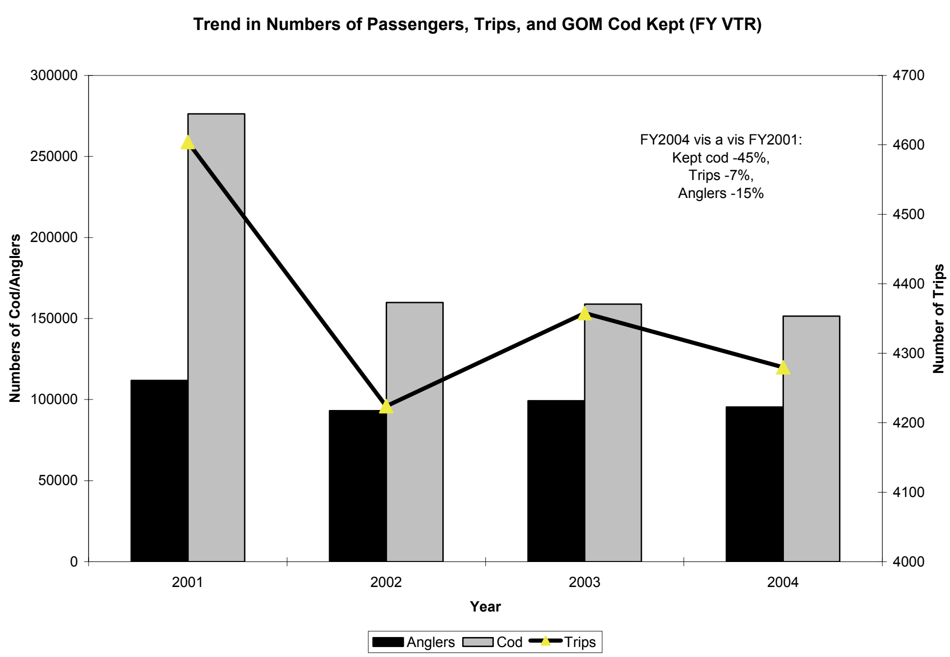


Figure 46 – Calendar year total GOM cod catch (MRFSS)

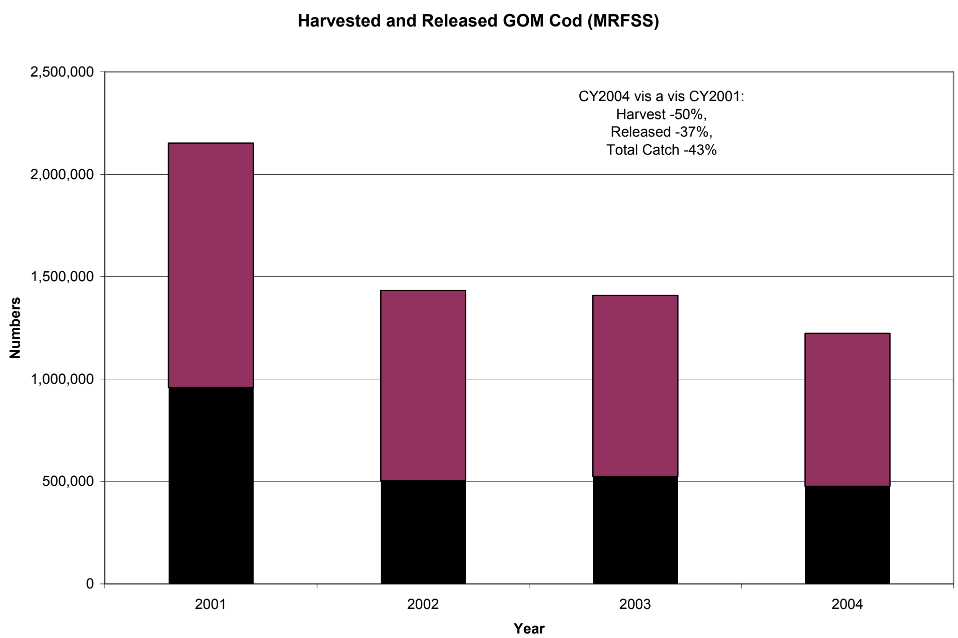


Figure 47 – Party/charter operating units that landed GOM cod (VTR)

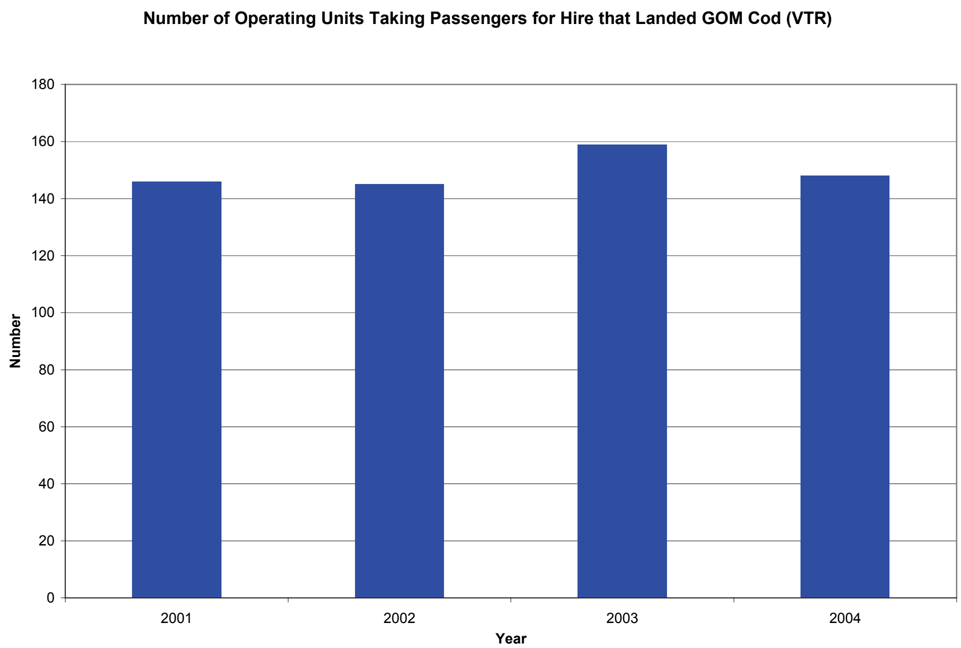


Figure 48 – Seasonal private boat GOM cod harvest (MRFSS)

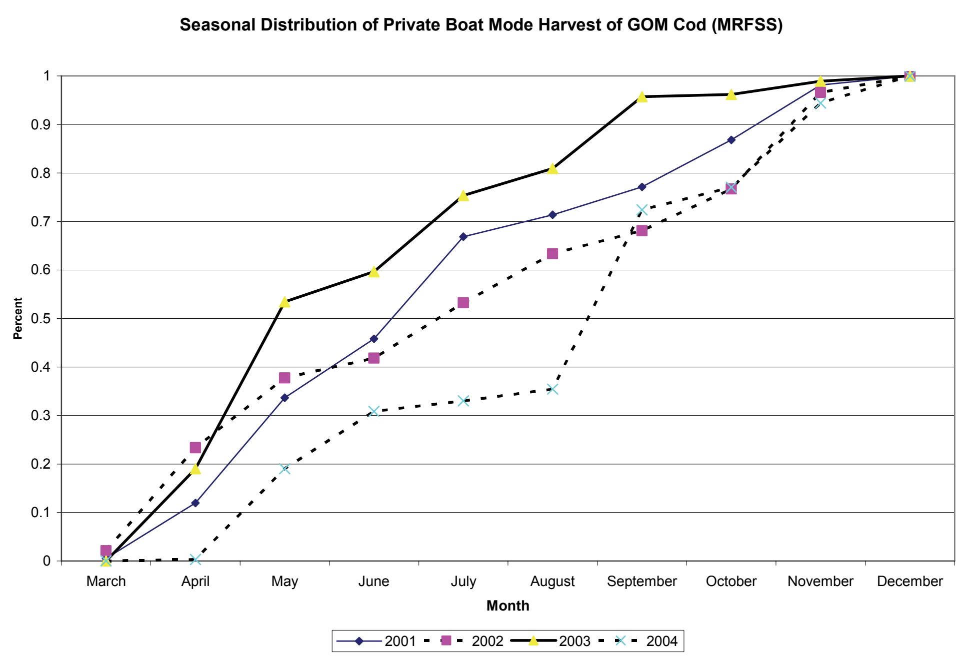


Figure 49 – Seasonal party/charter GOM cod harvest (MRFSS)

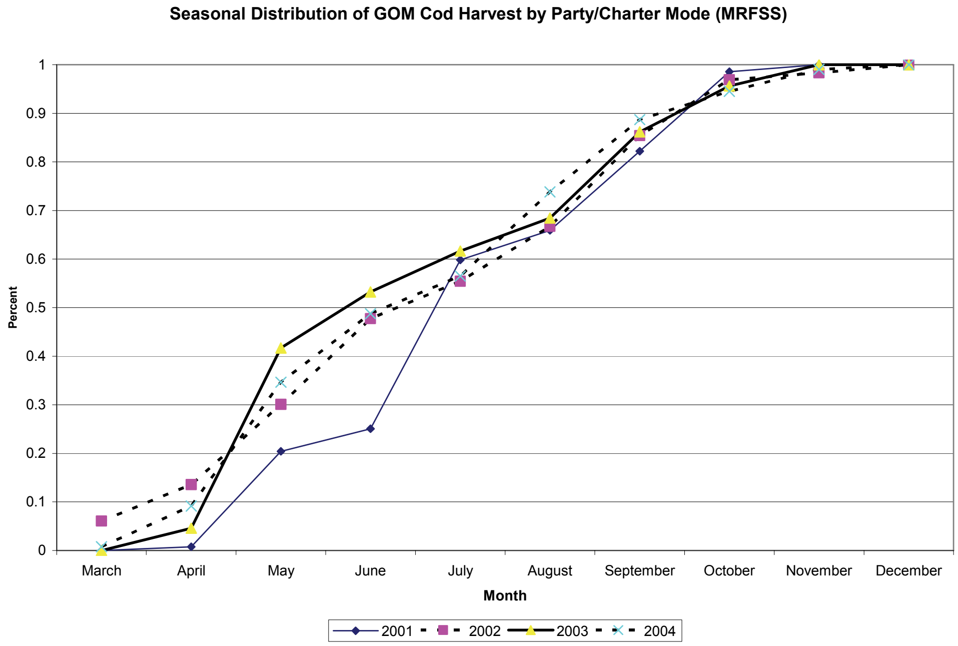


Figure 50 – Seasonal party/charter GOM cod kept (VTR)

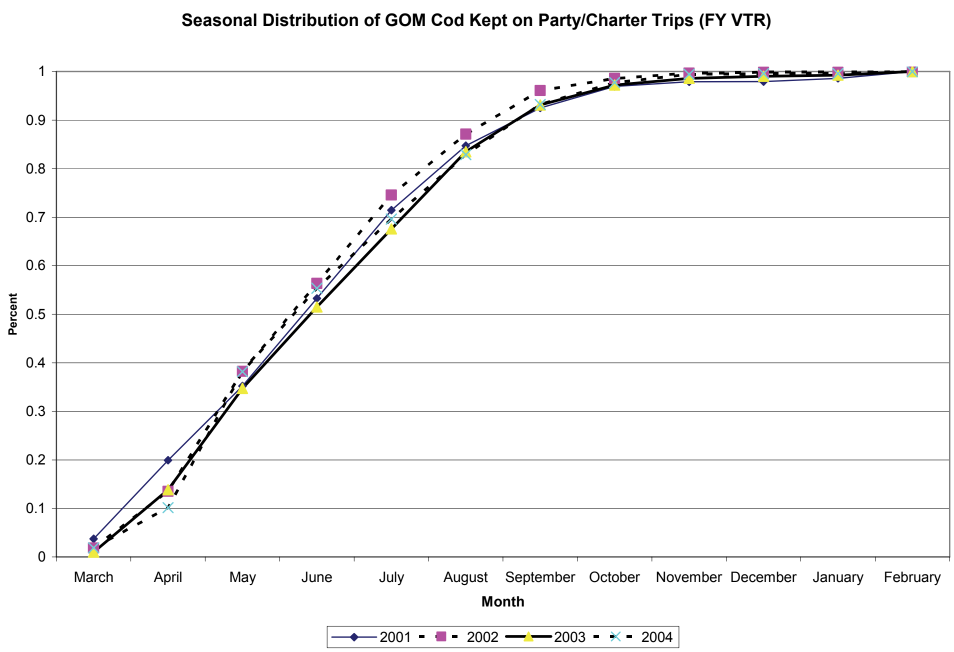


Figure 51 – Monthly number of party/charter trips keeping GOM cod (VTR)

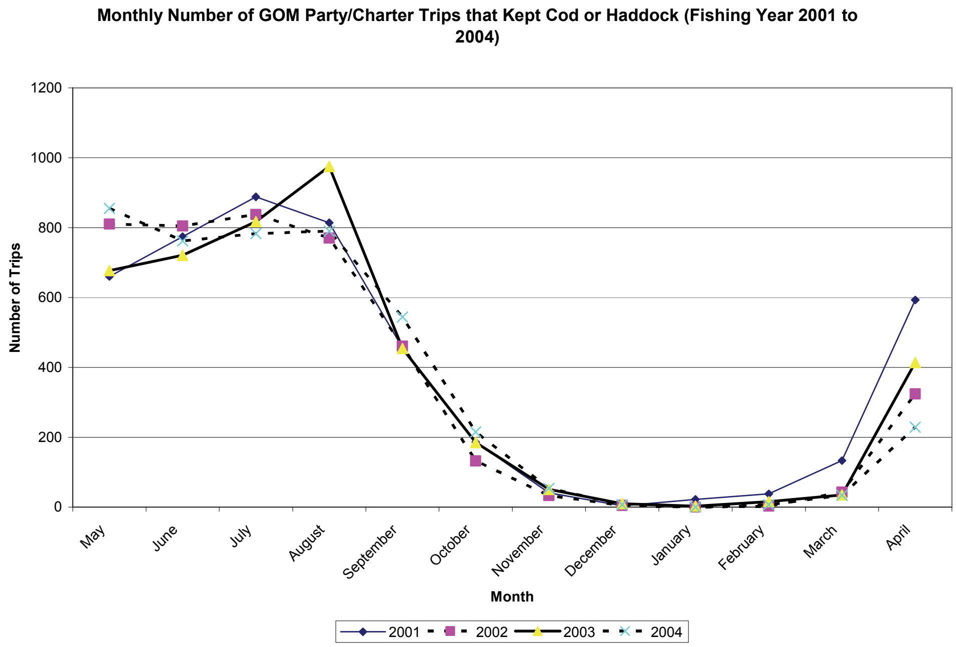


Figure 52 – CY 2003 and 2004 private boat GOM cod size distribution (MRFSS)

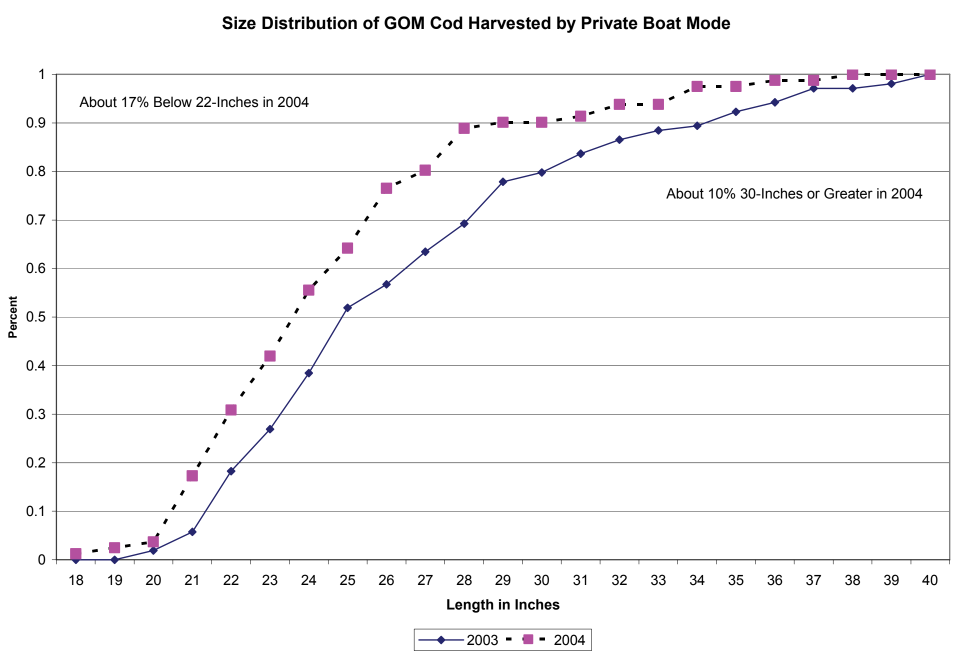


Figure 53 – CY 2003 and 2004 party/charter GOM cod size distribution (MRFSS)

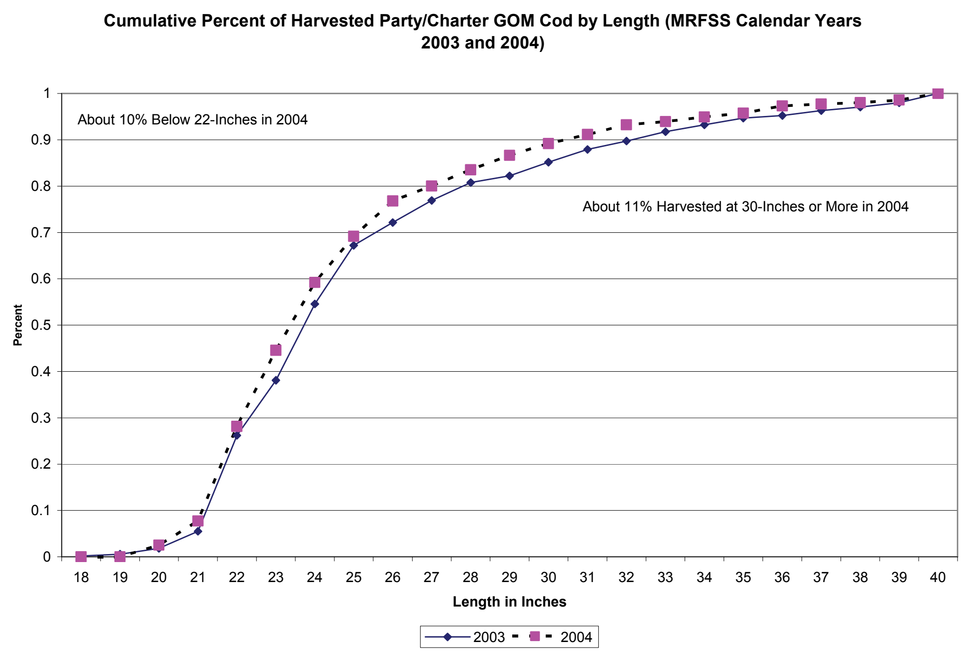


Figure 54 – Private boat catch per angler (MRFSS)

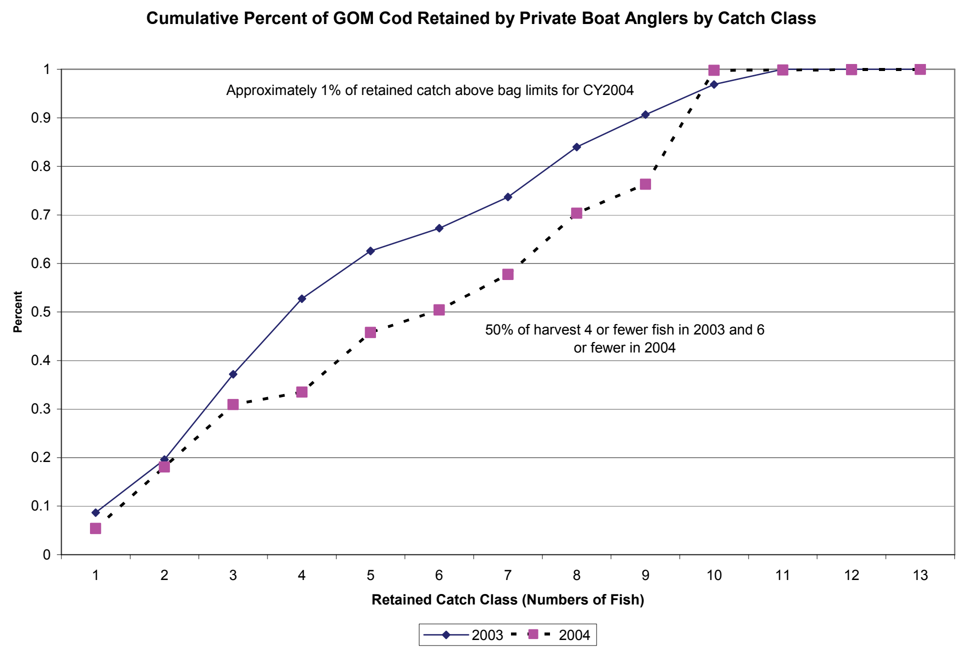


Figure 55 – Party/charter catch per angler (MRFSS)

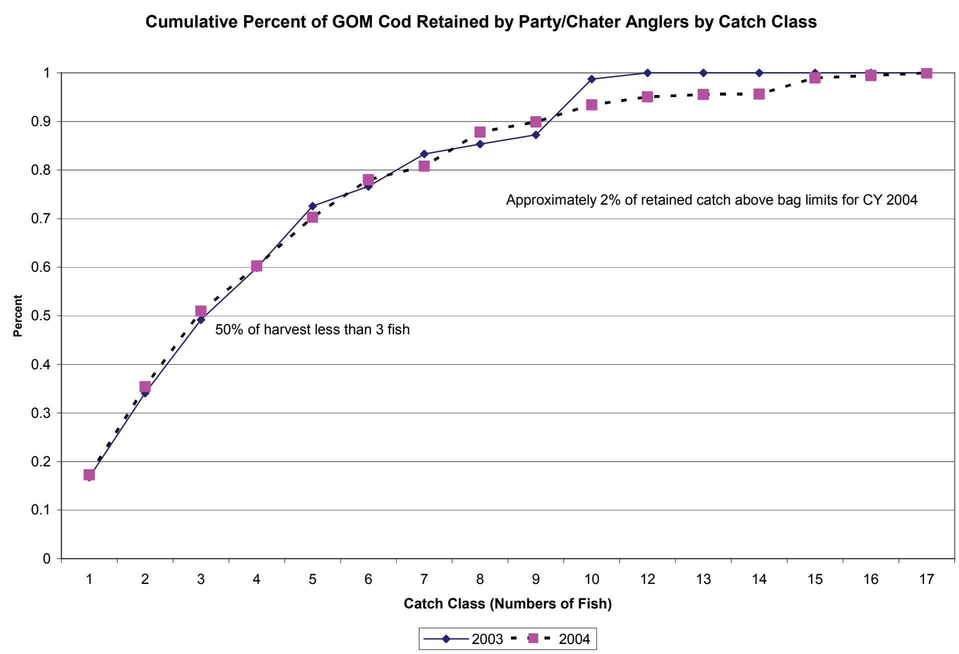


Figure 56 – FY 2004 party/charter GOM cod kept by area (Source: VTRs)

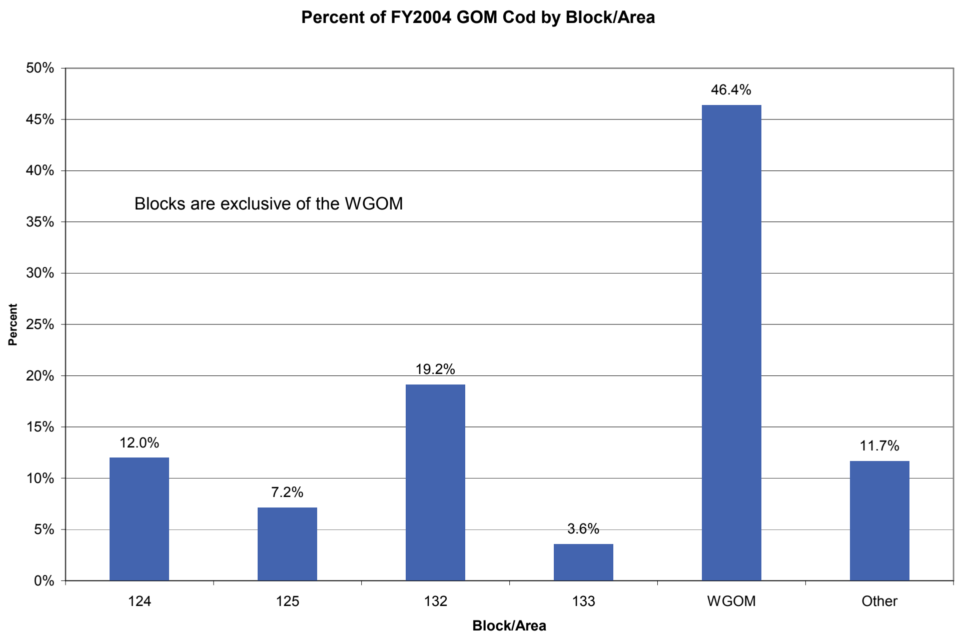
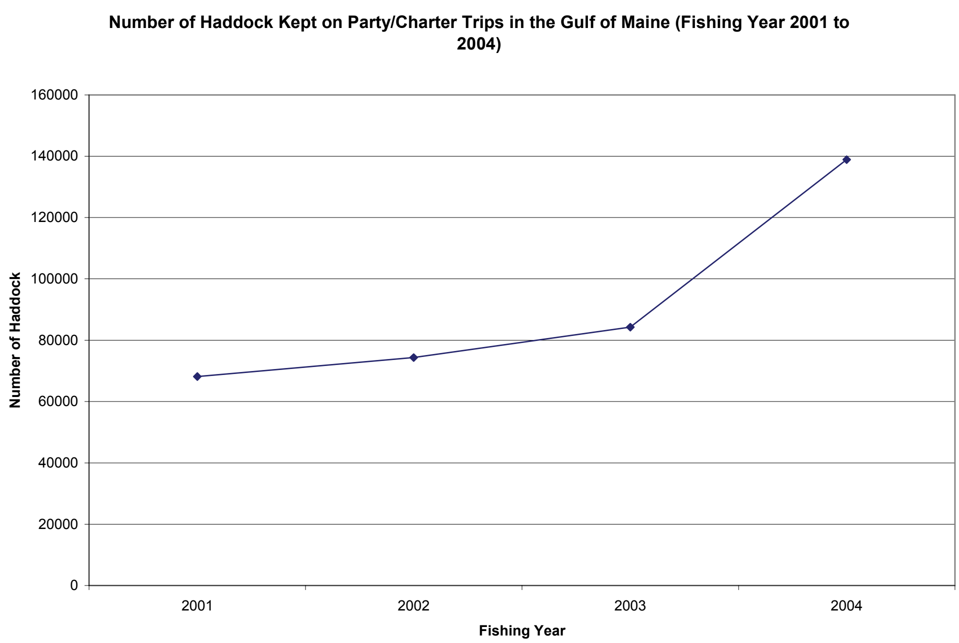


Figure 57 – FY 2001 to FY 2004 party/charter GOM haddock kept (VTR)



4.5.4 Processing and Wholesale Trade Sector

Fresh fish processing and frozen fish processing are two separate industries in New England. This sector is described in detail in Amendment 13. In general terms, the number of processing firms in New England has declined since 1995, while the number of wholesaling firms has increased. Processing sector employment increased until 1997, and then declined. Wholesale employment showed the opposite trend – declining until 1997, followed by an increase until 1999. While in 1999 the number of fresh-fish processing plants had been stable since 1995, the number in business was estimated to be one-third fewer than in 1992. Landing declines have forced processors to acquire additional imports from Canada and the west coast. Public testimony during public hearings on Amendment 13 noted that processors are under increasing pressure to provide retail outlets with predictable supplies of fish that can be incorporated into sophisticated marketing plans. Because supplies of local groundfish can fluctuate due to closed areas and seasons, processors have been forced to search for other sources of supply to meet market needs. Subsidiary impacts are a loss in the ability to handle large influxes of fresh fish when seasonal closed areas open, depressing prices. There is a concern that because of fluctuating supplies caused in part by regulatory actions, wholesale purchasers will abandon local suppliers. If that happens, some industry experts believe the processing of fresh fish may be exported, dealers will have difficulty retaining workers, and the local processing industry will vanish (Norton, pers.comm.).

4.5.5 Communities

4.5.5.1 Background

National Standard 8 requires the consideration of impacts on fishery dependent communities, where a fishing community is “a community which is substantially dependent on 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.” Current guidance on National Standard 8 specifies that communities are place-based: geographic units such as towns and cities that might fit the Census Bureau's definition of a “place.” But actual methodological guidelines are still in the process of refinement and 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. For example, the weigh-out data and the permit files document landing and home ports, but these are not necessarily the same places where people live, where specific styles of and knowledge about fishing are practiced, or where the impacts of management are most strongly felt. It is important to note that fishing communities are not bounded or separated from the commerce and institutional apparatus of the larger cities and towns in which they are located. In fact, most fishing communities rely on a rather complicated network of business and social ties that extend well beyond the boundaries of their communities and often into other communities in the region.

In terms of the keywords “substantially dependent” and “substantially engaged,” some have suggested, for example, that "substantial dependence" be measured in terms similar to the U.S. Department of Agriculture’s criteria for determining whether rural communities are dependent on agriculture or logging. The Economic Research Service of the USDA, for example, classifies counties as farming dependent given a certain percentage of economic activity, in this case labor and proprietor income. Some of the sources of data to consider in making determinations of fishing dependence are thus supplied in current guidance, such as landings information or numbers of participants, and the socio-cultural importance of the fishery. With respect to determining whether a community is "substantially engaged" in the harvesting or processing of a fishery, existing guidance does not provide clear criteria. While the application of a percentage of economic income activity may be an appropriate way to determine "substantial dependence", there may be other valid criteria for determining "substantial dependence." For example, it could be based on some minimum absolute level of activity (such as landings, number of vessels, etc.), or the presence of particular type of infrastructure (auctions, co-ops, state fish piers), or level of fishing activity (revenues, landings in weight, time spent fishing) that indicate a community is "substantially engaged" in fishing. This approach was used in Amendment 13 to identify fishing communities that are "substantially engaged" in fishing.

The Amendment 13 Affected Human Environment and the SIA also discuss ports and groups based on gear or other characteristics in order to meet the requirements of the fishery impact statements to examine the impacts to all the individuals, communities, and other groups that participate in the fishery. However, assessment of the impacts of the measures proposed in this action includes not only those communities that meet the strict interpretation of fishing communities, but also other ports or port groups that will certainly experience impacts from the Proposed Action. Not all of these port groups necessarily meet the legal definition of a fishing community as promulgated through National Standard 8, which can be considered a subset of the broader ports and groups involved in the groundfish fishery. The Northeast Region has begun to make 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 still usefully provide context and background for understanding the impacts that fishing communities defined by National Standard 8 might experience. However, they do not identify all the fishing dependent communities that may require action under National Standard 8, an exercise that is still in progress.

In Amendment 13, coastal communities throughout the Northeast region were organized into primary and secondary *port groups* based on participation in the groundfish fishery since the 1994 fishing year. The port groups were assembled in such a way that additional information about them can be obtained by cross-referencing information about the sub-regions in the MARFIN Report. The port groups identified in Amendment 13 are essentially subsets of the sub-regions identified in the MARFIN Report. Since social and demographic statistics are often compiled at the county level, the port groups are divided by county or adjacent counties, depending on how the MARFIN sub-regions are structured, so that county-level data may be used to characterize changes in these communities and ports.

The port groups are separated into primary and secondary groups. ***Primary groups*** are those communities that are substantially engaged in the groundfish fishery, as explained above, and which are likely to be the most impacted by groundfish management measures. ***Secondary groups*** are those communities that may not be substantially dependent or engaged in the groundfish fishery, but have demonstrated some participation in the groundfish fishery since the 1994 fishing year (FY94). Because of the size and diversity of the groundfish fishery, it is not practical to examine each secondary port individually, which is why most secondary ports are grouped with others in the same county or in geographically adjacent counties.

To identify primary and secondary port groups, groundfish landings by port were examined for the time period 1994-1999 from the dealer weighout database. Primary port groups represent the most active ports (currently) in the groundfish fishery and were selected based on groundfish landings greater than one million pounds annually since 1994 and/or the presence of significant groundfish infrastructure (auctions and co-ops, for example). In Amendment 13 and in the absence of specific guidance, these ports are considered <u>fishing communities</u> (as defined by the MSFCMA) because they have demonstrated a continued substantial engagement in fishing, here in particular the groundfish fishery. Secondary port groups consist of groups of ports in which some level of groundfish activity has been observed since 1994. This approach provides a way to consider the impacts of management measures on every port in which some amount of groundfish has been landed since 1994, and identifies some as fishing communities (as defined by NS8) based on substantial engagement. Though the analysis does not identify those fishing communities that meet the "substantial dependence" criteria, it is unlikely that the analysis misses any port which may be a fishing community based on the substantial dependence criteria because the impacts of the amendment are considered on nearly every port that has groundfish activity,

It is important to remember that because significant geographical shifts in the distribution of groundfish fishing activity have already occurred, the characterization of some ports as primary or secondary ports may not reflect their historical participation in and dependence on the groundfish fishery. A good example is Rockland, Maine. Historically, Rockland would have been considered a primary groundfish port, landing large quantities of redfish, flounders, and other groundfish, and serving as an important groundfish processing port, and would have met the test for "substantial engagement." In recent years, however (since the establishment of the Hague Line in 1984 and the decline of groundfish stocks in the early 1990s), fishing activity in Rockland has shifted from groundfish to other species like lobster and herring. This also reflects the apparent concentration of the groundfish fishery around Portland, Maine and the loss of the fishery to many coastal communities in northern Maine.

The outline below lists the Amendment 13 primary and secondary port groups. Additional information about each of these groups appears in Amendment 13. Primary multispecies ports are considered fishing communities under NS8.

I. DOWNEAST MAINE – WASHINGTON COUNTY

A. Primary Multispecies Port

1. None

B. Secondary Multispecies Ports

1. Downeast Maine: Jonesport, West Jonesport, Beals Island, Milbridge, Machias, Eastport, and Dyers Bay

II. UPPER MID-COAST MAINE – HANCOCK, WALDO, AND KNOX COUNTIES

A. Primary Multispecies Ports

1. None

B. Secondary Multispecies Communities

1. Upper Mid-Coast 1: Rockland, Port Clyde, Sprucehead, Owls Head, Friendship, Friendship Harbor, Camden, and Vinalhaven
2. Upper Mid-Coast 2: Stonington and Sunshine/Deer Isle
3. Upper Mid-Coast 3: Winter Harbor, Southwest Harbor, Bar Harbor, Northeast Harbor, and Northwest Harbor

III. LOWER MID-COAST MAINE – LINCOLN, SAGADAHOC, AND CUMBERLAND COUNTIES

A. Primary Multispecies Ports

1. Portland

B. Secondary Multispecies Ports

1. Lower Mid-Coast 1: New Harbor, Bristol, South Bristol, Boothbay Harbor, East Boothbay, Medomak, Southport, and Westport

2. Lower Mid-Coast 2: Cundys Harbor, Orrs Island, Yarmouth, Harpswell, East Harpswell, South Harpswell, Bailey Island, and Cape Elizabeth

3. Lower Mid-Coast 3: Sebasco Estates, Small Point, West Point, Five Islands, and Phippsburg

IV. SOUTHERN MAINE – YORK COUNTY

A. Primary Multispecies Ports

1. None

B. Secondary Multispecies Ports

1. Southern Maine: York, York Harbor, Camp Ellis, Kennebunkport, Kittery, Cape Porpoise, Ogunquit, Saco, and Wells

V. OTHER MAINE – all other coastal Ports in Maine

VI. STATE OF NEW HAMPSHIRE – ROCKINGHAM AND STRAFFORD COUNTIES

A. Primary Multispecies Ports

1. Portsmouth

B. Secondary Multispecies Ports

1. NH Seacoast: Rye, Hampton/Seabrook, Hampton, and Seabrook

VII. OTHER NEW HAMPSHIRE – all other coastal Ports in New Hampshire

VIII. GLOUCESTER AND NORTH SHORE – ESSEX COUNTY

A. Primary Multispecies Ports

1. Gloucester

B. Secondary Multispecies Ports

1. The North Shore: Rockport, Newburyport, Beverly/Salem, Beverly, Salem, Marblehead, Manchester, and Swampscott

IX. BOSTON AND SOUTH SHORE – MIDDLESEX, SUFFOLK, NORFOLK, AND PLYMOUTH COUNTIES

A. Primary Multispecies Ports

1. Boston

B. Secondary Multispecies Ports

1. The South Shore: Scituate, Plymouth, and Marshfield (Green Harbor)

X. CAPE AND ISLANDS – BARNSTABLE, DUKES, AND NANTUCKET COUNTIES

A. Primary Multispecies Ports

1. Chatham/Harwichport

B. Secondary Multispecies Ports

1. Provincetown

2. Other Cape Cod: Sandwich, Barnstable, Wellfleet, Woods Hole, Yarmouth, Orleans, and Eastham

3. The Islands: Nantucket, Oak Bluffs, Tisbury, and Edgartown

XI. NEW BEDFORD COAST – BRISTOL COUNTY

A. Primary Multispecies Ports

1. New Bedford/Fairhaven

B. Secondary Multispecies Ports

1. Other Bristol County: Dartmouth, and Westport

XII. OTHER MASSACHUSETTS – all other coastal Ports in Massachusetts

XIII. STATE OF RHODE ISLAND – WASHINGTON AND NEWPORT COUNTIES

A. Primary Multispecies Ports

1. Point Judith

B. Secondary Multispecies Ports

1. Western RI: Charlestown, Westerly, South Kingstown (Wakefield), and North Kingstown (Wickford)
2. Eastern RI: Newport, Tiverton, Portsmouth, Jamestown, Middletown, and Little Compton

XIV. OTHER RHODE ISLAND – all other coastal Ports in Rhode Island

XV. STATE OF CONNECTICUT – NEW LONDON, MIDDLESEX, NEW HAVEN, AND FAIRFIELD COUNTIES

A. Primary Multispecies Ports

1. None

B. Secondary Multispecies Ports

1. Coastal CT: Stonington, New London, Noank, Lyme, Old Lyme, East Lyme, Groton, and Waterford

XVI. OTHER CONNECTICUT – all other coastal Ports in Connecticut

XVII. LONG ISLAND, NEW YORK – SUFFOLK, NASSAU, QUEENS, AND KINGS COUNTIES

A. Primary Multispecies Ports

1. Eastern Long Island: Montauk, Hampton Bay, Shinnecock, and Greenport

B. Secondary Multispecies Ports

1. Other Long Island: Mattituck, Islip, Freeport, Brooklyn, Other Nassau County, and Other Suffolk County

XVIII. OTHER NEW YORK – all other coastal Ports in New York

XIX. NORTHERN COASTAL NEW JERSEY – MONMOUTH AND OCEAN COUNTIES

A. Primary Multispecies Ports

1. None

B. Secondary Multispecies Ports

1. Northern Coastal NJ: Point Pleasant, Belford, Long Beach/Barnegat Light, Barnegat, Highlands, Belmar, Sea Bright, and Manasquan

XX. SOUTHERN COASTAL NEW JERSEY – ATLANTIC AND CAPE MAY COUNTIES

A. Primary Multispecies Ports

1. None

B. Secondary Multispecies Ports

1. Southern Coastal NJ: Cape May, Wildwood, Burleigh, Sea Isle City, Ocean City, Stone Harbor, and Avalon

XXI. OTHER NEW JERSEY – all other coastal Ports in New Jersey

XXII. DELAWARE

XXIII. MARYLAND

XXIV. VIRGINIA

XXV. NORTH CAROLINA

4.5.5.1.1 Monkfish communities

This section updates information contained in the FSEIS for Amendment 2. The Monkfish FMP references Amendments 5 and 7 to the Northeast Multispecies FMP and Amendment 4 to the Sea Scallop FMP for social and cultural information about monkfish ports, including port profiles. Because of the nature of the monkfish fishery, there is significant overlap between the vessels and communities involved with the monkfish fishery and those involved with the multispecies (groundfish) and scallop fisheries. Many of the same boats that target monkfish or catch them incidentally also target groundfish or scallops. Only about six percent of the limited access monkfish permit holders do not also hold limited access permits in either multispecies or scallops.

For the purposes of this SAFE Report, "primary monkfish ports" are defined as those averaging more than $1,000,000 in monkfish revenues from 1994-1997 (based on the dealer weighout data presented in Table 45 of the Monkfish FMP). "Secondary monkfish ports" are defined as those averaging more than $50,000 in monkfish revenues from 1994-1997 (based on the dealer weighout data presented in the Monkfish FMP.

Primary monkfish ports include:

- Portland, ME
- Boston, MA
- Gloucester, MA
- New Bedford, MA
- Long Beach/Barnegat Light, NJ, and
- Point Judith, RI.

Secondary monkfish ports include:

- Rockland, ME
- Port Clyde, ME
- South Bristol, ME
- Ocean City, MD
- Chatham, MA
- Provincetown, MA

- Scituate, MA
- Plymouth, MA
- Westport, MA
- Portsmouth, NH
- Point Pleasant, NJ
- Cape May, NJ
- Greenport, NY
- Montauk, NY
- Hampton Bay, NY
- Newport, RI
- Hampton, VA, and
- Newport News, VA.

Virtually all of the monkfish landed in Portland, Gloucester and Boston come from the NFMA, while about 1/2 of New Bedford's landings and only 3 percent of Pt. Judith's landings come from the NFMA. Portland and Boston's landings are almost totally from otter trawls, while otter trawls make up about ½ of New Bedford and Gloucester landings. Gloucester landings are evenly split between trawls and gillnets, while New Bedford also has about 18% of monkfish landings by scallop dredge. Pt. Judith landings are about 2/3 gillnet, while New Hampshire, New York and New Jersey landings are predominately (>80%) caught by gillnet gear.

4.5.5.2 Expected Impacts of Amendment 13

Amendment 13 includes detailed descriptive information on the primary and secondary port groups. This section summarizes the expected impacts of Amendment 13 on the identified port groups.

Short-term reductions in fishing vessel gross revenues are expected to have a negative impact on port groups. Analysis in Amendment 13 estimated that many port groups would have reductions in sales and income as a result of Amendment 13. While compared to the entire economies of these groups the losses are generally minor, they may have substantial impacts on fishing-related businesses. New Bedford MA is likely to have the most serious short-term impacts, followed by lower Mid-Coast Maine, Gloucester MA, and Boston MA. The distribution of the total impacts is illustrated in Figure 53 through Figure 55. These figures demonstrate that the impacts are not evenly distributed across all ports. Generally, those ports with an active groundfish fleet are expected to have more negative impacts. Some exceptions can also be seen. For example, the fact that Boston is a large financial, shipping, and insurance hub results in large impacts, even though the groundfish fleet in this port is small. During Amendment 13 public hearings, concern was expressed that the loss in fishing revenues and reductions in fishing time would lead to the failure of fishery support businesses such as gear and ice suppliers, etc., and the analyses underestimated these impacts.

While these impacts represent specific economic impacts on fishing communities, Amendment 13 was also expected to affect the social fabric of the fishing industry and its communities. Five social impact factors were identified:

- Regulatory discarding
- Safety
- Disruption of daily living
- Changes in occupational opportunities and community infrastructure

- Formation of attitudes

The SIA in Amendment 13 concluded that as a result of regulations implemented since 1994, many groundfish vessels were having difficulty operating efficiently, maintaining year round income, and competing in domestic and international markets. Regulations were splintering the fleet, boxing each vessel into a specific fishery and often making them more dependent on groundfish than in the past. The loss of fishing related infrastructure and support services in some communities was increasing concern about the future of fishing as a part of the community. The Amendment 13 measures that have the most chance of creating positive short-term social impacts are trip limit adjustments and special access programs. To the extent that increasing the Gulf of Maine cod trip limit can reduce regulatory discarding without compromising the long-term objectives of the amendment, short-term social impacts are likely to be positive. The Closed Area II yellowtail flounder access program has potential to mitigate some of the negative impacts of DAS modifications for large vessels. The positive impacts of this program will depend on which alternative is ultimately selected to address rebuilding requirements and whether or not vessels will find it worthwhile to use their remaining DAS to travel to Closed Area II.

The Amendment 13 management measures that have the most chance of producing negative short-term (and most likely long-term) social impacts are DAS reductions and additional year-round area closures. DAS reductions and additional year-round area closures are likely to produce long-term impacts on affected vessels, families, and communities. Just as they have in the past, vessels and communities will likely adapt and adjust to minor modifications to the area closures, additional gear restrictions, etc. However, it will be more difficult to adjust to reductions in groundfish opportunities (DAS. It is very likely that smaller operations that are currently operating marginally will not be able to adapt to these kinds of measures.

Mitigation is an important consideration given the magnitude and extent of the impacts likely to result from Amendment 13. The elements of Amendment 13 that have the most likelihood of mitigating some of the negative social impacts of the measures, at least in the short-term, include, permit transfer, the DAS leasing program, and special access programs to harvest groundfish stocks that can support more effort. The programs proposed to allow the leasing of unused DAS from vessels and/or the purchase/transfer of DAS require capital investment. Many vessels that are currently marginal will not have the financial ability to participate in such programs unless they sell their DAS, further reducing their opportunities in the groundfish fishery. Some marginal vessels may be able to take advantage of the DAS leasing program – leasing out DAS to reduce their operating costs – but this option may be viewed as abandoning a way of life. There may also be some opportunities to use Category B DAS, but under Amendment 13 those opportunities are limited.

To an extent, mitigation can also be realized from the ability for affected individuals to exit the fishery altogether and capitalize on alternative employment opportunities. For fishermen, this has always been a difficult reality to face. Fishing Family Assistance Centers can help individuals seek alternative employment and train them for new/different job skills. Centers are currently located throughout communities in Maine, as well as in Gloucester, New Bedford, and on Cape Cod. It is likely that the importance of retraining centers in these communities will increase as a result of Amendment 13, especially because these are some of the communities that will be most negatively impacted by Amendment 13. However, retraining and obtaining alternative employment cannot be assumed to fully mitigate the impacts of such a severe reduction in the groundfish fishery. Only a small percentage of affected individuals can be expected to participate in the retraining programs that the centers offer. Because of the independence and freedoms associated with fishing as an occupation and a way of life, many fishermen are not interested in retraining for shore side employment that lacks many of the characteristics that drew them to fishing in the first place. In addition, education and language barriers will continue to limit the possibilities for retraining, despite other important skills that fishermen have acquired at sea. The declining status of today's economy exacerbates these problems.

Figure 58- Amendment 13 expected sales impacts, by port group

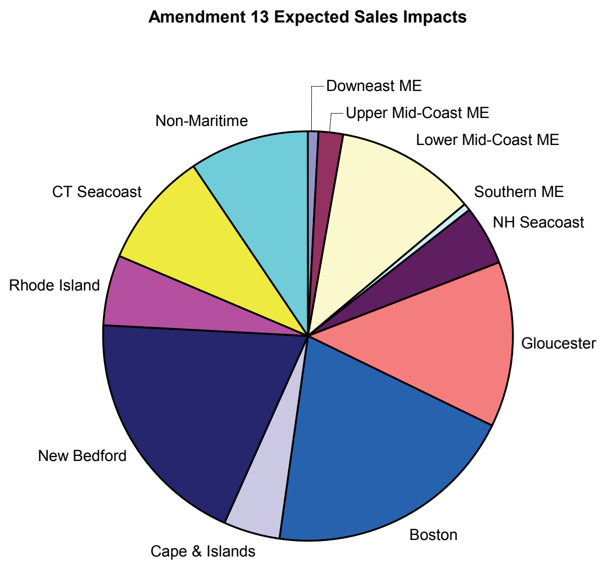


Figure 59 – Amendment 13 expected income impacts, by port group

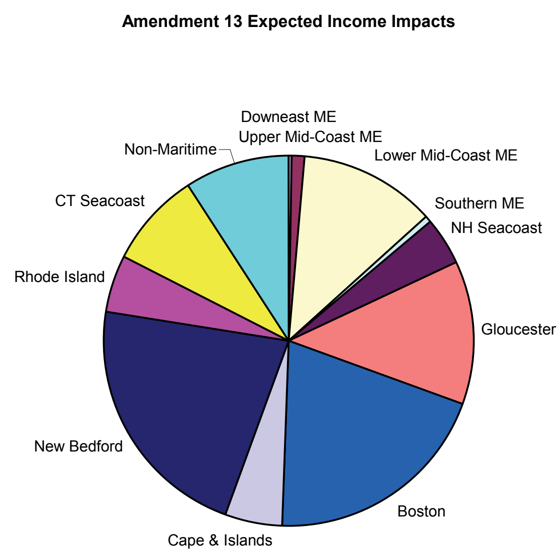
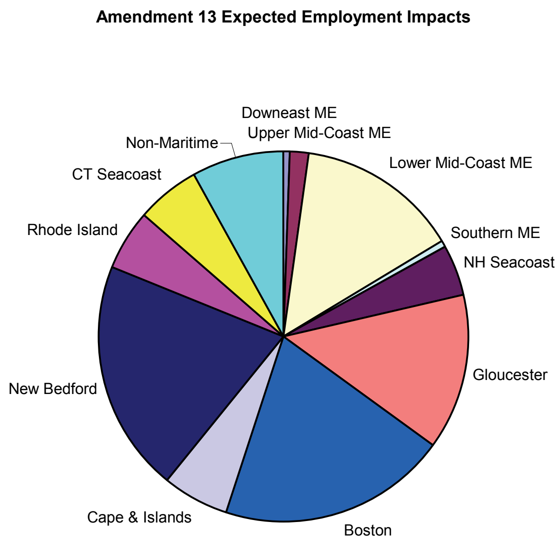


Figure 60 - Amendment 13 expected employment impacts, by port group



5.0 ENVIRONMENTAL CONSEQUENCES – ANALYSIS OF IMPACTS

5.1 Environmental Consequences of Alternative 1 (no action)

All prospective sector vessels would remain in the common pool fishing under DAS controls, trip limits and year-round and seasonal closures with no hard TACs on any species. In the event this Sector is not approved, the prospective Sector members will continue to be subject to the management system implemented through Amendment 13 with recent major modifications to be implemented as FW 42. Although the prospective sector members generally confine their fishing to the Gulf of Maine, their permits provide access to the larger Northeast Multispecies fishery and the analysis of FW 42 impacts is generally applicable to prospective Sector members. The environmental impacts of Alternative 1 are analyzed in depth in the Framework 44 E.A. (NEFMC FW 42 Section 7). A summary of impacts and discussion of some key impacts are provided here. Readers are referred to the FW 42 Ea for a more in-depth analysis.

5.1.1 Biological Impacts (Alternative 1)

Biological impacts on regulated groundfish species, monkfish, skates and dogfish

The Proposed Action will reduce fishing mortality on most groundfish stocks, and as a result mortality targets will be achieved for all stocks. In some instances fishing mortality that will result from these measures will be below the Amendment 13 targets. The Proposed Action will also reduce fishing mortality on monkfish. The expected reductions in groundfish fishing mortality are shown in the following table.

Table 60: Biological impacts of alternative 1

Species	Stock	Proposed Action Change In Fishing Mortality	Targeted Fishing Mortality Reduction from Effort Controls
Winter Flounder	GB	-41%	-35%
Winter Flounder	GOM	-52%	
Winter Flounder	SNE/MA	-19%	-9%
Cod	GB	-9%	0%
Cod	GOM	-44%	-32%
Haddock	GB	1%	
Haddock	GOM	-22%	
Plaice		-11%	
Pollock		-17%	
Redfish		-5%	
White Hake		-18%	-13%
Windowpane	NORTH	-31%	
Windowpane	SOUTH	-45%	
Witch	ALL	-25%	
Yellowtail	CC/GOM	-49%	-46%
Yellowtail	GB	-40%	-0%
Yellowtail	SNE/MA	-63%	-55%

For some stocks, rebuilding is expected to proceed more rapidly that anticipated by Amendment 13 as a result of this action. These stocks include GB haddock, GB cod, GOM cod.

Because the Proposed Action includes several changes to trip limits, this action may increase discard rates of GB yellowtail and winter flounder, CC/GOM and SNE/MA yellowtail flounder, and white hake. It is uncertain whether this will result in increased discards since effort is also being reduced and it is possible that the amount of discards may decrease even as discard rates increase. This may be particularly true for CC/GOM and SNE/MA yellowtail flounder, where the proposed differential DAS counting areas may reduce effort on these two stocks.

Protected Species

None of the measures proposed in Framework 42 are likely to produce impacts to protected species beyond those described in Amendment 13. While not quantifiable, the impacts of that action were expected to be beneficial as a result of overall reductions in groundfish fishing effort. In the case of the Framework 42 Proposed Action, particular effort reductions will occur in the GOM and in SNE, relative high use areas for several large whale species, small cetaceans and pinnipeds, resulting in more distinct benefits to protected resources compared to the status quo.

5.1.2 Habitat Impacts (Alternative 1)

The EFH Final Rule identifies adverse impacts as "any impact, which reduces quality and/or quantity of EFH. Adverse effects from fishing may include physical, chemical, or biological alterations of the substrate, and loss of, or injury to, benthic organisms, prey species and their habitat, and other components of the ecosystem" (NEFMC, 1998)

No adverse impacts on EFH are expected to result from Alternative 1. Reductions in effort, including differential DAS counting areas and a reduced number of DAS in the Category B (regular) DAS Program, are expected to benefit habitat. Other changes to special management programs are expected to have either neutral or beneficial effects on EFH.

5.1.3 Social and Economics Impacts (Alternative 1)

The XXXXXXXXXXXXXX area supports a fleet of XXXXXXXXXXXfishermen XXXXXXXXXXXXXX Not only financial survival but physical survival of these fishermen is at stake. The low profitability of the fleet has left little money for vessel upkeep while regulatory changes and the distribution of fish has forced vessels to fish further from port. This small fleet has lost vessels, and more importantly, lives as a result over the last few years.

XXXXXXXXXXXXXXX

Economic Impacts

The changes implemented under FW 42 (Alternative 1) will affect any commercial groundfish vessel with a limited access permit and a DAS baseline greater than zero. Total nominal revenues landed by these vessels on trips where groundfish was landed was $109 million in FY 2004. The Proposed Action would result in a short-term reduction in total fishing revenues of $21 million, of which the majority ($15 million) would be losses in revenue from regulated groundfish. This represents 19 percent of total groundfish revenue. Since many of these vessels participate in other fisheries, it represents an 8 percent decline in total fishing revenue.

Impacts on revenues are not evenly distributed. In general, ports adjacent to differential DAS areas that receive landings from the dayboat fleet are expected to have the largest declines in groundfish revenues. The ports of Portsmouth NH, Gloucester MA, Boston MA, Portland ME, South Shore MA, Chatham MA, and Provincetown MA are expected to see a decline in the value of landed catch (all species) of more than four percent, but the loss in groundfish revenues is higher. The ports expected to have the largest loss in groundfish revenues include Other NH Coast (-43%), New Jersey (-40%), South Shore MA (-32%), and North Shore MA (-31%). When impacts are measures by homeport state of fishing vessel, at the median level of impacts the largest declines in total fishing revenues are expected for vessels with homeports in New Hampshire (-33%) and Massachusetts (-16%). The largest declines in total revenues (again, reported at the median level) are inversely related to vessel size: -16% for vessels less than 50 feet, -12% for vessels 50 to 70 feet, and -5% for vessels greater than 70 feet. Gillnet and trawl vessels are expected to have similar declines at the median (-13%), while total revenues for hook vessels are expected to decline 5%. Vessels that fish more than 75% of their time in the inshore GOM blocks are expected to lose 35% of total revenue at the median, while those that fish less than 75% of their time in the inshore blocks are expected to lose 10% of their total revenue at the median.

The reductions in revenues summarized in the previous paragraph do not take into account revenues from Special Access Programs (SAPs) or the Category B (regular) DAS Program.

Estimates suggest that revenues from these programs should exceed $6 million, providing a measure of mitigation to the economic impacts. Since these programs are primarily used on Georges Bank, they may not benefit all vessels affected by this action.

Regional impacts were estimated using an input/output model of the Northeast Region. The estimated short-term impact on the northeast region gross sales was estimated as harvesters of $21 million for harvesters, $5 million for dealers, and $26 million for processors. Given this decline in gross sales of $52 million, the overall impact on the region's economy is estimated as $98 million. The largest impacts would be felt in the sub-regions of New Bedford ($14.4 million), Gloucester ($13.5 million), New York coastal ($12.6 million), and Boston ($11.1 million). Impacts in Massachusetts account for 43% of total northeast region impacts.

Social Impacts

The increased regulation of the groundfish fishery implemented by this action will likely have negative impacts on several of the key social factors identified in Amendment 13. Reductions in DAS and differential DAS counting areas will cause disruptions in daily living and will reduce occupational opportunities in the groundfish fishery. It is likely that the attitudes of fishermen towards the regulations will also suffer negative impacts, as fishermen resent the imposition of additional regulations so soon after the adoption of Amendment 13. The social impacts will not be evenly distributed. Ports most affected by the differential DAS counting area in the inshore Gulf of Maine will be more heavily impacts than those ports that do not rely on that area for a substantial portion of groundfish revenues. The impacts on vessel safety are uncertain. The Proposed Action was selected in part because it was viewed as having less adverse impact on safety that the other most promising alternative, but that does not mean that there will be no impacts on vessel safety. Some of the measures adopted in this action may help mitigate the adverse social impacts. These measures include the DAS leasing program, the extension of the Eastern U.S./Canada Haddock SAP, the adjustment to the haddock TAC for the CAI Hook Gear Haddock SAP, and the Category B (regular) DAS Program. Some of the smaller inshore vessels that are most affected by the action may be unable to take advantage of these programs, however, and so their communities may not receive much benefit from them.

The trip limits on cod, yellowtail flounder, winter flounder and hake not only reduce the efficiency and profitability of the fleet. They often force vessels to discard fish which is damaging for the morale of the fishermen who understand the need to rebuild fish stocks and are upset by the waste of legal size fish when they are finding it difficult to remain economically viable. The analysis in FW 42 Section 7.2.5.1.1 explains:

> *Excessive regulatory discards cause fishermen to feel as if the fishery resource and their time are being wasted and that they are forced to shovel over dead fish at a loss to the resource, the market, and their revenue potential. The Proposed Action adopts or modifies trip limits for CC/GOM yellowtail flounder, SNE/MA yellowtail flounder, GB yellowtail flounder, GB winter flounder, and white hake. Trip limits for GOM and GB cod remain the same, while the trip limit for haddock is removed.*

Summary of Economic and Social Impacts

Overall, Alternative 1 (which leaves prospective Sector members subject to the management measures implemented as FW 42) is likely to have a negative effect on the important social factors identified by Amendment 13. The further reductions in available Category A DAS, differential DAS counting areas, additional trip limits, adoption of a restricted Category B (regular) DAS program will make it more difficult for fishermen to maintain daily routines, operate in a safe manner, and maintain a positive attitude towards the management program. With these restrictions adopted barely two years after the major upheaval caused by the large effort reductions of Amendment 13, fishermen will no doubt question when the benefits promised by that rebuilding program will be realized. Landings and revenues declined in FY 2004, and are unlikely to increase for at least another year under this action. These problems will be most strongly experienced in the inshore GOM communities adjacent to the differential DAS counting area in the GOM, including Portland ME, coastal NH, Gloucester and the north shore of Massachusetts, Scituate, and Provincetown. The economic impacts of this action on those communities are expected to be severe and in some cases may threaten the existence of fishing businesses in those communities. These port groups will have a difficult time adjusting to the restrictions and the action will have a negative impact on the key social factors identified.

There are some communities where the impacts may not be as severe due to elements of the action that attempt to mitigate impacts. DAS leasing, the fixed gear sector, and changes to SAPs may help some vessels and their communities adapt to the restrictions in this action. These benefits may prove localized to small groups of vessels, however, and are unlikely to change the overall perception that the social impacts of this action, in the short term, are largely negative. Successful rebuilding of groundfish stocks should lead to future benefits for fishermen and their communities but as noted in Amendment 13 it is not clear that current fishery participants will reap those benefits.

5.2 Environmental Consequences of Alternative 2

Alternative 2 would approve the Generic Sector operating under a combination of hard TACs on stocks of concern and continued adherence to DAS controls. The sector would likely include over XXXXXXXXXX active multispecies permits with "A" days with primarily operating out of XXXXXXXXXXX ports. Most of these permits are used by vessels fishing mobile gear; however, the Sector would leave open the option for future members using fixed gear. The sector requests allocations of cod (GOM), yellowtail flounder (CC-GOM), and white hake. The Sector expects allocations to be less than 20% of the overall commercial share of the target TAC. Under this alternative the sector requests exemptions from:

- Trip limits on GB and GOM cod, GOM-CC, GB and SNE yellowtail flounder, GB winter flounder and white hake
- Differential DAS counting
- Rolling closures in the Gulf of Maine

5.2.1 Biological Impacts (Alternative 2)

Alternative 2, which creates a new sector allocation is not a stand-alone management alternative and cannot be analyzed as such. A key element of any sector approach, however, is the allocation of a specific amount of a resource to a particular sector. As long as that allocation is consistent with target fishing mortality rates, this alternative is consistent with the biological objectives of the FMP. The Sector is seeking allocations of the species that are "stocks of concern", the species for which fishing mortality has approached or exceeded overfishing definitions in recent years or is expected to in upcoming years.

The Sector allocations are a fixed share of the target TACs that are set to achieve the biological objectives of the FMP, and the Sector's catch will be strictly limited to less than or equal to these fixed catch levels. By staying within their allocated hard TACs of of cod (GOM), yellowtail flounder (CC-GOM), and white hake allocated to the Sector, approval of the Sector Operations Plan would not compromise groundfish mortality targets of Amendment 13. The Sector will ensure that over 10 groundfish permits do not contribute to overfishing of these stocks. Relative to the regulatory controls on the remainder of the fleet, the hard TACs the Sector would agree to abide by provide much stronger assurance that this sector of the industry's catch will remain below target levels. The effort controls and trip limits that the remainder of the fleet operate under are expected to constrain their catch below target levels, but do not directly do so and so provide less assurance.

By eliminating trip limits on cod, hake and yellowtail flounder and requiring full retention the Sector removes incentives for regulatory discards of legal sized fish which reduces mortality, waste and improves data quality for stock assessment purposes. According to the Amendment 13 FEIS, the Sector allocation is consistent with the biological objectives of the Amendment, given adherence to target fishing mortality rates (NEFMC, AM 13 FSEIS, Sec 5.2.4.18). The Sector will reduce discards in two ways: by eliminating trip limits and by sharing allocations between members. The daily trip limits that are designed to protect cod, yellowtail, white hake, and can result in regulatory discards when individual vessels exceed the daily catch limit. The Sector will allow members to retain 100% of legal sized catch species that would otherwise be subject to discard when a trip limit is exceeded, and then provide opportunities for members to share allocations when individuals meet their own allocation share, and/or issue a stop fishing order to vessels that meet their allocation share but have not acquired allocation share from other members.

In addition to begin limited by hard TACs of stocks of concern, the sector remains under effort controls that have been deemed (in analysis of prior management actions) to be sufficient (for most stocks more than sufficient) to maintain fishing mortality below target levels for all other groundfish stocks for which the Sector may not receive a fixed allocation. These effort controls, together with trip limits on monkfish and dogfish, have also been analyzed and deemed sufficient to maintain fishing mortality below target levels for monkfish, skates and dogfish.

Protected Species

Alternative 2 is not expected to result in any significant changes in impacts on protected species relative to the no-action alternative. Sector members will remain under the same overall controls on effort, will be fishing with the same gear, and will be subject to the same regulations designed to reduce impacts on protected species as the remainder of the fleet.

Biological Conclusions

Alternative 2 will is expected to have overall positive biological impacts by strictly controlling catches by Sector members to fixed shares of target TACs and by eliminating regulatory discarding due to trip limits. Continued adherence to DAS controls will serve to limit Sector catches of other groundfish species, monkfish, skates and dogfish.

5.2.2 Habitat Impacts (Alternative 2)

Alternative 2 is not expected to result in any significant changes in impacts on habitat relative to the no-action alternative. As stated in the Amendment 13 SEIS, "Sectors are not geographically constrained; it is unlikely that they, as a management measure, will have any significant habitat impacts.(NEFMC, Am 13 FSEIS, Section 5.3.4.15)

Sector members will remain under the same overall controls on effort, will be fishing with the same gear, and will be subject to the same regulations designed to reduce impacts on habitat as the remainder of the fleet. Sector vessels will be subject to the same prohibitions from fishing in permanently closed areas as the rest of the fleet.

Access to areas temporarily closed to the rest of the fleet through rolling closures is not expected to have any significant habitat impacts since it simply changes the timing of access rather than the amount of effort. Since Sector members will be subject to hard TACs on stocks of concern that are found in these areas, they may in fact reduce their overall level of effort if their catch per DAS of these species is higher than it would be when fishing in these areas outside of the rolling closures.

5.2.3 Social and Economic Impacts (Alternative 2)

The XXXXXXXXXXXXXX area supports a fleet of small xxxxxxx fishermen who ……Not only financial survival but physical survival of these fishermen is at stake. The low profitability of the fleet has left little money for vessel upkeep while regulatory changes and the distribution of fish has forced vessels to fish further from port.

Alternative 2 has the potential to provide some, although limited relief to this group of fishermen. A small increase in profitability for this fleet may be critical to their survival and to continuing provision of related benefits to the community.

As stated in the Amendment 13 SEIS: "By creating a process for the formation of self-selecting sectors, this Amendment creates an opportunity for groups of vessels to adapt their fishing behavior so that they remain economically viable in the face of increasing restrictions imposed to rebuild groundfish stocks. The ability to form a sector could be an important component of providing flexibility to small commercial fishing entities to mitigate the economic impacts of the Amendment. Further, depending on the geographic location of the membership of a given sector, sector allocation could also provide an opportunity for fishing communities to reduce economic impacts" (NEFMC, Am 13 FSEIS, Section 5.4.9.3).

By authorizing a Sector for a substantial number of multispecies permit holders, Alternative 2 will provide significant social and economic benefits to the affected fishing industry and associated communities. By allowing the Sector to be implemented, fishermen at the local level will be making decisions that impact the Sector members and their communities. By making collective decisions, Sector members will foster interconnectedness amongst fishermen that will allow them to become more efficient while protecting the fabric of their traditional fishing communities.

The Sector will generate economic stability and increased efficiency for individuals and for fishing communities. Sector members will be able to fish at times and in places that are most appropriate to the vessel capacity, and will be able to manage the hard TACs in a way that avoids waste of the resource. Sector members will continue to maintain local ties to their fishing community and generate economic activity in the ports they now support (XXXXXXXXXXXXXX ports).

The Sector implementation allows Sector vessels to adapt their fishing behavior so that they remain economically viable in the face of increasing restrictions imposed to rebuild groundfish stocks. The ability to form and operate a Sector is an important component of providing flexibility to small commercial fishing entities to mitigate the economic impacts of the Amendment 13 and subsequent framework adjustments. Sector allocation is cited repeatedly as a measure to mitigate economic harm caused by Amendment 13. For instance, "other opportunities have been created to ensure a viable fishing industry. The proposed action will allow the formation of voluntary, self-selecting sectors. These sectors may be able to develop more efficient means to harvest their portion of the resource." (NEFMC, Am 13 FSEIS, Section 7.2.10). Furthermore, "the Proposed Action contains a number of measures that would provide small entities with some degree of flexibility to be able to offset at least some portion of the estimated losses in profit. The major offsetting measures include the opportunity to use … sector allocation…" (NEFMC, Am 13 FSEIS, Section 7.3.3.7.2).

With the increasing costs of fuel and overhead, fishermen cannot afford regulations that undermine the efficiency of their operations. They therefore must capitalize on their financial opportunities during the relatively short intervals they are at sea. By fishing under a hard TAC rather than an inefficient daily trip limit and by eliminating temporal restrictions on access to certain areas designed primarily to reduce catches of stocks of concern, Sector members can maximize their profitability while minimizing their business expenditures. Again, hard TACs on stocks of concern will ensure that the efficiency gains for Sector vessels do not lead to overfishing of stocks of concern.

Implementation of the Sector is expected to have important safety benefits for sector members. Often, a vessel operator needs to come into port to avoid bad weather, and some ports do not have offloading facilities. In those cases, the vessel operator must balance the safety risk with the trip limit compliance need. Exemption from trip limit restrictions will eliminate the need to make such decisions.

Many vessel operators are currently traveling beyond the Gulf of Maine rolling closures to avoid these restrictions. For some, the distance may be beyond the capacity of the vessel, especially in times of bad weather. Elimination of these restrictions will allow vessels to operate in a safer manner. The Sector vessels will be restricted to a hard TAC for the species that trip limits, rolling closures are otherwise designed to protect, and can, therefore, still achieve the conservation objectives of those measures without compromising safety.

Social and Economic Conclusions

Overall, Alternative 2 will have positive social and economic impacts Sector members relative to the No-Action alternative. Implementation of the Sector provides safety benefits as well as regulatory flexibility that will allow cooperative harvest and improved economic opportunity.

Although excemptions from trip limits and rolling closures will provide regulatory relief to the Sector and should improve economic efficiency as well as safety., these benefits may be more than offset by the costs of organizing and operating the sector. Prospective sector members have not traditionally fished inside the areas with differential DAS counting and do not expect to do so, so this excemption provides quite limited additional benefits. The sector will incur substantial costs for preparation of documents, contracts, etc., for Sector administration and for monitoring. Complete excemption from DAS controls and allocation of TACs on all species under Alternative 3 would make possible much larger efficiency gains that should offset Sector costs. For that reason Alternative 3 was chosen over Alternative 2 as the preferred alternative.

5.3 Environmental Consequences of Alterative 3 (Preferred Alternative)

Under this alternative the Sector would receive allocations of all regulated groundfish species, monkfish, skate and dogfish. Allocations for all of these species would be based on the ratio of the Sector members' total catch by species and stock relative to the total commercial catch of each species and stock during the period running from May 1, 2002 through April 30, 2007.

Because the catch of all managed species would be constrained by hard TACs, the sector requests that it be exempted from other regulations designed specifically to control fishing mortality. Under this alternative the sector requests exemptions from:

- Northeast Multispecies Days at Sea (DAS) controls and reporting requirements
- Monkfish DAS controls and reporting requirements
- Trip limits on cod, yellowtail flounder, winter flounder and white hake
- Possession and landing limits on monkfish, skates and dogfish
- Gulf of Maine Rolling closures

5.3.1 Biological Impacts (Alternative 3 – Preferred Alternative)

Alternative 3, which creates a new sector allocation is not a stand-alone management alternative and cannot be analyzed as such. A key element of any sector approach, however, is the allocation of a specific amount of a resource to a particular sector. As long as that allocation is consistent with target fishing mortality rates, this alternative is consistent with the biological objectives of the FMP. Under this alternative the Sector would request allocations of the all regulated groundfish species, monkfish, skates and dogfish.

The Sector allocations are a fixed share of the target TACs that are set to achieve the biological objectives of the FMP, and the Sector's catch will be strictly limited to less than or equal to these fixed catch levels. By staying within their allocated hard TACs the Sector will not compromise groundfish mortality targets of Amendment 13 or of the monkfish, skate or dogfish FMPs. The Sector will ensure that over 10 groundfish permits do not contribute to overfishing of these stocks. Relative to the regulatory controls on the remainder of the fleet, the hard TACs the Sector would agree to abide by provide much stronger assurance that this sector of the industry's catch will remain below target levels. The effort controls and trip limits that the remainder of the fleet operates under are expected to constrain their catch below target levels, but do not directly do so and so provide less assurance.

By eliminating trip limits on these stocks the Sector removes incentives for regulatory discards of legal sized fish which reduces mortality, waste and improves data quality for stock assessment purposes. According to the Amendment 13 FEIS, the Sector allocation is consistent with the biological objectives of the Amendment, given adherence to target fishing mortality rates (NEFMC, AM 13 FSEIS, Sec 5.2.4.18). The Sector will reduce discards in two ways: by eliminating trip limits and by sharing allocations between members. The daily trip limits that are designed to protect cod, yellowtail, white hake flounder can result in regulatory discards when individual vessels exceed the daily catch limit. The Sector will allow members to retain 100% of legal sized catch species that would otherwise be subject to discard when a trip limit is exceeded, and then provide opportunities for members to share allocations when individuals meet their own allocation share, and/or issue a stop fishing order to vessels that meet their allocation share but have not acquired allocation share from other members.

Protected Species

Alternative 3 is not expected to result in any significant changes in impacts on protected species relative to the no-action alternative. Sector members will remain under the same regulations designed to reduce impacts on protected species as the remainder of the fleet.

Biological Conclusions

Alternative 3 will is expected to have overall positive biological impacts by strictly controlling catches by Sector members to fixed shares of target TACs and by eliminating regulatory discarding due to trip limits.

5.3.2 Habitat Impacts (Alternative 3 – Preferred Alternative)

Alternative 3 is not expected to result in any significant changes in impacts on habitat relative to the no-action alternative. As stated in the Amendment 13 SEIS, "Sectors are not geographically constrained; it is unlikely that they, as a management measure, will have any significant habitat impacts.(NEFMC, Am 13 FSEIS, Section 5.3.4.15)

Sector vessels will be subject to the same prohibitions from fishing in permanently closed areas as the rest of the fleet. Access to areas temporarily closed to the rest of the fleet through rolling closures is not expected to have any significant habitat impacts since it simply changes the timing of access rather than the amount of effort. Since Sector members will be subject to hard TACs on stocks of concern that are found in these areas, they may in fact reduce their overall level of effort if their catch per DAS of these species is higher than it would be when fishing in these areas outside of the rolling closures.

Because the Sector members will not be limited by DAS it is possible that their overall level of effort could increase if they can successfully target underutilized groundfish species while maintain catches of all species below allocated TACs. However, it expected that there will be offsetting factors that may actually reduce habitat impacts. While vessels may spend more actual time at sea, the amount of time that gear is actually deployed will not necessarily increase. In order to fish more selectively, vessels can be expected to make shorter tows and to spend more time searching for areas with appropriate species mix and sizes of fish. The ability to do this is now constrained by DAS limitations. In sum, it is not possible to say at this point whether Alternative 3 would result in more impact on habitat tha the status quo. However there is no strong reason to expect significant negative habitat impacts relative to the No-Action alternative.

5.3.3 Social and Economic Impacts (Alternative 3 – Preferred Alternative)

The XXXXXXXXXXXXXX area supports a fleet ofxxxxxxxxxxx fishermen who…………. Not only financial survival but physical survival of these fishermen is at stake. The low profitability of the fleet has left little money for vessel upkeep while regulatory changes and the distribution of fish has forced vessels to fish further from port.

Alternative 3 has the potential to provide substantial improvements in profitability for this group of fishermen. Even a small increase in profitability for this fleet may be critical to their survival and to continuing provision of related benefits to the community.

As stated in the Amendment 13 SEIS: "By creating a process for the formation of self-selecting sectors, this Amendment creates an opportunity for groups of vessels to adapt their fishing behavior so that they remain economically viable in the face of increasing restrictions imposed to rebuild groundfish stocks. The ability to form a sector could be an important component of providing flexibility to small commercial fishing entities to mitigate the economic impacts of the Amendment. Further, depending on the geographic location of the membership of a given sector, sector allocation could also provide an opportunity for fishing communities to reduce economic impacts" (NEFMC, Am 13 FSEIS, Section 5.4.9.3).

Alternative 3 will provide substantive social and economic benefits to the affected fishing industry and associated communities. By allowing the Sector to be implemented, fishermen at the local level will be making decisions that impact the Sector members and their communities. By making collective decisions, Sector members will foster interconnectedness amongst fishermen that will allow them to become more efficient while protecting the fabric of their traditional fishing communities.

The Sector will generate economic stability and increased efficiency for individuals and for fishing communities. Sector members will be able to fish at times and in places that are most appropriate to the vessel capacity, and will be able to manage the hard TACs in a way that avoids waste of the resource. Sector members will continue to maintain local ties to their fishing community and generate economic activity in the ports they now support (principally New Bedford, Boston, Gloucester and Portland), while using a common entity (PFE) to tally and report landings.

The Sector implementation allows Sector vessels to adapt their fishing behavior so that they remain economically viable in the face of increasing restrictions imposed to rebuild groundfish stocks. The ability to form and operate a Sector is an important component of providing flexibility to small commercial fishing entities to mitigate the economic impacts of the Amendment 13 and subsequent framework adjustments. Sector allocation is cited repeatedly as a measure to mitigate economic harm caused by Amendment 13. For instance, "other opportunities have been created to ensure a viable fishing industry. The proposed action will allow the formation of voluntary, self-selecting sectors. These sectors may be able to develop more efficient means to harvest their portion of the resource." (NEFMC, Am 13 FSEIS, Section 7.2.10). Furthermore, "the Proposed Action contains a number of measures that would provide small entities with some degree of flexibility to be able to offset at least some portion of the estimated losses in profit. The major offsetting measures include the opportunity to use … sector allocation…" (NEFMC, Am 13 FSEIS, Section 7.3.3.7.2).

With the increasing costs of fuel and overhead, fishermen cannot afford regulations that undermine the efficiency of their operations. They therefore must capitalize on their financial opportunities during the relatively short intervals they are at sea. By fishing under a hard TAC rather than an inefficient daily trip limit and by eliminating temporal restrictions on access to certain areas designed primarily to reduce catches of stocks of concern, Sector members can maximize their profitability while minimizing their business expenditures. Again, hard TACs on stocks of concern will ensure that the efficiency gains for Sector vessels do not lead to overfishing of stocks of concern.

Implementation of the Sector is expected to have important safety benefits for sector members. Often, a vessel operator needs to come into port to avoid bad weather, and some ports do not have offloading facilities. In those cases, the vessel operator must balance the safety risk with the trip limit compliance need. Exemption from trip limit restrictions will eliminate the need to make such decisions.

Many vessel operators are currently traveling beyond the Gulf of Maine rolling closures to avoid these restrictions. For some, the distance may be beyond the capacity of the vessel, especially in times of bad weather. Elimination of these restrictions will allow vessels to operate in a safer manner. The Sector vessels will be restricted to a hard TAC for the species that trip limits, rolling closures are otherwise designed to protect, and can, therefore, still achieve the conservation objectives of those measures without compromising safety.

Social and Economic Conclusions

Overall, Alternative 3 will have positive social and economic impacts Sector members relative to the No-Action alternative. Implementation of the Sector provides safety benefits as well as regulatory flexibility that will allow cooperative harvest and the maximization of economic opportunity. Altough the Sector will incur additional costs for development and operation of the sector, the benefits of Sector management are expected to outweight these costs. For this reason Alernative 3 is selected as the preferred alternative.

5.4 Qualitative comparative impact assessment

As this document describes, there will be different impacts depending on which alternative is chosen. The choice between alternatives is expected to have a relatively small impact on the biological and physical environment, although the preferred alternative will offer greater assurance that fishing mortality objectives on stocks of concern will be met. Alternative 3 offers the greatest positive social impacts including improved safety while Alternative 1 carries with it negative social impacts. In regards to economic impacts, Alternative 3 provides economic benefits to Sector members that may not be realized as compared to Alternative 1.

Alternative 3 provides greater biological, social and economic benefits than Alternative 2. Alternative 2 does not alleviate the Sector from the burden of complex and inefficient effort controls and does not implement hard limits on total catch for all of the species caught by the sector.

5.5 Essential Fish Habitat (EFH) Assessment

The alternatives are not expected to result in substantial changes in the amount or distribution of fishing effort or the fishing gears used by Sector members. Therefore, the choice between alternatives in this EA will have negligible impact on EFH.

6.0 CUMULATIVE IMPACTS

Cumulative impacts are the impacts on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. The analyses that follow are qualitative in nature.

6.1 Cumulative Impacts (Alternative 1 – No Action)

No cumulative impacts have been identified for Alternative 1 that have not been analyzed by the FSEIS for Amendment 13 (the most relevant document as no final documents for Framework 42 are yet available). Because Alternative 1 is a continuation of the input controls that have evolved since Amendment 5 in the 1990s, the cumulative impacts are the same as Amendment 13. The cumulative impacts were analyzed in Amendment 13 FSEIS: "The majority of the fishery administration measures have only limited or negligible effects on communities, stocks, protected species, and habitat. The additive effects of these measures in conjunction with other Amendment 13 alternatives, including measures to address stock rebuilding and capacity issues, as well as past actions in the groundfish fishery are low or negligible" (NEFMC, Amendment 13 FSEIS, Section 5.7.7.1).

Alternative 1, when considered in light of past, other present, and reasonably foreseeable future actions, will not have a significant impact on the human environment as defined by the National Environmental Policy Act (""the natural and physical environment and the relationship of the people with that environment"). Since this action continues the rebuilding programs adopted by Amendment 13, the physical and biological impacts fall within the range of the impacts characterized by that action. Analysis shows that there will not be significant impacts on habitat, protected species, groundfish stocks, or other stocks. It is likely, however, that the combination of Amendment 13 and this action will result in significant social and economic impacts.

6.2 Cumulative Impacts (Alternative 2)

Alternative 2 would approve the Sector. This will have minimal or positive direct biological and habitat impacts, as outlined in Section 6.2 of this EA. Although small, the biological impacts of Alternative 2 have the potential to be positive: a portion of landings of groundfish stocks of concern will be securely constrained under the twofold strong protection of a hard TACs, DAS usage. When social and economic impacts are considered, Alternative 2 will have positive cumulative impacts for the Sector members and their communities that will not be realized under Alternative 1.

The Amendment 13 FSEIS concluded that sector allocation had the potential to result in some level of positive cumulative impacts for fishermen and their associated communities, since it provides them with more control over specific management measures that will affect their fishing practices, lending flexibility to fishers and a greater sense of involvement in the regulatory process. Amendment 13 found cumulative effects on the resource and habitat as a result of sector allocation to be negligible (NEFMC, Am 13 FSEIS, Section 5.7.7.1).

Furthermore, by creating and implementing a model for other groups to create sectors, Alternative 2 will have a positive, though unquantifiable, social cumulative impact. As groups of fishermen voluntarily come together for the purpose of securing a resource allocation in New England, the Operations Plan provides a model. By being the first community based mobile gear Sector in New England to voluntarily accept a hard TAC-based management regime, the Sector is creating a positive example for the fleet that could translate into social and economic benefit to other fishing groups, while continuing to meet mortality objectives on groundfish stocks.

Past management measures, beginning with Amendment 5 in the mid-1990's, have, over time, restricted groundfish fishermen with input controls that have made them progressively less efficient. Alternative 1 (which results in implementation of FW 42 regulations for prospective Sector members) is expected to continue to reduce opportunities to harvest healthy stocks as it strives to maintain the rebuilding program initiated in Amendment 13. Alternative 2 provides an opportunity to mitigate the social and economic impacts of Framework 42 by allowing access to the target species while limiting impacts on Species of Concern (SOC). The continued use of DAS and the flexibility to redistribute these DAS onto the safest platforms insures positive social and economic impacts to the Sector.

6.3 Cumulative Impacts (Alternative 3 - Preferred)

Alternative 3 would also approve the Sector. This will have minimal or positive direct biological and habitat impacts, as outlined in Section 6.2 of this EA. Although small, the biological impacts of Alternative 2 have the potential to be positive: a portion of landings of groundfish stocks of concern will be securely constrained under the twofold strong protection of a hard TACs, DAS usage. When social and economic impacts are considered, Alternative 3 will have positive cumulative impacts for the Sector members and their communities that will not be realized under Alternative 1 and greater posititive cumulative impacts that will be realized under Alternative 2.

The Amendment 13 FSEIS concluded that sector allocation had the potential to result in some level of positive cumulative impacts for fishermen and their associated communities, since it provides them with more control over specific management measures that will affect their fishing practices, lending flexibility to fishers and a greater sense of involvement in the regulatory process. Amendment 13 found cumulative effects on the resource and habitat as a result of sector allocation to be negligible (NEFMC, Am 13 FSEIS, Section 5.7.7.1).

Furthermore, by creating and implementing a model for other groups to create sectors, Alternative 3 will have a positive, though unquantifiable, social cumulative impact. As groups of fishermen voluntarily come together for the purpose of securing a resource allocation in New England, the Operations Plan provides a model. By being the first mobile gear Sector in New England to voluntarily accept a hard TAC-based and community based management regime, the Sector is creating a positive example for the fleet that could translate into social and economic benefit to other fishing groups, while continuing to meet mortality objectives on groundfish stocks.

Past management measures, beginning with Amendment 5 in the mid-1990's , have, over time, restricted groundfish fishermen with input controls that have made them progressively less efficient. Alternative 1 (which results in implementation of FW 42 regulations for prospective Sector members) is expected to continue to reduce opportunities to harvest healthy stocks as it strives to maintain the rebuilding program initiated in Amendment 13. Alternative 2 provides an opportunity to mitigate the social and economic impacts of Framework 42 by allowing access to the target species while limiting impacts on Species of Concern (SOC). The continued use of

DAS and the flexibility to redistribute these DAS onto the safest platforms insures positive social and economic impacts to the Sector.

7.0 LIST OF PREPARERS

This document was prepared through the cooperative efforts of members of the staffs of the Gulf of Maine Research Institute, NMFS & NEFMC

NOAA Fisheries Service
One Blackburn Drive
Gloucester, MA 01930

8.0 LIST OF AGENCIES AND PERSONS CONSULTED

The Northeast Regional Office of NMFS and the NEFMC Staff were consulted in preparing this EA.

9.0 APPLICABLE LAW

Magnuson-Stevens Fishery Conservation and Management Act

The proposed action will comply with all elements of the MSFCMA and the NE Multispecies FMP.

Endangered Species Act

Section 7 of the ESA requires Federal agencies conducting, authorizing, or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The proposed action would not alter existing measures to protect endangered species likely to inhabit the management units of the subject fisheries.

Marine Mammal Protection Act

The impacts of the proposed action on protected species are considered in section 6.2.1 of this EA The proposed action would not alter existing measures to protect the species likely to inhabit the management units of the subject fisheries.

National Environmental Policy Act (NEPA)

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Finding of No Significant Impact for Approval of the Generic Sector

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. '1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

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

<u>Response</u>: The proposed action will not jeopardize the sustainability of any of the target species. The biological impacts of the proposed action are analyzed in Section 5.2.1.

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

<u>Response</u>: The proposed action is not expected to jeopardize the sustainability of any non-target species. Mortality of non-target species will be controlled within the Sector by continued use of DAS.

3) *Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?*

<u>Response</u>: The proposed action is not expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the under the Magnuson Act and identified in the FMP. The habitat impacts of the proposed action are analyzed in Section 5.3.2.

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

<u>Response</u>: The proposed action is not expected to have a substantial adverse impact on public health and safety. The Sector involves routine fishing operations and will not decrease safety at sea. In fact, it is expected that the centralized and local controls placed on the Sector will result in positive impacts on public health and safety. This will occur through daily monitoring and increased communication amongst Sector members, and the ability to respond rapidly to changing developments on the ocean.

Although NAO 216-6 refers to A "substantial impacts," this is understood to mean "significant impacts on the environment."

5) *Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?*

<u>Response</u>: The proposed action is not expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species. The impacts of the proposed action on protected species are considered in section 5.3.1 of this EA The proposed action would not alter existing measures to protect the species likely to inhabit the management units of the subject fisheries.

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

Response: The proposed action is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area.

7) *Are significant social or economic impacts interrelated with natural or physical environmental effects?*

Response: The social and economic impacts of the proposed action are not interrelated with significant natural or physical environmental effects. Significant negative social and economic impacts are not expected to result from natural or physical environmental effects, however the proposed action has the potential to provide positive social and economic relief to some Sector member that were disproportionately affected by Amendment 13 and the ensuing Framework actions.

8) *Are the effects on the quality of the human environment likely to be highly controversial?*

Response: The implementation of the first New England Sector was unanimously supported by the New England Fishery Management Council. During public comment, strong support was received for the sector allocation from a wide diversity of sources throughout the New England fishing community, the public, and the environmental community. The effects on the quality of the human environment caused by implementation of the Sector are likely to be positive and supported by a wide constituency of New England fishery stakeholders.

9) *Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?*

Response: The proposed action cannot reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas because these areas are not present with the affected environment.

10) *Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?*

Response: The impacts on the human environment are not likely to be highly uncertain nor do they involve unique or unknown risks. By allowing fishermen to take part in localized decision making, they are creating a sector-specific management regime that takes into account the needs of the fishermen. Effects to the human environment are detailed in sections 5.3.3.

11) *Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?*

Response: The proposed action is not related to other actions with individually insignificant, but cumulatively significant impacts.

12) *Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?*

Response: The proposed action is not likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources.

13) *Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?*

Response: The proposed action cannot reasonably be expected to result in the introduction or spread of non-indigenous species.

14) *Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?*

Response: Amendment 13 established the precedent of Sector allocations. The proposed action is a continuation and implementation of that decision. Future decisions in principle are not at question in this proposal.

15) *Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?*

Response: The proposed action is not expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

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

Response: The proposed action is not expected to result in cumulative adverse effects that could have a substantial effect on target or non-target species. As stated in Section 6.0, impact on resources, encompassing groundfish and other stocks is expected to be minimal.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for Approval of the it is hereby determined that the Approval of the will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

____________________________________ __________________
Assistant Administrator for Fisheries, NOAA Date
[or Responsible Program Manager, [identify Office]]

Administrative Procedure Act (APA)

Section 553 of the Administrative Procedure Act establishes procedural requirements applicable to informal rulemaking by Federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process, and to give the public adequate notice and opportunity for comment. At this time, the Council is not requesting any abridgement of the rulemaking process for this action.

Paperwork Reduction Act (PRA)

The purpose of the PRA is to control and, to the extent possible, minimize the paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. This action does not propose to modify any existing collections, or to add any new collections; therefore, no review under the PRA is necessary.

Data Quality Act (Section 515)

In accordance with the Data Quality Act (Public Law 106-554), the Office of Management and Budget directed each federal agency to issue guidelines that ensure the quality, objectivity, utility, and integrity of information disseminated by federal agencies. The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the Data Quality Act. Information must meet standards of utility, integrity, and objectivity. This section provides information that demonstrates compliance with these standards.
Utility of Information Product

A *Is the information helpful, beneficial or serviceable to the intended user?*

The Environmental Assessment contains a description of the authority for the formation of a Sector, as well as a description of the affected environment. In addition, this EA contains specific information on the expected number of participants in the Sector and the expected maximum percentages of TACs proposed for allocation to the Sector. Therefore, the EA contains the various information elements of interest to the public and necessary for decision makers to make informed decisions.

B *Is the data or information product an improvement over previously available information? Is it more current or detailed? Is it more useful or accessible to the public? Has it been improved based on comments from or interactions with customers?*

The data and information is the most current and detailed available or references the most current and detailed documents. It contains new information that has not been in prior documents.

C. *What media are used in the dissemination of the information? Printed publications? CD-ROM? Internet? Is the product made available in a standard data format? Does it use consistent attribute naming and unit conventions to ensure that the information is accessible to a broad range of users with a variety of operating systems and data needs?*

The Federal Register notice that announces the proposed Sector will be made available in printed publication and on the Internet website for the Northeast Regional Office. Instructions for obtaining a copy of this EA are included in the Federal Register notice.

Integrity of Information Product

The information product meets the following standards for integrity:

If information is confidential, it is safeguarded pursuant to the Privacy Act and Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business and financial information). (e.g., Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100 – Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.).
Objectivity of Information

Indicate which of the following categories of information products apply for this product:

Original Data
Synthesized Products
Interpreted Products
Hydrometeorological, Hazardous Chemical Spill, and Space Weather Warnings, Forecasts, and Advisories
Experimental Products
X Natural Resource Plans
Corporate and General Information

Describe how this information product meets the applicable objectivity standards.

What published standard(s) governs the creation of the Natural Resources Plan? Does the Plan adhere to the published standards?

The Sector proposal and accompanying EA must comply with the requirements of the Northeast Multispecies Fishery Management Plan (FMP), as well as the requirements of the Magnuson-Stevens Act, the National Environmental Policy Act, the Administrative Procedures Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, and Executive Orders 12612 (Federalism), 12630 (Property Rights), 12866 (Regulatory Planning), and 13158 (Marine Protected Areas). The NMFS Administrator, Northeast Region, has authority, under 50 CFR 648.87, to approve the Operations Plan and Sector Agreement and allocate TAC to the Sector. NOAA Fisheries has made a preliminary determination that the Sector proposal is consistent with the FMP and all applicable laws. In making a final decision, NOAA Fisheries will take into account comments received on the proposed rule and pertinent information that may be more current than previous information.

Was the Plan developed using the best information available? Please explain.

The Sector proposal is based upon currently available information.

Has a clear distinction been drawn between policy choices and the supporting science upon which they are based? Have all supporting materials, information, data and analyses used within the Plan been properly reference to ensure transparency?

The policy choices that are proposed are supported by the available scientific information. The supporting materials are contained in readily available documents. The process utilized to develop the proposal is described in the FMP.

Describe the review process of the Plan by technically qualified individuals to ensure that the Plan is valid, complete, unbiased, objective and relevant. For example, internal review by staff who were not involved in the development of the Plan to formal, independent, external peer review. The level of review *should be commensurate with the importance of the Plan and the constraints imposed by legally enforceable deadlines.*

The NMFS Administrator, Northeast Region made a preliminary determination that the Sector Proposal is consistent with the FMP and applicable laws. Staff from the Sustainable Fisheries Division and Fishery Statistics Division, as well as staff responsible for implementation of the National Environmental Policy Act (NEPA) reviewed the pertinent information. Establishment of the overall target TACs involved scientists with specialties in population dynamics, stock assessment methods, and demersal resources. In accordance with the FMP regulations, the Regional Administrator will make a final determination after obtaining public comment.

E.O. 13132 (Federalism)

This E.O. established nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. The E.O. also lists a series of policy making criteria to which Federal agencies must adhere when formulating and implementing policies that have federalism implications. However, no federalism issues or implications have been identified relative to the measures proposed in the Approval of the . This action does not contain policies with federalism implications sufficient to warrant preparation of an assessment under E.O. 13132. The affected states have been closely involved in the development of the proposed management measures through their representation on the Council (all affected states are represented as voting members of at least one Regional Fishery Management Council). No comments were received from any state officials relative to any federalism implications that may be associated with this action.

E.O. 13158 (Marine Protected Areas (MPAs))

The Executive Order on MPAs requires Federal agencies whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions and, to the extent permitted by law and to the maximum extent practicable, in taking such actions, avoid harm to the natural and cultural resources that are protected by an MPA. The E.O. directs Federal agencies to refer to the MPAs identified in a list developed and maintained by the Departments of Commerce and Interior. As of the date of submission of this document, however, the List of MPAs has not yet been developed. No further guidance related to this E.O. is available at this time.

10.0 GLOSSARY AND REFERENCES

10.1 Glossary

Adult stage: One of several marked phases or periods in the development and growth of many animals. In vertebrates, the life history stage where the animal is capable of reproducing, as opposed to the juvenile stage.

Adverse effect: Any impact that reduces quality and/or quantity of EFH. May include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include sites-specific of habitat wide impacts, including individual, cumulative, or synergistic consequences of actions.

Aggregation: A group of animals or plants occurring together in a particular location or region.

Anadromous species: fish that spawn in fresh or estuarine waters and migrate to ocean waters

Amphipods: A small crustacean of the order Amphipoda, such as the beach flea, having a laterally compressed body with no carapace.

Anaerobic sediment: Sediment characterized by the absence of free oxygen.

Anemones: Any of numerous flowerlike marine coelenterates of the class Anthozoa, having a flexible cylindrical body and tentacles surrounding a central mouth.

Annual total mortality: Rate of death expressed as the fraction of a cohort dying over a period compared to the number alive at the beginning of the period (# total deaths during year / numbers alive at the beginning of the year). Optimists convert death rates into annual survival rate using the relationship S=1-A.

ASPIC (A Surplus Production Model Incorporating Covariates): A non-equilibrium surplus production model developed by Prager (1995). ASPIC was frequently used by the Overfishing Definition Panel to define B_{MSY} and F_{MSY} reference points. The model output was also used to estimate rebuilding timeframes for the Amendment 9 control rules.

Bay: An inlet of the sea or other body of water usually smaller than a gulf; a small body of water set off from the main body; e.g. Ipswich Bay in the Gulf of Maine.

Benthic community: *Benthic* means the bottom habitat of the ocean, and can mean anything as shallow as a salt marsh or the intertidal zone, to areas of the bottom that are several miles deep in the ocean. *Benthic community* refers to those organisms that live in and on the bottom. (*In* meaning they live within the substrate; e.g, within the sand or mud found on the bottom. See *Benthic infauna*, below)

Benthic infauna: See *Benthic community*, above. Those organisms that live *in* the bottom sediments (sand, mud, gravel, etc.) of the ocean. As opposed to *benthic epifauna*, that live *on* the surface of the bottom sediments.

Benthivore: Usually refers to fish that feed on benthic or bottom dwelling organisms.

Berm: A narrow ledge typically at the top or bottom of a slope; e.g. a berm paralleling the shoreline caused by wave action on a sloping beach; also an elongated mound or wall of earth.

Biogenic habitats: Ocean habitats whose physical structure is created or produced by the animals themselves; e.g, coral reefs.

Biomass: The total mass of living matter in a given unit area or the weight of a fish stock or portion thereof. Biomass can be listed for beginning of year (Jan-1), Mid-Year, or mean (average during the entire year). In addition, biomass can be listed by age group (numbers at age * average weight at age) or summarized by groupings (e.g., age 1^+, ages 4+ 5, etc). See also spawning stock biomass, exploitable biomass, and mean biomass.

B_{MSY}: The stock biomass that would produce MSY when fished at a fishing mortality rate equal to F_{MSY}. For most stocks, B_{MSY} is about ½ of the carrying capacity. The proposed overfishing definition control rules call for action when biomass is below ¼ or ½ B_{MSY}, depending on the species.

$B_{threshold}$: 1) A limit reference point for biomass that defines an unacceptably low biomass i.e., puts a stock at high risk (recruitment failure, depensation, collapse, reduced long term yields, etc). 2) A biomass threshold that the SFA requires for defining when a stock is overfished. A stock is overfished if its biomass is below $B_{threshold}$. A determination of overfished triggers the SFA requirement for a rebuilding plan to achieve B_{target} as soon as possible, usually not to exceed 10 years except certain requirements are met. In Amendment 9 control rules, $B_{threshold}$ is often defined as either $1/2B_{MSY}$ or $1/4$ B_{MSY}. $B_{threshold}$ is also known as $B_{minimum}$.

B_{target}: A desirable biomass to maintain fishery stocks. This is usually synonymous with B_{MSY} or its proxy.

Biomass weighted F: A measure of fishing mortality that is defined as an average of fishing mortality at age weighted by biomass at age for a ranges of ages within the stock (e.g., ages 1^+ biomass weighted F is a weighted average of the mortality for ages 1 and older, age 3^+ biomass weighted is a weighted average for ages 3 and older). Biomass weighted F can also be calculated using catch in weight over mean biomass. See also fully-recruited F.

Biota: All the plant and animal life of a particular region.

Bivalve: A class of mollusks having a soft body with platelike gills enclosed within two shells hinged together; e.g., clams, mussels.

Bottom roughness: The inequalities, ridges, or projections on the surface of the seabed that are caused by the presence of bedforms, sedimentary structures, sedimentary particles, excavations, attached and unattached organisms, or other objects; generally small scale features.

Bottom tending mobile gear: All fishing gear that operates on or near the ocean bottom that is actively worked in order to capture fish or other marine species. Some examples of bottom tending mobile gear are otter trawls and dredges.

Bottom tending static gear: All fishing gear that operates on or near the ocean bottom that I snot actively worked; instead, the effectiveness of this gear depends on species moving to the gear which is set in a particular manner by a vessel, and later retrieved. Some examples of bottom tending static gear are gillnets, traps, and pots.

Boulder reef: An elongated feature (a chain) of rocks (generally piled boulders) on the seabed.

Bryozoans: Phylum aquatic organisms, living for the most part in colonies of interconnected individuals. A few to many millions of these individuals may form one colony. Some bryozoans encrust rocky surfaces, shells, or algae others form lacy or fan-like colonies that in some regions may form an abundant component of limestones. Bryozoan colonies range from millimeters to meters in size, but the individuals that make up the colonies are rarely larger than a millimeter. Colonies may be mistaken for hydroids, corals or seaweed.

Burrow: A hole or excavation in the sea floor made by an animal (as a crab, lobster, fish, burrowing anemone) for shelter and habitation.

Bycatch: (v.) the capture of nontarget species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program.

Capacity: the level of output a fishing fleet is able to produce given specified conditions and constraints. Maximum fishing capacity results when all fishing capital is applied over the maximum amount of available (or permitted) fishing time, assuming that all variable inputs are utilized efficiently.

Catch: The sum total of fish killed in a fishery in a given period. Catch is given in either weight or number of fish and may include landings, unreported landings, discards, and incidental deaths.

Closed Area Model: A General Algebraic Modeling System (GAMS) model used to evaluate the effectiveness of effort controls used in the Northeast Multispecies Fishery. Using catch data from vessels in the fishery, the model estimates changes in exploitation that may result from changes in DAS, closed areas, and possession limits. These changes in exploitation are then converted to changes in fishing mortality to evaluate proposed measures.

Coarse sediment: Sediment generally of the sand and gravel classes; not sediment composed primarily of mud; but the meaning depends on the context, e.g. within the mud class, silt is coarser than clay.

Commensalism: See *Mutualism*. An interactive association of two species where one benefits in some way, while the other species is in no way affected by the association.

Continental shelf waters: The waters overlying the continental shelf, which extends seaward from the shoreline and deepens gradually to the point where the sea floor begins a slightly steeper descent to the deep ocean floor; the depth of the shelf edge varies, but is approximately 200 meters in many regions.

Control rule: A pre-determined method for determining fishing mortality rates based on the relationship of current stock biomass to a biomass target. Amendment 9 overfishing control rules define a target biomass (B_{MSY} or proxy) as a management objective. The biomass threshold ($B_{threshold}$ or B_{min}) defines a minimum biomass below which a stock is considered overfished.

Cohort: see yearclass.

Crustaceans: Invertebrates characterized by a hard outer shell and jointed appendages and bodies. They usually live in water and breathe through gills. Higher forms of this class include lobsters, shrimp and crawfish; lower forms include barnacles.

Days absent: an estimate by port agents of trip length. This data was collected as part of the NMFS weighout system prior to May 1, 1994.

Days-at-sea (DAS): the total days, including steaming time that a boat spends at sea to fish. Amendment 13 categorized DAS for the multispecies fishery into three categories, based on each individual vessel's fishing history during the period fishing year 1996 through 2001. The three categories are: Category A: can be used to target any groundfish stock; Category B: can only be used to target healthy stocks; Category C: cannot be used until some point in the future. Category B DAS are further divided equally into Category B (regular) and Category B (reserve).

DAS "flip": A practice in the Multispecies FMP that occurs when a vessel fishing on a Category B (regular) DAS must change ("flip") its DAS to a Category A DAS because it has exceeded a catch limit for a stock of concern.

Demersal species: Most often refers to fish that live on or near the ocean bottom. They are often called benthic fish, groundfish, or bottom fish.

Diatoms: Small mobile plants (algæ) with silicified (silica, sand, quartz) skeletons. They are among the most abundant phytoplankton in cold waters, and an important part of the food chain.

Discards: animals returned to sea after being caught; see Bycatch (n.)

Dissolved nutrients: Non-solid nutrients found in a liquid.

Echinoderms: A member of the Phylum Echinodermata. Marine animals usually characterized by a five-fold symmetry, and possessing an internal skeleton of calcite plates, and a complex water vascular system. Includes echinoids (sea urchins), crinoids (sea lillies) and asteroids (starfish).

Ecosystem-based management: a management approach that takes major ecosystem components and services—both structural and functional—into account, often with a multispecies or habitat perspective

Egg stage: One of several marked phases or periods in the development and growth of many animals. The life history stage of an animal that occurs after reproduction and refers to the developing embryo, its food store, and sometimes jelly or albumen, all surrounded by an outer shell or membrane. Occurs before the *larval* or *juvenile stage*.

Elasmobranch: Any of numerous fishes of the class Chondrichthyes characterized by a cartilaginous skeleton and placoid scales: sharks; rays; skates.

Embayment: A bay or an indentation in a coastline resembling a bay.

Emergent epifauna: See *Epifauna*. Animals living upon the bottom that extend a certain distance above the surface.

Epifauna: See *Benthic infauna*. *Epifauna* are animals that live on the surface of the substrate, and are often associated with surface structures such as rocks, shells, vegetation, or colonies of other animals.

Essential Fish Habitat (EFH): Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998).

Estuarine area: The area of an estuary and its margins; an area characterized by environments resulting from the mixing of river and sea water.

Estuary: A water passage where the tide meets a river current; especially an arm of the sea at the lower end of a river; characterized by an environment where the mixing of river and seawater causes marked variations in salinity and temperature in a relatively small area.

Eutrophication: A set of physical, chemical, and biological changes brought about when excessive nutrients are released into the water.

Euphotic zone: The zone in the water column where at least 1% of the incident light at the surface penetrates.

Exclusive Economic Zone (EEZ): a zone in which the inner boundary is a line coterminous with the seaward boundary of each of the coastal States and the outer boundary is line 200 miles away and parallel to the inner boundary

Exempt fisheries: Any fishery determined by the Regional Director to have less than 5 percent regulated species as a bycatch (by weight) of total catch according to 50 CFR 648.80(a)(7).

Exploitable biomass: The biomass of fish in the portion of the population that is vulnerable to fishing.

Exploitation pattern: Describes the fishing mortality at age as a proportion of fully recruited F (full vulnerability to the fishery). Ages that are fully vulnerable experience 100% of the fully recruited F and are termed fully recruited. Ages that are only partially vulnerable experience a fraction of the fully recruited F and are termed partially recruited. Ages that are not vulnerable to the fishery (including discards) experience no mortality and are considered pre-recruits. Also known as the partial recruitment pattern, partial recruitment vector or fishery selectivity.

Exploitation rate (u): The fraction of fish in the exploitable population killed during the year by fishing. This is an annual rate compared to F, which is an instantaneous rate. For example, if a population has 1,000,000 fish large enough to be caught and 550,000 are caught (landed and discarded) then the exploitation rate is 55%.

Fathom: A measure of length, containing six feet; the space to which a man can extend his arms; used chiefly in measuring cables, cordage, and the depth of navigable water by soundings.

Fishing mortality (F): A measurement of the rate of removal of fish from a population caused by fishing. This is usually expressed as an instantaneous rate (F) and is the rate at which fish are harvested at any given point in a year. Instantaneous fishing mortality rates can be either fully recruited or biomass weighted. Fishing mortality can also be expressed as an exploitation rate (see exploitation rate) or less commonly, as a conditional rate of fishing mortality (m, fraction of fish removed during the year if no other competing sources of mortality occurred. Lower case m should not be confused with upper case M, the instantaneous rate of natural mortality).

$F_{0.1}$: a conservative fishing mortality rate calculated as the F associated with 10 percent of the slope at origin of the yield-per-recruit curve.

F_{MAX}: a fishing mortality rate that maximizes yield per recruit. F_{MAX} is less conservative than $F_{0.1}$.

F_{MSY}: a fishing mortality rate that would produce MSY when the stock biomass is sufficient for producing MSY on a continuing basis.

$F_{threshold}$: 1) The maximum fishing mortality rate allowed on a stock and used to define overfishing for status determination. Amendment 9 frequently uses F_{MSY} or F_{MSY} proxy for $F_{threshold.}$ 2) The maximum fishing mortality rate allowed for a given biomass as defined by a control rule.

Fishing effort: the amount of time and fishing power used to harvest fish. Fishing power is a function of gear size, boat size and horsepower.

Framework adjustments: adjustments within a range of measures previously specified in a fishery management plan (FMP). A change usually can be made more quickly and easily by a framework adjustment than through an amendment. For plans developed by the New England Council, the procedure requires at least two Council meetings including at least one public hearing and an evaluation of environmental impacts not already analyzed as part of the FMP.

Furrow: A trench in the earth made by a plow; something that resembles the track of a plow, as a marked narrow depression; a groove with raised edges.

Glacial moraine: A sedimentary feature deposited from glacial ice; characteristically composed of unsorted clay, sand, and gravel. Moraines typically are hummocky or ridge-shaped and are located along the sides and at the fronts of glaciers.

Glacial till: Unsorted sediment (clay, sand, and gravel mixtures) deposited from glacial ice.

Grain size: the size of individual sediment particles that form a sediment deposit; particles are separated into size classes (e.g. very fine sand, fine sand, medium sand, among others); the classes are combined into broader categories of mud, sand, and gravel; a sediment deposit can be composed of few to many different grain sizes.

Growth overfishing: Fishing at an exploitation rate or at an age at entry that reduces potential yields from a cohort but does not reduce reproductive output (see recruitment overfishing).

Halocline: The zone of the ocean in which salinity increases rapidly with depth.

Habitat complexity: Describes or measures a habitat in terms of the variability of its characteristics and its functions, which can be biological, geological, or physical in nature. Refers to how complex the physical structure of the habitat is. A bottom habitat with *structure-forming organisms*, along with other three dimensional objects such as boulders, is more complex than a flat, featureless, bottom.

Highly migratory species: tuna species, marlin, oceanic sharks, sailfishes, and swordfish

Hydroids: Generally, animals of the Phylum Cnidaria, Class Hydrozoa; most hydroids are bush-like polyps growing on the bottom and feed on plankton, they reproduce asexually and sexually.

Immobile epifaunal species: See *epifauna*. Animals living on the surface of the bottom substrate that, for the most part, remain in one place.

Individual Fishing Quota (IFQ): federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by an individual person or entity

Juvenile stage: One of several marked phases or periods in the development and growth of many animals. The life history stage of an animal that comes between the *egg* or *larval stage* and the *adult stage*; juveniles are considered immature in the sense that they are not yet capable of reproducing, yet they differ from the larval stage because they look like smaller versions of the adults.

Landings: The portion of the catch that is harvested for personal use or sold.

Land runoff: The part of precipitation, snowmelt, or irrigation water that reaches streams (and thence the sea) by flowing over the ground, or the portion of rain or snow that does not percolate into the ground and is discharged into streams instead.

Larvae stage: One of several marked phases or periods in the development and growth of many animals. The first stage of development after hatching from the *egg* for many fish and invertebrates. This life stage looks fundamentally different than the juvenile and adult stages, and is incapable of reproduction; it must undergo metamorphosis into the juvenile or adult shape or form.

Lethrinids: Fish of the genus *Lethrinus*, commonly called emperors or nor'west snapper, are found mainly in Australia's northern tropical waters. Distinctive features of Lethrinids include thick lips, robust canine teeth at the front of the jaws, molar-like teeth at the side of the jaws and cheeks without scales. Lethrinids are carnivorous bottom-feeding fish with large, strong jaws.

Limited-access permits: permits issued to vessels that met certain qualification criteria by a specified date (the "control date").

Lutjanids: Fish of the genus of the Lutjanidae: snappers. Marine; rarely estuarine. Some species do enter freshwater for feeding. Tropical and subtropical: Atlantic, Indian and Pacific Oceans.

Macrobenthos: See *Benthic community* and *Benthic infauna*. Benthic organisms whose shortest dimension is greater than or equal to 0.5 mm.

Maturity ogive: A mathematical model used to describe the proportion mature at age for the entire population. A_{50} is the age where 50% of the fish are mature.

Mean biomass: The average number of fish within an age group alive during a year multiplied by average weight at age of that age group. The average number of fish during the year is a function of starting stock size and mortality rate occurring during the year. Mean biomass can be aggregated over several ages to describe mean biomass for the stock. For example the mean biomass summed for ages 1 and over is the 1^+ mean biomass; mean biomass summed across ages 3 and over is 3^+ mean biomass.

Megafaunal species: The component of the fauna of a region that comprises the larger animals, sometimes defined as those weighing more than 100 pounds.

Mesh selectivity ogive: A mathematical model used to describe the selectivity of a mesh size (proportion of fish at a specific length retained by mesh) for the entire population. L_{25} is the length where 25% of the fish encountered are retained by the mesh. L_{50} is the length where 50% of the fish encountered are retained by the mesh.

Meter: A measure of length, equal to 39.37 English inches, the standard of linear measure in the metric system of weights and measures. It was intended to be, and is very nearly, the ten millionth part of the distance from the equator to the north pole, as ascertained by actual measurement of an arc of a meridian.

Metric ton: A unit of weight equal to a thousand kilograms (1kgs = 2.2 lbs.). A metric ton is equivalent to 2,205 lbs. A thousand metric tons is equivalent to 2.2 million lbs.

Microalgal: Small microscopic types of algae such as the green algae.

Microbial: Microbial means of or relating to microorganisms.

Minimum spawning stock threshold: the minimum spawning stock size (or biomass) below which there is a significantly lower chance that the stock will produce enough new fish to sustain itself over the long term.

Mobile organisms: organisms that are not confined or attached to one area or place, that can move on their own, are capable of movement, or are moved (often passively) by the action of the physical environment (waves, currents, etc.).

Molluscs: Common term for animals of the phylum Mollusca. Includes groups such as the bivalves (mussels, oysters etc.), cephalopods (squid, octopus etc.) and gastropods (abalone, snails). Over 80,000 species in total with fossils back to the Cambrian period.

Mortality: see Annual total mortality (A), Exploitation rate (u), Fishing mortality (F), Natural mortality (M), and instantaneous total mortality (Z).

Motile: Capable of self-propelled movement. A term that is sometimes used to distinguish between certain types of organisms found in water.

Multispecies: the group of species managed under the Northeast Multispecies Fishery Management Plan. This group includes whiting, red hake and ocean pout plus the regulated species (cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish).

Mutualism: See *Commensalism*. A symbiotic interaction between two species in which both derive some benefit.

Natural disturbance: A change caused by natural processes; e.g. in the case of the seabed, changes can be caused by the removal or deposition of sediment by currents; such natural processes can be common or rare at a particular site.

Natural mortality: A measurement of the rate of death from all causes other than fishing such as predation, disease, starvation, and pollution. Commonly expressed as an instantaneous rate (M). The rate of natural mortality varies from species to species, but is assumed to be M=0.2 for the five critical stocks. The natural mortality rate can also be expressed as a conditional rate (termed n and not additive with competing sources of mortality such as fishing) or as annual expectation of natural death (termed v and additive with other annual expectations of death).

Nearshore area: The area extending outward an indefinite but usually short distance from shore; an area commonly affected by tides and tidal and storm currents, and shoreline processes.

Nematodes: a group of elongated, cylindrical worms belonging to the phylum Nematoidea, also called thread-worms or eel-worms. Some non-marine species attack roots or leaves of plants, others are parasites on animals or insects.

Nemerteans: Proboscis worms belonging to the phylum Nemertea, and are soft unsegmented marine worms that have a threadlike proboscis and the ability to stretch and contract.

Nemipterids: Fishes of the Family Nemipteridae, the threadfin breams or whiptail breams. Distribution: Tropical and sub-tropical Indo-West Pacific.

Northeast Shelf Ecosystem: The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream.

Northwest Atlantic Analysis Area (NAAA): A spatial area developed for analysis purposes only. The boundaries of this the area are within the 500 fathom line to the east, the coastline to the west, the Hague line to the north, and the North Carolina/ South Carolina border to the south. The area is approximately 83,550 square nautical miles, and is used as the denominator in the EFH analysis to determine the percent of sediment, EFH, and biomass contained in an area, as compared to the total NAAA.

Nutrient budgets: An accounting of nutrient inputs to and production by a defined ecosystem (e.g., salt marsh, estuary) versus utilization within and export from the ecosystem.

Observer: any person required or authorized to be carried on a vessel for conservation and management purposes by regulations or permits under this Act

Oligochaetes: See *Polychaetes*. Oligochaetes are worms in the phylum Annelida having bristles borne singly along the length of the body.

Open access: describes a fishery or permit for which there is no qualification criteria to participate. Open-access permits may be issued with restrictions on fishing (for example, the type of gear that may be used or the amount of fish that may be caught).

Opportunistic species: Species that colonize disturbed or polluted sediments. These species are often small, grow rapidly, have short life spans, and produce many offspring.

Optimum Yield (OY): the amount of fish which A) will provide the greatest overall benefit to the nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems; B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery

Organic matter: Material of, relating to, or derived from living organisms.

Overfished: A conditioned defined when stock biomass is below minimum biomass threshold and the probability of successful spawning production is low.

Overfishing: A level or rate of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis.

Peat bank: A bank feature composed of partially carbonized, decomposed vegetable tissue formed by partial decomposition of various plants in water; may occur along shorelines.

Pelagic gear: Mobile or static fishing gear that is not fixed, and is used within the water column, not on the ocean bottom. Some examples are mid-water trawls and pelagic longlines.

Phytoplankton: Microscopic marine plants (mostly algae and diatoms) which are responsible for most of the photosynthetic activity in the oceans.

Piscivore: A species feeding preferably on fish.

Planktivore: An animal that feeds on plankton.

Polychaetes: Polychaetes are segmented worms in the phylum Annelida. Polychaetes (poly-chaetae = many-setae) differ from other annelids in having many setae (small bristles held in tight bundles) on each segment.

Porosity: The amount of free space in a volume of a material; e.g. the space that is filled by water between sediment particles in a cubic centimeter of seabed sediment.

Possession-limit-only permit: an open-access permit (see above) that restricts the amount of multispecies a vessel may retain (currently 500 pounds of "regulated species").

Pre-recruits: Fish in size or age groups that are not vulnerable to the fishery (including discards).

Prey availability: The availability or accessibility of prey (food) to a predator. Important for growth and survival.

Primary production: The synthesis of organic materials from inorganic substances by photosynthesis.

Recovery time: The period of time required for something (e.g. a habitat) to achieve its former state after being disturbed.

Recruitment: the amount of fish added to the fishery each year due to growth and/or migration into the fishing area. For example, the number of fish that grow to become vulnerable to fishing gear in one year would be the recruitment to the fishery. "Recruitment" also refers to new year classes entering the population (prior to recruiting to the fishery).

Recruitment overfishing: fishing at an exploitation rate that reduces the population biomass to a point where recruitment is substantially reduced.

Regulated groundfish species: cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish. These species are usually targeted with large-mesh net gear.

Relative exploitation: an index of exploitation derived by dividing landings by trawl survey biomass. This measure does not provide an absolute magnitude of exploitation but allows for general statements about trends in exploitation.

Retrospective pattern: A pattern of systematic over-estimation or underestimation of terminal year estimates of stock size, biomass or fishing mortality compared to that estimate for that same year when it occurs in pre-terminal years.

Riverine area: The area of a river and its banks.

Saurids: Fish of the family Scomberesocidae, the sauries or needlefishes. Distribution: tropical and temperate waters.

Scavenging species: An animal that consumes dead organic material.

Sea whips: A coral that forms long flexible structures with few or no branches and is common on Atlantic reefs.

Sea pens: An animal related to corals and sea anemones with a featherlike form.

Sediment: Material deposited by water, wind, or glaciers.

Sediment suspension: The process by which sediments are suspended in water as a result of disturbance.

Sedentary: See *Motile* and *Mobile organisms*. Not moving. Organisms that spend the majority of their lives in one place.

Sedimentary bedforms: Wave-like structures of sediment characterized by crests and troughs that are formed on the seabed or land surface by the erosion, transport, and deposition of particles by water and wind currents; e.g. ripples, dunes.

Sedimentary structures: Structures of sediment formed on the seabed or land surface by the erosion, transport, and deposition of particles by water and wind currents; e.g. ripples, dunes, buildups around boulders, among others.

Sediment types: Major combinations of sediment grain sizes that form a sediment deposit, e.g. mud, sand, gravel, sandy gravel, muddy sand, among others.

Spawning adult stage: See *adult stage*. Adults that are currently producing or depositing eggs.

Spawning stock biomass (SSB): the total weight of fish in a stock that sexually mature, i.e., are old enough to reproduce.

Species assemblage: Several species occurring together in a particular location or region

Species composition: A term relating the relative abundance of one species to another using a common measurement; the proportion (percentage) of various species in relation to the total on a given area.

Species diversity: The number of different species in an area and their relative abundance

Species richness: See *Species diversity*. A measurement or expression of the number of species present in an area; the more species present, the higher the degree of species richness.

Species with vulnerable EFH: If a species was determined to be "highly" or "moderately" vulnerable to bottom tending gears (otter trawls, scallop dredges, or clam dredges) then it was included in the list of species with vulnerable EFH. Currently there are 23 species and life stages that are considered to have vulnerable EFH for this analysis.

Status Determination: A determination of stock status relative to $B_{threshold}$ (defines overfished) and $F_{threshold}$ (defines overfishing). A determination of either overfished or overfishing triggers a SFA requirement for rebuilding plan (overfished), ending overfishing (overfishing) or both.

Stock: A grouping of fish usually based on genetic relationship, geographic distribution and movement patterns. A region may have more than one stock of a species (for example, Gulf of Maine cod and Georges Bank cod). A species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

Stock assessment: determining the number (abundance/biomass) and status (life-history characteristics, including age distribution, natural mortality rate, age at maturity, fecundity as a function of age) of individuals in a stock

Stock of concern: a regulated groundfish stock that is overfished, or subject to overfishing.

Structure-forming organisms: Organisms, such as corals, colonial bryozoans, hydroids, sponges, mussel beds, oyster beds, and seagrass that by their presence create a three-dimensional physical structure on the bottom. See *biogenic habitats*.

Submerged aquatic vegetation: Rooted aquatic vegetation, such as seagrasses, that cannot withstand excessive drying and therefore live with their leaves at or below the water surface in shallow areas of estuaries where light can penetrate to the bottom sediments. SAV provides an important habitat for young fish and other aquatic organisms.

Surficial sediment: Sediment forming the sea floor or land surface; thickness of the surficial layer may vary.

Surplus production: Production of new stock biomass defined by recruitment plus somatic growth minus biomass loss due to natural deaths. The rate of surplus production is directly proportional to stock biomass and its relative distance from the maximum stock size at carrying capacity (K). B_{MSY} is often defined as the biomass that maximizes surplus production rate.

Surplus production models: A family of analytical models used to describe stock dynamics based on catch in weight and CPUE time series (fishery dependent or survey) to construct stock biomass history. These models do not require catch at age information. Model outputs may include stock biomass history, biomass weighted fishing mortality rates, MSY, F_{MSY}, B_{MSY}, K, (maximum population biomass where stock growth and natural deaths are balanced) and r (intrinsic rate of increase).

Survival rate (S): Rate of survival expressed as the fraction of a cohort surviving the a period compared to number alive at the beginning of the period (# survivors at the end of the year / numbers alive at the beginning of the year). Pessimists convert survival rates into annual total mortality rate using the relationship A=1-S.

Survival ratio (R/SSB): an index of the survivability from egg to age-of-recruitment. Declining ratios suggest that the survival rate from egg to age-of-recruitment is declining.

TAC: Total allowable catch. This value is calculated by applying a target fishing mortality rate to exploitable biomass.

Taxa: The plural of taxon. Taxon is a named group or organisms of any rank, such as a particular species, family, or class.

Ten-minute- "squares" of latitude and longitude (TMS): Are a measure of geographic space. The actual size of a ten-minute-square varies depending on where it is on the surface of the earth, but in general each square is approximately 70-80 square nautical miles in this region. This is the spatial area that EFH designations, biomass data, and some of the effort data have been binned into for analysis purposes in various sections of this document.

Topography: The depiction of the shape and elevation of land and sea floor surfaces.

Total Allowable Catch (TAC): The amount (in metric tons) of a stock that is permitted to be caught during a fishing year. In the Multispecies FMP, TACs can either be "hard" (fishing ceases when the TAC is caught) or a "target" (the TAC is merely used as an indicator to monitor effectiveness of management measures, but does not trigger a closure of the fishery).

Total mortality: The rate of mortality from all sources (fishing, natural, pollution) Total mortality can be expressed as an instantaneous rate (called Z and equal to F + M) or Annual rate (called A and calculated as the ratio of total deaths in a year divided by number alive at the beginning of the year)

Trophic guild: Trophic is defined as the feeding level within a system that an organism occupies; e.g., predator, herbivore. A guild is defined as a group of species that exploit the same class of environmental resources in a similar way. The trophic guild is a utilitarian concept covering both structure and organization that exists between the structural categories of trophic groups and species.

Turbidity: Relative water clarity; a measurement of the extent to which light passing through water is reduced due to suspended materials.

Two-bin (displacement) model: a model used to estimate the effects of area closures. This model assumes that effort from the closed areas (first bin) is displaced to the open areas (second bin). The total effort in the system is then applied to the landings-per-unit-effort (LPUE) in open areas to obtain a projected catch. The percent reduction in catch is calculated as a net result.

Vulnerability: In order to evaluate the potential adverse effects of fishing on EFH, the vulnerability of each species EFH was determined. This analysis defines vulnerability as the likelihood that the functional value of EFH would be adversely affected as a result of fishing with different gear types. A number of criteria were considered in the evaluation of the vulnerability of EFH for each life stage including factors like the function of habitat for shelter, food and/or reproduction.

Yield-per-recruit (YPR): the expected yield (weight) of individual fish calculated for a given fishing mortality rate and exploitation pattern and incorporating the growth characteristics and natural mortality.

Yearclass: also called cohort. Fish that were spawned in the same year. By convention, the "birth date" is set to January 1st and a fish must experience a summer before turning 1. For example, winter flounder that were spawned in February-April 1997 are all part of the 1997 cohort (or year-class). They would be considered age 0 in 1997, age 1 in 1998, etc. A summer flounder spawned in October 1997 would have its birth date set to the following January 1 and would be considered age 0 in 1998, age 1 in 1999, etc.

Z: instantaneous rate of total mortality. The components of Z are additive (i.e., Z = F+M)

Zooplankton: See *Phytoplankton*. Small, often microscopic animals that drift in currents. They feed on detritus, phytoplankton, and other zooplankton. They are preyed upon by fish, shellfish, whales, and other zooplankton.

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