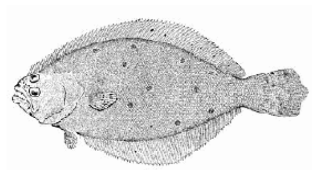
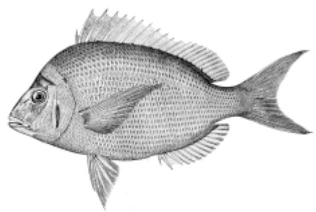
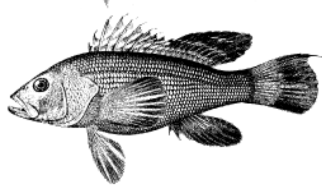
AMENDMENT 14 TO THE
SUMMER FLOUNDER, SCUP, AND BLACK SEA BASS
FISHERY MANAGEMENT PLAN

(Includes Environmental Assessment, Preliminary Regulatory Economic Evaluation, and Essential Fish Habitat Assessment)







February 2007

Mid-Atlantic Fishery Management Council
in cooperation with
the National Marine Fisheries Service

Draft adopted by MAFMC: 10 October 2006
Final adopted by MAFMC: 14 February 2007
Final approved by NOAA:

A Publication of the Mid-Atlantic Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award No. NA57FC0002

1.0 EXECUTIVE SUMMARY

This amendment document and environmental assessment (EA) present and evaluate management alternatives and measures to achieve specific goals and objectives for the scup fishery (section 4.0). This document was prepared by the Mid-Atlantic Fishery Management Council in consultation with the National Marine Fisheries Service (NMFS). This amendment is being developed in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, M-S Act) and the National Environmental Policy Act (NEPA), the former being the primary domestic legislation governing fisheries management in the U.S. Exclusive Economic Zone (EEZ). In 1996, Congress passed the Sustainable Fisheries Act (SFA), which amended and reauthorized the MSFCMA and included a new emphasis on precautionary fisheries management. New provisions mandated by the SFA require managers to end overfishing and rebuild overfished fisheries within specified time frames, minimize bycatch and bycatch mortality to the extent practicable, and identify and protect essential fish habitat (EFH).

Although this Fishery Management Plan (FMP) amendment has been prepared primarily in response to the requirements of the MSFCMA and NEPA, it also addresses the requirements of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). When preparing a FMP or FMP amendment, the Council also must comply with the requirements of the Regulatory Flexibility Act (RFA), the Administrative Procedure Act (APA), the Paperwork Reduction Act (PRA), the Coastal Zone Management Act (CZMA), the Information Quality Act (IQA), and Executive Orders 13132 (Federalism), 12898 (Environmental Justice), 12866 (Regulatory Planning), and 13158 (Marine Protected Areas). These other applicable laws and executive orders help ensure that in developing an FMP/amendment, the Council considers the full range of alternatives and their expected impacts on the marine environment, living marine resources, and the affected human communities. This integrated document contains all required elements of the FMP amendment as required by NEPA and information to ensure consistency with other applicable laws and executive orders.

The proposed actions in this amendment would: 1) implement a rebuilding plan to rebuild the scup stock to the stock level associated with maximum sustainable yield (B_{msy}) and 2) make the scup Gear Restricted Areas (GRAs) currently addressed and modified through the annual specification setting process modifiable though frameworks to the FMP. Table ES-1 provides a brief summary of all of the alternatives discussed in this amendment. These include a range of fishing mortalities (F), harvest amounts, and rebuilding times related to rebuilding strategies as well as administrative approaches to implementing the GRAs. Those alternatives considered but rejected from further analysis are also exhibited in the table.

Table ES-1. Brief description of the alternatives included in this amendment. "Status" refers to whether an alternative is proposed or has been considered but rejected from further analysis in this EA. Detailed descriptions of each alternative are provided in section 5.0.

Issue	**Strategy**	**Alternative**	**Status of Alternative**	**Description** (section 5.0)	**Impacts Discussion**
Rebuilding Program	*Maintain Constant Fishing Mortality (F) over Rebuilding Period*	1A	Proposed (No action)	F=0.26	section 7.1
		1B	Proposed	F=0.136; 10-years	section 7.1
		1C (Preferred)	Proposed	F=0.10; 7-years	section 7.1
		1D	Proposed	F=0.067; 5-years	section 7.1
		1E	Considered but Rejected[a]	F=0; 4-years	section 5.1.E and Appendix A
	Maintain Constant Harvest over Rebuilding Period	1F	Considered but Rejected[a]	10-years of constant harvest (17.170 million lb)	section 5.1.F and Appendix A
		1G	Proposed	7-years of constant harvest (12.842 million lb)	section 7.1
		1H	Proposed	5-years of constant harvest (8.741 million lb)	section 7.1
Gear Restricted Areas (GRAs)	*Administrative*	2A	Proposed (No action)	Address GRAs in specifications	section 7.2
		2B (Preferred)	Proposed	Address GRAs through framework to FMP	section 7.2
		2C	Considered but Rejected[b]	Discontinue GRAs	section 5.2.C

[a] Considered but rejected from further analysis. Basic consideration was given to the impacts of the alternative; however, it was not considered a reasonable solution to the issue.

[b] Considered but rejected from further analysis. Because this alternative is inconsistent with National Standard 9, it was not given further consideration in the document beyond justification for rejection in section 5.2.C.

This document was presented to the Council at its October 2006 meeting, at which time the Council voted to take this to the public without selecting preferred alternatives. Following the Council's recommendations, a public comment period was initiated during which several meetings were held to allow for open review of the proposed management actions by fishery participants and concerned members of the public. The Council was presented with the public's comments at its February 2007 Council meeting. At that meeting, the Council identified Alternatives 1C and 2B as their preferred management actions. However, they recommended additional conditions to be applied to Alternative 1C upon implementation due to the uncertainty surrounding the assessment of the scup stock. This uncertainty stems from the inability to estimate the absolute magnitude of F and absolute biomass for the scup stock in any given year, difficulties in quantifying the magnitude of scup discards in the scup fishery and in other fisheries, and the limitations of the projections of relative biomass that were performed to evaluate how different rates of exploitation under the various proposed alternatives effect long-term population trends for scup.

The Council recommended a periodic review be conducted by the Council's scientific advisors to determine if the stock can be rebuilt within the 7-year rebuilding time period at the fishing mortality rates estimated from the projections of relative scup biomass proposed in Alternative 1C. If the stock cannot be rebuilt within 7 years under that fishing mortality rate, then the Council will recommend measures to rebuild the stock as soon as possible after the seven years but not to exceed 10 years. In addition, the biological reference points (stock status determination criteria) will be reviewed after the RV Bigelow has completed two full years of service. If a stock assessment is completed before the end of the 7-year rebuilding time period that results in a change to the biological reference points, the Council may reconsider the rebuilding targets. The Council recommendations are presented to NMFS in this document for implementation via rulemaking under the authority of the Secretary of Commerce.

For the purposes of the analysis of impacts presented in this document (summary of impacts provided below), a rebuilding start date of 2007 was used as that was the data and information available when document development began. However, implementation of this amendment is expected to occur on January 1, 2008. A January 1, 2008 rebuilding start date would be consistent with the guidance provided under National Standard 1 that states rebuilding programs for overfished stocks begin when the regulations adopting those programs are implemented (50 CFR 600.310(e)(4)(ii)(C)).

Impact Analysis

Analysis of all management alternatives and independent management measures under consideration is provided in this document in relation to a series of valued ecosystem components, or VECs. VECs represent the resources that may be affected by a proposed action, including non-preferred alternatives, and by other actions that have occurred or will occur outside the proposed action. An analysis of impacts is performed on each VEC to assess the direct/indirect effects of an alternative and whether these effects add to or subtract from effects of the past, present and future actions on that VEC from outside the proposed action (i.e., cumulative effects). The VECs identified for Amendment 14 include: the managed resource (scup), non-target species, habitat (including EFH), protected resources, and human communities.

The Alternatives under consideration can be found in section 5.0 of this document. The Affected Environment section (6.0) is designed to enhance the readers' understanding of the historical, current, and near-future conditions (baselines and trends) in order to better evaluate the anticipated environmental impacts of the management actions under consideration in this amendment. This section is followed by the Analysis of Impacts section (7.0), which is structurally similar to section 6.0, and addresses the direct, indirect, and cumulative impacts of the alternative management actions.

Table ES-2, provided at the end of this Executive Summary, lists all of the scup rebuilding management alternatives under consideration (Alternatives 1A, 1B, 1C, 1D, 1G, and 1H) and briefly summarizes the anticipated impacts of each of the management alternatives on the VECs. Table ES-3, provided at the end of this Executive Summary, lists all of the GRA management alternatives under consideration (Alternatives 2A and 2B) and briefly summarizes the anticipated impacts of each of the management alternatives on the VECs.

Managed Resource Impacts

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are expected to result in positive biological impacts on the scup stock. Only one alternative, the no action alternative (alternative 1A), would not result in stock rebuilding to the B_{MSY} level within 10 years or less. Alternative 1A would, however, result in some positive impact on the scup stock as the projected Northeast Fisheries Science Center (NEFSC) Spring Spawning Stock Biomass (SSB) 3-year index value of 2.96 kg/tow (2015-2017) would be larger than the current index value of 1.32 kg/tow (2004-2006); therefore, the biological impacts could be neutral to positive.

Relative to the no action alternative (2A) presented in this document, GRA alternative 2B, which would make the GRAs modifiable through frameworks to the FMP, is not expected to result in positive or negative biological impacts to the scup stock. This action is purely administrative; therefore, it is not expected to result in biological impacts on the scup stock.

Non-target Species Impacts

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are not expected to result in changes in the discarding rates of scup when targeted, discarding rates when fishing for non-target species, or increased discarding of non-target species.

Relative to the no action alternative (2A) presented in this document, GRA alternative 2B, which would make the GRAs modifiable through frameworks to the FMP, is not expected to result in positive or negative biological impacts on non-target species. This action is purely administrative; therefore, it is not expected to result in changes in the discarding rates of scup when targeted, discarding rates when fishing for non-target species, or increased discarding of non-target species.

Habitat Impacts

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are not expected to result in positive or negative impacts to habitat.

Relative to the no action alternative (2A) presented in this document, GRA alternative 2B, which would make the GRAs modifiable through frameworks to the FMP, is not expected to result in positive or negative impacts to habitat, including EFH. This action is purely administrative; therefore, it is not expected to result in impacts on habitat.

Protected Resources Impacts

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are not expected to result in positive or negative impacts to endangered or protected resources.

Relative to the no action alternative (2A) presented in this document, GRA alternative 2B, which would make the GRAs modifiable through frameworks to the FMP, is not expected to result in positive or negative impacts to protected resources. This action is purely administrative; therefore, it is not expected to result in impacts on protected resources.

Human Communities Impacts

The methods and analysis used to evaluate the impacts on human communities are described in section 7.1.5. Below is a brief summary of that analysis, although the methods and limitations associated with this analysis (described in 7.1.5) should be considered.

Gross commercial revenues for alternatives 1A and 1B are predicted to increase each successive year under rebuilding. Gross revenues for 1C and 1D also increase each year while rebuilding is occurring, but then they level out after the stock is considered to be rebuilt. Gross revenues for the last two alternatives (1G and 1H) remain constant during rebuilding, and then they rise to another constant level after rebuilding is complete. All of the discounted annual gross revenue estimates for alternatives 1B, 1C, 1D, 1G, and 1H are estimated to be lower than those predicted for the no action alternative (1A) during rebuilding, but exceed the no action alternative's estimates after rebuilding is complete or by the last year of rebuilding in 2016. The no action alternative (1A) results in the greatest cumulative discounted revenue stream by 2016; however, this alternative is not projected to rebuild the stock during the 10 year time period. Alternative 1D is projected to result in the next greatest cumulative discounted revenue stream (in 2004 constant dollars), followed in descending order by 1C, 1B, 1H, and alternative 1G, which results in the lowest cumulative discounted total.

Potential increases in recreational landings, relative to 2006 levels, could be observed in 2007 under the recreational harvest limits projected for alternatives 1A, 1B, 1C and 1G. The 2007 recreational harvest limits for alternatives 1D and 1H are projected to result in a potential decrease when compared to 2006 levels.

Alternative 1A (no action) is not projected to rebuild the stock over the maximum 10 year rebuilding period. While this alternative does result in positive short-term benefits, the lack of rebuilding could result in long-term negative economic impacts. Although alternatives 1C, 1D, 1G, and 1H will likely have negative short-term economic impacts on some scup harvesting businesses, they are expected to result in long-term positive impacts to the industry as a whole once the scup stock rebuilds.

Relative to the no action alternative (2A) presented in this document, GRA alternative 2B, which would make the GRAs modifiable through frameworks to the FMP, is not expected to result in positive or negative social and economic impacts. This action is purely administrative; therefore, it is not expected to result in social or economic impacts.

Table ES-2. Overall qualitative summary of expected impacts from various scup rebuilding alternatives considered in this document. A minus sign signifies an expected negative impact, a plus sign signifies a positive impact, a zero is used for null impact, and (?) indicates uncertainty associated with a given impact (S=short-term, L=long-term).

		Environmental Dimensions					
Strategy	**Alternative**	**Managed Resource**	**Non-target Species**	**EFH**	**Protected Resources**	**Economic**	**Social**
Constant Fishing Mortality	**Alternative 1A** F=0.26 (no action)	+/0	0	0	0	+S/-L	+S/-L
	Alternative 1B F=0.136 (10-years) (non-preferred)	+	0	0	0	+S/+L	+S/+L
	Alternative 1C F=0.10 (7-years) (preferred)	+	0	0	0	-S/+L	-S/+L
	Alternative 1D F=0.067 (5-years) (non-preferred)	+	0	0	0	-S/+L	-S/+L
Constant Harvest	**Alternative 1G** 12.842 mil lbs (<7-years) (non-preferred)	+	0	0	0	-S/+L	-S/+L
	Alternative 1H 8.741 mil lbs (<5-years) (non-preferred)	+	0	0	0	-S/+L	-S/+L

Table ES-3. Overall qualitative summary of expected impacts from GRA alternatives considered in this document. A minus sign signifies an expected negative impact, a plus sign signifies a positive impact, a zero is used for null impact, and (?) indicates uncertainty associated with a given impact (S=short-term, L=long-term).

		Environmental Dimensions					
Issue	**Alternative**	**Managed Resource**	**Non-target Species**	**EFH**	**Protected Resources**	**Economic**	**Social**
GRAs	**Alternative 2A** *Address through Specifications* (no action)	0	0	0	0	0	0
	Alternative 2B *Address through FMP* (preferred)	0	0	0	0	0	0

2.0 LIST OF ACRONYMS

ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
APA	Administrative Procedures Act
ASMFC	Atlantic States Marine Fisheries Commission or Commission
B	Biomass
CEQ	Council on Environmental Quality
CPUE	Catch Per Unit Effort
CZMA	Coastal Zone Management Act
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act of 1973
F	Fishing Mortality Rate
FR	Federal Register
FMP	Fishery Management Plan
GRA	Gear Restricted Area
HPTRP	Harbor Porpoise Take Reduction Plan
IQA	Information Quality Act
IRFA	Initial Regulatory Flexibility Analysis
LTPC	Long-term Potential Catch
LWTRP	Large Whale Take Reduction Plan
M	Natural Mortality Rate
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistical Survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
mt	metric tons
NAO	National Oceanic and Atmospheric Administration Administrative Order
NE	New England
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OLS	Ordinary Least Squares
OY	Optimal Yield
PBR	Potential Biological Removal
PRA	Paperwork Reduction Act
PREE	Preliminary Regulatory Economic Evaluation
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
RSA	Research Set-Aside
SAFMC	South Atlantic Fishery Management Council
SARC	Stock Assessment Review Committee
SAS	Statistical Analysis System (Software)
SAV	Submerged Aquatic Vegetation
SAW	Stock Assessment Workshop
SFA	Sustainable Fisheries Act
SMA	Small Business Administration
SSB	Spawning Stock Biomass

TAL	Total Allowable Landings
TL	Total Length
VECs	Valued Ecosystem Components
VMS	Vessel Monitoring System
VPA	Virtual Population Analysis
VTR	Vessel Trip Report

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ENVIRONMENTAL ASSESSMENT

4.0 INTRODUCTION AND BACKGROUND

The scup fishery is managed by the Mid-Atlantic Fishery Management Council's Summer Flounder, Scup, and Black Sea Bass FMP (FMP). The scup management program was developed and integrated into the FMP through Amendment 8, which was approved by the Secretary of Commerce in July 1996. Amendment 12 to the FMP was developed to bring the FMP into compliance with the provisions of the Sustainable Fisheries Act (SFA). The SFA reauthorized and amended the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and made a number of changes to the existing National Standards. To comply with National Standard 1, the SFA requires that each Council FMP define overfishing as a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce maximum sustainable yield (MSY) on a continuing basis. In addition, each FMP must specify objective and measurable status determination criteria for identifying when stocks or stock complexes covered by the FMP are overfished.

In 1998, an Overfishing Definition Review Panel, formed by the New England Fishery Management Council to evaluate existing overfishing definitions for species managed by both the New England and Mid-Atlantic Fishery Management Councils, developed recommendations for new definitions to meet the requirements of the Sustainable Fisheries Act. Using the most recent assessment (1997), the scup stock was considered overfished and overfishing was occurring. In Amendment 12 to the FMP, the Council indicated that the scup stock could be rebuilt within 10 years if the target fishing mortality rates were achieved each year. As such, the Council did not propose any changes to the fishing mortality rate reduction schedule established in Amendment 8 to the FMP.

NMFS partially approved Amendment 12 to the FMP (for the summer flounder and black sea bass fisheries) on April 28, 1999. NMFS disapproved the Council's finding that the management measures in place to rebuild the scup fishery, i.e., those established in Amendment 8, were adequate under new SFA guidelines. The proposed fishing mortality reference point was not determined to be in accordance with advice resulting from the 27th Stock Assessment Workshop (SAW-27). The Northeast Fisheries Science Center (NEFSC) reaffirmed the Stock Assessment Review Committee (SARC) recommendation that $F_{0.1}$ should be used as a proxy for F_{MSY}, noting that greater caution was necessary in setting an F threshold for scup than would be provided under the proposed reference point. The combination of the less conservative choice of F by the Council and the risk-prone rebuilding program was determined to be inconsistent with the SFA guidelines and therefore, was disapproved. In addition, NMFS also disapproved the scup bycatch provision recommended in that amendment due to it being inconsistent with National Standard 9.

In subsequent years, the scup stock exhibited signs of recovery. In 2001, the NEFSC Spring 3-year average (2000-2002) survey index value indicated that scup spawning stock biomass (SSB) was above the minimum biomass threshold of 2.77 kg/tow. The scup stock was no longer considered overfished (NMFS 2002), although SARC 32 indicated that "stock status with respect to overfishing cannot currently be evaluated." In 2005, the NEFSC Spring SSB 3-year index value decreased to 0.69 kg/tow, indicating that the stock was below the minimum biomass threshold value of 2.77 kg/tow. Thus, relative to the stock status determination criteria, the scup stock is considered overfished. In August 2005, NMFS notified the Council that the scup stock has officially been designated as overfished.

4.1 Purpose and Need for Action

The purpose of this amendment is to develop a rebuilding plan for the scup stock, thereby preventing overfishing and rebuilding the scup stock to the level associated with maximum sustainable yield (B_{msy}). In addition, the scup Gear Restricted Areas (GRAs) currently addressed and modified through the annual specification setting process would be made modifiable through frameworks to the FMP. This action is needed to improve the timing of implementation of modifications to the GRAs and allow those actions to be expedited through framework documents as opposed to specifications, which are published prior to or at the beginning of the fishery year. The GRAs reduce the bycatch of scup in small mesh fisheries and, therefore, would be consistent with National Standard 9.

4.2 History of FMP Development

As described above in section 4.0, the management program for scup was developed and integrated into the FMP through Amendment 8. The Environmental Impact Statement (EIS) prepared for Amendment 8 considered the impacts of the overall management measures for scup on the human environment (biological, habitat (EFH), socioeconomic, and protected resources). The EIS for the FMP was most recently updated in Amendment 13 (approved on March 4, 2003; 68 FR 10181; MAFMC 2002). As previously discussed, the scup rebuilding and bycatch reduction portions of Amendment 12 were disapproved. Amendments and framework actions (frameworks) to the FMP are summarized in Box 4.1, where “Plan Species” indicates which plan species were affected by the given action.

Box. 4.1 Summary of the history of the Summer Flounder, Scup, and Black Sea Bass FMP.

Year	Document	Plan Species	Management Action
1988	Original FMP	summer flounder	- Established management plan for summer flounder
1991	Amendment 1	summer flounder	- Established an overfishing definition for summer flounder
1993	Amendment 2	summer flounder	- Established rebuilding schedule, commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements for summer flounder - Created the Summer Flounder Monitoring Committee
1993	Amendment 3	summer flounder	- Revised the exempted fishery line - Increased the large mesh net threshold - Established otter trawl retention requirements for large mesh use
1993	Amendment 4	summer flounder	- Revised state-specific shares for summer flounder quota allocation
1993	Amendment 5	summer flounder	- Allowed states to combine or transfer summer flounder quota
1994	Amendment 6	summer flounder	- Set criteria for allowance of multiple nets on board commercial vessels for summer flounder - Established deadline for publishing catch limits, commercial mgmt. measures for summer flounder

Box. 4.1 Cont. Summary of the history of the Summer Flounder, Scup, and Black Sea Bass FMP.			
Year	**Document**	**Plan Species**	**Management Action**
1995	Amendment 7	summer flounder	- Revised the F reduction schedule for summer flounder
1996	Amendment 8	summer flounder and scup	- Incorporated Scup FMP into Summer Flounder FMP and established scup measures including commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements
1996	Amendment 9	summer flounder and black sea bass	- Incorporated Black Sea Bass FMP into Summer Flounder FMP and established black sea bass measures including commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements
1997	Amendment 10	summer flounder, scup, and black sea bass	- Modified commercial minimum mesh requirements, continued commercial vessel moratorium, prohibited transfer of fish at sea, and established special permit for party/charter sector for summer flounder
1998	Amendment 11	summer flounder, scup, and black sea bass	- Modified certain provisions related to vessel replacement and upgrading, permit history transfer, splitting, and permit renewal regulations
1999	Amendment 12	summer flounder, scup, and black sea bass	- Revised FMP to comply with the SFA and established framework adjustment process
2001	Framework 1	summer flounder, scup, and black sea bass	-Established quota set-aside for research for all three species
2001	Framework 2	summer flounder	- Established state-specific conservation equivalency measures for summer flounder
2003	Framework 3	scup	- Allowed the rollover of winter scup quota - Revised start date for summer quota period for scup fishery
2003	Framework 4	scup	- Established system to transfer scup at sea
2003	Amendment 13	summer flounder, scup, and black sea bass	- Addressed the disapproved sections of Amendment 12 - Revised black sea bass commercial quota system - Addressed other black sea bass mgmt. measures
2004	Framework 5	summer flounder, scup, and black sea bass	- Established multi-year specification setting of quota for all three species
2006	Framework 6	summer flounder	- Established region-specific conservation equivalency measures for summer flounder

4.3 Management Objectives

The objectives of the FMP are to:

1) reduce fishing mortality in the summer flounder, scup, and black sea bass fisheries to ensure that overfishing does not occur;
2) reduce fishing mortality on immature summer flounder, scup, and black sea bass to increase spawning stock biomass;
3) improve the yield from the fishery;
4) promote compatible management regulations between state and Federal jurisdictions;
5) promote uniform and effective enforcement of regulations; and
6) minimize regulations to achieve the management objectives stated above.

4.4 Management Unit

The management unit is all scup (*Stenotomus chrysops*) in U.S. waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the U.S.-Canadian border.

5.0 MANAGEMENT ALTERNATIVES

5.1 Scup Rebuilding Plan Alternatives

The Council identified Alternative 1C as their preferred scup rebuilding plan alternative. However, they recommended additional conditions to be applied to Alternative 1C upon implementation due to the uncertainty surrounding the assessment of the scup stock. This uncertainty stems from the inability to estimate the absolute magnitude of F and absolute biomass for the scup stock in any given year, difficulties in quantifying the magnitude of scup discards in the scup fishery and in other fisheries, and the limitations of the projections of relative biomass that were performed to evaluate how different rates of exploitation under the various proposed alternatives effect long-term population trends for scup.

The Council recommended a periodic review be conducted by the Council's scientific advisors to determine if the stock can be rebuilt within the 7-year rebuilding time period at the fishing mortality rates estimated from the projections of relative scup biomass proposed in Alternative 1C. If the stock cannot be rebuilt within 7 years under that fishing mortality rate, then the Council will recommend measures to rebuild the stock as soon as possible after the seven years but not to exceed 10 years. In addition, the biological reference points (stock status determination criteria) will be reviewed after the RV Bigelow has completed two full years of service. If a stock assessment is completed before the end of the 7-year rebuilding time period that results in a change to the biological reference points, the Council may reconsider the rebuilding targets. The Council recommendations are presented to NMFS in this document for implementation via rulemaking under the authority of the Secretary of Commerce.

Specific estimates of biomass, landings, fishing mortality rates, and total allowable landings levels described in the various rebuilding options below are based on current stock assessment information and other critical assumptions. As such, these values may change with the input of updated information.

Stock Rebuilding Target

The biomass rebuilding target for the scup stock under each of the following alternatives would be the biomass at maximum sustainable yield (B_{MSY}). A proxy for this would be calculated using data from the NEFSC Spring survey (Figure 1). The current minimum biomass threshold is the NEFSC Spring SSB 3-year index value (1977-1979) of 2.77 kg/tow. Assuming the minimum biomass threshold is a proxy for ½ $B_{MSY,}$ doubling that index value would be a proxy for B_{MSY}. Specifically, NEFSC Spring 3-year index value of 5.54 kg/tow would be a proxy for B_{MSY}.

The minimum biomass threshold was incorporated into the FMP through Amendment 12. The 27th SAW report (NEFSC 1998) stated, "The SARC noted that estimates of B_{MSY} using scup landings and survey time series may be too low, given the very high commercial catch removed from the stock prior to the initiation of the NEFSC spring and autumn surveys (e.g., 1950s and early 1960s). However, the SARC defined a minimum threshold biomass index for stock rebuilding as the maximum value of a three-year moving average of the NEFSC spring survey catch per tow of spawning stock biomass (1977-1979=2.77 SSB kg/tow)."

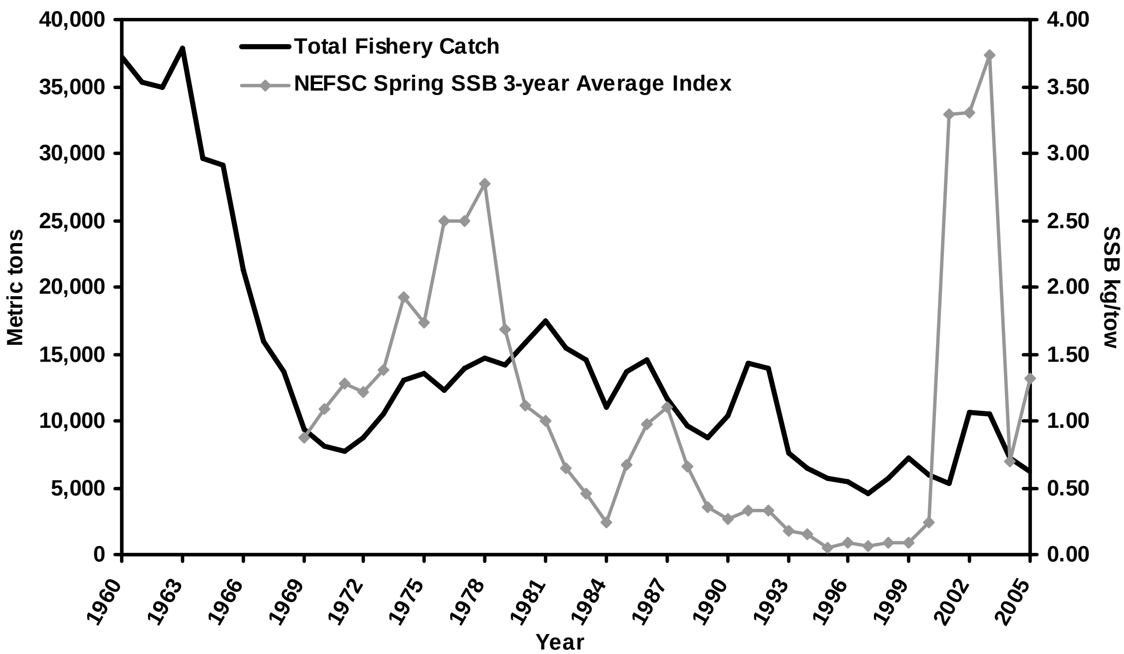


Figure 1. Scup total fishery catch and the NEFSC Spring SSB 3-year index value

Stock Rebuilding Timeline

The guidelines to National Standard 1 state that rebuilding programs for overfished stocks begin when the regulations adopting those programs are implemented (50 CFR 600.310(e)(4)(ii)(C)). In 1999, NMFS disapproved the finding presented by the Council in Amendment 12 to the FMP that the current management measures in place to rebuild the scup fishery were adequate under the Sustainable Fisheries Act (SFA) guidelines. For the purposes of the analysis of impacts presented in this document, a start date of 2007 was used as that was the data and information available when document development began. However, implementation of this amendment is expected to occur on January 1, 2008. A January 1, 2008 rebuilding start date would be consistent with the guidance provided under National Standard 1.

Stock Rebuilding Projections

Stock projections were conducted to evaluate each of the proposed rebuilding alternatives using an approach similar to that applied at the Stock Assessment Workshop 35 (SAW 35) in June 2002. At SAW 35, these projections were conducted to assess projected stock status against rebuilding schedules using the NEFSC spring survey catch per tow at age estimates (NEFSC 2002). Using this long-term projection approach, projections of relative biomass were performed to evaluate how different rates of exploitation effect long-term population trends for scup. This type of projection approach needs to be applied because of the inability to estimate the absolute magnitude of F for the scup stock in any given year. The projections were based on the average 2004-2006 NEFSC spring survey catch per tow at age estimates; offshore strata only. The survey catch per tow at age values were projected into the next respective age at each time step, with an assumed M=0.20 and a median recruitment estimate. Yearly recruitment at age-1 was assumed equal to the long-term median catch per tow at age-1 from the NEFSC spring survey offshore strata (1977-2006; median = 5.40). The projections were conducted using different intrinsic rates of fishing mortality (user-defined), with the same rate being applied to each year of the projection. Relative biomass was estimated by multiplying catch per tow at age by a maturity-at-age vector and a weight-at-age vector, which was calculated using data from 2004-2006. Maturity at age was 1% at age 1, 55% at age 2, 99% at age 3, and 100% at ages 4 and older. Projections of relative biomass trends were dependent on the assumed fishing mortality rate. Potential fluctuations in recruitment (inter-annual variability), changes in catchability, and environmental variation should also be considered when interpreting these stock projections.

Harvest levels (total allowable landings – TALs) estimated based on the projected NEFSC Spring SSB 3-year index values were calculated using the relative exploitation rate assuming that F was at least 1.0 in 1999 (an exploitation rate of 58%). The 31st SARC concluded that the F on age 0-3 scup was at least 1.0 in 1999, and the 35th SARC determined that “absolute estimates of fishing mortality for scup could not be calculated.” Obviously, lower survey values would have lower associated TALs. This is the current approach used to calculate the annual TAC/TAL for the scup fishery. It is important to note that these calculations are sensitive to the assumption that F was 1.0 in 1999.

5.1.A Alternative 1A (No Action – Constant F=0.26)

Under this alternative, a biomass rebuilding plan will not be specified for the scup stock. If this alternative is selected, the rebuilding plan and timeline for the scup stock would remain undefined and F would be maintained at the current F-target of 0.26.

An F=0.26 could be applied every year from 2007 (Year-1) onward. This would not result in the stock being rebuilt by the end of the maximum ten-year rebuilding time period in Year-10 to a 2016 NEFSC Spring SSB 3-year index (2015-2017) value of 5.54 kg/tow (rebuilding target proxy for B_{MSY}; Figure 2). Instead, the stock would be rebuilt to a NEFSC Spring SSB 3-year index (2015-2017) value of 2.96 kg/tow, which is less than the rebuilding target proxy for B_{MSY}.

5.1.B Alternative 1B (10-year Rebuilding Plan (2007-2016) – Constant F=0.136)

Under this alternative, a constant fishing mortality rate (F) that is approximately one half the current F target would be applied every year such that the stock is rebuilt at the end of the ten-year rebuilding period. The Spring SSB 3-year (2004-2006) index for 2005 is 1.32 kg/tow. Scup rebuilding projections are used to predict which constant F would achieve the rebuilding target by 2016 (section 5.1).

An F=0.136 could be applied every year from 2007 (Year-1) onward and would result in the stock being rebuilt by the end of the ten-year rebuilding time period in Year-10 to a 2016 NEFSC Spring SSB 3-year index (2015-2017) value of 5.54 kg/tow (Figure 2). This is equal to the rebuilding target proxy for B_{MSY} (5.54 kg/tow).

5.1.C Alternative 1C (Preferred: 7-year Rebuilding Plan (2007-2013) – Constant F=0.10)

Under this alternative, a constant fishing mortality rate (F) would be applied every year such that the stock is rebuilt at the end of the seven-year rebuilding period. The Spring SSB 3-year (2004-2006) index for 2005 is 1.32 kg/tow. Scup rebuilding projections are used to predict which constant F would achieve the rebuilding target by 2013 (section 5.1).

An F=0.10 could be applied every year from 2007 (Year-1) onward and would result in the stock being rebuilt by the end of the seven-year rebuilding time period in Year-7 to a 2013 NEFSC Spring SSB 3-year index (2012-2014) value of 5.96 kg/tow (Figure 2). This is greater than the rebuilding target proxy for B_{MSY} (5.54 kg/tow).

The Council recommended additional conditions to be applied to this Council preferred alternative. Those conditions are described in detail above in Section 5.1, and stem from uncertainty surrounding the assessment of the scup stock.

5.1.D Alternative 1D (5-year Rebuilding Plan (2007-2011) – Constant F=0.067)

Under this alternative, a constant fishing mortality rate (F) that is approximately one quarter the current F target would be applied every year such that the stock is rebuilt at the end of the five-year rebuilding period. The Spring SSB 3-year (2004-2006) index for 2005 is 1.32 kg/tow. Scup rebuilding projections are used to predict which constant F would achieve the rebuilding target by 2011 (section 5.1).

An F=0.067 could be applied every year from 2007 (Year-1) onward and would result in the stock being rebuilt by the end of the five-year rebuilding time period in Year-5 to a 2011 NEFSC Spring SSB 3-year index (2010-2012) value of 5.55 kg/tow (Figure 2). This is slightly above the rebuilding target proxy for B_{MSY} (5.54 kg/tow).

5.1.E Considered but Rejected from Further Analysis Alternative 1E (Rebuilding Plan (2007-2010) – Constant F=0)

Under this alternative, the fishing mortality rate (F) would be reduced to F=0 and applied every year such that the stock is rebuilt. The Spring SSB 3-year (2004-2006) index for 2005 is 1.32 kg/tow. Scup rebuilding projections are used to predict how many years of zero F would be necessary to achieve the rebuilding target (section 5.1).

An F=0 could be applied every year from 2007 (Year-1) onward and would result in the stock being rebuilt by the end of the five-year rebuilding time period in Year-4 to a 2010 NEFSC Spring SSB 3-year index (2009-2011) value of 6.07 kg/tow (Figure 2). This is above the rebuilding target proxy for B_{MSY} (5.54 kg/tow).

An F=0 on the scup stock could only be achieved if all fishing mortality for scup is eliminated. In the commercial fishery, to achieve an F=0 the directed fishery for scup would need to be closed, as well as all fisheries within the scup management unit that land and discard scup in their fishing gears. For example, this could include fisheries that use a variety of gears including trawls and pots and traps. In the case of the recreational fishery, about 15% of the scup caught and released by anglers are assumed to die in the recreational fishery (NEFSC 2002). Therefore, to achieve F=0 in the recreational fishery, recreational anglers would be unable land scup or fish in areas where they may encounter scup to prevent the release mortality from contributing towards F on the stock.

This alternative was rejected because it would require that all scup fishing mortality within the management unit be eliminated to achieve an F=0. It presents an unrealistic scenario that would likely yield profound social and economic impacts to fishermen, ports and communities, and the nation. Additional information and analysis for this alternative is presented in Appendix A.

5.1.F Considered but Rejected from Further Analysis Alternative 1F (<10-year Rebuilding Plan (2007-2016) – Constant Harvest)

Under this alternative, a constant harvest would be applied every year such that the stock is rebuilt at the end of the ten-year rebuilding period. This approach would reduce F during the course of the rebuilding program as the stock continues to increase over a period of ten-years.

An F=0.136 is associated with a harvest level of 17.170 million lb (7,788 mt) in 2007 (Year-1), based on projected NEFSC Spring SSB 3-year index values (Table 1). Therefore, the F associated with maintaining this harvest level in 2008 would be less than F=0.136 if the scup stock increases as predicted, and the F level would decrease each year thereafter by holding harvest constant as the scup stock increases. The scup stock would be rebuilt in less than the ten-year rebuilding time period to the rebuilding target proxy for B_{MSY} (5.54 kg/tow; Alternative 1B).

This alternative was rejected because it results in the lowest overall cumulative revenues to the commercial fishery over the 10-year rebuilding period, when compared to other alternatives presented in this amendment document. Additional information and analysis for this alternative is presented in Appendix A.

5.1.G Alternative 1G (<7-year Rebuilding Plan (2007-2013) – Constant Harvest)

Under this alternative, a constant harvest would be applied every year such that the stock is rebuilt at the end of the seven-year rebuilding period. This approach would reduce F during the course of the rebuilding program as the stock continues to increase over a period of 7 years.

An F=0.1 is associated with a harvest level of 12.842 million lb (5,825 mt) in 2007 (Year-1), based on projected NEFSC Spring SSB 3-year index values (Table 1). Therefore, the F associated with maintaining this harvest level in 2008 would be less than F=0.1 if the scup stock increases as predicted, and the F level would decrease each year thereafter by holding harvest constant as the scup stock increases. This scup stock would be rebuilt in less than the seven-year rebuilding time period to the rebuilding target proxy for B_{MSY} (5.54 kg/tow; Alternative 1B).

5.1.H Alternative 1H (<5-year Rebuilding Plan (2007-2011) – Constant Harvest)

Under this alternative, a constant harvest would be applied every year such that the stock is rebuilt at the end of the five-year rebuilding period. This approach would reduce F during the course of the rebuilding program as the stock continues to increase over a period of 5 years.

An F=0.067 is associated with a harvest level of 8.741 million lb (3,965 mt) in 2007 (Year-1), based on projected NEFSC Spring SSB 3-year index values (Table 1). Therefore, the F associated with maintaining this harvest level in 2008 would be less than F=0.067 if the scup stock increases as predicted, and the F level would decrease each year thereafter by holding harvest constant as the scup stock increases. This scup stock would be rebuilt in less than the five-year rebuilding time period to the rebuilding target proxy for B_{MSY} (5.54 kg/tow; Alternative 1B).

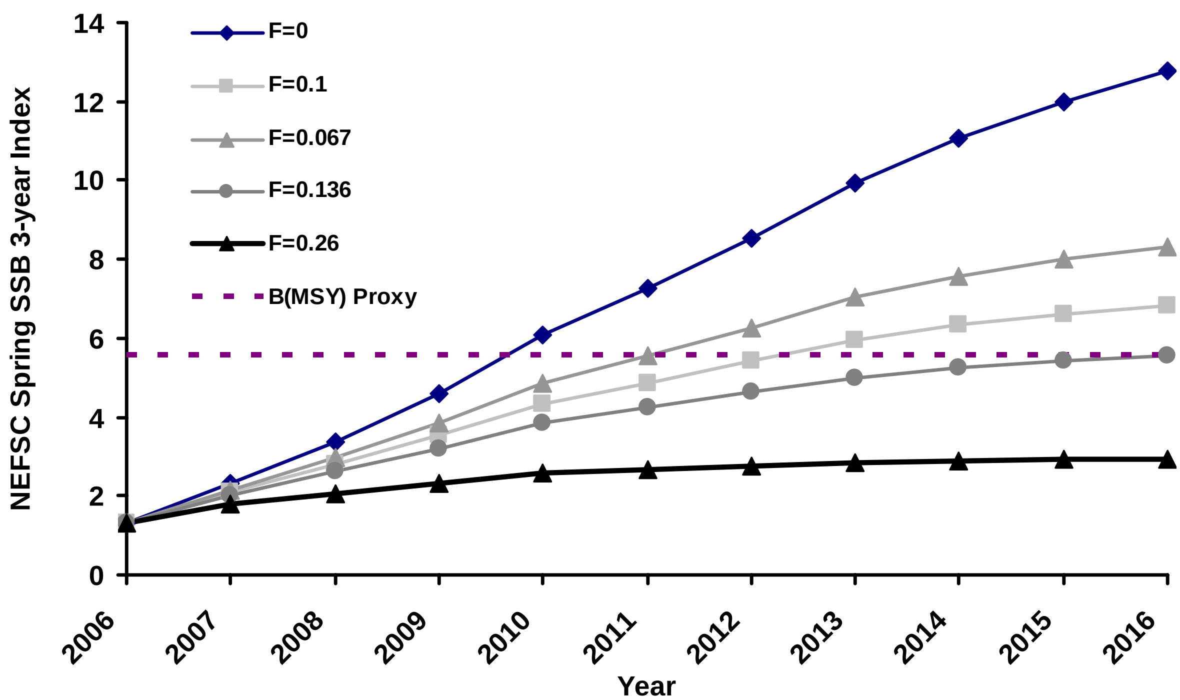


Figure 2. Projected NEFSC Spring SSB 3-year index values under various rebuilding fishing mortality (F) rates relative to the B_{MSY} rebuilding target proxy of 5.54 kg/tow.

Table 1. Projected NEFSC Spring SSB 3-year index values (kg/tow) under various constant fishing mortality rate (F) scenarios.

Year	F=0	F=0.067	F=0.10	F=0.136	F=0.26	F=0.5	F=1	F=2
2006	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32
2007	2.30	2.15	2.08	2.01	1.78	1.40	0.85	0.31
2008	3.39	2.98	2.80	2.62	2.08	1.33	0.54	0.10
2009	4.61	3.85	3.53	3.21	2.32	1.27	0.40	0.07
2010	6.07	4.84	4.33	3.84	2.57	1.24	0.35	0.07
2011	7.28	5.55	4.87	4.24	2.66	1.19	0.32	0.07
2012	8.55	6.28	5.41	4.62	2.76	1.16	0.32	0.07
2013	9.94	7.03	5.96	5.01	2.85	1.15	0.31	0.07
2014	11.05	7.57	6.33	5.24	2.89	1.14	0.31	0.07
2015	11.98	7.99	6.61	5.42	2.91	1.13	0.31	0.07
2016	12.77	8.31	6.82	5.54	2.92	1.13	0.31	0.07

5.2 Specification of Gear Restricted Areas

The Council identified Alternative 2B as their preferred Gear Restricted Area alternative.

5.2.A Alternative 2A (No Action)

Under this alternative, the current Gear Restricted Areas (GRAs), as described below (Figure 3), would continue to be addressed and modified through the annual specification setting process for scup.

The Northern Gear Restricted Area is in effect from November 1 through December 31. All trawl vessels in the Northern Gear Restricted Area that fish for or possess non-exempt species (*Loligo* squid, black sea bass, and silver hake) must fish with nets that have a minimum mesh size of 5.0-inch (12.7-cm) diamond mesh, applied throughout the codend for at least 75 continuous meshes forward of the terminus of the net. For trawl nets with codends (including an extension) of fewer than 75 meshes, the entire trawl net must have a minimum mesh size of 5.0 inches (12.7 cm) throughout the net. The Northern Gear Restricted Area is an area bounded by straight lines connecting the following points.

Northern Gear Restricted Area

Point	Latitude		Longitude	
	Degrees	**Minutes**	**Degrees**	**Minutes**
NGA 1	41	00	71	00
NGA 2	41	00	71	30
NGA 3	40	00	72	40
NGA 4	40	00	72	05
NGA 1	41	00	71	00

The Southern Gear Restricted Area is in effect from January 1 through March 15. All trawl vessels in the Southern Gear Restricted Area that fish for or possess non-exempt species (*Loligo* squid, black sea bass, and silver hake) must fish with nets that have a minimum mesh size of 5.0-inch (12.7-cm) diamond mesh, applied throughout the codend for at least 75 continuous meshes forward of the terminus of the net. For trawl nets with codends (including an extension) of fewer than 75 meshes, the entire trawl net must have a minimum mesh size of 5.0 inches (12.7 cm) throughout the net. The Southern Gear Restricted Area is an area bounded by straight lines connecting the following points.

Southern Gear Restricted Area

Point	Latitude		Longitude	
	Degrees	**Minutes**	**Degrees**	**Minutes**
SGA 1	39	20	72	53
SGA 2	39	20	72	28
SGA 3	38	00	73	58
SGA 4	37	00	74	43
SGA 5	36	30	74	43
SGA 6	36	30	75	03
SGA 7	37	00	75	03
SGA 8	38	00	72	23
SGA 1	39	20	72	53

5.2.B Alternative 2B (Preferred: Incorporation of GRAs into FMP)

Under this alternative, the Gear Restricted Areas (GRAs), as described in alternative 5.2.A (Figure 3), would be modifiable through a framework under the FMP and would no longer be modified and addressed through the scup annual specification setting process. This administrative change would not alter the shape, area, or function of the current GRAs. Any modifications to the GRAs would be considered actions that can be addressed through a framework document as described under Section 50 CFR 648.127. As described in this section, the Council would develop and analyze any modifications to the GRAs over the span of at least two Council meetings through a framework document and provide the public with advance notice of the availability of the recommendation(s), appropriate justification(s) and economic and biological analyses, and the opportunity to comment on the proposed adjustment(s) at the first meeting and prior to, and at, the second Council meeting. The Council's recommendations on modifications to the GRAs would be limited to those described in the current regulations for scup (Section 50 CFR 648.127).

5.2.C Considered but Rejected from Further Analysis - Alternative 2C (Discontinue administration of Scup GRAs)

Under this alternative, the Gear Restricted Areas (GRAs), as described in alternative 5.2.A (Figure 3), would no longer be administered. This would result in discontinuation of the Northern and Southern GRAs. This alternative was rejected because the Northern and Southern GRAs were developed to reduce the seasonal discarding of scup in small mesh fisheries; therefore, this action would ignore the benefits of the GRAs and be inconsistent with National Standard 9.

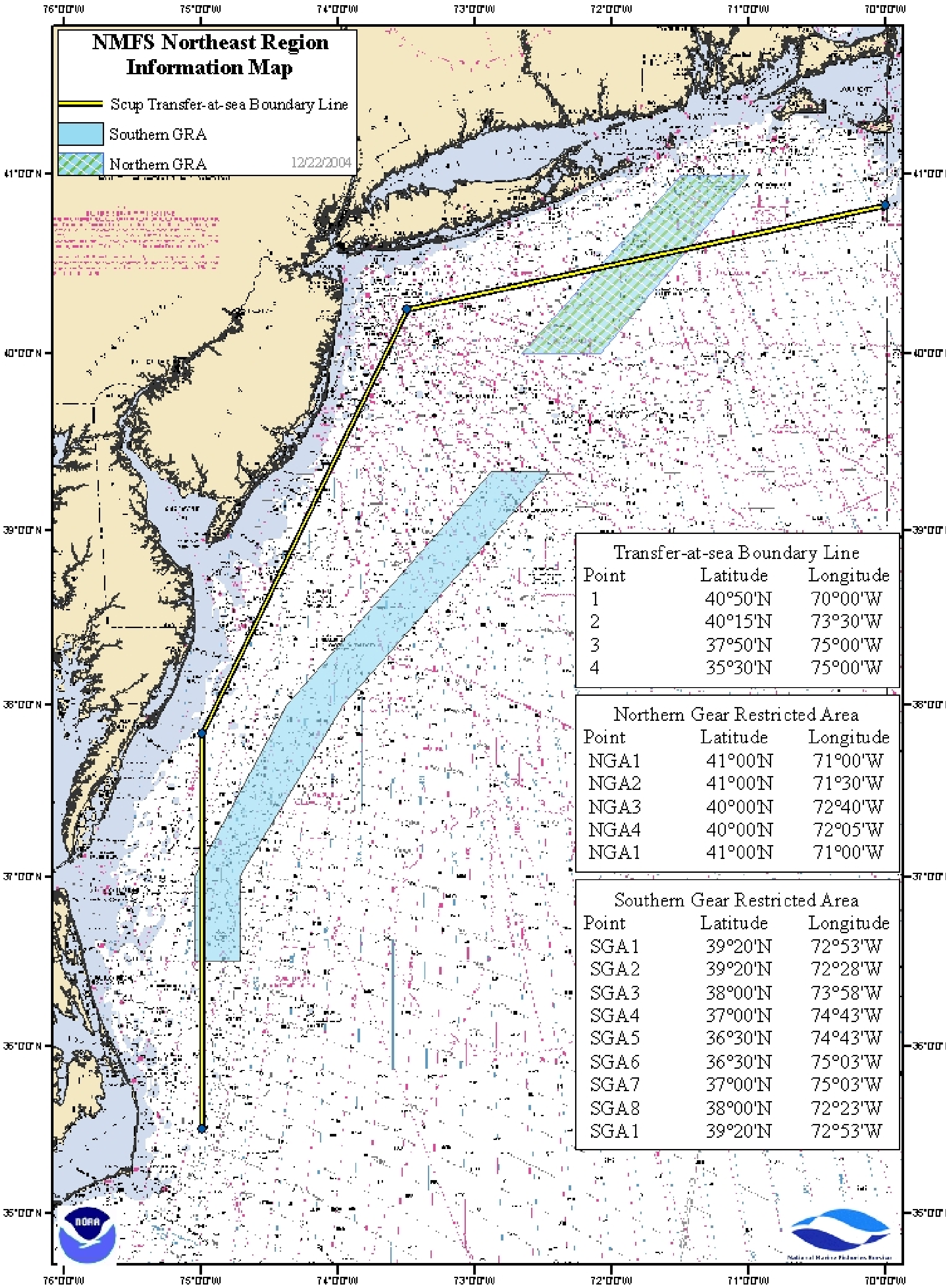


Figure 3. Northern and Southern gear restricted areas (GRAs).

6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section serves to identify and describe the *valued ecosystem components* (VECs; Beanlands and Duinker 1984) that are likely to be directly or indirectly affected by the actions proposed in this document. These VECs comprise the affected environment within which the proposed actions will take place. Following the guidance provided by the Council on Environmental Quality (CEQ 1997), the VECs are identified and described here as a means of establishing a baseline for the impact analysis that will be presented in the subsequent document section (section 7.0 Analysis of Impacts). Impacts of the proposed actions on the VECs will also be determined from a cumulative effects perspective, which is in the context of other past, present, and reasonably foreseeable future actions.

Identification of the Selected Valued Ecosystem Components

As indicated in CEQ (1997), one of the fundamental principles of cumulative effects analysis is that "… the list of environmental effects must focus on those that are truly meaningful." As such, the range of VECs described in this section is limited to those for which a reasonable likelihood of meaningful impacts is expected. These VECs are listed below.

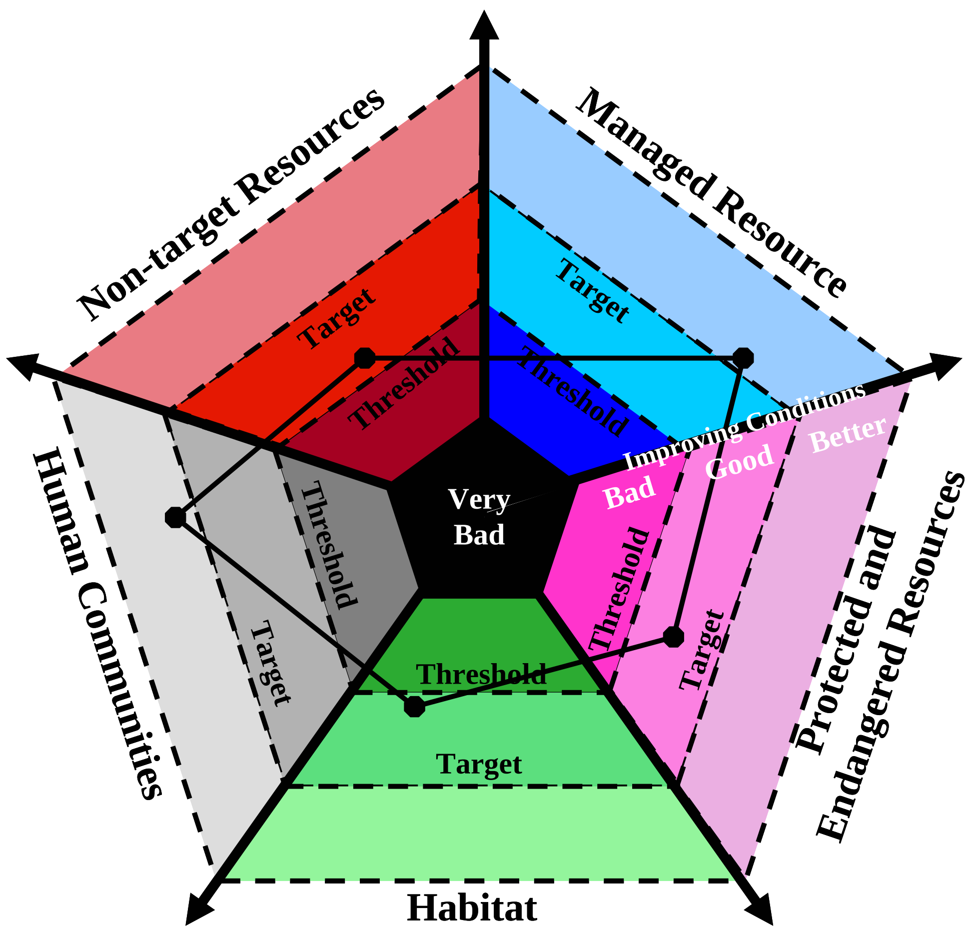
1. Managed resource (Scup)
2. Non-target species
3. Habitat including EFH for the managed resource and non-target species
4. Endangered and protected resources
5. Human Communities

The managed resource VEC includes scup, which is managed under the Summer Flounder, Scup, and Black Sea Bass FMP. Changes to the FMP, such as those proposed in this amendment, have the potential to directly affect the condition of the scup stock. These impacts may occur when management actions either reduce or expand the directed harvest of scup or bycatch of this species.

Similarly, management actions that would change the distribution and/or magnitude of fishing effort for the managed resource may indirectly affect the non-target species VEC (species incidentally captured as a result of fishing activities for the managed resource), the habitat VEC (especially habitats vulnerable to activities related to directed fishing for the managed resource), and the protected resources VEC (especially those species with a history of encounters with the scup fishery).

The human communities VEC could be affected directly or indirectly through a variety of complex economic and social relationships associated with managing the species.

To further illustrate this point, the conceptual "sustainability polygon" below is comprised of the VECs on which meaningful impacts could be expected as a result of actions taken in this amendment. The dynamics and condition of each VEC are captured through examination of trends in status determination criteria, which may be comprised of measurable, objective indicators (or a single indicator) that are compared to reference values, such as targets and thresholds, or may merely be qualitative indicators. These criteria allow progress towards management and policy objectives to be evaluated. For example, stock status for scup is evaluated against biomass and fishing mortality targets and thresholds; therefore, the rebuilding alternatives proposed in this document were developed to meet those policy objectives. While progress for each of the VECs is tracked independently, there are complex interactions that occur among them. These interactions result in flexion of the "sustainability polygon" in response to changes in the dynamics and condition of another VEC.



Temporal Scope of the Selected VECs

While the effects of the historical fishery are considered, the temporal scope of past and present actions for the managed resource, non-target species, habitat and human communities is primarily focused on actions that have occurred after FMP implementation. An assessment using this timeframe demonstrates changes to the resources that have resulted through management under the Council process. Further, landings and discard data collected prior to implementation of the FMP are often insufficient for the purposes of detailed analysis.

For endangered and other protected species, the scope of past and present actions is on a species-by-species basis and is largely focused on the 1980s and 1990s through the present, which is when NMFS began generating stock assessments for marine mammals and sea turtles that inhabit waters of the U.S. EEZ.

The temporal scope of future actions for all five VECs extends ten years into the future (2016). This period was chosen because the maximum time frame proposed for rebuilding the scup stock is 10 years.

Geographic Scope of the Selected VECs

The overall geographic scope for the managed resource, non-target species, habitat, and endangered and protected species can be considered as the total range of these VECs in the Western Atlantic Ocean. The management unit identified in the FMP (section 4.3) covers a subset of the overall geographic scope and is defined as all scup in US waters in the Western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border. The analyses of impacts presented in this amendment focus primarily on actions related to the harvest of the managed resource. Therefore, a more limited geographic area is used to define the core geographic scope within which the majority of harvest effort for the managed resource occurs.

Because the potential exists for far-reaching sociological or economic impacts on U.S. citizens who may not be directly involved in fishing for the managed resource, the overall geographic scope for human communities is defined as all U.S. human communities. Limitations on the availability of information needed to measure sociological and economic impacts at such a broad level necessitate the delineation of core boundaries for the human communities. These are defined as those U.S. fishing communities directly involved in the harvest of the managed resource. These communities were found to occur in coastal states from Maine to North Carolina. Communities heavily involved in the scup fishery are identified in the port and community description (section 6.5). The directionality and magnitude of impacts on human communities directly involved in the scup fishery will be a function of their level of involvement and dependence on this fishery.

6.1 Description of the Managed Resource

6.1.1 Description of the Fishery

Commercial

Commercial scup landings declined from 1988 to 1989 by over 33 percent (13.10 million lb or 5.94 million kg to 8.77 million lb or 3.97 million kg), increased to 15.61 million lb (7.08 million kg) in 1991 and then dropped to the lowest value in the time series, 2.66 million lb (1.20 million kg), in 2000 (Table 2). Commercial landings substantially increased to over 9.91 million lb (4.50 million kg) in 2003 and have been at 9.33 million lb (4.23 million kg) and 9.56 million lb (4.34 million kg) in 2004 and 2005, respectively.

Recreational

Recreational catch and landings of scup have fluctuated since 1981 (Table 2). Recreational catch peaked in 1986 at 30.87 million fish and then declined to 2.67 million fish in 1998, which is the lowest value in the times series. Recreational landings peaked at 11.61 million lb (5.27 million kg) in 1986 and then trended downward to a low of 0.88 million lb (0.40 million kg) in 1998. In 2000, catch and landings increased significantly to 11.28 million fish and 5.44 million lb (2.47 million kg), respectively. Catch and landings dropped in 2002 to 7.58 million fish and 3.62 million lb (1.64 million kg), respectively. In 2003, catch and landings increased to 14.66 million fish and 8.48 million lb (3.85 million kg) but then dropped in 2004 to 9.53 million fish and 4.41 million lb (2.00 million kg), respectively. In 2005, recreational catches were 5.86 million fish, and recreational landings were 2.38 million lb (1.08 million kg).

Historical Account of Overages

To prevent overfishing, the Council recommends annual specifications that are intended to have at least a 50% probability that the specified target Fs for the coming fishing year will not be exceeded. Because of the nature of the scup fishery and the inherent time lags encountered in collecting landings that are necessary to make final determinations of actual landings, there is always the possibility that some harvest quotas may be unintentionally exceeded before the information necessary to close that portion of the fishery is available. On the other hand, other sectors of the fishery may under-harvest their allowable harvest levels in a given year.

The regulation implementing the FMP requires that any scup commercial fishery overages in a given year be subtracted from the initial quota for the given season the following year. In the recreational fisheries for these species, projected landings in a given year are used by the Council to recommend recreational management measures for the following year. The Council and NMFS consider angler effort and success, stock availability, and the target harvest limits in establishing recreational measures including size limits, seasons, and bag limits. The recreational fishery has target harvest levels, which do not require the fishery to be closed when attained, as compared to the commercial fishing quotas, which do require the fishery to be closed when the quota is attained. Harvest limits, total landings, and total overages for the scup fishery are given in Table 3 and Figure 4 (weight in million lb).

Table 2. Scup commercial and recreational landings ('000 lb), 1981-2005.

Year	Comm[a]	Rec[b]	Total	% Comm	% Rec
1981	21,729	5,812	27,541	79	21
1982	19,188	5,205	24,393	79	21
1983	17,184	6,252	23,436	73	27
1984	17,129	2,416	19,545	88	12
1985	14,829	6,093	20,922	71	29
1986	15,816	11,605	27,421	58	42
1987	13,854	6,197	20,051	69	31
1988	13,105	4,267	17,372	75	25
1989	8,769	5,557	14,326	61	39
1990	10,084	4,140	14,224	71	29
1991	15,610	8,087	23,697	66	34
1992	13,798	4,412	18,210	76	24
1993	10,416	3,197	13,613	77	23
1994	9,682	2,628	12,310	79	21
1995	6,783	1,344	8,127	83	17
1996	6,501	2,156	8,657	75	25
1997	4,837	1,198	6,035	80	20
1998	4,174	875	5,049	83	17
1999	3,318	1,886	5,204	64	36
2000	2,661	5,443	8,104	33	67
2001	4,067	4,262	8,329	49	51
2002	7,281	3,624	10,905	67	33
2003	9,907	8,484	18,391	54	46
2004	9,334	4,406	13,740	68	32
2005	9,557	2,379	11,936	80	20
Mean	10,785	4,477	15,262	70	30

[a] Source: Preliminary Dealer Weighout Data as of May 15, 2006, and South Atlantic General Canvass Data as of June 9, 2006. Commercial landings include additional landings data from Massachusetts.
[b] Source: MRFSS personnel communication from the National Marine Fisheries Service, Fisheries Statistics Division**.**

Table 3. Historical account of scup overages in the commercial and recreational fisheries.

Year	Overall TAL[a]	Total Landings[b]	Overall Overage[c]
1997	7.947	6.035	-
1998	6.125	5.049	-
1999	3.770	5.204	1.434
2000	3.770	8.104	4.334
2001	6.210	8.329	2.119
2002	10.770	10.905	0.135
2003	16.500	18.391	1.891
2004	16.500	13.740	-
2005[d]	16.270	11.936	-
2006	16.270	n/a	n/a

[a] Includes both commercial and recreational harvest limits.
[b] Include both commercial and recreational landings.
[c] Includes both commercial and recreational harvest limits and landings.
[d] Preliminary.
Note - 2006 landings not yet available.

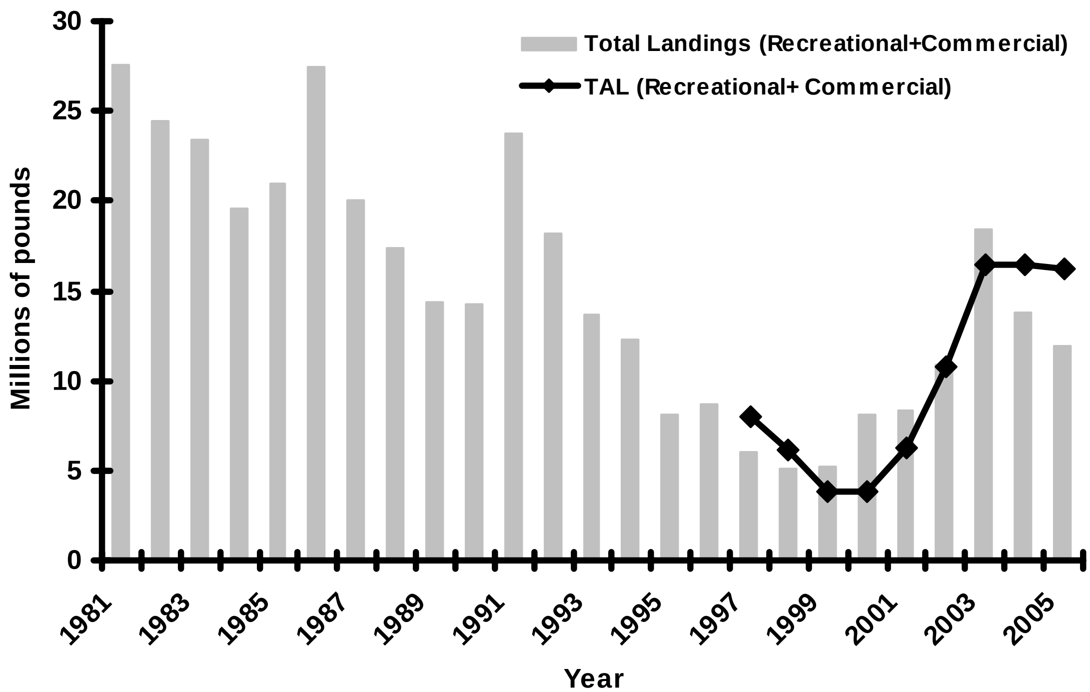


Figure 4. Total scup landings (1981-2005), recreational and commercial combined relative to the TALs in place from 1997 to 2005.

6.1.2 Status of the Stock

The most recent assessment on scup was completed in June 2002 (35th SARC). That assessment indicated that scup are no longer overfished, "but stock status with respect to overfishing cannot currently be evaluated." The SARC also concluded that although "the relative exploitation rates have declined in recent years the absolute value of F cannot be determined." However, they did indicate that "survey data indicate strong recruitment and some rebuilding of age structure" in recent years.

State and Federal surveys indicated an increase in stock abundance since the mid to late 90s; however, NEFSC spring survey results indicate that spawning stock decreased in 2004. Biomass estimates are based on a 3-year average (2003-2005), and the estimate for 2004 was 0.69 kg/tow (Figure 5). This is below the biomass threshold[1] value of 2.77 kg/tow. Therefore, the stock is considered overfished. In 2005, the NEFSC Spring SSB 3-year average (2004-2006) index value increased to 1.32 kg/tow.

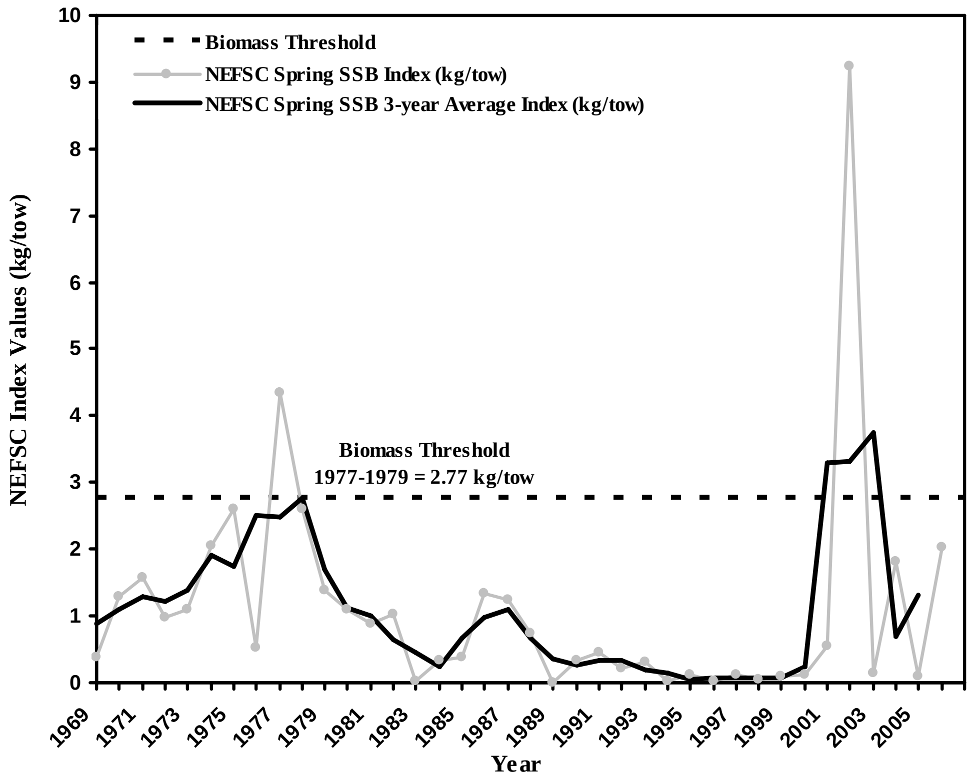


Figure 5. The scup NEFSC Spring SSB 3-year average index values relative to the minimum biomass threshold. NEFSC Spring SSB single-year index values also shown.

[1] Biomass threshold is a term used to define when a fishery is considered overfished. When the stock biomass is below the biomass threshold, then the fishery is considered overfished.

The spring survey index increased in 2006 to 2.03 kg/tow relative to the low value of 0.15 kg/tow derived in 2003 (Figure 4). The 2006 index is the largest value in the spring survey since 1978, excluding the large index value in 2002 of 9.24 kg/tow.

In 2002 and 2003, the Council and Commission discussed the uncertainty associated with the spring survey estimate for 2002 and decided not to use it in setting the TAC. In fact, the 35th SARC noted the "high degree of inter-annual variation in individual survey indices." They noted that the "abundance of all age groups in the survey increased substantially as compared with the 2001 results" suggesting that increased availability of scup to the survey gear was an important determinant in the 2002 survey results.

Year class strength is evident in the NEFSC Autumn trawl survey results. The survey indicates that strong year classes were produced from 1999-2002. The SARC also noted the predominance of the 2000 year class in several of the state surveys. The most recent information indicates a below average year class was produced in 2004.

Estimates of fishing mortality rates for scup are uncertain. The 31st SARC conducted several analyses that indicated that F was at least 1.0 for ages 0-3 scup for the 1984 to 2000 time series. SARC 31 could not estimate Fs on older fish because they were not well represented in the surveys. Although the magnitude of the current mortality rates is unknown, relative exploitation rates have changed over the period. Relative exploitation rates based on total landings and the spring survey suggest a general increase in exploitation from 1981 to 1995. Since then, relative exploitation rates have declined from the 1995 value of 135.5 to single digit values for 2001 to 2003. This relative index increased to 19.4 in 2004 due to the drop in the 3-year average spawning stock biomass (SSB) value. In 2005, this relative index value was 9.06.

6.1.3 Stock Characteristics and Ecological Relationships

The stock characteristics and ecological relationships of scup are fully described in section 3.1.2 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP. Scup was last fully assessed at SAW-35 in 2002. As in previous assessment reviews, the SARC concluded that estimates of commercial fishery discards were unreliable due to limited sample size and uncertainty as to their representative nature of the sea sampling data for scup. The uncertainties associated with the catch data led the SARC to conclude that an analytical assessment would be inappropriate as the basis for management decisions for scup at this time. An analytical formulation for scup is not feasible until the quality and quantity of the input data (biological sampling and estimates of all components of catches) are significantly improved and an adequate time series developed.

Although the 31st SARC concluded that the F on age 0-3 scup was at least 1.0, the 35th SARC determined that "absolute estimates of fishing mortality for scup could not be calculated." However, the relative exploitation index may offer some information as to current levels of mortality for older fish. Because the index is based primarily on landings of scup larger than 9" TL (the commercial minimum fish size) and SSB, the index may indicate fishing mortality rates for the larger fish have declined in recent years.

The SARC-35 draft Advisory Report states that, “Indices of recruitment from the NEFSC fall survey suggest improved recruitment in 1999-2001, with estimated age-0 abundance exceeding the 1984-2001 average of 69.03 fish per tow. NEFSC spring and winter indices of stock biomass and abundance for 2002 were the highest within each respective time series. Other survey indices have increased since the mid-1990s.” Additional, detailed information is available in the SAW-35 documents. Electronic versions of these documents are available at the following website: http://www.nefsc.noaa.gov/nefsc/saw/

6.2 Non-target Species

National Standard 9 requires Councils to consider the bycatch effects of existing and planned conservation and management measures. Bycatch can impede efforts to protect marine ecosystems and achieve sustainable fisheries. Bycatch can substantially increase the uncertainty associated with total fishing-related mortality, making it difficult to assess the status of stocks, set appropriate optimal yields (OY), define overfishing levels, and ensure that OYs are attained and overfishing levels are not exceeded. Bycatch may also preclude more productive uses of fishery resources. Bycatch is defined as fish that are harvested in a fishery but are not sold or kept for personal use. This includes the discard of whole fish at sea or elsewhere, including economic and regulatory discards, and fishing mortality due to an encounter with fishing gear that does not result in capture of fish (i.e., unobserved fishing mortality). Bycatch does not include any fish that are legally retained in a fishery and kept for personal, tribal, or cultural use, or that enter commerce through sale, barter, or trade.

Otter trawls, pots, and traps are the primary gears used to harvest scup commercially. The Mid-Atlantic bottom trawl fishery relies principally on scup, summer flounder, and black sea bass, but it also harvests significant quantities of *Loligo* squid, winter flounder, witch flounder, yellowtail flounder, and other species either as bycatch or in directed fisheries.

Bycatch does not include fish released alive under a recreational catch-and-release fishery management program. A catch-and-release fishery management program is one in which the retention of a particular species is prohibited. In such a program, those fish released alive would not be considered bycatch. There is a significant recreational fishery for scup. A large portion of scup that are caught are released after capture. In 2005, about 44% of those fish caught were released. It is estimated that 15% of the scup that are caught and released by anglers die after release, i.e., the majority of the fish are released alive and are expected to survive after release. In addition, other species (i.e., bluefish, black sea bass, weakfish, striped bass, tautog) are caught and released by recreational anglers targeting scup. The proportions of these non-target species that die after release are expected to be small due to use of rod and reel and handlines in the scup recreational fishery. The Council and Commission believe that information and education programs relative to proper catch and release techniques for scup and other species caught by recreational fishermen should help to maximize the number of these species released alive.

Changes in recreational management measures may affect the discards of scup. These measures include a possession limit, size limit, and season. The effects of the possession limit would be greatest at small limits and be progressively less at higher limits. The size limit would have similar effects, but the level of discarding will be dependent upon the levels of incoming recruitment and subsequent abundance of small fish. Seasonal effects would differ depending on the length of the season and the amount of scup caught while targeting other species.

6.3 Habitat (Including Essential Fish Habitat)

Pursuant to the Magnuson Stevens Act / EFH Provisions (50 CFR Part 600.815 (a)(1)), an FMP must describe EFH by life history stage for each of the managed species in the plan. This information was previously described in Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP (MAFMC 1998). EFH for the managed resource is described using fundamental information on habitat requirements by life history stage that was summarized in a document produced by NMFS. This document is entitled "Essential Fish Habitat Source Document: Scup, *Stenotomus chrysops*, Life History and Habitat Characteristics" (Steimle et al. 1999). This document, as well as additional reports and publications, is used to provide the best available information on life history characteristics, habitat requirements, and ecological relationships at this time. An electronic version of this source document is available at the following website: http://www.nefsc.noaa.gov/nefsc/habitat/efh/

The following are the official EFH designation definitions by life history stage for scup. Electronic versions of these definitions are available at the following website: http://www.nero.noaa.gov/hcd/list.htm

It should also be noted that within designated EFH, FMPs should identify habitat areas of particular concern (HAPC) within EFH where one or more of the following four criteria must be met: ecological function, sensitive to human induced environmental degradation, developing activities stressing habitat type, or rarity of habitat (50 CFR Part 600.815 (a)(9)). The MAFMC has not recommended any portions of EFH as HAPC for scup in Amendment 14 or in past amendments to the FMP.

Eggs: EFH is estuaries where scup eggs were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. In general, scup eggs are found from May through August in southern New England to coastal Virginia, in waters between 55 and 73 ^{o}F and in salinities greater than 15 ppt.

Larvae: EFH is estuaries where scup were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. In general scup larvae are most abundant nearshore from May through September, in waters between 55 and 73 ^{o}F and in salinities greater than 15 ppt.

Juveniles: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where juvenile scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Juvenile scup, in general during the summer and spring are found in estuaries and bays between Virginia and Massachusetts, in association with various sands, mud, mussel and eelgrass bed type substrates and in water temperatures greater than 45 ^{o}F and salinities greater than 15 ppt.

Adults: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, wintering adults (November through April) are usually offshore, south of New York to North Carolina, in waters above 45 ^{o}F.

A description of the environment associated with the scup fishery is presented in section 3.2 of Amendment 13, and a brief summary of that information is given here. A discussion of the impact of fishing on scup EFH and the impact of the scup fishery on other species' EFH can be found in Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP (section 3.2). Potential impacts associated with the proposed measures under this amendment are discussed in section 7.0.

The Northeast Shelf Ecosystem encompasses the core geographic scope where the scup fishery is prosecuted. The Northeast Shelf Ecosystem has been described as 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 (Sherman et al. 1996). The Gulf of Maine, Georges Bank, and Mid-Atlantic Bight are distinct subsystems within this region. The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of 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. It is characterized by highly productive, well-mixed waters and fast-moving currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. Pertinent aspects of the physical characteristics of each of these subsystems are available in several review documents (Cook 1988; Pacheco 1988; Stumpf and Biggs 1988; Abernathy 1989; Townsend 1992; Mountain et al. 1994; Beardsley et al. 1996; Brooks 1996; Sherman et al. 1996; NEFMC 1998; Steimle et al. 1999).

A report entitled "Characterization of Fishing Practices and the Marine Benthic Ecosystems of the Northeast U.S. Shelf, and an Evaluation of the Potential Effects of

Fishing on Essential Fish Habitat" was developed by NMFS (Stevenson et al. 2004). This document provides additional descriptive information on habitat association and function, coastal features and regional subsystems in the Northeast Shelf Ecosystem, and how they relate to Federally managed species in the northeast region. These documents are available by request through the NMFS Northeast Regional Office or electronically at: http://www.nefsc.noaa.gov/nefsc/publications.

Any actions implemented in the FMP that affect species with overlapping EFH were considered in the EFH assessment for Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP. Scup are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. As stated in section 3.2.8 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP, the Council determined that both mobile bottom tending and stationary gear have a potential to adversely impact EFH. Thus, Amendment 13 included alternatives that minimize the adverse impacts on EFH to the extent practicable as required pursuant to section 303(a)(7) of the SFA. Because of the narrow scope of this amendment document and requirements that it be implemented in a timely manner ((50 CFR 600.310(e)(3))), the effects of fishing on EFH have not been re-evaluated, and no alternatives to minimize adverse effects on EFH are presented in this amendment. An updated review of the best scientific information available and an evaluation of alternatives that minimize adverse effects on EFH to the extent practicable will be performed in a subsequent amendment document.

6.4 Endangered and Protected Species

There are numerous species inhabiting the environment within the management unit of this FMP that are afforded protection under the Endangered Species Act (ESA) of 1973 (i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act of 1972 (MMPA). Sixteen are classified as endangered or threatened under the ESA, while the rest are protected by the provisions of the MMPA. The Council has determined that the following list of species protected by the Endangered Species Act of 1973 (ESA), the Marine Mammal Protection Act of 1972 (MMPA), or the Migratory Bird Act of 1918 may be found in the environment utilized by the scup fishery:

Cetaceans

Species	**Status**
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
Beaked whale (*Ziphius and Mesoplodon spp.*)	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

Sea Turtles

Species	**Status**
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

Species	**Status**
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Smalltooth sawfish (*Pristis pectinata*)	Endangered

Birds

Species	**Status**
Roseate tern (*Sterna dougallii dougallii*)	Endangered
Piping plover (*Charadrius melodus*)	Endangered

Critical Habitat Designations

Species	**Area**
Right whale	Cape Cod Bay and the Great South Channel Area

A description of the species listed as endangered or threatened which inhabit the management unit of the FMP is presented in Appendix B. The status of these and other marine mammal populations inhabiting the Northwest Atlantic has been discussed in detail in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments. Initial assessments were presented in Blaylock et al. (1995) and are updated in Waring et al. (2006). The most recent information on the stock assessment of various marine mammals through 2005 can be found at:
http://www.nmfs.noaa.gov/pr/PR2/Stock_Assessment_Program/individual_sars.html.

Three other useful websites on marine mammals are:
http://www.nmfs.noaa.gov/pr/recovery,
http://spo.nwr.noaa.gov/mfr611/mfr611.htm, and
http://www.nmfs.noaa.gov/pr/species/mammals.

Recreational Fishery

The principle gears used in the recreational fishery for scup are rod and reel and handlines. Recreational fisheries, in general, have very limited interaction with marine mammals and endangered or threatened species.

Commercial Fishery

Under section 118 of the MMPA of 1972, NMFS must publish, and annually update, the List of Fisheries (LOF) which places all U.S. commercial fisheries in one of three categories based on the level of incidental serious injury and mortality of marine mammals in each fishery (arranging them according to a two tiered classification system). The categorization of a fishery in the List of Fisheries (LOF) determines whether participants in that fishery may be required to comply with certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. The classification criteria consist of a two tiered, stock-specific approach that first addresses the total impact of all fisheries on each marine mammal stock (Tier 1) and then addresses the impact of the individual fisheries on each stock (Tier 2). If the total annual mortality and serious injury of all fisheries that interact with a stock is less than 10% of the Potential Biological Removal[2] (PBR) for the stock, then the stock is designated as Tier 1, and all fisheries interacting with this stock would be placed in Category III. Otherwise, these fisheries are subject to categorization under Tier 2.

Under Tier 2, individual fisheries are subject to the following categorization:

I. Annual mortality and serious injury of a stock in a given fishery is greater than or equal to 50 percent of the PBR level;

II. Annual mortality and serious injury of a stock in a given fishery is greater than one percent and less than 50 percent of the PBR level; or

III. Annual mortality and serious injury of a stock in a given fishery is less than one percent of the PBR level.

Under Category I, there is documented information indicating a "frequent" incidental mortality and injury of marine mammals in the fishery. In Category II, there is documented information indicating an "occasional" incidental mortality and injury of marine mammals in the fishery. In Category III, there is information indicating no more than a "remote likelihood"[3] of an incidental taking of a marine mammal in the fishery or, in the absence of information indicating the frequency of incidental taking of marine

[2] PBR is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997).

[3] A commercial fishery with a "remote likelihood" of causing incidental mortality and serious injury of marine mammals is one that collectively with other fisheries is responsible for the annual removal of: (1) 10% or less of any marine mammal stock's potential biological removal level, or (2) More than 10% of any marine mammal stock's PBR level, yet that fishery by itself is responsible for the annual removal of 1 percent or less of that stock's PBR level.

mammals, other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, and species and distribution of marine mammals in the area suggest there is no more than a remote likelihood of an incidental take in the fishery. All types of commercial fishing gear are required to meet the gear restrictions detailed in the Atlantic Large Whale Take Reduction Plan, the Harbor Porpoise Take Reduction Plan, the MMPA, and the ESA. These restrictions are intended to reduce fishery interactions and incidental injury or mortality of protected resources. Otter trawls, pots, and traps are the primary mechanism used in the commercial harvest of scup. All three of these methods are relatively indiscriminate and non-target species including summer flounder, black sea bass, squid, Atlantic mackerel, and silver hake are taken incidentally.

The 2006 LOF indicates that the Mid-Atlantic bottom trawl fishery is a Category II fishery, with potential to result in incidental injury and mortality of Western North Atlantic common dolphins, short-finned pilot whales, and long-finned pilot whales. According to Waring et al. (2006), in 1999 there was one pilot whale taken in the Mid-Atlantic mixed species trawl fisheries fishery reported. The incidental take was observed on a trip that landed silver hake as the primary species. In 1997, there was one observed common dolphin incidentally taken in the Southern New England/Mid-Atlantic bottom trawl fishery reported (Waring et al. 2006); however, scup was not the target species. Therefore, based on the information above as well as recent NMFS observer information through July 10, 2006, there are no documented marine mammal species or stocks with incidental injury and mortality resulting from the Mid-Atlantic bottom trawl fishery where scup was the target species. The Atlantic mixed species trap/pot fishery is listed as a Category II fishery in the 2006 LOF, with potential to result in incidental injury and mortality of North Atlantic fin whales and humpback whales in the Gulf of Maine. This fishery was classified by analogy. There have been no observed interactions of fin and humpback whales with the Atlantic mixed species trap/pot fishery; however, the lobster trap/pot fishery has been involved in entanglements with large cetaceans (Waring et al. 2006). Therefore, there are no documented marine mammal species or stocks with incidental injury and mortality resulting from the Atlantic mixed species trap/pot fishery where scup was the target species.

6.5 Human Communities

6.5.1 Key Ports and Communities

The ports and communities that are dependent on summer flounder, scup, and black sea bass are fully described in Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP (section 3.4.2). To examine recent landings patterns among ports, 2005 NMFS dealer data are used. The top commercial landings ports for scup by pounds landed are given in Table 4. A “top port by landings (lb)” is defined as any port that landed at least 100,000 lb of scup. The percent of scup landings to total landings indicates the relative importance of scup landings to that port. The top commercial landings ports for scup by value are given in Table 5. A “top port by ex-vessel value ($)” is defined as any port that landed at least $100,000 worth of scup. The percent of scup ex-vessel value to total ex-vessel value indicates the relative importance of scup ex-vessel value to that port. Due to the nature of the recreational database (Marine Recreational Fisheries Statistical Survey), it is inappropriate to desegregate to less than state levels. Thus, port-level recreational data are not shown.

Table 4. Top ports by landings (lb) for scup based on NMFS 2005 dealer data. Since this table includes only the "top ports," it may not include all of the landings for the year.

Port	# Scup Vessels	Scup Landings (lb)	Scup Landings Value ($)	Percent of Scup Landings to Total Landings (lb)
POINT JUDITH, RI	103	1,705,766	1,150,574	4.29
PT. PLEASANT, NJ	21	1,377,122	828,246	15.97
LITTLE COMPTON, RI	15	1,120,496	846,435	43.17
MONTAUK, NY	39	1,079,390	1,047,861	9.04
NEW BEDFORD, MA	37	776,366	746,637	0.63
HAMPTON BAY, NY	37	467,737	391,602	9.88
NEWPORT, RI	30	410,538	240,511	5.81
CAPE MAY, NJ	14	311,970	163,737	0.45
STONINGTON, CT	17	299,057	235,254	8.91
BELFORD, NJ	20	238,998	148,487	7.73
POINT LOOKOUT, NY	7	165,163	120,013	16.34
CHINCOTEAGUE, VA	8	157,113	84,088	3.46
CHATHAM, MA	12	134,710	94,707	1.70
GREENPORT, NY	7	120,574	119,959	16.60
HAMPTON, VA	25	119,692	58,860	1.60

Table 5. Top ports by ex-vessel value ($) for scup based on NMFS 2005 dealer data. Since this table includes only the "top ports," it may not include all of the landings values for the year.

Port	# Scup Vessels	Scup Landings Value ($)	Scup Landings (lb)	Percent of Scup Value to Total Value ($)
POINT JUDITH, RI	103	1,150,574	1,705,766	3.08
MONTAUK, NY	39	1,047,861	1,079,390	6.51
LITTLE COMPTON, RI	15	846,435	1,120,496	29.39
PT. PLEASANT, NJ	21	828,246	1,377,122	5.85
NEW BEDFORD, MA	37	746,637	776,366	0.27
HAMPTON BAY, NY	37	391,602	467,737	5.86
NEWPORT, RI	30	240,511	410,538	1.66
STONINGTON, CT	17	235,254	299,057	2.22
CAPE MAY, NJ	14	163,737	311,970	0.26
BELFORD, NJ	20	148,487	238,998	4.28
POINT LOOKOUT, NY	7	120,013	165,163	14.43
GREENPORT, NY	7	119,959	120,574	17.16

6.5.2 Analysis of Permit Data

Federally Permitted Vessels

This analysis estimates that in 2005 there were 1,511 vessels with one Federal Northeast permit for scup (Table 6). The fishery for scup has vessels permitted as commercial, recreational, or both. Of the 1,511 vessels with at least one Federal permit for scup, there were 656 that held only commercial permits for only scup or scup in combination with summer flounder and/or black sea bass. In 2005, of those 656 Federally permitted commercial vessels that could land scup, only 428 (65%) of these vessels landed scup. There were 796 vessels that held only a recreational permit for only scup or scup in combination with summer flounder and/or black sea bass. The remaining vessels (59) held some combination of recreational and commercial permits (Table 6). Whether engaged in a commercial or recreational fishing activity for scup, vessels may hold any one of four combinations of scup permits. The total number of vessels holding any one of these possible combinations of permits by species and commercial or recreational status is reported in Table 6.

Row sums in Table 6 indicate the total number of vessels that have been issued some unique combination of commercial permits. For example, there were 66 vessels whose only commercial permit was for scup. By contrast, there were 497 vessels that held all three commercial permits. Column totals in Table 6 indicate the total number of vessels that have been issued some unique combination of Federal recreational permits. For example, there were 9 vessels whose only recreational permit was for scup while 662 vessels held all three recreational permits. Each cell in Table 6 reports the total number of vessels that have a unique combination of recreational and commercial permits by species.

Table 6. Summary of number of vessels holding Federal commercial and/or recreational permit combinations for only scup (SCP) or scup in combination with summer flounder (FLK) and/or black sea bass (BSB), 2005.

Comm. Permit Combinations	Recreational Permit Combinations					
	No Rec. Permit	SCP Only	FLK/ SCP	SCP/ BSB	FLK/ SCP/ BSB	Row Total
No Comm. Permit	0	9	21	21	605	656
SCP Only	57	0	0	0	9	66
FLK/ SCP	109	0	0	0	2	111
SCP/ BSB	151	0	0	1	29	181
FLK/ SCP/ BSB	479	0	1	0	17	497
Column Total	796	9	22	22	662	1511

Dealers

There were 148 dealers who bought scup in 2005. Employment data for these specific firms are not available. In 2005, these dealers bought $7.26 million worth of scup (Source: Preliminary Dealer Weighout Data, as of May 15, 2006, and South Atlantic General Canvass Data as of June 9, 2006). Of those 148 dealers, the majority of dealers are located in four states, where 50 were in New York (34% of total), 30 were in Massachusetts (20%), 27 were in Rhode Island (18%), and 14 were in New Jersey (9%). Fewer than 10% of total dealers were located in the following states; 9 in North Carolina (6%), 7 in Connecticut (5%), 7 in Virginia (5%), 3 in Maryland (2%), and 1 in Maine (0.7%).

7.0 ENVIRONMENTAL CONSEQUENCES AND REGULATORY ECONOMIC EVALUATION OF ALTERNATIVES

7.1 Scup Rebuilding Plan Alternatives

For reference, the scup rebuilding plan alternatives under consideration are the following:

- Alternative 1A - No Action which maintains an annual constant F=0.26
- Alternative 1B - 10-year rebuilding plan at a constant F=0.136
- Preferred: Alternative 1C - 7-year rebuilding plan at a constant F=0.10
- Alternative 1D - 5-year rebuilding plan at a constant F=0.067
- Alternative 1G - <7-year rebuilding plan at a constant harvest level
- Alternative 1H - <5-year rebuilding plan at a constant harvest level

The Council identified Alternative 1C as their preferred rebuilding plan alternative; however, they recommended additional conditions to be applied to Alternative 1C upon implementation due to the uncertainty surrounding the assessment of the scup stock (see section 5.1 for additional discussion).

The outcomes and impacts of the recommended conditions by the Council on the preferred alternative are speculative. It is unknown when a review is conducted by the Council's scientific advisors whether they will or will not determine if the stock can be rebuilt within the 7-year rebuilding time period. Therefore, it is unclear as to whether more restrictive measures will need to be implemented to ensure rebuilding as soon as possible after those 7 years but not to exceed 10 years. There is also no certainty as to what the results of a review the biological reference points after the RV Bigelow has completed two full years of service will be, or if a stock assessment will or will not be completed before the end of the 7-year rebuilding time period. Therefore, it is not possible to analyze the potential impacts of those additional conditions that apply to Alternative 1C on the VECs. If in the future any of those additional conditions described in Section 5.1 are applied to Alternative 1C and result in changes to the rebuilding plan (eg. changes in targets, fishing mortality rates, rebuilding deadline), any necessary analyses would be conducted at that juncture.

7.1.1 Impacts on Managed Resource

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are expected to result in positive biological impacts on the scup stock. The rebuilding of the population biomass to a level equal to B_{MSY} would improve the health and sustainability of scup. All of the action alternatives (1B, 1C, 1D, 1G, and 1H) are expected to achieve the B_{MSY} level (5.54 kg/tow rebuilding target proxy) within 10 years or less (maximum of 10 years), with the rate at which B_{MSY} is achieved dependent on the rebuilding time period associated with each alternative. Only one alternative, the no action alternative (alternative 1A), would not result in stock rebuilding to the B_{MSY} level within 10 years or less. Alternative 1A would, however, result in some positive impact on the scup stock as the projected NEFSC Spring SSB 3-year index value of 2.96

kg/tow (2015-2017) would be higher than the current index value of 1.32 kg/tow (2004-2006); therefore, the biological impacts could be neutral to positive. It should be noted, however, that alternatives 1G and 1H, which apply a constant harvest strategy, could allow for overexploitation of the scup stock in some years, while in other years it could be underexploited due to large inter-annual variability in recruitment and year class strength of the scup stock. The end result of those constant harvest alternatives would be similar to the constant F alternatives, with the same positive impacts resulting from the population biomass of scup being rebuilt to a level equal to B_{MSY}.

7.1.2 Impacts on Non-target Species

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are not expected to result in changes in the discarding rates of scup when targeted, discarding rates when fishing for non-target species, or increased discarding of non-target species. Section 6.2 previously defined discards in the scup fishery. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps. This fishery often harvests other species, including summer flounder, black sea bass, squid, Atlantic mackerel, and silver hake. Given the mixed species nature of the scup fishery, incidental catch of other species does occur. If there are decreases in the quotas specified under the proposed stock rebuilding alternatives, slight positive impacts on other fisheries could occur. If there are increases in the quotas specified under the stock rebuilding alternatives, slight negative impacts on other fisheries could occur due to increased discarding of non-target species. However, these impacts could be offset by changes in fishery regulations (i.e., minimum fish sizes, gear requirements such as net mesh size, and trip limits) in the scup fishery. In addition, it is difficult to predict the impacts of an expanding scup age and size structure on the discard rates of scup as the stock continues to rebuild. Under all of the alternatives, the scup stock is expected to increase over the proposed rebuilding time periods.

7.1.3 Impacts on Habitat (Including EFH)

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are not expected to result in positive or negative impacts to habitat. Section 6.3 described fishing gears used in the commercial and recreational scup fishery. Rod and reel and handlines in the recreational fishery are generally not associated with adverse EFH impacts because the gear does not alter bottom structure. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps. It is difficult to predict precisely whether changes in commercial quotas specified under the proposed stock rebuilding alternatives will result in a change in fishing effort on EFH. Several possibilities exist that have an influence on fishing effort. Potentially, a smaller quota could result in fewer fishing trips or shorter fishing trips, with a corresponding reduction in habitat impacts. Conversely, a smaller quota may mean that states establish smaller possession limits, which result in an equal number of fishing trips. Similarly, with increased species abundance, catch-per-unit-effort could increase which results in the same number of tows landing a larger volume of fish. A larger quota could result in more fishing trips, with a corresponding increase in habitat impacts. It may mean that states establish higher possession limits, which result in an equal number of fishing trips. The proposed quotas under the rebuilding alternatives 1B, 1C, 1D, 1G, and 1H would likely result in the same gear impacts to bottom habitats when compared to the no action alternative. Under all of the alternatives, the scup stock is expected to increase over the proposed rebuilding time periods.

7.1.4 Impacts on Protected Resources

Relative to the no action alternative (1A) presented in this document, alternatives 1B, 1C, 1D, 1G, and 1H are not expected to result in positive or negative impacts to endangered or protected resources. Section 6.3 described fishing gears used in the commercial and recreational scup fishery. The principal gears used in the recreational scup fishery are rod and reel and handlines. Recreational gears are not categorized in the final List of Fisheries for 2006 for the taking of marine mammals by commercial fishing operations under section 118 of the Marine Mammal Protection Act of 1972. Therefore, minimal interaction is expected between rod and reel and handlines used in the scup recreational fishery and endangered and protected species.

Impacts on protected resources would be related to encounter rates as they change with fishing effort. Changes in the overall commercial fishing effort as a result of quota specified under the stock rebuilding alternatives are unknown. If the quota decreased, fishery effort could increase as vessels take more or longer trips. Conversely, fishing effort could remain constant because vessels may achieve a greater catch-per-unit-effort due to increased species abundance. Conversely, a larger quota may mean that states establish lower possession limits, which results in an equal number of fishing trips landing a larger volume of fish. These impacts could be offset by changes in fishery regulations (i.e., minimum fish sizes, gear requirements such as net mesh size, and trip limits) in the scup fishery. In addition, it is difficult to predict the impacts of an expanding scup age and size structure on the fishery as the stock continues to rebuild. The proposed quotas under the rebuilding alternatives 1B, 1C, 1D, 1G, and 1H would likely result in similar impacts on endangered and protected resources when compared to the no action alternative. Under all of the alternatives, the scup stock is expected to increase over the proposed rebuilding time periods.

7.1.5 Social and Economic Impacts

Commercial Harvesting

This section describes the potential economic effects of the proposed rebuilding strategies. The effects are evaluated from both a short-term and long-term perspective and are assessed in terms of projected changes in landings, prices, and gross revenues. Nominal and constant dollar values of impacts are estimated as well as the cumulative discounted value of gross revenues for each rebuilding alternative.

Ex-vessel prices for scup are determined jointly by market demand and supply. Although many factors affect the level of supply and demand at any point in time, given observed levels of quantities supplied and demanded an equilibrium price per pound can be calculated. If it can be shown that a measurable relationship existed between quantities supplied and demanded in the past, it is often possible to forecast how future prices may be impacted by potential changes in supply or demand.

In the following economic analysis, data on scup landings and ex-vessel revenues in the North Atlantic for the period 1980 through 2004 were obtained from the Fisheries Statistics Division of the National Marine Fisheries Service (NMFS) via the website http://www.st.nmfs.gov/st1/commercial/index.html.

These data provided the basis for an ex-vessel price model that was constructed to project how potential changes in landings during the rebuilding period will likely affect ex-vessel market prices under each of the alternatives.

The following log-linear price model was specified and estimated:

$$\text{(log) Ex-vessel Price}_t = \alpha + \beta_1 \text{(log) Landings}_t + AR_t .$$

Where (log) Ex-vessel Price is the natural log of the observed annual (nominal) ex-vessel price per pound of scup landings in the North Atlantic, (log) Landings is the natural log of the annual ex-vessel level of landings, AR is an autoregressive error term, t is time, and α and β are parameters to be estimated.

A log-linear specification for the model was chosen rather than a strict linear model, because the relationship between estimated prices and landings is not likely to be strictly linear. An increase in scup landings from 10 to 15 million pounds is not likely to have the same impact on prices as an increase from 40 to 45 million pounds (i.e., the slopes are not constant). Log-linear models are capable of capturing this distinction. There are, of course, many other more complicated functional forms that could be used to examine the relationship between scup prices and landings, and the choice of the log-linear form is motivated principally by the need for a relatively simple predictive model that is capable of adequately measuring the variation in scup prices associated with varying levels of landings.

The log-linear model was initially estimated using ordinary least squares (OLS). The error term was found to be serially correlated over time, however, so a second-order autoregressive model was estimated using the AUTOREG[4] procedure in SAS.

[4] The AUTOREG procedure augments the regression model with an autoregressive model for the random error, thereby accounting for the autocorrelation of the errors. A second-order autoregressive model was estimated because the Durbin-Watson statistic associated with the first-order OLS model indicated positive autocorrelation. The second-order Durbin-Watson statistic indicated no evidence of positive or negative autocorrelation. Maximum likelihood estimation is used in the AUTOREG procedure rather than ordinary least squares.

The final estimates were as follows:

$$\text{(log) Ex-vessel Price}_t = 8.8111 - 0.5698 \text{ (log) Landings}_t + AR_t ;$$

(7.52) (-7.84)

where

$$AR_t = 1.1165_{AR_{t-1}} - 0.4811_{AR_{t-2}} + \varepsilon_t .$$

(-5.81) (2.47)

The numbers in parentheses are the t-statistics, the total R-squared equaled 0.9505, N = 25, the first-order Durbin-Watson statistic equaled 2.1969, and the second-order Durbin-Watson statistic equaled 1.5839.

Overall, the predictive capability of the model seems to be reasonably strong. The high total R-squared value reveals that the estimated ex-vessel price values predicted by the equation correspond rather closely to the observed ex-vessel prices from 1980 to 2004. The t-statistic for the landings parameter is statistically significant at the 5% level, and landings are estimated to be negatively related to price. The value of the landings parameter (-0.57) indicates that if scup landings increase by 1%, the ex-vessel price per pound paid to harvesters declines by 0.57%.

Figure 6 shows scup landings during 1980-2004, the observed annual ex-vessel price per pound during this period, the model's predicted price per pound for each of those years, and 95% upper and lower confidence intervals. In general, from 1980-2004, landings and observed ex-vessel prices were inversely related. As can be seen from the fitted trend line, the predicted price model captures much of this observed inverse relationship. The predicted prices closely resemble the observed prices in almost all years. However, the predictions are strongest during years when landings are high as indicated by the close-fitting confidence intervals during the 1980s and early 1990s. The confidence intervals are slightly larger during the latter half of the 1990s when landings were at their lowest levels in the time series.

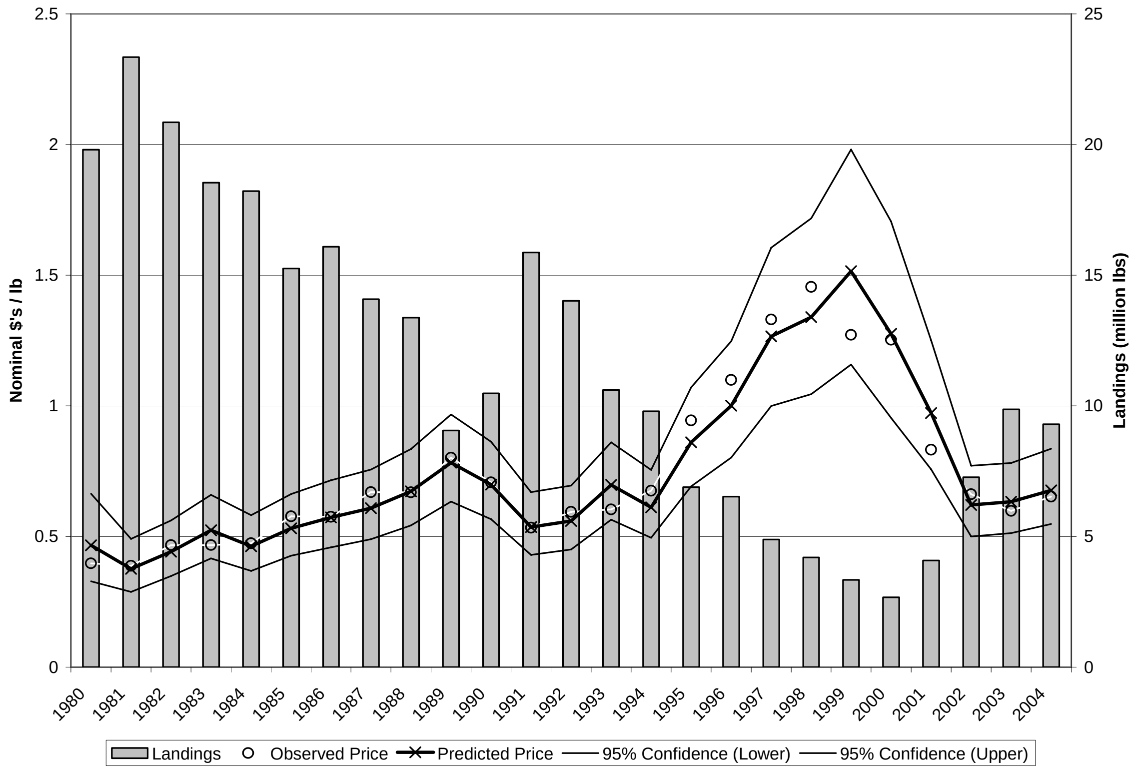


Figure 6. Ex-vessel price model regression results.

To produce ex-vessel price forecasts for each year of the rebuilding alternatives, the level of landings associated with the predicted annual commercial fishing TALs during 2007-2016 (Table 7) were incorporated into the price model. The TALs for the rebuilding strategies of less than 10 years in duration were extended to allow for a side-by-side comparison of the various rebuilding schedules. For example, the scup fishery is projected to be rebuilt after 7 years under alternative 1C. For purposes of this analysis, it was assumed the rebuilt stock would be then be fished at an F=0.26 (the current fishing mortality target) in the remaining years. This assumption results in an annual commercial TAL of 101.104 million pounds in years 8, 9, and 10 under alternative 1C. The same assumption was employed for the other rebuilding strategies of less than 10 years. Alternatives 1D and 1H are projected to be rebuilt over a five year period; alternative 1G over a seven year period. Alternative 1B is projected to rebuild after a ten year period, while the no action alternative (alternative 1A), is not projected to ever achieve the rebuilding target. For those constant harvest strategies, it is possible the stock could rebuild in less than the time period noted (i.e., 7-years or less), although the limitations of the projections prevent an exact calculation of time to rebuild. Therefore, it was assumed that the stock would rebuild over the maximum time period possible under alternatives 1G and 1H, and it should be noted that TALs and associated revenues may be higher under those alternatives if rebuilding occurs earlier than assumed in these analyses.

Table 7. Projected annual commercial TALs (millions).

	Alternatives					
Year	**1A**	**1B**	**1C**	**1D**	**1G**	**1H**
2007	24.164	13.393	10.017	6.818	10.017	6.818
2008	32.397	20.324	15.758	11.085	10.017	6.818
2009	37.891	26.502	21.214	15.366	10.017	6.818
2010	42.386	32.461	26.703	19.839	10.017	6.818
2011	46.923	38.868	32.763	24.909	10.017	6.818
2012	48.582	42.848	36.871	101.104	10.017	101.104
2013	50.331	46.745	40.950	101.104	10.017	101.104
2014	52.072	50.645	101.104	101.104	101.104	101.104
2015	52.722	53.041	101.104	101.104	101.104	101.104
2016	53.118	54.786	101.104	101.104	101.104	101.104

The resulting model-predicted ex-vessel prices associated with an annual TAL for each of the years in an alternative's rebuilding timeline were then standardized[5] to a base year (2004) so that comparisons could be made across alternatives. Standardization was accomplished by dividing the predicted prices between 2007 and 2016 by the 2004 predicted price and then multiplying that ratio by the observed 2004 ex-vessel price. The predicted standardized prices under each of the alternatives are shown in Figure 7. Ex-vessel prices are predicted to decline each year under all of the alternatives as the level of landings associated with the TALs successively increases. Constant prices are predicted for the rebuilt years when the annual commercial TAL is estimated to be 101.104 million pounds. The large decrease in ex-vessel price predicted for alternatives 1G and 1H after 7 and 5 years, respectively, is an artifact of assuming the entire scup TAL will be taken each year. The ex-vessel price associated with a rebuilt TAL of 101.104 million pounds (if fully utilized) is estimated to be considerably lower than the price corresponding to the TALs in alternatives 1G and 1H in the final year of rebuilding (10.017 and 6.818 million pounds, respectively). These large decreases in ex-vessel prices are not likely to occur if the entire rebuilt scup TAL is not taken by the fleet in the years following rebuilding. Unfortunately, it is not possible to adequately predict whether or not the fleet will harvest the indicated TALs; thus, the estimated ex-vessel prices generated in this assessment should be considered lower bound projections. If landings are lower than the projected TALs, ex-vessel prices will likely be greater than estimated with this price model.

[5] This standardization was used to change nominal prices (the absolute or current dollar price of a good or service when it is sold) to real prices (the price relative to an aggregate measure of prices or constant dollar price).

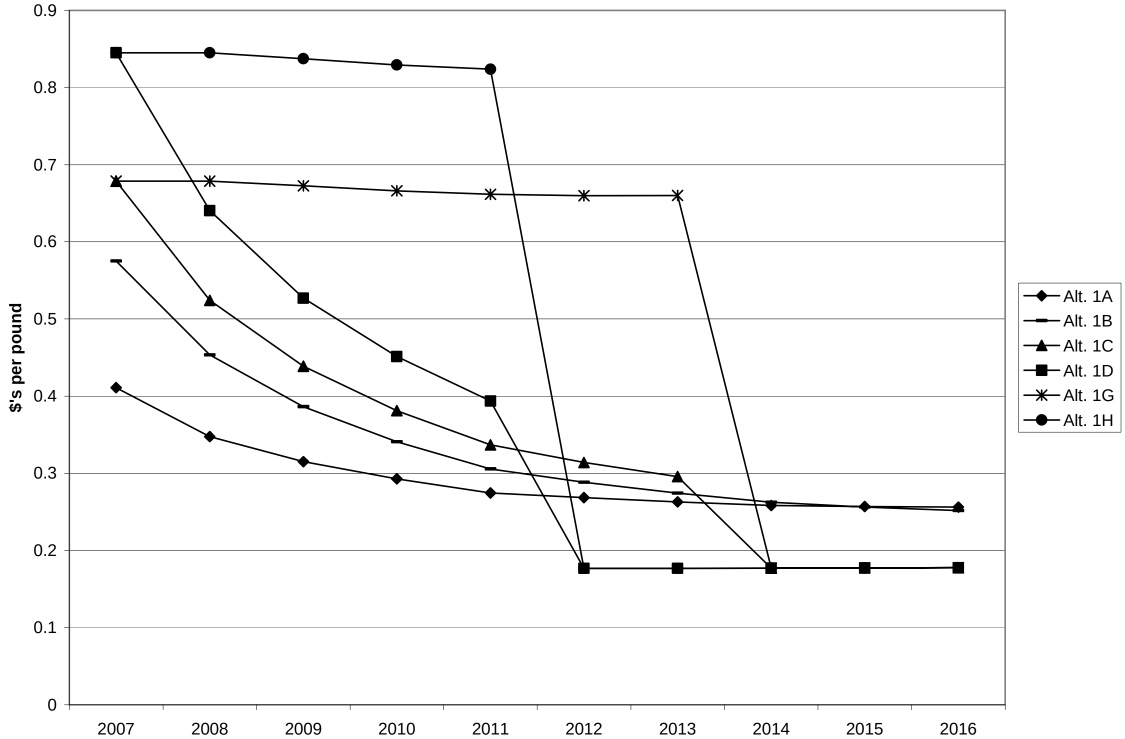


Figure 7. Projected ex-vessel prices per pound for each rebuilding strategy (2004 constant dollars).

Ex-vessel price forecasts for each of the years in an alternative's rebuilding timeline were then multiplied by the corresponding level of TAL landings for that year to predict ex-vessel revenues (Figure 8). Gross revenues for alternatives 1A and 1B are predicted to increase each successive year under rebuilding. Gross revenues for 1C and 1D also increase each year while rebuilding is occurring but then level out after the stock is considered to be rebuilt. Gross revenues for the last two alternatives (1G and 1H) remain constant during rebuilding and then rise to another constant level after rebuilding is complete.

Comparison of gross revenue streams over time, however, requires discounting future benefits to convert all benefit streams to a present value. For this purpose, a discount rate of 7% was selected as recommended by the Office of Management and Budget Circular A-94. All of the discounted annual gross revenue estimates for alternatives 1B, 1C, 1D, 1G, and 1H are estimated to be lower than those predicted for the no action alternative (1A) during rebuilding, but they exceed the no action alternative's estimates after rebuilding is complete or by the last year of rebuilding in 2016 (Figure 9). A comparison of total discounted gross revenue streams across alternatives can be made by summing the revenue streams from 2007 to 2016 (Figure 10). The no action alternative (1A) results in the largest cumulative discounted revenue stream by 2016 ($87 million). However, alternative 1A is not projected to be sufficient to rebuild the stock during the 10 year time period. Alternative 1D is projected to result in the next highest discounted cumulative revenue stream (approximately $85 million in 2004 constant dollars). Alternative 1D is followed by 1C ($82 million), 1B ($79 million), 1H ($76 million), and alternative 1G results in the lowest cumulative discounted total (approximately $66 million).

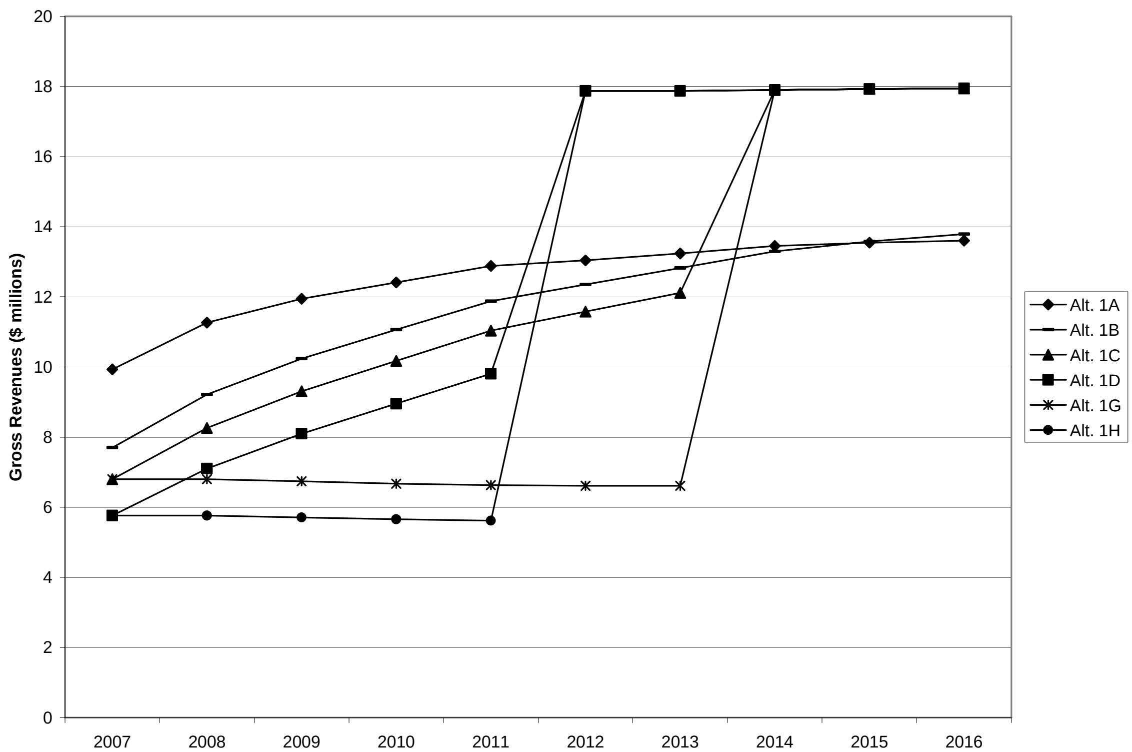


Figure 8. Projected gross revenues for each rebuilding strategy (2004 constant dollars).

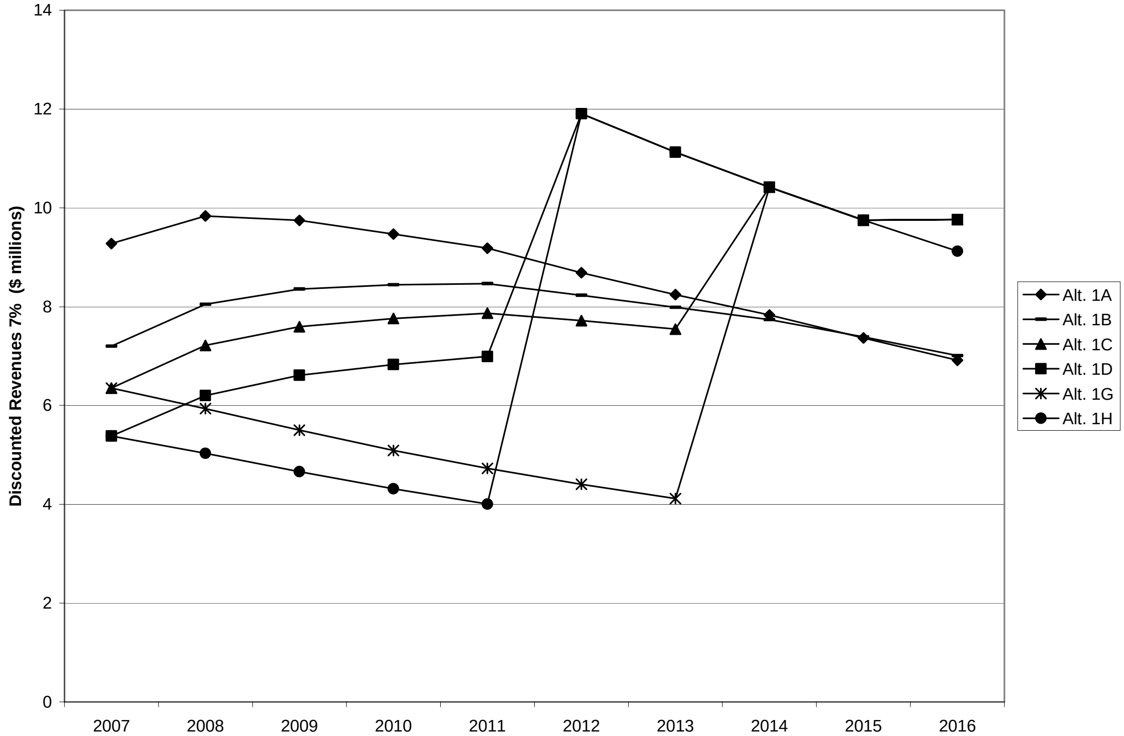


Figure 9. Present value of projected gross revenues for each alternative (7% discount rate).

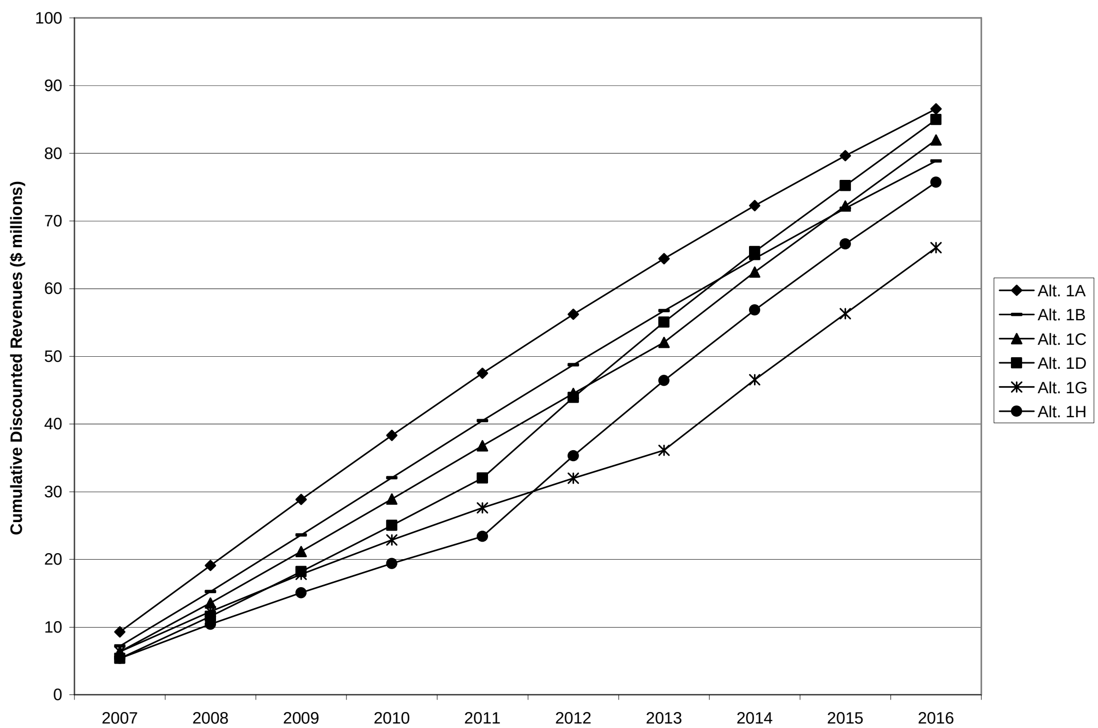


Figure 10. Cumulative present value of projected gross revenues for each alternative (7% discount rate).

Short-term impacts

Commercial landings of scup in 2005 are estimated at 9.56 million pounds. If 2005 landings values are used as a proxy for 2006 levels, potential increases in landings could be observed in 2007 under the TALs projected for alternatives 1A, 1B, 1C and 1G. The 2007 commercial TALs for alternatives 1D and 1H are projected to be 6.818 million pounds, a potential decrease of 2.742 million pounds.

If the average ex-vessel price in 2006 is assumed to be the same as in 2005 ($0.75 per pound) and then adjusted to constant 2004 dollars (standardization or real prices), comparisons can be made to the 2007 values projected by the price model. Using the same standardization procedure as indicated above results in an adjusted price of $0.72 per pound. Thus, 2006 estimated gross revenues are estimated to approximate $6.883 million (in 2004 constant dollars). Based on the projected values from the price model, this means that the 2007 TALs may potentially yield a real increase in revenue of $3.045 million under alternative 1A ($9.928 million - $6.883 million), an increase of $0.819 million under alternative 1B ($7.702 million - $6.883 million), a loss of $0.085 million under alternative 1C (6.798 million - $6.883 million), a loss of $1.122 million under alternative 1D ($5.761 million - $6.883 million), a loss of $0.085 million under alternative 1G ($6.798 million - $6.883 million), and a loss of $1.122 million under alternative 1H ($5.761 million - $6.883 million) when compared to 2006 (using 2005 landings as a proxy).

These values reflect the modeled inverse relationship between landings and ex-vessel prices. If a constant price is used to assess the relative changes in gross revenues, the results would be quite different. For example, the TAL for alternative 1C is estimated at 10.017 million pounds in 2007. This translates into a potential increase in landings of 0.457 million pounds from 2006 levels (9.56 million pounds). If the adjusted 2006 price ($0.72 per pound) is assumed to remain constant in 2007, gross revenues would be estimated at $7.212 million (10.017 x 0.72), which is an increase of $0.329 million from 2006 levels ($6.883 million). In contrast, when the inverse relationship between landings and price shown in the price model is employed, the 2007 price declines to just under $0.68 per pound ($0.6786 per pound) as landings increase to 10.017 million pounds. This translates into gross revenues of $6.8 million (10.017 x 0.6786), a decline of $0.083 million relative to 2006 ($6.883 million).

Assuming that the predicted changes in initial annual revenues in 2007 are for all participants in the fishery and that they are evenly distributed over all participants in the fishery (428 vessels that landed scup in 2005), each business unit could gain on average $7,114 in gross revenues under alternative 1A and $1,914 under alternative 1B if the entire TAL is landed in 2007. Potential losses in 2007 of $194 in gross revenues are estimated for each scup vessel under alternative 1C, $2,621 under alternative 1D, $194 under alternative 1G, and $2,621 under alternative 1H. Although these alternatives will likely have a negative short-term economic impact on some scup harvesting businesses, they are expected to result in long-term positive impacts to the industry as a whole once the scup stock rebuilds.

Recreational Fishing

Recreational landings of scup in 2005 were estimated at 2.38 million pounds. If 2005 landings values are used as a proxy for 2006 levels, potential increases in landings could be observed in 2007 under the recreational harvest limits projected for alternatives 1A, 1B, 1C and 1G. The 2007 recreational harvest limits for alternatives 1D and 1H are projected to be 1.923 million pounds, a potential decrease of 0.457 million pounds when compared to 2006 levels.

There is no empirical information available to determine how sensitive affected anglers might be to the proposed changes in scup recreational harvest limits. In other words, it is not possible to determine how affected anglers will respond to the new regulations. Scup angler trip taking behavior may remain unchanged, or the management measures may result in anglers taking fewer fishing trips or no recreational trips at all if suitable alternative target species are unavailable. Although the potential changes in trip taking behavior cannot be quantified, given the marginal changes in management measures from 2006 to those proposed for 2007 and the fact that the proposed measures do not prohibit anglers from engaging in catch and release fishing, the demand for fishing trips should remain relatively unaffected. Nevertheless, to the extent that anglers impacted by the proposed measures do take fewer trips, economic losses may accrue to businesses that support marine recreational activities.

As a summary, the total allowable landings, commercial quotas, recreational harvest limits, and projected ex-vessel gross revenues associated with the six scup rebuilding plan alternatives discussed in this amendment are presented in Table 8.

Limitations

There are several limitations to the analysis conducted in this section. The present values derived in the analysis represent industry revenues. The incorporation of changes on the cost side and consumer surplus would yield a more realistic total economic value for the fishery. However, the lack of information on fishing costs creates difficulty when assessing the net effect of the proposed options on the fishery. The lack of a demand equation for scup does not allow for the incorporation of consumer surplus into the analysis.

The analysis conducted above assumes that the entire TAL would be taken each year during the stock rebuilding period. However, if this is not the case, then the estimated revenues could be more or less than those projected above.

In addition, re-specification of the model to include variables accounting for scup substitutes in the price quantity model could yield more realistic results. Finally, it is assumed that the results provided above are not affected by other significant factors in the price determination of this analysis. However, it is possible that fluctuations in landings and prices of other fisheries, such as the groundfish fishery, could affect prices in the scup fishery.

Table 8. Associated total allowable landings, commercial quota, recreational harvest limits, and potential gross ex-vessel revenues for the rebuilding strategies.

Rebuilding schedules	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Alternative 1A (constant F=0.26)										
TAL (million lb)[a]	30.979	41.534	48.578	54.341	60.158	62.285	64.527	66.759	67.592	68.100
Commercial quota (million lb)[b]	24.164	32.397	37.891	42.386	46.923	48.582	50.331	52.072	52.722	53.118
Cumulative (million lb)	24.164	56.560	94.451	136.837	183.760	232.343	282.674	334.746	387.467	440.585
Revenue ($)[c]										
Nominal	9,928,069	11,261,658	11,941,678	12,410,293	12,879,211	13,037,261	13,238,874	13,453,717	13,547,057	13,605,071
Discounted (7%)	9,278,569	9,836,368	9,747,967	9,467,753	9,182,700	8,687,278	8,244,505	7,830,186	7,368,701	6,916,128
Cumulative Discounted (7%)	9,278,569	19,114,938	28,862,904	38,330,658	47,513,357	56,200,635	64,445,140	72,275,326	79,644,027	86,560,155
Rec. harvest limit (million lb)[d]	6.815	9.137	10.687	11.955	13.235	13.703	14.196	14.687	14.870	14.982
Cumulative (million lb)	6.815	15.953	26.640	38.595	51.830	65.533	79.728	94.415	109.286	124.268
Alternative 1B (constant F=0.136)										
TAL (million lb)[a]	17.170	26.056	33.977	41.617	49.831	54.933	59.929	64.929	68.001	70.238
Commercial quota (million lb)[b]	13.393	20.324	26.502	32.461	38.868	42.848	46.745	50.645	53.041	54.786
Cumulative (million lb)	13.393	33.716	60.218	92.680	131.548	174.396	221.140	271.785	324.826	379.611
Revenue ($)[c]										
Nominal	7,702,256	9,215,020	10,239,516	11,064,790	11,876,944	12,351,600	12,824,565	13,293,863	13,582,256	13,787,229
Discounted (7%)	7,198,370	8,048,755	8,358,495	8,441,275	8,468,097	8,230,392	7,986,494	7,737,150	7,387,847	7,008,728
Cumulative Discounted (7%)	7,198,370	15,247,126	23,605,621	32,046,896	40,514,993	48,745,385	56,731,880	64,469,029	71,856,876	78,865,605
Rec. harvest limit (million lb)[d]	3.777	5.732	7.475	9.156	10.963	12.085	13.184	14.284	14.960	15.452
Cumulative (million lb)	3.777	9.510	16.985	26.140	37.103	49.188	62.373	76.657	91.617	107.070
Alternative 1C (constant F=0.10)										
TAL (million lb)[a]	12.842	20.202	27.197	34.234	42.004	47.270	52.500	129.620	129.620	129.620
Commercial quota (million lb)[b]	10.017	15.758	21.214	26.703	32.763	36.871	40.950	101.104	101.104	101.104
Cumulative (million lb)	10.017	25.774	46.988	73.691	106.454	143.324	184.274	285.378	386.481	487.585
Revenue ($)[c]										
Nominal	6,797,624	8,259,615	9,304,683	10,173,364	11,035,270	11,578,624	12,114,803	17,897,803	17,926,060	17,944,971
Discounted (7%)	6,352,920	7,214,268	7,595,393	7,761,210	7,867,995	7,715,326	7,544,490	10,416,684	9,750,589	9,760,875
Cumulative Discounted (7%)	6,352,920	13,567,188	21,162,580	28,923,791	36,791,786	44,507,112	52,051,603	62,468,287	72,218,876	81,979,751
Rec. harvest limit (million lb)[d]	2.825	4.444	5.983	7.531	9.241	10.399	11.550	28.516	28.516	28.516
Cumulative (million lb)	2.825	7.270	13.253	20.785	30.025	40.425	51.975	80.491	109.008	137.524

Table 8 Continued. Associated total allowable landings, commercial quota, recreational harvest limits, and potential gross ex-vessel revenues for the rebuilding strategies.

Rebuilding schedules	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Alternative 1D (constant F=0.067)										
TAL (million lb)[a, e]	8.741	14.211	19.700	25.435	31.934	129.620	129.620	129.620	129.620	129.620
Commercial quota (million lb)[b]	6.818	11.085	15.366	19.839	24.909	101.104	101.104	101.104	101.104	101.104
Cumulative (million lb)	6.818	17.903	33.269	53.108	78.016	179.120	280.224	381.327	482.431	583.534
Revenue ($)[c]										
Nominal	5,760,833	7,099,795	8,099,388	8,952,746	9,808,031	17,869,160	17,871,517	17,897,803	17,926,060	17,944,971
Discounted (7%)	5,383,956	6,201,236	6,611,514	6,830,007	6,992,991	11,906,976	11,129,483	10,416,684	9,750,589	9,760,875
Cumulative Discounted (7%)	5,383,956	11,585,192	18,196,706	25,026,713	32,019,703	43,926,679	55,056,162	65,472,846	75,223,435	84,984,310
Rec. harvest limit (million lb)[d]	1.923	3.126	4.334	5.596	7.025	28.516	28.516	28.516	28.516	28.516
Cumulative (million lb)	1.923	5.049	9.383	14.979	22.005	50.521	79.037	107.554	136.070	164.587
Alternative 1G (constant harvest @ 12.842 million lb)										
TAL (million lb)[a, f]	12.842	12.842	12.842	12.842	12.842	12.842	12.842	129.620	129.620	129.620
Commercial quota (million lb)[b]	10.017	10.017	10.017	10.017	10.017	10.017	10.017	101.104	101.104	101.104
Cumulative (million lb)	10.017	20.034	30.050	40.067	50.084	60.101	70.117	171.221	272.325	373.428
Revenue ($)[c]										
Nominal	6,797,624	6,797,035	6,737,799	6,672,547	6,628,289	6,610,093	6,610,965	17,897,803	17,926,060	17,944,971
Discounted (7%)	6,352,920	5,936,794	5,500,051	5,090,454	4,725,879	4,404,584	4,116,977	10,416,684	9,750,589	9,760,875
Cumulative Discounted (7%)	6,352,920	12,289,714	17,789,764	22,880,219	27,606,097	32,010,681	36,127,658	46,544,342	56,294,931	66,055,807
Rec. harvest limit (million lb)[d]	2.825	2.825	2.825	2.825	2.825	2.825	2.825	28.516	28.516	28.516
Cumulative (million lb)	2.825	5.650	8.476	11.301	14.126	16.951	19.777	48.293	76.809	105.326

Table 8 Continued. Associated total allowable landings, commercial quota, recreational harvest limits, and potential gross ex-vessel revenues for the rebuilding strategies.

Rebuilding schedules	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Alternative 1H (constant harvest @ 8.741 million lb)										
TAL (million lb)[a, g]	8.741	8.741	8.741	8.741	8.741	129.620	129.620	129.620	129.620	129.620
Commercial quota (million lb)[b]	6.818	6.818	6.818	6.818	6.818	101.104	101.104	101.104	101.104	101.104
Cumulative (million lb)	6.818	13.636	20.454	27.272	34.090	135.194	236.297	337.401	438.504	539.608
Revenue ($)[c]										
Nominal	5,760,833	5,760,334	5,710,132	5,654,833	5,617,325	17,869,160	17,871,517	17,897,803	17,926,060	17,944,971
Discounted (7%)	5,383,956	5,031,298	4,661,169	4,314,045	4,005,075	11,906,976	11,129,483	10,416,684	9,750,589	9,122,313
Cumulative Discounted (7%)	5,383,956	10,415,254	15,076,423	19,390,468	23,395,543	35,302,519	46,432,002	56,848,686	66,599,275	75,721,588
Rec. harvest limit (million lb)[d]	1.923	1.923	1.923	1.923	1.923	28.516	28.516	28.516	28.516	28.516
Cumulative (million lb)	1.923	3.846	5.769	7.692	9.615	38.132	66.648	95.164	123.681	152.197

[a] TAL = TAC - Discards.
[b] Commercial allocation = 78% of the TAL
[c] Projections based on prices derived from the ex-vessel price model and assumes entire TAL will be landed each year
[d] Recreational allocation = 22% of the TAL
[e] Assume projected yields of 129.620 million lb after recovery period (2011 to 2016).
[f] Assume projected yields of 129.620 million lb after recovery period (2012 to 2016).
[g] Assume projected yields of 129.620 million lb after recovery period (2014 to 2016).

7.2 Gear Restricted Areas (GRAs) Alternatives

The Council has identified Alternative 2B as the preferred Gear Restricted Area alertnative.

7.2.1 Impacts on Managed Resource

Relative to the no action alternative (2A) presented in this document, alternative 2B is not expected to result in positive or negative biological impacts to the scup stock. Under alternative 2B, the scup GRAs would be modifiable through a framework under the FMP and would no longer be modified and addressed through the scup annual specification setting process. This action is purely administrative and; therefore, it is not expected to result in biological impacts on the scup stock.

7.2.2 Impacts on Non-target Species

Relative to the no action alternative (2A) presented in this document, alternative 2B is not expected to result in positive or negative biological impacts on non-target species. Under alternative 2B, the scup GRAs would be modifiable through a framework under the FMP and would no longer be modified and addressed through the scup annual specification setting process. This action is purely administrative and; therefore, it is not expected to result in changes in the discarding rates of scup when targeted, discarding rates when fishing for non-target species, or increased discarding of non-target species.

7.2.3 Impacts on Habitat (Including EFH)

Relative to the no action alternative (2A) presented in this document, alternative 2B is not expected to result in positive or negative impacts to habitat, including EFH. Under alternative 2B, the scup GRAs would be modifiable through a framework under the FMP and would no longer be modified and addressed through the scup annual specification setting process. This action is purely administrative and; therefore, it is not expected to result in impacts on habitat.

7.2.4 Impacts on Protected Resources

Relative to the no action alternative (2A) presented in this document, alternative 2B is not expected to result in positive or negative impacts to protected resources. Under alternative 2B, the scup GRAs would be modifiable through a framework under the FMP and would no longer be modified and addressed through the scup annual specification setting process. This action is purely administrative and; therefore, it is not expected to result in impacts on protected resources.

7.2.5 Social and Economic Impacts

Relative to the no action alternative (2A) presented in this document, alternative 2B is not expected to result in positive or negative social and economic impacts. Under alternative

2B, the scup GRAs would be modifiable through a framework under the FMP and would no longer be modified and addressed through the scup annual specification setting process. This action is purely administrative and; therefore, it is not expected to result in social or economic impacts.

7.3 Cumulative Effects Analysis

A cumulative effects analysis (CEA) is required by the Council on Environmental Quality (CEQ) (40 CFR part 1508.7). The purpose of CEA is to consider the combined effects of many actions on the human environment over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective, but rather, the intent is to focus on those effects that are truly meaningful. A formal cumulative impact assessment is not necessarily required as part of an Environmental Assessment under NEPA as long as the significance of cumulative impacts have been considered (U.S. EPA 1999). The following remarks address the significance of the expected cumulative impacts as they relate to the federally-managed scup fishery.

7.3.1 Consideration of the VECs

In section 6.0 (Description of the Affected Environment), the valued ecosystem components (VECs) that exist within the scup fishery environment are identified, and the basis for their selection is established. The significance of the cumulative effects will be discussed in relation to the VECs listed below.

1. Managed resource (Scup)
2. Non-target species
3. Habitat including EFH for the managed resource and non-target species
4. Endangered and protected species
5. Human communities

7.3.2 Geographic Boundaries

The analysis of impacts focuses primarily on actions related to the harvest of the scup. The core geographic scope for the managed resource, non-target species, habitat, and endangered and protected resources can be considered the overall range of these VECs in the Western Atlantic Ocean (section 6.0). For human communities, the core geographic boundaries are defined as those U.S. fishing communities directly involved in the harvest or processing of the managed resource, which were found to occur in coastal states from Maine to North Carolina (section 6.5).

7.3.3 Temporal Boundaries

The temporal scope of past and present actions for the managed resource, non-target species, habitat and human communities is primarily focused on actions that have occurred after scup FMP implementation (1996). For endangered and other protected resources, the scope of past and present actions is on a species-by-species basis (section 6.4) and is largely focused on the 1980s and 1990s through the present, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ. The temporal scope of future actions for all five VECs, including the measures proposed by this amendment, extends ten years into the future. This period was chosen because the longest time frame proposed for rebuilding the scup stock is 10 years. In addition, the temporal scope does not extend beyond ten years because the dynamic nature of resource management and lack of information on projects that may occur in the future make it difficult to predict impacts beyond this timeframe with any certainty.

7.3.4 Actions Other Than Those Proposed in this Amendment

Table 9 below presents meaningful past (P), present (Pr), or reasonably foreseeable future (RFF) actions to be considered other than those actions being considered in this amendment document. These impacts are described in chronological order and qualitatively, as the actual impacts of these actions are too complex to be quantified in a meaningful way. When any of these abbreviations occur together (i.e., P, Pr, RFF), it indicates that some past actions are still relevant to the present and/or future actions.

Past and Present Actions

The historical management practices of the Council (described in section 4.2) have resulted in positive impacts on the health of the scup stock. Scup was integrated into the Summer Flounder, Scup, and Black Sea Bass FMP in 1996, and numerous actions have been taken to manage the commercial and recreational fisheries for scup through amendment and framework actions. In addition, the annual specifications process is intended to provide the opportunity for the Council and NMFS to regularly assess the status of the fishery and to make necessary adjustments to ensure that there is a reasonable expectation of meeting the objectives of the FMP and the targets associated with any rebuilding programs under the FMP. The statutory basis for Federal fisheries management is the Magnuson-Stevens Act. That act, as amended by the SFA in 1996, promotes long-term positive impacts on the environment through National Standards included in the Act. To the degree with which this regulatory regime is complied, the cumulative impacts of past, present, and reasonably foreseeable future Federal fishery management actions on the VECs should generally be associated with positive long-term outcomes. Constraining fishing effort through regulatory actions can often have negative short-term socio-economic impacts. These impacts are usually necessary to bring about long-term sustainability of a given resource, and as such, should, in the long-term, promote positive on effects on human communities, especially those that are economically dependent upon the scup stock.

Non-fishing activities that introduce chemical pollutants, sewage, changes in water temperature, salinity, dissolved oxygen, and suspended sediment into the marine environment pose a risk to the all of the identified VECs. Human-induced non-fishing activities tend to be localized in nearshore areas and marine project areas where they occur. Examples of these activities include, but are not limited to, agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging and the disposal of dredged material. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the managed resource, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities. The overall impact to the affected species and their habitats on a population level is unknown, but likely neutral to low negative, since a large portion of these species have a limited or minor exposure to these local non-fishing perturbations.

In addition to guidelines mandated by the MSFMCA, NMFS reviews these types of effects through the review process required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by Federal, state, and local authorities. The jurisdiction of these activities is in "waters of the U.S." and includes both riverine and marine habitats.

Reasonably Foreseeable Future Actions

In terms of Reasonably Foreseeable Future (RFF) Actions that relate to the federally-managed scup fishery (Table 9), several warrant additional discussion. The development of Amendment 15 to the Summer Flounder, Scup, and Black Sea Bass FMP would continue to manage these resources in accordance with the National Standards required under the Magnuson-Stevens Act. The issues to be addressed in Amendment 15 are speculative, with many potential issues proposed for consideration by the Council and the public that would meet the FMP objectives.

In order for many of the non-fishing actions proposed in Table 9 to be permitted under other Federal agencies (such as beach nourishment, offshore wind facilities, etc.), those agencies would conduct examinations of potential biological, socioeconomic, and habitat impacts. The MSFMCA (50 CFR 600.930) imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH. The eight Fishery Management Councils are engaged in this review process by making comments and recommendations on any Federal or state action that may affect habitat, including EFH, for their managed species and by commenting on actions likely to substantially affect habitat, including EFH.

In addition, under the Fish and Wildlife Coordination Act (Section 662), “whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States, or by any public or private agency under Federal permit or license, such department or agency first shall consult with the United States Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular State wherein the” activity is taking place. This act provides another avenue for review of actions by other Federal and state agencies that may impact resources that NMFS manages in the reasonably foreseeable future.

Table 9. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the five VECs (not including those actions considered in this amendment).

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
P, Pr Original FMP and subsequent Amendments and Frameworks to the FMP (1996 to 2006)	Established commercial and recreational management measures	**Indirect Positive** Regulatory tool available to rebuild and manage stocks	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Benefited domestic businesses
P, Pr Summer Flounder, Scup, and Black Sea Bass Specifications (1997, 1998, 1999, 2001-2006)	Establish annual quotas and fishery regulations (commercial and recreational)	**Indirect Positive** Regulatory tool available to specify annual quotas and regulations; allows response to annual stock updates	**Indirect Positive** Reduced effort levels and gear requirements	**Indirect Positive** Reduced effort levels and gear requirements	**Indirect Positive** Reduced effort levels and gear requirements	**Indirect Positive** Benefited domestic businesses
P, Pr Summer Flounder, Scup, and Black Sea Bass Specifications (2000)	Established scup small mesh gear restricted areas	**Potentially Indirect Positive** Reduced fishing effort locally	**Potentially Indirect Positive** Reduced fishing effort locally	**Potentially Indirect Positive** Reduced fishing effort locally	**Potentially Indirect Positive** Reduced fishing effort locally	**Indirect Negative** Reduced availability of resource for some participants
Pr, RFF Amendment 15 to the Summer Flounder, Scup, and BSB FMP (~2009)	Comprehensive review of management practice in these fisheries	**Unknown** Pending analysis	**Unknown** Pending analysis	**Unknown** Pending analysis	**Unknown** Pending analysis	**Unknown** Pending analysis
P, Pr, RFF Agricultural runoff	Nutrients applied to agricultural land are introduced into aquatic systems	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource viability

Table 9 Continued. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the five VECs (not including those actions considered in this amendment).

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
P, Pr, RFF Port maintenance	Dredging of wetlands, coastal, port and harbor areas for port maintenance	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects
P, Pr, RFF Offshore disposal of dredged materials	Disposal of dredged materials	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource viability
P, Pr, RFF Beach nourishment	Offshore mining of sand for beaches	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Mixed** Positive for mining companies, possibly negative for fisheries
	Placement of sand to nourish beach shorelines	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Positive** Beachgoers generally like sand
P, Pr, RFF Marine transportation	Expansion of port facilities, vessel operations and recreational marinas	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Mixed** Positive for some interests, potential displacement for others
P, Pr, RFF Installation of pipelines, utility lines and cables	Transportation of oil, gas and energy through pipelines, utility lines and cables	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects	**Potentially Direct Negative** Reduced habitat quality	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects

Table 9 Continued. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the five VECs (not including those actions considered in this amendment).

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
RFF National Offshore Aquaculture Act of 2005 (currently proposed)	Proposed bill that would grant DOC authority to issue permits for offshore aquaculture in Federal waters	**Potentially Indirect Negative** Localized decreases in habitat quality possible	**Potentially Indirect Negative** Localized decreases in habitat quality possible	**Direct Negative** Localized decreases in habitat quality possible	**Potentially Indirect Negative** Localized decreases in habitat quality possible	**Unknown** Costs/benefits remain unanalyzed
RFF Offshore Wind Energy Facilities (within 5 years)	Construction of wind turbines to harness electrical power (Several facilities proposed from ME through NC, including off the coast of NY/NJ and VA)	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects
RFF Liquefied Natural Gas (LNG) terminals (within 5 years)	Transportation of natural gas via tanker to terminals located offshore and onshore (Several LNG terminals are proposed, including RI, NY, NJ and DE)	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Unknown** Dependent on mitigation effects	**Unknown** Dependent on mitigation effects
RFF Convene Atlantic Trawl Gear Take Reduction Team (2006)	Recommend measures to reduce mortality and injury to marine mammals	**Indirect Positive** Will improve data quality for monitoring total removals	**Indirect Positive** Reducing availability of gear could reduce bycatch	**Indirect Positive** Reducing availability of gear could reduce gear impacts	**Indirect Positive** Reducing availability of gear could reduce encounters	**Indirect Negative** Reducing availability of gear could reduce revenues

Table 9 Continued. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the five VECs (not including those actions considered in this amendment).

Action	Description	Impacts on Managed Resources	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Resources	Impacts on Human Communities
RFF Develop Standardized Bycatch Reporting Methodology (2006/2007)	Recommend measures to monitor bycatch in scup fisheries that will achieve an acceptable level of precision and accuracy	**Indirect Positive** Will improve data quality for monitoring total removals of managed resource	**Indirect Positive** Will improve data quality for monitoring removals of non-target species	**Neutral** Will not affect distribution of effort	**Indirect Positive** Will increase observer coverage	**Potentially Indirect Negative** May impose an inconvenience on vessel operations
RFF Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (w/in next 5 years)	May recommend strategies to prevent the bycatch of sea turtles in commercial fisheries operations	**Indirect Positive** Will improve data quality for monitoring total removals	**Indirect Positive** Reducing availability of gear could reduce bycatch	**Indirect Positive** Reducing availability of gear could reduce gear impacts	**Indirect Positive** Reducing availability of gear could reduce encounters	**Indirect Negative** Reducing availability of gear could reduce revenues

7.3.5 Magnitude and Significance of Cumulative Effects

In determining the magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions, must be taken into account.

7.3.5.1 Managed Resource (Scup)

Those past, present, and reasonably foreseeable future actions, whose effects may impact the scup stock and the direction of those potential impacts, are summarized in Table 10. The indirectly negative actions described in Table 10, which include offshore disposal of dredged materials, beach nourishment, marine transportation, and the National Offshore Aquaculture Act of 2005 (currently proposed), are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on the managed resource is expected to be limited. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on productivity of the managed resource is unquantifiable. As described above (section 7.3.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources under NMFS' jurisdiction.

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on the managed resource. It is anticipated that the future management actions, described in Table 10, will result in additional indirect positive effects on the managed resource through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which scup productivity depends. These impacts could be broad in scope. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to the managed resource have had a positive cumulative effect.

The implementation of a rebuilding plan for scup would support the long-term sustainability of the scup stock and be consistent with the objectives of the FMP under the guidance of the MSFMCA. The administration of the GRAs through regulations implementing the FMP, as opposed to annual specifications, would append the GRAs and their scup bycatch reduction measures to the FMP. Therefore, none of the proposed actions in this document would have any significant effect on the managed resource individually, or in conjunction with other anthropogenic activities.

Table 10. Summary of the effects of past, present, and reasonably foreseeable future actions on the managed resource.

<table>
<tr><th>Action (see Table 9 for more detailed description)</th><th colspan="2">Past to the Present</th><th>Reasonably Foreseeable Future</th></tr>
<tr><td>Original FMP and subsequent Amendments and Frameworks to the FMP</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications (2000)</td><td colspan="2">Potentially Indirect Positive</td><td></td></tr>
<tr><td>Amendment 15 to the Summer Flounder, Scup and Black Sea Bass FMP</td><td></td><td colspan="2">Unknown</td></tr>
<tr><td>Agricultural runoff</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Port maintenance</td><td colspan="3">Unknown</td></tr>
<tr><td>Offshore disposal of dredged materials</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Offshore mining</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Sand placement</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Marine transportation</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Installation of pipelines, utility lines and cables</td><td colspan="3">Unknown</td></tr>
<tr><td>National Offshore Aquaculture Act of 2005 (currently proposed)</td><td></td><td></td><td>Potentially Indirect Negative</td></tr>
<tr><td>Offshore Wind Energy Facilities (within 5 years)</td><td></td><td></td><td>Unknown</td></tr>
<tr><td>Liquefied Natural Gas (LNG) terminals (within 5 years)</td><td></td><td></td><td>Unknown</td></tr>
<tr><td>Convene Atlantic Trawl Gear Take Reduction Team (2006)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Develop Standardized Bycatch Reporting Methodology (2006/2007)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 5 years)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Summary of past, present, and future actions excluding those proposed in this Amendment</td><td colspan="3">Overall, actions have had, or will have, positive impacts on scup</td></tr>
</table>

7.3.5.2 Non-target Species

Those past, present, and reasonably foreseeable future actions, whose effects may impact non-target species and the direction of those potential impacts, are summarized in Table 11. The effects of indirectly negative actions described in Table 11, which include offshore disposal of dredged materials, beach nourishment, marine transportation, and the National Offshore Aquaculture Act of 2005 (currently proposed), are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on non-target species is expected to be limited. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on productivity of non-target resources and the oceanic ecosystem is unquantifiable. As described above (section 7.3.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. At this time, NMFS can consider impacts to non-target species (federally-managed or otherwise) and comment on potential impacts. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources within NMFS' jurisdiction.

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on non-target species. While the issues to be addressed in the upcoming development of Amendment 15 are unknown, these actions would be consistent with the objectives of the FMP and the National Standards, and the amendment document would include an EIS. The EIS will describe the potential impacts for non-target species from the proposed action and therefore, provide an opportunity for NMFS to implement actions which minimize those impacts. It is therefore anticipated that the future management actions, described in Table 11, will result in additional indirect positive effects on non-target species through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which the productivity of many of these non-target resources depend. In particular, standardized bycatch reporting methodology would have a particular impact on non-target species by improving the methods which can be used to assess the magnitude and extent of a potential bycatch problem. Better assessment of potential bycatch issues allows more effective and specific management measures to be developed to address a bycatch problem. The impacts of these future actions could be broad in scope, and it should be noted the managed resource and non-target species are often coupled in that they utilize similar habitat areas and ecosystem resources on which they depend. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful have had a positive cumulative effect on non-target species.

The implementation of a rebuilding plan for scup would support the long-term sustainability of the scup stock and be consistent with the objectives of the FMP under the guidance of the MSFMCA, including National Standard 9. The administration of the GRAs through regulations implementing the FMP, as opposed to annual specifications, would append the GRAs and their scup bycatch reduction measures to the FMP. Therefore, none of the proposed actions in this document would have any significant effect on the non-target species individually, or in conjunction with other anthropogenic activities.

Table 11. Summary of the effects of past, present, and reasonably foreseeable future actions on non-target species.

<table>
<tr><th>Action (see Table 9 for more detailed description)</th><th colspan="2">Past to the Present</th><th>Reasonably Foreseeable Future</th></tr>
<tr><td>Original FMP and subsequent Amendments and Frameworks to the FMP</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications (2000)</td><td colspan="2">Potentially Indirect Positive</td><td></td></tr>
<tr><td>Amendment 15 to the Summer Flounder, Scup and Black Sea Bass FMP</td><td></td><td colspan="2">Unknown</td></tr>
<tr><td>Agricultural runoff</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Port maintenance</td><td colspan="3">Unknown</td></tr>
<tr><td>Offshore disposal of dredged materials</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Offshore mining</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Sand placement</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Marine transportation</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Installation of pipelines, utility lines and cables</td><td colspan="3">Unknown</td></tr>
<tr><td>National Offshore Aquaculture Act of 2005 (currently proposed)</td><td></td><td></td><td>Potentially Indirect Negative</td></tr>
<tr><td>Offshore Wind Energy Facilities (within 5 years)</td><td></td><td></td><td>Unknown</td></tr>
<tr><td>Liquefied Natural Gas (LNG) terminals (within 5 years)</td><td></td><td></td><td>Unknown</td></tr>
<tr><td>Convene Atlantic Trawl Gear Take Reduction Team (2006)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Develop Standardized Bycatch Reporting Methodology (2006/2007)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 5 years)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Summary of past, present, and future actions excluding those proposed in this Amendment</td><td colspan="3">Overall, actions have had, or will have, positive impacts on non-target species</td></tr>
</table>

7.3.5.3 Habitat including EFH

Those past, present, and reasonably foreseeable future actions, whose effects may impact habitat (including EFH) and the direction of those potential impacts, are summarized in Table 12. The direct and indirect negative actions described in Table 12, which include offshore disposal of dredged materials, beach nourishment, marine transportation, offshore wind energy facilities, LNG terminals, and the National Offshore Aquaculture Act of 2005 (currently proposed), are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on habitat is expected to be limited. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on habitat and EFH is unquantifiable. As described above (section 7.3.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources and the habitat on which they rely prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of direct and indirect negative impacts those actions could have on habitat utilized by resources under NMFS' jurisdiction.

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on habitat and EFH. The actions have constrained fishing effort at a large scale and locally and have implemented gear requirements, which may reduce habitat impacts. It is anticipated that the future management actions, described in Table 12, will result in additional direct or indirect positive effects on habitat through actions which protect EFH for federally-managed species and protect ecosystem services on which these species productivity depends. These impacts could be broad in scope. All of the VECs are interrelated; therefore, the linkages among habitat quality and EFH, managed resource and non-target species productivity, and associated fishery yields should be considered. For habitat and EFH, there are direct and indirect negative effects from actions which may be localized or broad in scope; however, positive actions that have broad implications have been, and it is anticipated will continue to be, taken to improve the condition of habitat. There are some actions, which are beyond the scope of NMFS and Council management such as coastal population growth and climate changes, which may indirectly impact habitat and ecosystem productivity. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to habitat have had a neutral to positive cumulative effect.

The implementation of a rebuilding plan for scup would support the long-term sustainability of the scup stock and be consistent with the objectives of the FMP under the guidance of the MSFMCA, including EFH. The administration of the GRAs through regulations implementing the FMP, as opposed to annual specifications, would append the GRAs and their scup bycatch reduction measures to the FMP. Therefore, none of the proposed actions in this document would have any significant effect on habitat individually, or in conjunction with other anthropogenic activities.

Table 12. Summary of the effects of past, present, and reasonably foreseeable future actions on habitat (including EFH).

<table>
<tr><th>Action (see Table 9 for more detailed description)</th><th colspan="2">Past to the Present</th><th>Reasonably Foreseeable Future</th></tr>
<tr><td>Original FMP and subsequent Amendments and Frameworks to the FMP</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications (2000)</td><td colspan="2">Potentially Indirect Positive</td><td></td></tr>
<tr><td>Amendment 15 to the Summer Flounder, Scup and Black Sea Bass FMP</td><td></td><td colspan="2">Unknown</td></tr>
<tr><td>Agricultural runoff</td><td colspan="3">Direct Negative</td></tr>
<tr><td>Port maintenance</td><td colspan="3">Unknown</td></tr>
<tr><td>Offshore disposal of dredged materials</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Offshore mining</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Sand placement</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Marine transportation</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Installation of pipelines, utility lines and cables</td><td colspan="3">Unknown</td></tr>
<tr><td>National Offshore Aquaculture Act of 2005 (currently proposed)</td><td></td><td></td><td>Direct Negative</td></tr>
<tr><td>Offshore Wind Energy Facilities (within 5 years)</td><td></td><td></td><td>Potentially Direct Negative</td></tr>
<tr><td>Liquefied Natural Gas (LNG) terminals (within 5 years)</td><td></td><td></td><td>Potentially Direct Negative</td></tr>
<tr><td>Convene Atlantic Trawl Gear Take Reduction Team (2006)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Develop Standardized Bycatch Reporting Methodology (2006/2007)</td><td></td><td></td><td>Neutral</td></tr>
<tr><td>Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 5 years)</td><td></td><td></td><td>Indirect Positive</td></tr>
<tr><td>Summary of past, present, and future actions excluding those proposed in this Amendment</td><td colspan="3">Overall, actions have had, or will have, neutral to positive impacts on habitat (including EFH)</td></tr>
</table>

7.3.5.4 Protected Resources

Those past, present, and reasonably foreseeable future actions, whose effects may impact the protected resources and the direction of those potential impacts, are summarized in Table 13. The indirectly negative actions described in Table 13, which include offshore disposal of dredged materials, beach nourishment, marine transportation, and the National Offshore Aquaculture Act of 2005 (currently proposed), are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on protected resources, relative to the range of many of the protected resources, is expected to be limited. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on protected resources either directly or indirectly is unquantifiable. As described above (section 7.3.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' protected resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on protected resources under NMFS' jurisdiction.

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on protected resources through the reduction of fishing effort (potential interactions) and implementation of gear requirements. It is anticipated that the future management actions, specifically the Atlantic Trawl Gear Take Reduction Team and the development of strategies for sea turtle conservation described in Table 13, will result in additional indirect positive effects on the protected resources through management actions. These impacts could be broad in scope. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to protected resources have had a positive cumulative effect.

The implementation of a rebuilding plan for scup would support the long-term sustainability of the scup stock and be consistent with the objectives of the FMP under the guidance of the MSFMCA. The administration of the GRAs through regulations implementing the FMP, as opposed to annual specifications, would append the GRAs and their scup bycatch reduction measures to the FMP. Therefore, none of the proposed actions in this document would have any significant effect on protected resources individually, or in conjunction with other anthropogenic activities.

Table 13. Summary of the effects of past, present, and reasonably foreseeable future actions on protected resources.

<table>
<tr><th>Action (see Table 9 for more detailed description)</th><th>Past to the Present</th><th>Reasonably Foreseeable Future</th></tr>
<tr><td>Original FMP and subsequent Amendments and Frameworks to the FMP</td><td>Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications</td><td>Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications (2000)</td><td>Potentially Indirect Positive</td><td></td></tr>
<tr><td>Amendment 15 to the Summer Flounder, Scup and BSB FMP (~2009)</td><td></td><td>Unknown</td></tr>
<tr><td>Agricultural runoff</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Port maintenance</td><td colspan="2">Unknown</td></tr>
<tr><td>Offshore disposal of dredged materials</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Offshore mining</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Sand placement</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Marine transportation</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Installation of pipelines, utility lines and cables</td><td colspan="2">Unknown</td></tr>
<tr><td>National Offshore Aquaculture Act of 2005 (currently proposed)</td><td></td><td>Potentially Indirect Negative</td></tr>
<tr><td>Offshore Wind Energy Facilities (within 5 years)</td><td></td><td>Unknown</td></tr>
<tr><td>Liquefied Natural Gas (LNG) terminals (within 5 years)</td><td></td><td>Unknown</td></tr>
<tr><td>Convene Atlantic Trawl Gear Take Reduction Team (2006)</td><td></td><td>Indirect Positive</td></tr>
<tr><td>Develop Standardized Bycatch Reporting Methodology (2006/2007)</td><td></td><td>Indirect Positive</td></tr>
<tr><td>Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 5 years)</td><td></td><td>Indirect Positive</td></tr>
<tr><td>Summary of past, present, and future actions excluding those proposed in this Amendment</td><td colspan="2">Overall, actions have had, or will have, positive impacts on protected resources</td></tr>
</table>

7.3.5.5 Human Communities

Those past, present, and reasonably foreseeable future actions, whose effects may impact human communities and the direction of those potential impacts, are summarized in Table 14. The indirectly negative actions described in Table 14, which include offshore disposal of dredged materials, beach nourishment, marine transportation, and the National Offshore Aquaculture Act of 2005 (currently proposed), are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on human communities is expected to be limited in scope. It may, however, displace fishermen from project areas. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude. This may result in indirect negative impacts on human communities by reducing resource availability; however, this effect is unquantifiable. As described above (section 7.3.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact human communities which are sustained by NMFS' resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on human communities that rely on NMFS' resources for their income and livelihood.

Past fishery management actions taken through the FMP and annual specification process have had both positive and negative cumulative effects by benefiting domestic fisheries through sustainable fishery management practices, while at the same time potentially reducing the availability of the resource to all participants. Sustainable management practices are, however, expected to yield broad positive impacts to fishermen, their communities, businesses, and the nation as a whole. It is anticipated that the future management actions, described in Table 14, will result in positive effects for human communities due to sustainable management practices, although additional indirect negative effects on the human communities could occur through management actions that may implement gear requirements or area closures and thus, reduce revenues. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to human communities have had a positive cumulative effect.

The implementation of a rebuilding plan for scup would support the long-term sustainability of the scup stock, and therefore the human communities which rely on this resource, and be consistent with the objectives of the FMP under the guidance of the MSFMCA. The administration of the GRAs through regulations implementing the FMP, as opposed to annual specifications, would append the GRAs and their scup bycatch reduction measures to the FMP. Therefore, none of the proposed actions in this document would have any significant effect on human communities individually, or in conjunction with other anthropogenic activities.

Table 14. Summary of the effects of past, present, and reasonably foreseeable future actions on human communities.

<table>
<tr><th>Action (see Table 9 for more detailed description)</th><th colspan="2">Past to the Present</th><th>Reasonably Foreseeable Future</th></tr>
<tr><td>Original FMP and subsequent Amendments and Frameworks to the FMP</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications</td><td colspan="2">Indirect Positive</td><td></td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications (2000)</td><td colspan="2">Indirect Negative</td><td></td></tr>
<tr><td>Amendment 15 to the Summer Flounder, Scup and Black Sea Bass FMP</td><td></td><td colspan="2">Unknown</td></tr>
<tr><td>Agricultural runoff</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Port maintenance</td><td colspan="3">Unknown</td></tr>
<tr><td>Offshore disposal of dredged materials</td><td colspan="3">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Offshore mining</td><td colspan="3">Mixed</td></tr>
<tr><td>Beach nourishment – Sand placement</td><td colspan="3">Positive</td></tr>
<tr><td>Marine transportation</td><td colspan="3">Mixed</td></tr>
<tr><td>Installation of pipelines, utility lines and cables</td><td colspan="3">Unknown</td></tr>
<tr><td>National Offshore Aquaculture Act of 2005 (currently proposed)</td><td></td><td></td><td>Unknown</td></tr>
<tr><td>Offshore Wind Energy Facilities (within 5 years)</td><td></td><td></td><td>Unknown</td></tr>
<tr><td>Liquefied Natural Gas (LNG) terminals (within 5 years)</td><td></td><td></td><td>Unknown</td></tr>
<tr><td>Convene Atlantic Trawl Gear Take Reduction Team (2006)</td><td></td><td></td><td>Indirect Negative</td></tr>
<tr><td>Develop Standardized Bycatch Reporting Methodology (2006/2007)</td><td></td><td></td><td>Potentially Indirect Negative</td></tr>
<tr><td>Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 5 years)</td><td></td><td></td><td>Indirect Negative</td></tr>
<tr><td>Summary of past, present, and future actions excluding those proposed in this Amendment</td><td colspan="3">Overall, actions have had, or will have positive impacts on human communities</td></tr>
</table>

7.3.5.6 Preferred Action on all the VECS

The Council has identified Alternatives 1C and 2B as their preferred action alternatives. The cumulative effects of the range of actions considered in this document can be considered to make a determination if significant cumulative effects are anticipated from the preferred action.

Table 15. Magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions.

VEC	Status in 2006	Net Impact of P, Pr, and RFF Actions	Impact of the Proposed Action	Significant Cumulative Effects
Managed Resource	Overfished; overfishing unknown (Section 6.1)	Positive (Sections 7.3.4 and 7.3.5.1)	Neutral to positive (Sections 7.1.2 and 7.2.2)	**None**
Non-target Species	Complex and variable (Section 6.2)	Positive (Sections 7.3.4 and 7.3.5.2)	Neutral (Sections 7.1.2 and 7.2.2)	**None**
Habitat	Complex and variable (Section 6.3)	Neutral to positive (Sections 7.3.4 and 7.3.5.3)	Neutral (Sections 7.1.3 and 7.2.3)	**None**
Protected Resources	Complex and variable (Section 6.4)	Positive (Sections 7.3.4 and 7.3.5.4)	Neutral (Sections 7.1.4 and 7.2.4)	**None**
Human Communities	Complex and variable (Section 6.5)	Positive (Sections 7.3.4 and 7.3.5.5)	Short-term-Negative to positive; Long-term-Positive (Sections 7.1.4 and 7.2.4)	**None**

The impacts of this proposed action on the VECs are described in sections 7.1 and 7.2. The magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions, have been taken into account throughout this Section 7.3. The action proposed in this document builds off action taken in the original FMP and subsequent amendments and framework documents. When this action is considered in conjunction with all the other pressures placed on fisheries by past, present, and reasonably foreseeable future actions, it is not expected to result in any significant impacts, positive or negative. Based on the information and analyses presented in these past FMP documents and this document, there are no significant cumulative effects associated with the action proposed in this document.

8.0 EFH ASSESSMENT

Scup have EFH designated in many of the same bottom habitats that have been designated as EFH for most of the MAFMC managed species. Such MAFMC-managed species include surfclams/ocean quahogs, squid/mackerel/butterfish, bluefish, summer flounder, black sea bass, and dogfish, as well as the New England Fishery Management Council species of groundfish within the Northeast Multispecies FMP, including: Atlantic cod, haddock, monkfish, ocean pout, American plaice, pollock, redfish, white hake, windowpane flounder, winter flounder, witch flounder, yellowtail flounder, Atlantic halibut, and Atlantic sea scallops. Numerous species within the NMFS Highly Migratory Species Division and the South Atlantic Fishery Management Council have EFH identified in areas also identified as EFH for summer flounder, scup and black sea bass. Broadly, EFH is designated as the pelagic and demersal waters along the continental shelf from off southern New England through the south Atlantic to Cape Canaveral, Florida. The specific identification and description of summer flounder, scup, and black sea bass EFH is detailed in section 3.2.4 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP. Specific habitats that are designated as EFH and are important to scup are described in section 6.3 of this document.

8.1 Description of Action

A description of the alternatives proposed in this amendment document to address rebuilding of the scup stock and potentially shifting administration of the scup GRAs from the annual specifications process to the FMP are provided in section 5.0. Under the EFH Final Rule, "Councils must act to prevent, mitigate, or minimize any adverse effect from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature..." "Adverse effect" means any impact that reduces the quality or quantity of EFH. Summer flounder, scup, and black sea bass are primarily landed using otter trawls and pots/traps. The baseline, potential impacts of otter trawls and pots/traps are described in detail and evaluated in section 3.2.7.2.2 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP. That evaluation indicates that the baseline impact of otter trawls and pots/traps on EFH is "more than minimal and not temporary in nature" (section 3.2.7.2.2 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP). As such, in Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP, the Council proposed alternatives to prevent, mitigate or minimize adverse effects from these gear (section 2.2 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP) and evaluated those alternatives for practicability (section 4.2 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP). As discussed in section 6.3 of this EA, because of the narrow scope of this amendment document and requirements that it be implemented in a timely manner ((50 CFR 600.310(e)(3))), the effects of fishing on EFH have not been re-evaluated, and no alternatives to minimize adverse effects on EFH are presented. An evaluation of the best scientific information and potential alternatives that minimize adverse effects of fishing on EFH to the extent practicable will be performed in a subsequent amendment document.

8.2 Analysis of Potential Adverse Effects on EFH

The action proposed in this document is necessary to achieve rebuilding of the scup stock. The scup rebuilding measure proposed in this amendment document may have effects to EFH that range from impacts remaining the same to impacts that are less than existing impacts. The action associated with the GRAs is not expected to have an adverse effect on EFH. The impacts of the action proposed in this EA on EFH are described in detail in section 7.0.

8.3 Determination of Habitat Impacts for Selected Measures and for the Action

The Council has identified Alternatives 1C and 2B as their preferred action alternatives. The effects of the action proposed in this document can be considered to make a determination if habitat impacts are anticipated.

The scup rebuilding measure proposed in this amendment document may have effects on EFH that range from impacts remaining the same to impacts that are less than existing impacts. The action associated with the GRAs will not have an adverse effect on EFH. Since the change in quota for scup associated with rebuilding the stock is a balance of meeting the FMP objectives and minimizing impacts on the VECs and due to the lack of direct evidence to suggest that fishing effort on bottom habitats will increase due to action taken under this amendment, it is expected that this action minimizes the adverse effects of fishing on EFH to the extent practicable, pursuant to section 305(a)(7) of the Magnuson-Stevens Fishery Conservation and Management Act.

9.0 APPLICABLE LAWS

9.1 Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

9.1.1 National Standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act requires that fishery management plans (FMPs) contain conservation and management measures that are consistent with the ten National Standards. The Council continues to manage the scup fishery in accordance with the National Standards required under the Magnuson-Stevens Act. Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP fully addresses how the management actions implemented to successfully manage scup comply with the National Standards. First and foremost, the Council continues to meet the obligations of National Standard 1 by adopting and implementing conservation and management measures that will continue to prevent overfishing, while achieving, on a continuing basis, the optimum yield for summer flounder and the U.S. fishing industry. The Council uses the best scientific information available (National Standard 2) and manages scup throughout its range (National Standard 3). These management measures do not discriminate among residents of different states (National Standard 4), they do not have economic allocation as their sole purpose (National Standard 5), the measures account for variations in fisheries (National Standard 6), they avoid unnecessary duplication (National Standard 7), they take into account the fishing communities (National Standard 8) and they promote safety at sea (National Standard 10). Finally, actions taken are consistent with National Standard 9, which addresses bycatch in fisheries. The Council has implemented many regulations that have indirectly acted to reduce fishing gear impacts on EFH. By continuing to meet the National Standards requirements of the Magnuson-Stevens Act through future FMP amendments and framework actions, the Council will insure that cumulative impacts of these actions will remain positive overall for the ports and communities that depend on these fisheries, the Nation as a whole, and certainly for the resources.

9.2 NEPA

9.2.1 Finding of No Significant Impact (FONSI)

National Oceanic and Atmospheric Administration Administrative Order 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 to 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?

The proposed action presented in this document is not expected to jeopardize the sustainability of scup. The proposed action will ensure the long-term sustainability of harvests from the scup stock through the implementation of a rebuilding plan for this overfished stock. Making the GRAs modifiable through a framework is purely administrative and therefore does not impact the sustainability of the managed resource.

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

The proposed action presented in this document is not expected to jeopardize the sustainability of any non-target species. This action is not expected to alter fishing methods or activities.

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?

The proposed action is not expected to cause damage to the ocean, coastal habitats, and/or EFH as defined under the Magnuson-Stevens Act and identified in the FMP (Section 7.0). In general, bottom-tending mobile gear, primarily otter trawls, has the potential to adversely affect EFH as detailed in section 6.3 of the EA. The quota-setting measures proposed in this action will either reduce the amount of time that bottom trawling vessels spend fishing for scup or maintain it at the same level as the status quo alternative. In either case, no adverse impacts to the marine habitats or EFH are expected. Similarly, none of the other measures included in the proposed action will have any adverse habitat impact.

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

The proposed measure does not alter the manner in which the industry conducts fishing activities for the target species. Therefore, no changes in fishing behavior that would affect safety are anticipated. The overall effect of the proposed action on the scup fishery, including the communities in which it operates, will not impact adversely public health or safety. NMFS will consider comments received concerning safety and public health issues.

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

The proposed action is not expected to alter fishing methods or activities, or the spatial or temporal distribution of these activities. Therefore, this action is not expected to affect endangered or threatened species or critical habitat in any manner not considered in previous consultations on the 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.)?

The proposed action is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area. This action is not expected to alter fishing methods or activities, nor is it expected to increase fishing effort or the spatial and/or temporal distribution of current fishing effort. The proposed action will likely contribute to biodiversity and ecosystem stability over the long term as the scup stock rebuilds.

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

As discussed in section 7.0 of this EA, the proposed action is not expected to result in significant social or economic impacts, or significant natural or physical environmental effects.

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

Measures contained in this EA are not expected to be controversial. This action addresses issues relating to the rebuilding of the scup stock to sustainable levels and making the GRAs modifiable through a framework.

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?

The scup fishery is not known to be prosecuted in any unique areas such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. Therefore, the proposed action is not expected to have a substantial impact on any of these areas.

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

The impacts of the proposed measure on the human environment are described in section 7.0 of this EA. This action is not expected to alter fishing methods or activities in the scup fishery. Therefore, measures contained in this action are not expected to have highly uncertain, unique, or unknown risks on the human environment.

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

As discussed in section 7.3, the proposed action is not expected to have individually insignificant, but cumulatively significant impacts. The proposed action, together with past, present, and future actions is not expected to result in significant cumulative impacts on the human environment.

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?

The impacts of the proposed measure on the human environment are described in section 7.0 of this EA. The scup fishery is not known to be prosecuted in any areas that might affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause the loss or destruction of significant scientific, cultural or historical resources. Therefore, the proposed action is not expected to affect any of these areas.

13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

There is no evidence or indication that the prosecution of the scup fishery has ever resulted in the introduction or spread of nonindigenous species. This action is not expected to alter fishing methods or activities in the scup fishery, or the spatial and/or temporal distribution of this fishery. Therefore, it is highly unlikely that the action described in this EA would be expected to result in the introduction or spread of a 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?

The proposed action is not expected to establish a precedent for future actions with significant effects in this fishery or other fisheries. This action does not result in significant effects, nor does it represent a decision in principle about a future consideration.

The proposed action is not expected to alter fishing methods or activities in the scup fishery such that they threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. In fact, the proposed measures have been found to be consistent with other applicable laws (see sections 9.3 - 9.10 below).

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?

The impacts of the preferred alternatives on the biological, physical, and human environment are described in sections 7.1 and 7.2 of this EA. The cumulative effects of the proposed action on target and non-target species are detailed in section 7.3. The proposed action is not expected to alter fishing methods or activities in the summer flounder recreational fishery, or the spatial and/or temporal distribution of this fishery. The synergistic interaction of improvements in the condition of the scup stock as it rebuilds and increased flexibility in the timing of administration of the scup GRAs by making them modifiable through a framework is expected to generate slightly positive impacts overall.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting EA prepared for Amendment 14 to the Summer Flounder, Scup, and Black Sea Bass FMP, it is hereby determined that the proposed actions 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*

9.3 Endangered Species Act

Sections 6.4, 7.1.4, and 7.2.4 of the EA should be referenced for an assessment of the impacts of the proposed action on endangered species and protected resources. The action proposed in this document is not expected to alter fishing methods or activities. Therefore, this action is not expected to affect endangered or threatened species or critical habitat in any manner not considered in previous consultations on the fisheries.

9.4 Marine Mammal Protection Act

Sections 6.4, 7.1.4, and 7.2.4 of the EA should be referenced for an assessment of the impacts of the proposed action on marine mammals. The action proposed in this document is not expected to alter fishing methods or activities. Therefore, this action is not expected to affect marine mammals or critical habitat in any manner not considered in previous consultations on the fisheries.

9.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, provides measures for ensuring stability of productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals.

The Council must determine whether the FMP will affect a state's coastal zone. If it will, the FMP must be evaluated relative to the state's approved CZM program to determine whether it is consistent to the maximum extent practicable. The states have 60 days in which to agree or disagree with the Council's evaluation. If a state fails to respond within 60 days, the state's agreement may be presumed. If a state disagrees, the issue may be resolved through negotiation or, if that fails, by the Secretary.

The Council determined that the action in this amendment is consistent to the maximum extent practicable with the enforceable provisions of the approved coastal management programs as understood by the Council. This determination was submitted for review by the responsible state agencies on February 26, 2007, under section 307 of the Coastal Zone Management Act. Letters were sent to each of the following states within the management unit reviewing the consistency of the proposed action relative to each state’s Coastal Zone Management Program: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. To request a copy of the letter or a list of the CZM contacts for each state, contact Daniel T. Furlong at the Mid-Atlantic Fishery Management Council, Room 2115 Federal Building, 300 South New Street, Dover, Delaware 19904-6790, Telephone: (302) 674-2331, Fax: (302) 674-5399.

9.6 Administrative Procedure Act

Sections 553 of the Federal Administrative Procedure Act (5 USC. §551 et. seq.) establish procedural requirements applicable to informal rulemaking by Federal agencies. The purpose is to ensure public access to the Federal rulemaking process and to give the public notice and an opportunity to comment before the agency promulgates new regulations.

The Administrative Procedure Act requires solicitation and review of public comments on actions taken in the development of a fishery management plan and subsequent amendments and framework adjustments. Development of this amendment provided many opportunities for public review, input, and access to the rulemaking process. This proposed document was developed as a result of a multi-stage process that involved review by affected members of the public. The public had the opportunity to review and comment on these actions during the MAFMC Meetings held in August 2006 and October 2006. In addition, the public will have further opportunity to comment on this amendment once NMFS publishes a request for comments notice in the Federal Register (FR). The public will have the opportunity, as well, to comment on the proposed rule published to implement this amendment.

9.7 Section 515 (Information Quality Act)

Pursuant to NMFS guidelines implementing Section 515 of Public Law 106-554 (the Information Quality Act), all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies. To facilitate the Pre-Dissemination Review, this document addresses the utility, integrity, and objectivity of the information included in the document and used as the basis for making decisions regarding the proposed action.

Utility

Utility means that disseminated information is useful to its intended users. "Useful" means that the content of the information is helpful, beneficial, or serviceable to its intended users, or that the information supports the usefulness of other disseminated information by making it more accessible or easier to read, see, understand, obtain or use.

The information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the alternatives considered by the Council, and the analyses of the potential impacts of the proposed action to fishery resources, habitat, protected resources, and affected entities and communities so that intended users may have a full understanding of the proposed action and its implications.

This document is the first and only information product that provides the information described above. It includes the most current available relevant data and provides these data in a form that is intended to be useful and accessible to the public.

This document will be made available to the public via several media: Online, through the NMFS Northeast Regional Office web page at http://www.nero.noaa.gov; in hardcopy, available at the request of the public; and at Council meetings. Online, the document will be available in a standard format for such documents, that of "Portable Document Format," or PDF.

Integrity

Integrity refers to security-the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification. Prior to dissemination, NMFS information, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information.

All electronic information disseminated by NMFS adheres to the standards set out in Appendix III, "Security of Automated Information Resources," of OMB Circular A-130; the Computer Security Act; and the Government Information Security Act. All confidential information (e.g., dealer purchase reports) is safeguarded pursuant to the Privacy Act; Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business, and financial information); the Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity

Objective information is presented in an accurate, clear, complete, and unbiased manner, and in proper context. The substance of the information is accurate, reliable, and unbiased; in the scientific, financial, or statistical context, original and supporting data are generated and the analytical results are developed using sound, commonly accepted scientific and research methods. "Accurate" means that information is within an acceptable degree of imprecision or error appropriate to the particular kind of information at issue and otherwise meets commonly accepted scientific, financial, and statistical standards.

This document is considered, for purposes of the Pre-Dissemination Review, to be a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act.

The review process for this amendment involves the Council, the NEFSC, the Northeast Regional Office, NMFS headquarters, and NOAA/NEPA. The NEFSC technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment methods, demersal resources, population biology, and the social sciences. These reviewers will comment on the technical merits of any analyses included in this document. The Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the amendment document. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the document and clearance of the rule is conducted by staff at NMFS Headquarters, NOAA, the Department of Commerce, and the U.S. Office of Management and Budget.

9.7 Paperwork Reduction Act

The Paperwork Reduction Act (PRA) concerns the collection of information. The intent of the PRA is to minimize the Federal paperwork burden for individuals, small businesses, state and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government. There are no changes to the existing reporting requirements previously approved under this FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act.

9.8 Impacts of the Plan Relative to Federalism/EO 13132

This amendment does not contain policies with Federalism implications sufficient to warrant preparation of a Federalism assessment under Executive Order (EO) 13132.

9.9 Environmental Justice/EO 12898

This EO provides that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” EO 12898 directs each Federal agency to analyze the environmental effects, including human health, economic, and social effects of Federal actions on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA. Agencies are further directed to “identify potential effects and mitigation measures in consultation with affected communities, and improve the accessibility of meetings, crucial documents, and notices.”

Since the proposed action is not expected to affect participation in the scup fishery, no negative economic or social effects are anticipated as a result (section 7.0). Therefore, the proposed action under the preferred alternative is not expected to cause disproportionately high and adverse human health, environmental or economic effects on minority populations, low-income populations, or Indian tribes.

9.10 Regulatory Impact Review/Initial Regulatory Flexibility Analysis (RFA/IRFA)

9.10.1 Introduction

The National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions that either implement a new Fishery Management Plan (FMP) or significantly amend an existing plan. This RIR is part of the process of preparing and reviewing FMPs and provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. This analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of this analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. This RIR addresses many items in the regulatory philosophy and principles of EO 12866.

Also included is an Initial Regulatory Flexibility Analysis (IRFA), as required by the Regulatory Flexibility Act, to evaluate the economic impacts of the alternatives on small business entities. This analysis is undertaken in support of a more thorough analysis of the proposed action.

9.10.2 Evaluation of EO 12866 Significance

9.10.2.1 Description of the Management Objectives

A complete description of the purpose and need and objectives of this proposed rule is found under section 4.0. This action is taken under the authority of the Magnuson-Stevens Act and regulations at 50 CFR part 648.

9.10.2.2 Description of the Fishery

A description of the scup fishery is presented in section 6.0. A description of ports and communities that are dependent on scup is found in section 3.4.2 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP. Recent landing patterns among ports are examined in section 6.5.1. An analysis of permit data is found in section 6.5.2.

9.10.2.3 A Statement of the Problem

A statement of the problem for resolution is presented under section 4.0.

9.10.2.4 A Description of Each Alternative

A full description of the alternatives analyzed in this section is presented in sections 5.0.

9.10.2.5 Analysis of Alternatives

For each alternative, potential impacts on several areas of interest are discussed. The objective of this analysis is to describe clearly and concisely the economic effects of the various alternatives. The types of effects that should be considered include the following: changes in landings, prices, consumer and producer benefits, harvesting costs, enforcement costs, and distributional effects. Due to the lack of an empirical model for this fishery and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was adopted. Nevertheless, quantitative measures are provided whenever possible.

A more detailed description of the economic concepts involved can be found in "Guidelines for Economic Analysis of Fishery Management Actions" (NMFS 2000), as only a brief summary of key concepts will be presented here.

Benefit-cost analysis is conducted to evaluate the net social benefit arising from changes in consumer and producer surpluses that are expected to occur upon implementation of a regulatory action. Total Consumer Surplus (CS) is the difference between the amounts consumers are willing to pay for products or services and the amounts they actually pay. Thus CS represents net benefits to consumers. When the information necessary to plot the supply and demand curves for a particular commodity is available, CS is represented by the area that is below the demand curve and above the market clearing price where the two curves intersect. Since an empirical model describing the elasticities of supply and demand for these species is not available, it was assumed that the price for these species was determined by the market clearing price or the intersection of the supply and demand curves. These market clearing prices were the base prices used to determine potential changes in price that could occur in response to changes in landings.

Net benefit to producers is producer surplus (PS). Total PS is the difference between the amounts producers actually receive for providing goods and services and the economic cost producers bear to do so. Graphically, it is the area above the supply curve and below the market clearing price where supply and demand intersect. Economic costs are measured by the opportunity cost of all resources including the raw materials, physical and human capital used in the process of supplying these goods and services to consumers.

One of the more visible costs to society due to fisheries regulation are enforcement costs. From a budgetary perspective, the cost of enforcement is equivalent to the total public expenditure devoted to enforcement. However, the economic cost of enforcement is measured by the opportunity cost of devoting resources to enforcement vis à vis some other public or private use and/or by the opportunity cost of diverting enforcement resources from one fishery to another.

Methodology

For purposes of this analysis, all alternatives will be evaluated under the assumption that the primary measure for achieving the conservation objectives will be through changes in quota levels associated with various rebuilding schedules. The overall economic analysis presented in this RIR, as well as in the IRFA in the next section is assessed in terms of projected changes in landings, prices, and/or gross revenues. Aggregate changes in fishing opportunities in 2007 versus the base line (proxy for 2006 landings) are presented and changes in landings, prices, CS, harvest costs, producer surplus, enforcement costs, and distributive effects are provided. In addition, cumulative impacts associated with changes in projected gross revenues for the entire rebuilding time period are also presented. Furthermore, it is assumed that the entire scup commercial quota in taken in year 2007 and subsequent years. A detailed description of the methodology used in the analysis is presented in section 7.1.5.

Stock Rebuilding Alternatives

Landings - Aggregate scup landings for 2007 relative to 2006 are expected to be the highest under alternative 1A (153 %), followed by alternative 1B (41%), and alternatives 1C and 1G (5% each). Under alternatives 1D and 1H, scup landings are expected to decrease (29% each) in 2007 when compared to 2006. A detail discussion of the potential changes in landings associated with each alternative is presented in section 7.1.5.

Prices - It is expected that given the potential increase in scup landings under alternatives 1A, 1B, 1C, and 1G, the price for scup will decrease under those alternatives in 2007 when compared to 2006. The largest reduction in price will be under alternative 1A followed by alternative 1B, and alternatives 1C and 1G. Under alternatives 1D and 1H, the price of scup is expected to increase (equal amount under both alternatives) given the potential decrease in landings in 2007 when compared to 2006 for these alternatives. A detail discussion of the potential changes in prices associated with each alternative is presented in section 7.1.5.

Consumer Surplus - Assuming the potential increase in the price of scup under alternatives 1D and 1H, it is possible that the CS associated with this fishery may decrease (equal amount under both alternatives). Conversely, given the potential decrease in the price for scup under alternatives 1A, 1B, and 1C and 1G, the CS associated with the fishery may increase. The increase in consumer surplus is expected to be larger under alternative 1A followed in descending order by alternative 1B and alternatives 1C and 1G.

Harvest Costs - No changes in harvest costs are identified under these alternatives.

Producer Surplus - If there is a change in the price of scup there will be associated changes in PS. The magnitude of the PS change will be associated with the price elasticity of demand for this species.

The law of demand states that price and quantity demanded is inversely related. Given a demand curve for a commodity (good or service), the elasticity of demand is a measure of the responsiveness of the quantity that will be taken by consumers giving changes in the price of that commodity (while holding other variables constant). There are several major factors that influence the elasticity for a specific commodity. These factors largely determine whether demand for a commodity is price elastic or inelastic[6]: 1) the number and closeness of substitutes for the commodity under consideration, 2) the number of uses to which the commodity can be put; and 3) the price of the commodity relative to the consumer's purchasing power (income). There are other factors that may also determine the elasticity of demand but are not mention here because they are beyond the scope of this discussion. As the number and closeness of substitutes and/or the number of uses for a specific commodity increase, the demand for the specific commodity will tend to be more elastic. Demand for commodities that take a large amount of the consumer’s income is likely to be elastic compared to services with low prices relative to the consumer’s income. It is argued that the availability of substitutes is the most important of the factors listed in determining the elasticity of demand for a specific commodity (Leftwich 1973; Awk 1988). Seafood demand in general appears to be elastic. In fact, for most species, product groups, and product forms, demand is elastic (Asche and Bjørndal 2003).

For example, an increase in the ex-vessel price of scup may increase PS. A decrease in the ex-vessel price of scup may also increase PS if we assumed that the demand for scup is moderate to highly elastic. However, the magnitude of these changes cannot be entirely assessed without knowing the exact shape of the market demand curve for this species. In all, a decrease in the ex-vessel price of scup may increase PS if we assumed that the demand for these species is moderate to highly elastic.

Enforcement Costs - Properly defined, enforcement costs are not equivalent to the budgetary expense of dockside or at-sea inspection of vessels. Rather, enforcement costs from an economic perspective are measured by opportunity cost in terms of foregone enforcement services that must be diverted to enforcing summer flounder, scup, and black sea bass regulations. The proposed measures are not expected to change enforcement costs.

Distributive Effects - There are no changes to the quota allocation process for this species. As such, no distributional effects are identified under these alternatives.

<u>GRA Alternatives</u>

The scup GRAs alternatives presented in this document are purely administrative. Basically, GRAs which are presently addressed and modified through the specifications process will instead be modifiable through frameworks to the FMP. This action is purely

[6] Price elasticity of demand is elastic when a change in quantity demanded is large relative to the change in price. Price elasticity of demand is inelastic when a change in quantity demanded is small relative to the change in price. Price elasticity of demand is unitary when a change in quantity demanded and price are the same.

administrative and; therefore, it is not expected to result in changes in the fishing methods and practices utilized in the scup fishery and thus are not expected to result in changes to landings, prices, CS, harvest costs, PS, enforcement costs, or distributive impacts.

Overall Impacts

The ex-vessel price for scup in 2005 was estimated at $0.75 per pound. If the average ex-vessel price in 2006 is assumed to be the same as in 2005 ($0.75 per pound) and then adjusted to constant 2004 dollars (standardization or real prices), comparisons can be made to the 2007 values projected by the price model. Using the same standardization procedure as described in section 7.1.5 results in an adjusted price of $0.72 per pound. Thus, 2006 estimated gross revenues are estimated to approximate $6.883 million (in 2004 constant dollars). Based on the projected values from the price model, this means that the 2007 TALs may potentially yield a real increase in revenue of $3.045 million under alternative 1A ($9.928 million - $6.883 million), an increase of $0.819 million under alternative 1B ($7.702 million - $6.883 million), a loss of 0.085 million under alternative 1C (6.798 million - $6.883 million), a loss of $1.122 million under alternative 1D ($5.761 million - $6.883 million), a loss of 0.085 million under alternative 1G ($6.798 million - $6.883 million), and a loss of $1.122 million under alternative 1H ($5.761 million - $6.883 million) when compared to 2006 (using 2005 landings as a proxy). These changes in revenues assumed the projected 2007 prices derived from the ex-vessel price model that was constructed to project how potential changes in landings during the rebuilding period will likely affect ex-vessel market prices under each of the alternatives. In addition, it is assumed that the overall commercial quota for scup will be taken in 2007 (section 7.1.5).

Changes in revenues indicate that in the short-term (2007), alternative 1A would provide the largest net benefit gain followed by alternative 1B; while both alternatives 1D and 1H would provide the largest benefit loss followed by both alternatives 1C and 1G. It is important to mention that the estimated benefits derived above likely correspond to the upper/lower limits due to the fact that in deriving those values it was assumed that all available commercial TALs would be harvested. Other limitations regarding the analysis presented above are described in detail in section 7.1.5.

Comparison of gross revenue streams over time, however, requires discounting future benefits to convert all benefit streams to a present value. For this purpose, a discount rate of 7% was selected as recommended by the Office of Management and Budget Circular A-94. All of the discounted annual gross revenue estimates for alternatives 1B, 1C, 1D, 1G, and 1H are estimated to be lower than those predicted for the no action alternative (1A) during rebuilding, but they exceed the no action alternative's estimates after rebuilding is complete or by the last year of rebuilding in 2016 (Figure 9; section 7.1.5). A comparison of total discounted gross revenue streams across alternatives can be made by summing the revenue streams from 2007 to 2016 (Figure 10; section 7.1.5). The no action alternative (1A) results in the largest cumulative discounted revenue stream by 2016 ($87 million). However, alternative 1A is not projected to be sufficient to rebuild the stock during the 10 year time period. Alternative 1D is projected to result in the next highest discounted cumulative revenue stream (approximately $85 million in 2004 constant dollars). Alternative 1D is followed by 1C ($82 million), 1B ($79 million), 1H ($76 million), and alternative 1G results in the lowest cumulative discounted total (approximately $66 million). As indicated above, the scup GRAs alternatives discussed in this document are purely administrative and are not expected to have socioeconomic impacts.

It is important to mention that although the commercial measures that are evaluated in this specification package are for the duration of the rebuilding period ~~only~~, these measures could have potential cumulative impacts. The extent of any cumulative impacts from measures established in previous years is largely dependent on how effective those measures were in meeting their intended objectives and the extent to which mitigating measures compensated for any quota overages. Section 7.3 has a detailed description or historical account of cumulative impacts of the measures established in previous years. This information is important because it allows for the evaluation of projected results from the implementation of specific management measures versus actual results. Table 9 presents meaningful past (P), present (Pr), or reasonably foreseeable future (RFF) actions to be considered other than those actions being considered in this amendment document. These impacts are described in chronological order and qualitatively, as the actual impacts of these actions are too complex to be quantified in a meaningful way. When any of these abbreviations occur together (i.e., P, Pr, RFF), it indicates that some past actions are still relevant to the present and/or future actions.

The proposed action does not constitute a significant regulatory action under EO 12866 for the following reasons. First, it will not have an annual effect on the economy of more than $100 million. Based on preliminary unpublished NMFS dealer data the 2005 total commercial value for scup was estimated at approximately $7.0 million from Maine to Cape Hatteras, NC. As estimated above, assuming the potential change in landings due to the quotas in 2007 relative to the 2006 landings (using 2005 landings as a proxy) the overall change in gross revenue would range from a $3.045 million gain under alternative 1A to a $1.122 million loss under both alternatives 1D and 1H in 2007 when compared to 2006. In addition, on average, the overall cumulative revenues (discounted; 7%) during the rebuilding period (2007 to 2016) would be $8.7 million under alternative 1A, $8.5 million for 1D, $8.2 for 1C, $7.9 for 1B, $7.5 for 1H, and $6.6 for 1G.

The rebuilding strategies being considered by this action are necessary to advance the recovery of the scup stock, and to establish harvest levels that are sustainable over the long-term. In a material way, the action benefits the economy, productivity, competition, and jobs. The action will not adversely affect, in the long-term, competition, jobs, the environment, public health or safety, or state, local, or tribal government communities. Second, the action will not create a serious inconsistency or otherwise interfere with an action taken or planned by another agency. No other agency has indicated that it plans an action that will affect scup fisheries in the EEZ. Third, the action will not materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of their participants. And, fourth, the action do not raise novel, legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in EO 12866.

9.10.3 Initial Regulatory Flexibility Analysis

9.10.3.1 Introduction and Methods

The Regulatory Flexibility Act (RFA) requires the Federal rulemaker to examine the impacts of proposed and existing rules on small businesses, small organizations, and small governmental jurisdictions. In reviewing the potential impacts of proposed regulations, the agency must either certify that the rule "will not, if promulgated, have a significant economic impact on a substantial number of small entities." A determination of substantial depends on the context of the proposed action, the problem to be addressed, and the structure of the regulated industry. Standards for determining significance are discussed below. An IRFA was prepared to further evaluate the economic impacts of the proposed action on small business entities. This analysis is undertaken in support of a more thorough analysis for this amendment.

9.10.3.2 Description of Reasons Why Action by the Agency is being Considered

A complete description of the purpose and need and objectives of this proposed rule is found under section 4.0. A statement of the problem for resolution is presented under section 4.0.

9.10.3.3 The Objectives and legal basis of the Proposed Rule

A complete description of the objectives of this proposed rule is found under section 4.0. This action is taken under the authority of the Magnuson-Stevens Act and regulations at 50 CFR part 648.

9.10.3.4 Estimate of the Number of Small Entities

The potential number of small entities that may be affected by the proposed rule is presented below.

9.10.3.5 Reporting Requirements

There are no changes to the existing reporting requirements previously approved under this FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act.

9.10.3.6 Conflict with Other Federal Rules

This action does not duplicate, overlap, or conflict with other Federal rules.

A description of the scup fishery is presented in section 6.0 of this document and section 3.0 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP. A description of ports and communities that are dependent on scup is found in section 3.4.2 of Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass FMP. Recent scup landing patterns among ports are presented in section 6.5.1. An analysis of permit data is found in section 6.5.2. A full description of the alternatives analyzed in this section is presented in section 5.0.

The Small Business Administration (SBA) defines a small business in the commercial fishing and recreational fishing activity, as a firm with receipts (gross revenues) of up to $4.0 and $6.5 million, respectively. The proposed measures regarding the scup rebuilding alternatives could affect any vessel holding an active federal permit for scup, as well as vessels that fish for this species in state waters. Data from the Northeast permit application database shows that in 2005 there were 1,511 vessels that were permitted to take part in the scup fisheries (both commercial and charter/party sectors). These permitted vessels may be further categorized depending upon which permits or combinations of permits that were held (section 6.5.2). However, active participants are more likely to be affected in the near term. All permitted vessels readily fall within the definition of small business.

Since all permit holders do not actually land scup, the more immediate impact of the rule may be felt by the 428 commercial vessels that are actively participating in this fishery (that landed scup in 2005). An active participant was defined as any vessel that reported having landed one or more pounds of scup in the Northeast dealer data during calendar year 2005. The dealer data covers activity by unique vessels that hold a federal permit of any kind and provides summary data for vessels that fish exclusively in state waters. This means that an active vessel may be a vessel that holds a valid federal scup permit; a vessel that holds a valid federal permit but no scup permit; a vessel that holds a federal permit other than scup and fishes for this species exclusively in state waters; or may be vessel that holds no federal permit of any kind. Of the four possibilities the number of vessels in the latter two categories cannot be estimated because the dealer data provides only summary information for state waters vessels and because the vessels in the last category do not have to report landings.

In this IRFA, the primary unit of observation for purposes of performing a threshold analysis is vessels that participated in the commercial scup fishery during calendar year 2005, irrespective of their current permit status.

The effects of actions were analyzed by employing quantitative approaches to the extent possible. Where quantitative data were not available, qualitative analyses were conducted. In the current analysis, effects on profitability associated with the proposed management measures should be evaluated by looking at the impact of the proposed measures on individual vessel costs and revenues. However, in the absence of cost data for individual vessels engaged in these fisheries, changes in gross revenues are used a proxy for profitability.

Procedurally, the economic effects of the quotas under the various rebuilding schedules were estimated by assessing the changes in potential revenues. This was accomplished by multiplying the corresponding level of TAL under each alternative by the ex-vessel price forecasted for each of the years in an alternative's rebuilding timeline. A complete description of the methodology used in the analysis is presented in section 7.1.5.

9.10.4 Description of the Alternatives

A full description of the alternatives analyzed in this section is presented in sections 5.0.

9.10.5 Analyses of Impacts of the Alternatives

Commercial Fishery

Assuming that the predicted changes in initial annual revenues in 2007 are for all participants in the fishery and that they are evenly distributed over all participants in the fishery (428 vessels that landed scup in 2005), each business unit could gain on average $7,114 in gross revenues under alternative 1A and $1,914 under alternative 1B if the entire TAL is landed in 2007. Potential losses in 2007 of $194 in gross revenues are estimated for each scup vessel under alternative 1C, $2,621 under alternative 1D, $194 under alternative 1G, and $2,621 under alternative 1H.

If revenues earned from all other species are assumed to remain constant, 21 vessels are projected to incur total revenue losses of 5 percent or more in 2007 under the two most restrictive alternatives (1D and 1H). Of these 21 vessels, 11 are projected to incur revenue reductions of 5-9 percent and 10 vessels are projected to lose up to 10-19 percent of their total gross revenue.

Relative to each vessel's home port state as reported on the vessel's permit application, 9 of the vessels projected to incur revenue losses of 5 percent or more under alternatives 1D and 1H listed New York as their home port state, 5 of these vessels listed Massachusetts as their home port state and 5 listed Rhode Island as their home port state. The home port states of the remaining two vessels can not be disclosed for confidentiality reasons.

The 21 vessels estimated to incur revenue losses of 5 percent or more in 2007 under the two most restrictive alternatives (1D and 1H) list 15 different home port locations on their permit applications. The only home port locations with more than one vessel estimated to incur total revenue reductions of 5 percent or more are in Montauk, New York (5 vessels) and Point Judith, Rhode Island (3 vessels).

Although alternatives 1C, 1D, 1G, and 1H will likely have a negative short-term economic impact on some scup harvesting businesses, they are expected to result in long-term positive impacts to the industry as a whole once the scup stock rebuilds (section 7.1.5).

Recreational Fishery

Recreational landings of scup in 2005 were estimated at 2.38 million pounds. If 2005 landings values are used as a proxy for 2006 levels, potential increases in landings could be observed in 2007 under the recreational harvest limits projected for alternatives 1A, 1B, 1C and 1G. The 2007 recreational harvest limits for alternatives 1D and 1H are projected to be 1.923 million pounds, a potential decrease of 0.457 million pounds when compared to 2006 levels.

There is no empirical information available to determine how sensitive affected anglers might be to the proposed changes in scup recreational harvest limits. In other words, it is not possible to determine how affected anglers will respond to the new regulations. Scup angler trip taking behavior may remain unchanged, or the management measures may result in anglers taking fewer fishing trips or no recreational trips at all if suitable alternative target species are unavailable. Although the potential changes in trip taking behavior cannot be quantified, given the marginal changes in management measures from 2006 to those proposed for 2007 and the fact that the proposed measures do not prohibit anglers from engaging in catch and release fishing, the demand for fishing trips should remain relatively unaffected. Nevertheless, to the extent that anglers impacted by the proposed measures do take fewer trips, economic losses may accrue to businesses that support marine recreational activities.

As a summary, the total allowable landings, commercial quotas, recreational harvest limits, and projected ex-vessel gross revenues associated with the six scup rebuilding plan alternatives discussed in this amendment are presented in Table 8.

GRA Alternatives

The scup GRAs alternatives presented in this document are purely administrative. Basically, GRAs which are presently addressed and modified through the specifications process will instead be modifiable through frameworks to the FMP. This action is purely administrative and; therefore, it is not expected to result in changes in the fishing methods and practices utilized in the scup fishery and thus are not expected to result in changes to landings, prices, CS, harvest costs, PS, enforcement costs, or distributive impacts.

10.0 LITERATURE CITED

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11.0 LIST OF PREPARERS OF THE ENVIRONMENTAL ASSESSMENT

Amendment 14 to the Summer Flounder, Scup and Black Sea Bass FMP was submitted to NMFS by the MAFMC. This document was prepared by the following members of the MAFMC staff: Jessica Coakley, Dr. José Montañez, and Dr. Christopher Moore. In addition, input throughout document development was provided by the Amendment 14 Technical Team, the MAFMC Demersal Committee and Council members, as well as the ASMFC staff and ASMFC Board members.

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12.0 LIST OF AGENCIES AND PERSONS CONSULTED

In preparing this amendment, the Council consulted with the NMFS, New England and South Atlantic Fishery Management Councils, Fish and Wildlife Service, and the states of Maine through North Carolina through their membership on the Mid-Atlantic and New England Fishery Management Councils. In addition, states that are members within the management unit were consulted through the Coastal Zone Management Program consistency process. Letters were sent to each of the following states within the management unit reviewing the consistency of the proposed action relative to each state's Coastal Zone Management Program: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. To request a copy of the letter or a list of the CZM contacts for each state, contact Daniel T. Furlong at the Mid-Atlantic Fishery Management Council, Room 2115 Federal Building, 300 South New Street, Dover, Delaware 19904-6790, Telephone: (302) 674-2331, Fax: (302) 674-5399.

In order to ensure compliance with NMFS formatting requirements, the advice of NMFS Northeast Region personnel was sought, including Sarah McLaughlin, Michael Pentony, and Sarah Thompson.

GLOSSARY

Amendment. A formal change to a fishery management plan (FMP). The Council prepares amendments and submits them to the Secretary of Commerce for review and approval. The Council may also change FMPs through a "framework adjustment framework adjustment" (see below).

B. Biomass, measured in terms of total weight, spawning capacity, or other appropriate units of production.

B_{MSY}. Long-term average exploitable biomass that would be achieved if fishing at a constant rate equal to F_{MSY}. For most stocks, B_{MSY} is about ½ of the carrying capacity. Overfishing definition control rules usually call for action when biomass is below ¼ or ½ B_{MSY}, depending on the species.

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

$B_{threshold}$. 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. $B_{threshold}$ is also known as $B_{minimum}$, or B_{min}.

Bycatch. Fish that are harvested in a fishery, but which are not sold or kept for personal use. This includes economic discards and regulatory discards. The fish that are being targeted may be bycatch if they are not retained.

Commission. Atlantic States Marine Fisheries Commission.

Committee. The Monitoring Committee, made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Commission, the Northeast Regional Office of NMFS, the Northeast Fisheries Center, and the Southeast Fisheries Center. The MAFMC Executive Director or his designee chairs the Committee.

Conservation equivalency. The approach under which states are required to develop, and submit to the Commission for approval, state-specific or region-specific management measures (i.e., possession limits, size limits, and seasons) designed to achieve state-specific or region-specific harvest limits.

Control rule. A pre-determined method for determining rates based on the relationship of current stock biomass to a biomass target. The biomass threshold ($B_{threshold}$ or B_{min}) defines a minimum biomass below which a stock is considered.

Council. The Mid-Atlantic Fishery Management Council.

Environmental Impact Statement. An analysis of the expected impacts of a fishery management plan (or some other proposed Federal action) on the environment and on people, initially prepared as a "Draft" (DEIS) for public comment. After an initial EIS is prepared for a plan, subsequent analyses are called "Supplemental." The Final EIS is referred to as the Final Supplemental Environmental Impact Statement (FSEIS).

Exclusive Economic Zone. For the purposes of the Magnuson-Stevens Fishery Conservation and Management Act, the area from the seaward boundary of each of the coastal states to 200 nautical miles from the baseline.

Fishing for scup. Any activity, other than scientific research vessel activity, which involves: (a) the catching, taking, or harvesting of scup; (b) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of summer flounder, scup, or black sea bass; or (c) any operations at sea in support of, or in preparation for, any activity described in paragraphs (a) or (b) of this definition.

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.

Fishing mortality rate. The part of the total mortality rate (which also includes natural mortality) applying to a fish population that is caused by man's harvesting. Fishing mortality is usually expressed as an instantaneous rate (F), and can range from 0 for no fishing to very high values such as 1.5 or 2.0. The corresponding annual fishing mortality rate (A) is easily computed but not frequently used. Values of A that would correspond to the F values of 1.5 and 2.0 would be 78% and 86%, meaning that there would be only 22% and 14% of the fish alive (without any natural mortality) at the end of the year that were alive at the beginning of the year. Fishing mortality rates are estimated using a variety of techniques, depending on the available data for a species or stock.

F_{max}. A calculated instantaneous fishing mortality rate that is defined as "the rate of fishing mortality for a given method of fishing that maximizes the harvest in weight taken from a single year class of fish over its entire life span".

F_{MSY}. A fishing mortality rate that would produce MSY when the stock biomass is sufficient for producing MSY on a continuing basis.

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 Mid-Atlantic 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.

F_{target}. The target fishing mortality rate, equal to the annual F determined from the selected rebuilding schedule for overfished resources and Council selected fishing mortality level for non-overfished resources. Overfishing occurs when the overfishing target is exceeded.

$F_{threshold}$. 1) The maximum fishing mortality rate allowed on a stock and used to define overfishing for status determination. 2) The maximum fishing mortality rate allowed for a given biomass as defined by a control rule.

Landings. The portion of the catch that is harvested for personal use or sold.

Metric ton. A unit of weight equal to 1,000 kilograms (1 kg = 2.2 lb.). A metric ton is equivalent to 2,205 lb. A thousand metric tons is equivalent to 2.2 million lb.

MSY. Maximum sustainable yield. The largest long-term average yield (catch) that can be taken from a stock under prevailing ecological and environmental conditions. Overfished. An overfished stock is one whose size is sufficiently small that a change in management practices is required in order to achieve an appropriate level and rate of rebuilding.

Natural Mortality Rate. The part of the total mortality rate applying to a fish population that is caused by factors other than fishing. This may include disease, senility, predation, pollution, etc., with all sources of natural mortality being considered together. Natural mortality is usually expressed as an instantaneous rate, and is abbreviated as "M". An instantaneous mortality rate reflects the percentage of fish dying at any one time, as compared to an annual rate which reflects the percentage of fish dying in one year. Natural mortality is differentiated from the instantaneous fishing mortality rate, "F". Together, these comprise the instantaneous total mortality rate, "Z" (i.e., $Z = F + M$). Natural mortality rates can be estimated using a variety of techniques depending on data availability. As compared to fishing mortality, natural mortality is often difficult to investigate because direct evidence about the timing or magnitude of natural deaths is rarely available.

Overfished. An overfished stock is one “whose size is sufficiently small that a change in management practices is required to achieve an appropriate level and rate of rebuilding.” A stock or stock complex is considered overfished when its population size falls below the minimum stock size threshold (MSST). A rebuilding plan is required for stocks that are deemed overfished. A stock is considered “overfished” when exploited beyond an explicit limit beyond which its abundance is considered ”too low” to ensure safe reproduction.

Overfishing. According to the National Standard Guidelines, “overfishing occurs whenever a stock or stock complex is subjected to a rate or level of fishing mortality that jeopardizes the capacity of a stock or stock complex to produce maximum sustainable yield (MSY) on a continuing basis.” Overfishing is occurring if the maximum fishing mortality threshold (MFMT) is exceeded for 1 year or more. In general, it is the action of exerting fishing pressure (fishing intensity) beyond the agreed optimum level. A reduction of fishing pressure would, in the medium term, lead to an increase in the total catch.

Party/Charter boat. Any vessel which carries passengers for hire to engage in fishing

Recruitment. The addition of fish to the fishable population due to migration or to growth. Recruits are usually fish from one year class that have just grown large enough to be retained by the fishing gear.

Spawning Stock Biomass. The total weight of all sexually mature fish in the population. This quantity depends on year class abundance, the exploitation pattern, the rate of growth, fishing and natural mortality rates, the onset of sexual maturity and environmental conditions.

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 a species 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).

TAL. Total allowable landings; the total regulated landings from a stock in a given time period, usually one year.

Total length. The straight-line distance from the tip of the snout to the end of the tail while the fish is lying on its side. For black sea bass, the total length excludes any caudal filament.

Year-class. The fish spawned or hatched in a given year.

Yield per recruit. The theoretical yield that would be obtained from a group of fish of one age if they were harvested according to a certain exploitation pattern over the life span of the fish. From this type of analysis, certain critical fishing mortality rates are estimated that are used as biological reference points for management, such as F_{max} and $F_{0.1}$.

APPENDIX A – Impacts Associated with Considered but Rejected from Further Analysis Alternatives 1E and 1F.

Under alternative 1E, the fishing mortality rate (F) would be reduced to F=0 and applied every year such that the stock is rebuilt at the end of the maximum allowable ten-year rebuilding period. Under alternative 1F, a constant harvest of 17.170 million lb would be applied every year such that the stock is rebuilt at the end of the ten-year rebuilding period. This approach would reduce F during the course of the rebuilding program as the stock continues to increase over a period of ten-years. A more detailed description of these considered but rejected alternatives is provided in section 5.0 of the main document. These alternatives were rejected from further analysis in the document based on the preliminary consideration given below.

Impacts on the Managed Resource

Relative to the no action alternative (1A) presented in this document, considered but rejected alternatives 1E and 1F are expected to result in positive biological impacts on the scup stock. The rebuilding of the population biomass to a level equal to B_{MSY} would improve the health and sustainability of scup. This alternative is expected to achieve the B_{MSY} level (5.54 kg/tow rebuilding target proxy) within 10 years or less (maximum of 10 years). It should be noted, however that Alternatives 1F applies a constant harvest strategy that could allow for overexploitation of the scup stock in some years, while in other years it could be underexploited due to large inter-annual variability in recruitment and year class strength of the scup stock. The end result of this constant harvest alternative would be similar to a constant F approach, with the same positive impacts resulting from the population biomass of scup being rebuilt to a level equal to B_{MSY}.

Impacts on the Non-target Species

Relative to the no action alternative (1A) presented in this document, alternative 1F is not expected to result in changes in the discarding rates of scup when targeted, discarding rates when fishing for non-target species, or increased discarding of non-target species. Section 6.2 previously defined discards in the scup fishery. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps. This fishery often harvests other species, including summer flounder, black sea bass, squid, Atlantic mackerel, and silver hake. Given the mixed species nature of the scup fishery, incidental catch of other species does occur. If there are decreases in the quotas specified under the proposed stock rebuilding alternatives, slight positive impacts on other fisheries could occur. If there are increases in the quota specified under the stock rebuilding alternatives, slight negative impacts on other fisheries could occur due to increased discarding of non-target species. However, these impacts could be offset by changes in fishery regulations (i.e., minimum fish sizes, gear requirements (net mesh size), and trip limits) in the scup fishery. In addition, it is difficult to predict the impacts of an expanding scup age and size structure on the discard rates of scup, as the stock continues to rebuild. Under alternative 1E and 1F, the scup stock is expected to increase over the proposed rebuilding time period.

Under Alternative 1E, the fishing mortality rate would be set at F=0. This would require closing the directed fishery for scup, as well as other commercial fisheries which encounter and discard scup. In addition, the recreational fishery would need to be closed in areas that encounter scup. This alternative would substantially reduce fishing effort on scup. Commercial scup fishermen may shift their effort to other areas and fish more intensely for other species. This could result in increased discarding of non-target species associated with this increased effort. This is however unlikely since other commercial fisheries are constrained by input or output fishing controls (quotas or days-at-sea) as well as other fishery regulation. While it is not known with certainty how these rebuilding measures will affect fishing effort, it is likely that the proposed measures under Alternative 1D would result in neutral impacts if fishing effort shifts, or a decrease in the incidental catch and discard rates of other species relative to the status quo alternative.

Impacts on Habitat (Including EFH)

Relative to the no action alternative (1A) presented in this document, alternative 1F is not expected to result in positive or negative impacts to habitat. Section 6.3 described fishing gears used in the commercial and recreational scup fishery. Rod and reel and handlines in the recreational fishery are generally not associated with adverse EFH impacts because the gear does not alter bottom structure. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps. It is difficult to predict precisely whether changes in commercial quotas specified under the proposed stock rebuilding alternatives will result in a change in fishing effort on EFH. Several possibilities exist that have an influence fishing effort. Potentially, a smaller quota could result in fewer fishing trips, or shorter fishing trips, with a corresponding reduction in habitat impacts. Conversely, a smaller quota may mean that states establish smaller possession limits, which result in an equal number of fishing trips. Similarly, with increased species abundance, catch-per-unit-effort could increase which results in the same number of tows landing a larger volume of fish. A larger quota could result in more fishing trips, with a corresponding increase in habitat impacts. It may mean that states establish higher possession limits, which result in an equal number of fishing trips. The proposed quotas under the rebuilding alternative 1F would likely result in the same gear impacts to bottom habitats when compared to the no action alternative. Under alternatives 1E and 1F), the scup stock is expected to increase over the proposed rebuilding time periods.

Under Alternative 1E, the fishing mortality rate would be set at F=0. This would require closing the directed fishery for scup, as well as other commercial fisheries which encounter and discard scup. In addition, the recreational fishery would need to be closed in areas that encounter scup. This alternative would substantially reduce fishing effort on scup. Commercial scup fishermen may shift their effort to other areas and fish more intensely for other species. This could result in increased gear impacts on habitat associated with this increased effort. This is however unlikely since other commercial fisheries are constrained by input or output fishing controls (quotas or days-at-sea) as well as other fishery regulation. While it is not known with certainty how these rebuilding measures will affect fishing effort, it is likely that the proposed measures under Alternative 1E would result in neutral impacts if fishing effort shifts, or a decrease in gear impacts on habitat relative to the status quo alternative.

Impacts on Protected Resources

Relative to the no action alternative (1A) presented in this document, alternative 1F is not expected to result in positive or negative impacts to endangered or protected resources. Section 6.3 described fishing gears used in the commercial and recreational scup fishery. The principal gears used in the recreational scup fishery are rod and reel and handlines. Recreational gears are not categorized in the final List of Fisheries for 2005 for the taking of marine mammals by commercial fishing operations under section 114 of the Marine Mammal Protection Act of 1972. Therefore, minimal interaction is expected between rod and reel and handlines used in the scup recreational fishery and endangered and protected species.

Impacts on protected resources would be related to encounter rates as they change with fishing effort. Changes in the overall commercial fishing effort as a result of quota specified under the stock rebuilding alternatives are unknown. If the quota decreased, fishery effort could increase as vessels take more or longer trips. Conversely, fishing effort could remain constant because vessels may achieve a higher catch-per-unit-effort due to increased species abundance. Conversely, a larger quota may mean that states establish lower possession limits, which results in an equal number of fishing trips landings a larger volume of fish. These impacts could be offset by changes in fishery regulations (i.e., minimum fish sizes, gear requirements (net mesh size), and trip limits) in the scup fishery. In addition, it is difficult to predict the impacts of an expanding scup age and size structure on the fishery, as the stock continues to rebuild. The proposed quotas under rebuilding alternative 1F would likely result in similar impacts on endangered and protected resources when compared to the no action alternative. Under alternatives 1E and 1F, the scup stock is expected to increase over the proposed rebuilding time periods.

Under Alternative 1E, the fishing mortality rate would be set at F=0. This would require closing the directed fishery for scup, as well as other commercial fisheries which encounter and discard scup. In addition, the recreational fishery would need to be closed in areas that encounter scup. This alternative would substantially reduce fishing effort on scup. Commercial scup fishermen may shift their effort to other areas and fish more intensely for other species. This could result in increased encounters with protected resources associated with this increased effort. This is however unlikely since other commercial fisheries are constrained by input or output fishing controls (quotas or days-at-sea) as well as other fishery regulation. While it is not known with certainty how these rebuilding measures will affect fishing effort, it is likely that the proposed measures under Alternative 1E would result in neutral impacts if fishing effort shifts, or a positive impact on protected resources relative to the status quo alternative.

Social and Economic Impacts

Commercial Harvesting

This section describes the potential economic effects of the proposed rebuilding strategies in alternative 1E and 1F. The effects are evaluated from both a short-term and long-term perspective and are assessed in terms of projected changes in landings, prices, and gross revenues. Nominal and constant dollar values of impacts are estimated as well as the cumulative discounted value of gross revenues for each rebuilding alternative.

Ex-vessel prices for scup are determined jointly by market demand and supply. Although many factors affect the level of supply and demand at any point in time, given observed levels of quantities supplied and demanded an equilibrium price per pound can be calculated. If it can be shown that a measurable relationship existed between quantities supplied and demanded in the past, it is often possible to forecast how future prices may be impacted by potential changes in supply or demand.

In the following economic analysis, data on scup landings and ex-vessel revenues in the North Atlantic for the period 1980 through 2004 were obtained from the Fisheries Statistics Division of the National Marine Fisheries Service (NMFS) via the website http://www.st.nmfs.gov/st1/commercial/index.html.

These data provided the basis for an ex-vessel price model that was constructed to project how potential changes in landings during the rebuilding period will likely affect ex-vessel market prices under each of the alternatives.

The following log-linear price model was specified and estimated:

$$\text{(log) Ex-vessel Price}_t = \alpha + \beta_1 \text{(log) Landings}_t + AR_t .$$

Where (log) Ex-vessel Price is the natural log of the observed annual (nominal) ex-vessel price per pound of scup landings in the North Atlantic, (log) Landings is the natural log of the annual ex-vessel level of landings, AR is an autoregressive error term, t is time, and α and β are parameters to be estimated.

A log-linear specification for the model was chosen rather than a strict linear model, because the relationship between estimated prices and landings is not likely to be strictly linear. An increase in scup landings from 10 to 15 million pounds is not likely to have the same impact on prices as an increase from 40 to 45 million pounds (i.e., the slopes are not constant). Log-linear models are capable of capturing this distinction. There are, of course, many other more complicated functional forms that could be used to examine the relationship between scup prices and landings, and the choice of the log-linear form is motivated principally by the need for a relatively simple predictive model that is capable of adequately measuring the variation in scup prices associated with varying levels of landings.

The log-linear model was initially estimated using ordinary least squares (OLS). The error term was found to be serially correlated over time, however, so a second-order autoregressive model was estimated using the AUTOREG[7] procedure in SAS.

The final estimates were as follows:

$$\text{(log) Ex-vessel Price}_t = \underset{(7.52)}{8.8111} - \underset{(-7.84)}{0.5698}\ \text{(log) Landings}_t + AR_t\,;$$

where

$$AR_t = \underset{(-5.81)}{1.1165}_{AR_{t-1}} - \underset{(2.47)}{0.4811}_{AR_{t-2}} + \varepsilon_t\,.$$

The numbers in parentheses are the t-statistics, the total R-squared equaled 0.9505, N = 25, the first-order Durbin-Watson statistic equaled 2.1969, and the second-order Durbin-Watson statistic equaled 1.5839.

Overall, the predictive capability of the model seems to be reasonably strong. The high total R-squared value reveals that the estimated ex-vessel price values predicted by the equation correspond rather closely to the observed ex-vessel prices from 1980 to 2004. The t-statistic for the landings parameter is statistically significant at the 5% level, and landings are estimated to be negatively related to price. The value of the landings parameter (-0.57) indicates that if scup landings increase by 1%, the ex-vessel price per pound paid to harvesters declines by 0.57%.

Figure A1 shows scup landings during 1980-2004, the observed annual ex-vessel price per pound during this period, the model's predicted price per pound for each of those years, and 95% upper and lower confidence intervals. In general, from 1980-2004, landings and observed ex-vessel prices were inversely related. As can be seen from the fitted trend line, the predicted price model captures much of this observed inverse relationship. The predicted prices closely resemble the observed prices in almost all years. However, the predictions are strongest during years when landings are high as indicated by the close-fitting confidence intervals during the 1980s and early 1990s. The confidence intervals are slightly larger during the latter half of the 1990s when landings were at their lowest levels in the time series.

To produce ex-vessel price forecasts for each year of the rebuilding alternatives, the level of landings associated with the predicted annual commercial fishing TALs during 2007-

[7] The AUTOREG procedure augments the regression model with an autoregressive model for the random error, thereby accounting for the autocorrelation of the errors. A second-order autoregressive model was estimated because the Durbin-Watson statistic associated with the first-order OLS model indicated positive autocorrelation. The second-order Durbin-Watson statistic indicated no evidence of positive or negative autocorrelation. Maximum likelihood estimation is used in the AUTOREG procedure rather than ordinary least squares.

2016 (Table A1) were incorporated into the price model. The TALs for the rebuilding strategies of less than 10 years in duration were extended to allow for a side-by-side comparison of the various rebuilding schedules. For example, the scup fishery is projected to be rebuilt after 4 years under alternative 1E. For purposes of this analysis, it was assumed the rebuilt stock would be then be fished at an F=0.26 (the current fishing mortality target) in the remaining years. This assumption results in an annual commercial TAL of 101.104 million pounds in years 5, 6, 7, 8, 9, and 10 under alternative 1E. The same assumption was employed for the other rebuilding strategies of less than 10 years. Alternative 1F is projected to be rebuilt over a ten year period.

The resulting model-predicted ex-vessel prices associated with an annual TAL for each of the years in an alternative's rebuilding timeline were then standardized[8] to a base year (2004) so that comparisons could be made across alternatives. Standardization was accomplished by dividing the predicted prices between 2007 and 2016 by the 2004 predicted price and then multiplying that ratio by the observed 2004 ex-vessel price. The predicted standardized prices under each of the alternatives are shown in Figure A2. Ex-vessel prices under alternative 1F remain relative constant over the time period as a result of the constant harvest approach over the ten-year period. Constant prices are predicted for the rebuilt years under alternative 1E when the annual commercial TAL is estimated to be 101.104 million pounds. If landings are lower than the projected TALs, ex-vessel prices will likely be greater than estimated with this price model.

Ex-vessel price forecasts for each of the years in an alternative's rebuilding timeline were then multiplied by the corresponding level of TAL landings for that year to predict ex-vessel revenues (Figure A3). Gross revenues for alternatives 1E remain steady at around $18 million once the stock had been fully rebuilt. Gross revenues for 1F remain relatively constant and throughout rebuilding.

Comparison of gross revenue streams over time, however, requires discounting future benefits to convert all benefit streams to a present value. For this purpose, a discount rate of 7% was selected as recommended by the Office of Management and Budget Circular A-94. The discounted annual gross revenue estimates for alternatives 1E and 1F, are estimated to be lower than those predicted for the no action alternative (1A; see sections 5.1.A and 7.1.5 of the EA) during rebuilding, but they exceed the no action alternative's estimates after rebuilding is complete or by the last year of rebuilding in 2016 (Figure A4). A comparison of total discounted gross revenue streams across alternatives can be made by summing the revenue streams from 2007 to 2016 (Figure A5). Considered but rejected alternatives 1E and 1F results in the smallest cumulative discounted revenue stream by 2016; $66 million and $53 million, respectively.

[8] This standardization was used to change nominal prices (the absolute or current dollar price of a good or service when it is sold) to real prices (the price relative to an aggregate measure of prices or constant dollar price).

Short-term impacts

Commercial landings of scup in 2005 are estimated at 9.56 million pounds. If 2005 landings values are used as a proxy for 2006 levels, a potential increase in landings could be observed in 2007 under the TAL projected for alternative 1F. The 2007 commercial fishery would be closed under alternative 1E.

If the average ex-vessel price in 2006 is assumed to be the same as in 2005 ($0.75 per pound) and then adjusted to constant 2004 dollars (standardization or real prices), comparisons can be made to the 2007 values projected by the price model. Using the same standardization procedure as indicated above results in an adjusted price of $0.72 per pound. Thus, 2006 estimated gross revenues are estimated to approximate $6.883 million (in 2004 constant dollars). Based on the projected values from the price model, this means that the 2007 TALs may potentially yield a real decrease in revenue of $6.883 million under alternative 1E ($0 million - $6.883 million) and an increase of $0.885 million under alternative 1F ($7.768 million - $6.883 million), when compared to 2006 (using 2005 landings as a proxy).

These values reflect the modeled inverse relationship between landings and ex-vessel prices. If a constant price is used to assess the relative changes in gross revenues, the results would be quite different. For example, the TAL for alternative 1F is estimated at 13.393 million pounds in 2007. This translates into a potential increase in landings of 3.833 million pounds from 2006 levels (9.56 million pounds). If the adjusted 2006 price ($0.72 per pound) is assumed to remain constant in 2007, gross revenues would be estimated at $9.643 million (13.393 x 0.72), which is an increase of $2.760 million from 2006 levels ($6.883 million). In contrast, when the inverse relationship between landings and price shown in the price model is employed, the 2007 price declines to $0.58 per pound as landings increase to 13.393 million pounds. This translates into gross revenues of $7.768 million (13.393 x 0.58), an increase of $0.885 million relative to 2006 ($6.883 million).

Assuming that the predicted changes in initial annual revenues in 2007 are for all participants in the fishery and that they are evenly distributed over all participants in the fishery (428 vessels that landed scup in 2005), each business unit could lose on average $16,081 in gross revenues under alternative 1E and gain $2,068 under alternative 1F if the entire TAL is landed in 2007.

Recreational Fishing

Recreational landings of scup in 2005 were estimated at 2.38 million pounds. If 2005 landings values are used as a proxy for 2006 levels, a potential increase in landings could be observed in 2007 under the recreational harvest limit projected for alternative 1F. The 2007 recreational fishery would be closed under alternative 1E.

There is no empirical information available to determine how sensitive affected anglers might be to the proposed changes in scup recreational harvest limits. In other words, it is not possible to determine how affected anglers will respond to the new regulations. Scup angler trip taking behavior may remain unchanged, or the management measures may result in anglers taking fewer fishing trips or no recreational trips at all if suitable alternative target species are unavailable. Although the potential changes in trip taking behavior cannot be quantified, given the marginal changes in management measures from 2006 to those proposed for 2007 and the fact that the proposed measures do not prohibit anglers from engaging in catch and release fishing, the demand for fishing trips should remain relatively unaffected. Nevertheless, to the extent that anglers impacted by the proposed measures do take fewer trips, economic losses may accrue to businesses that support marine recreational activities.

As a summary, the total allowable landings, commercial quotas, recreational harvest limits, and projected ex-vessel gross revenues associated with these two considered but rejected scup rebuilding plan alternatives are presented in Table A1.

Limitations

There are several limitations to the analysis conducted in this section. The present values derived in the analysis represent industry revenues. The incorporation of changes on the cost side and consumer surplus would yield a more realistic total economic value for the fishery. However, the lack of information on fishing costs creates difficulty when assessing the net effect of the proposed options on the fishery. The lack of a demand equation for scup does not allow for the incorporation of consumer surplus into the analysis.

The analysis conducted above assumes that the entire TAL would be taken each year during the stock rebuilding period. However, if this is not the case, then the estimated revenues could be more or less than those projected above.

In addition, re-specification of the model to include variables accounting for scup substitutes in the price quantity model could yield more realistic results. Finally, it is assumed that the results provided above are not affected by other significant factors in the price determination of this analysis. However, it is possible that fluctuations in landings and prices of other fisheries, such as the groundfish fishery, could affect prices in the scup fishery.

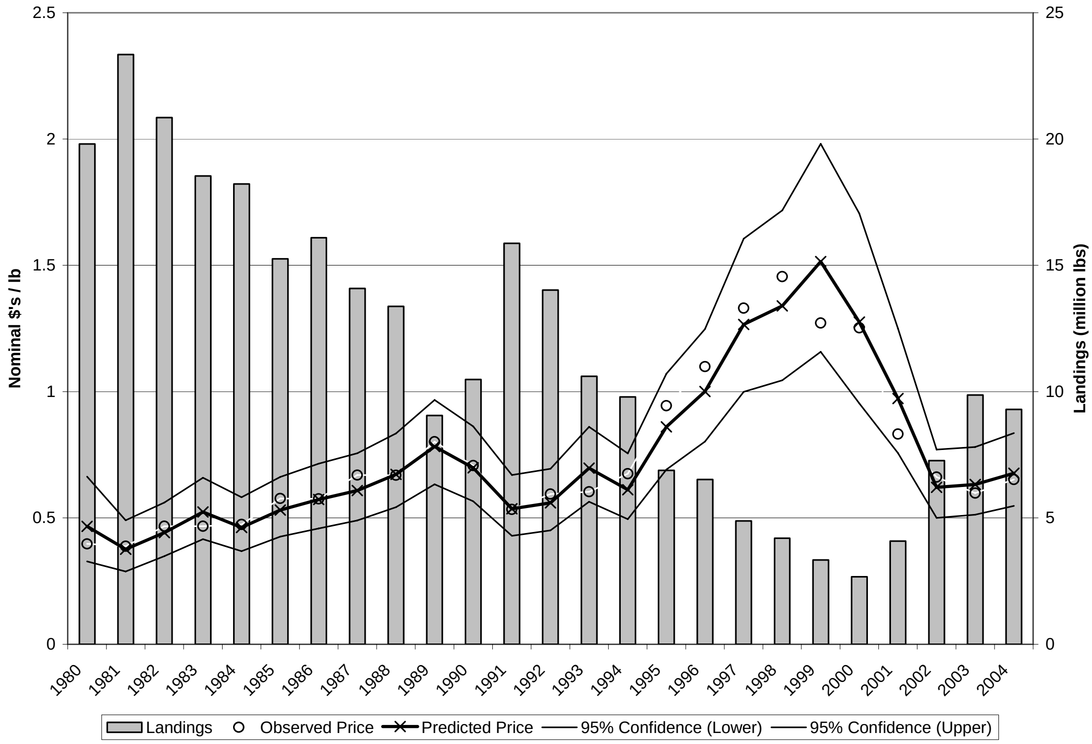

Figure A1. Ex-vessel price model regression results.

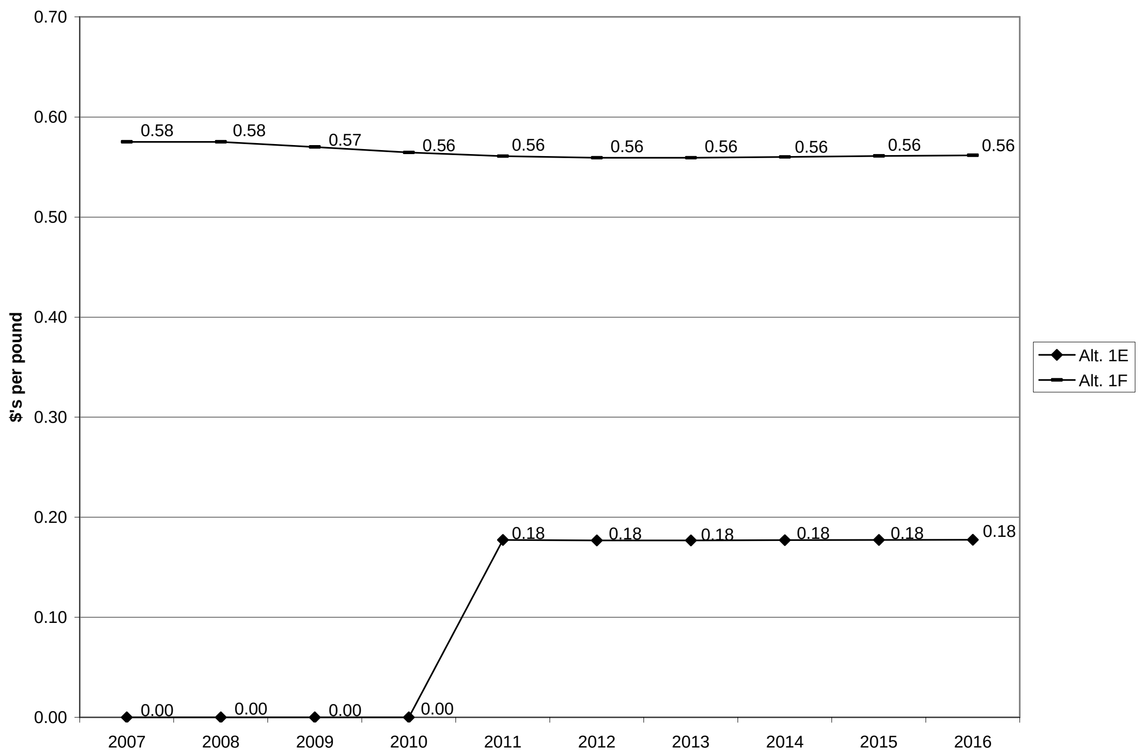

Figure A2. Projected ex-vessel prices per pound for rebuilding strategies 1E and 1F (2004 constant dollars)

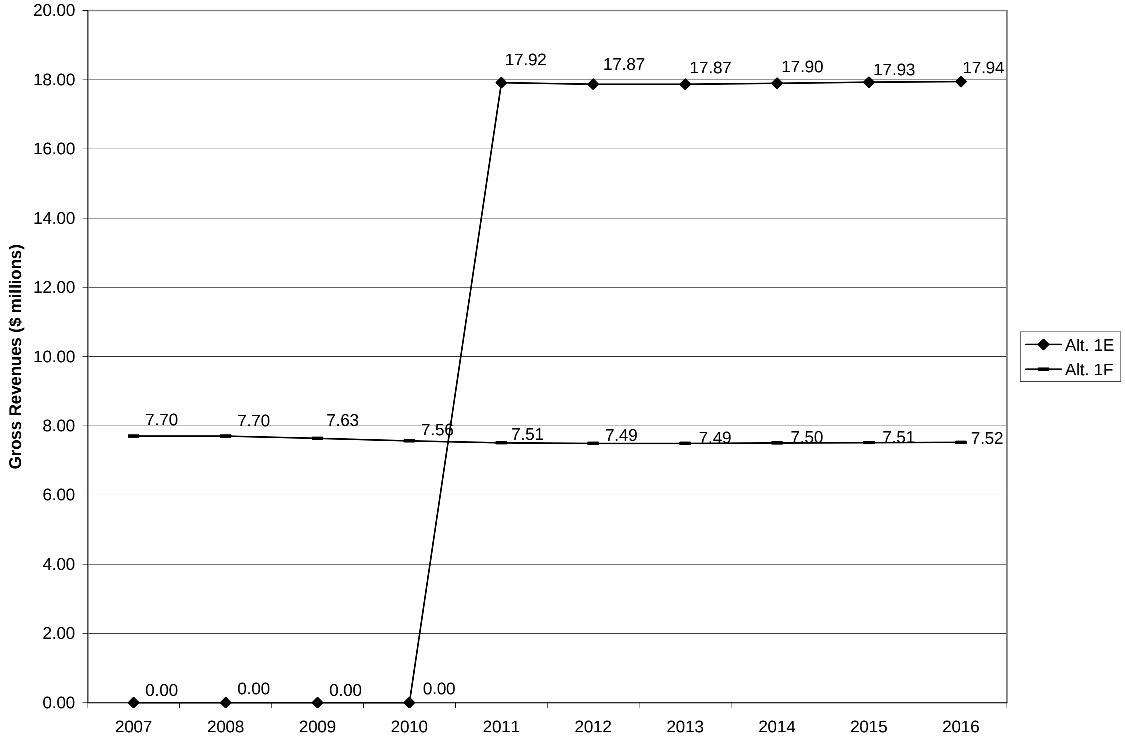

Figure A3. Projected gross revenues for rebuilding strategies 1E and 1F (2004 constant dollars)

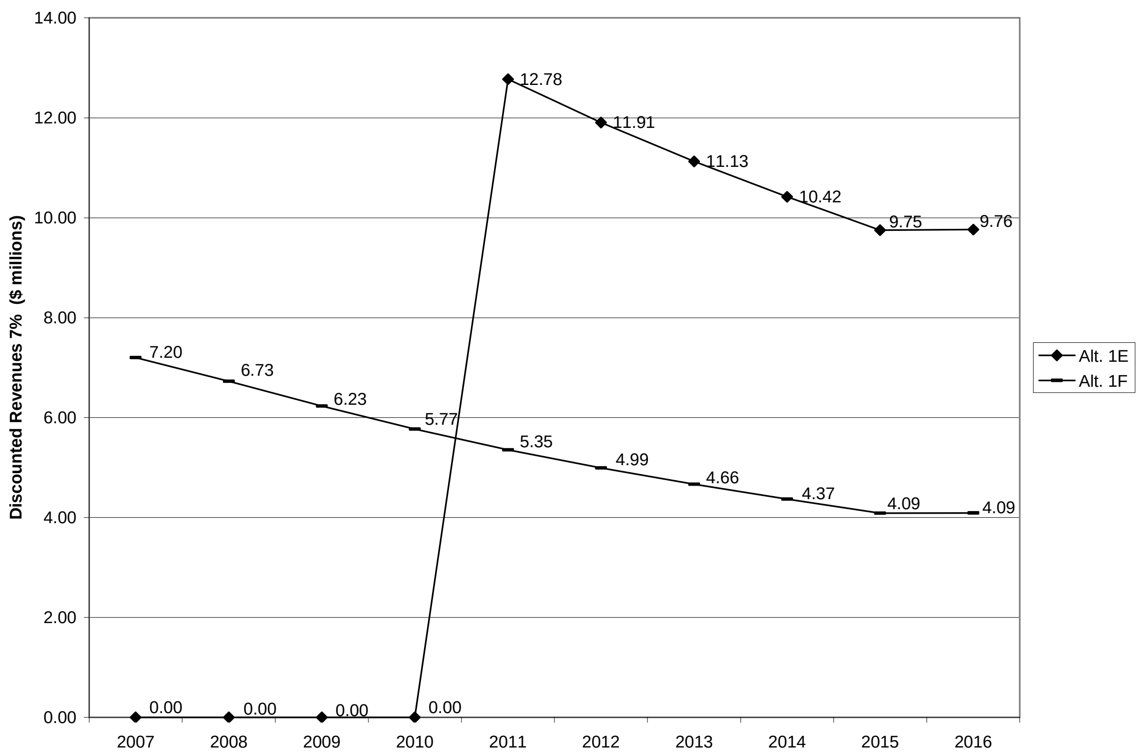

Figure A4. Present value of projected gross revenues for alternative's 1E and 1F (7% discount rate)

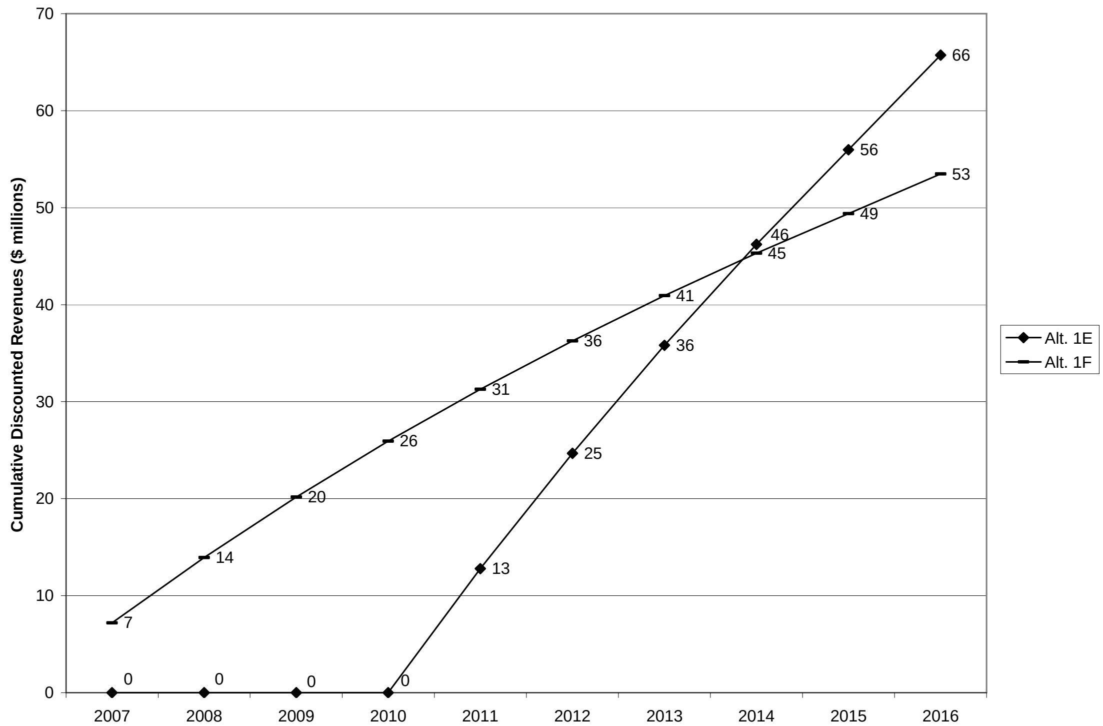

Figure A5. Cumulative present value of projected gross revenues for alternative's 1E and 1F (7% discount rate)

Table A1. Associated total allowable landings, commercial quota, recreational harvest limit, and potential gross ex-vessel revenues (7% discount rate) for rebuilding schedules 1E and 1F for scup.

Rebuilding schedules	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Alternative 1E (constant F=0)										
TAL (million lb)[a]	0	0	0	0	129.620	129.620	129.620	129.620	129.620	129.620
Commercial quota (million lb)[b]	0.000	0.000	0.000	0.000	101.104	101.104	101.104	101.104	101.104	101.104
Cumulative (million lb)	0.000	0.000	0.000	0.000	101.104	202.207	303.311	404.414	505.518	606.622
Revenue ($)[c]										
Nominal	0	0	0	0	17,918,320	17,869,129	17,871,487	17,897,773	17,926,030	17,944,940
Discounted (7%)	0	0	0	0	12,775,515	11,906,955	11,129,464	10,416,667	9,750,572	9,760,859
Cumulative Discounted (7%)	0	0	0	0	12,775,515	24,682,470	35,811,934	46,228,600	55,979,173	65,740,032
Rec. harvest limit (million lb)[d]	0.000	0.000	0.000	0.000	28.516	28.516	28.516	28.516	28.516	28.516
Cumulative (million lb)	0.000	0.000	0.000	0.000	28.516	57.033	85.549	114.066	142.582	171.098
Alternative 1F (constant harvest @ 27.170 million lb)										
TAL (million lb)[a]	17.170	17.170	17.170	17.170	17.170	17.170	17.170	17.170	17.170	17.170
Commercial quota (million lb)[b]	13.393	13.393	13.393	13.393	13.393	13.393	13.393	13.393	13.393	13.393
Cumulative (million lb)	13.393	26.785	40.178	53.570	66.963	80.356	93.748	107.141	120.533	133.926
Revenue ($)[c]										
Nominal	7,702,157	7,701,490	7,634,371	7,560,437	7,510,290	7,489,672	7,490,660	7,501,677	7,513,521	7,521,447
Discounted (7%)	7,198,278	6,726,780	6,231,921	5,767,821	5,354,733	4,990,684	4,664,807	4,366,045	4,086,858	4,091,169
Cumulative Discounted (7%)	7,198,278	13,925,058	20,156,978	25,924,799	31,279,532	36,270,216	40,935,023	45,301,067	49,387,925	53,479,094
Rec. harvest limit (million lb)[d]	3.777	3.777	3.777	3.777	3.777	3.777	3.777	3.777	3.777	3.777
Cumulative (million lb)	3.777	7.555	11.332	15.110	18.887	22.664	26.442	30.219	33.997	37.774

[a] TAL = TAC - Discards.
[b] Commercial allocation = 78% of the TAL
[c] Projections based on prices derived from the ex-vessel price model and assumes entire TAL will be landed each year
[d] Recreational allocation = 22% of the TAL
[e] Assume projected yields of 129.620 million lb after recovery period (2011 to 2016).
[f] Assume projected yields of 129.620 million lb after recovery period (2012 to 2016).
[g] Assume projected yields of 129.620 million lb after recovery period (2014 to 2016).

APPENDIX B - Description of Species Listed as Endangered and Threatened which inhabit the management unit of the FMP

(References mentioned in the text below are listed in section 10.0 of this document)

North Atlantic Right Whale

Right whales have occurred historically in all the world's oceans from temperate to subarctic latitudes. NMFS recognizes three major subdivisions of right whales: North Pacific, North Atlantic, and Southern Hemisphere. NMFS further recognizes two extant subunits in the North Atlantic: eastern and western. A third subunit may have existed in the central Atlantic (migrating from east of Greenland to the Azores or Bermuda), but this stock appears to be extinct (Waring et al. 2002).

The north Atlantic right whale has the highest risk of extinction among all of the large whales in the worlds oceans. The scarcity of right whales is the result of an 800-year history of whaling that continued into the 1960s (Klumov 1962). Historical records indicate that right whales were subject to commercial whaling in the North Atlantic as early as 1059. Between the 11th and 17th centuries, an estimated 25,000-40,000 right whales may have been harvested. The size of the western north Atlantic right whale population at the termination of whaling is unknown, but the stock was recognized as seriously depleted as early as 1750. However, right whales continued to be taken in shore-based operations or opportunistically by whalers in search of other species as late as the 1920's. By the time the species was internationally protected in 1935, there may have been fewer than 100 western north Atlantic right whales in the western Atlantic (Hain 1975; Reeves et al. 1992; Waring et al. 2002).

Right whales appear to prefer shallow coastal waters, but their distribution is also strongly correlated to the distribution of their prey (zooplankton). In both the northern and southern hemispheres, right whales are observed in the lower latitudes and more coastal waters during winter where calving takes place, and then tend to migrate to higher latitudes during the summer. The distribution of right whales in summer and fall in both hemispheres appears linked to the distribution of their principal zooplankton prey (Winn et al. 1986). They generally occur in Northwest Atlantic waters west of the Gulf Stream and are most commonly associated with cooler waters (21^{o} C). They are not found in the Caribbean and have been recorded only rarely in the Gulf of Mexico.

Right whales feed on zooplankton through the water column, and in shallow waters may feed near the bottom. In the Gulf of Maine they have been observed feeding on zooplankton, primarily copepods, by skimming at or below the water's surface with open mouths (NMFS 1991b; Kenney et al. 1986; Murison and Gaskin 1989; and Mayo and Marx 1990). Research suggests that right whales must locate and exploit extremely dense patches of zooplankton to feed efficiently (Waring et al. 2000). New England waters include important foraging habitat for right whales and at least some portion of the North Atlantic right whale population is present in these waters throughout most months of the year. 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 (Payne et al. 1990) where they have been observed feeding predominantly on copepods, largely of the genera Calanus and Pseudocalanus (Waring et al. 2002). 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 and summer months. Mid-Atlantic waters are used as a migratory pathway from the spring and summer feeding/nursery areas to the winter calving grounds off the coast of Georgia and Florida.

NMFS designated right whale critical habitat on June 3, 1994 (59 FR 28793) to help protect important right whale foraging and calving areas within the U.S. These include the waters of Cape Cod Bay and the Great South Channel off the coast of Massachusetts, and waters off the coasts of southern Georgia and northern Florida. In 1993, Canada's Department of Fisheries declared two conservation areas for right whales; one in the Grand Manan Basin in the lower Bay of Fundy, and a second in Roseway Basin between Browns and Baccaro Banks (Canadian Recovery Plan for the North Atlantic Right Whale 2000).

The northern right whale was listed as endangered throughout its range on June 2, 1970 under the ESA. The current population is considered to be at a low level and the species remains designated as endangered (Waring et al. 2002). A Recovery plan has been published and currently is in effect (NMFS 1991). This is a strategic stock because the average annual fishery-related mortality and serious injury from all fisheries exceeds the PBR.

The western North Atlantic population of right whales was estimated to be 291 individuals in 1998 (Waring et al. 2002). The current population growth rate of 2.5% as reported by Knowlton et al. (1994) suggests the stock may be showing signs of slow recovery. The best available information makes it reasonable to conclude that the current death rate exceeds the birth rate in the western North Atlantic right whale population. The nearly complete reproductive failure in this population from 1993 to 1995 and again in 1998 and 1999 suggests that this pattern has continued for almost a decade, though the 2000/2001 season appears the most promising in the past 5 years, in terms of calves born. Because no population can sustain a high death rate and low birth rate indefinitely, this combination places the North Atlantic right whale population at high risk of extinction. Coupled with an increasing calving interval, the relatively large number of young right whales (0-4 years) and adults that are killed, by human-related factors, the likelihood of extinction is high. The recent increase in births gives rise to optimism, however these young animals must be provided with protection so that they can mature and contribute to future generations in order to be a factor in stabilizing of the population.

Right whales may be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries. However, the major known sources of anthropogenic mortality and injury of right whales clearly are ship strikes and entanglement in commercial fishing gear. Waring et al. (2002) give a detailed description of the annual human related mortalities of right whales.

Humpback Whale

The humpback whale was listed as endangered throughout its range on June 2, 1970. This species is the fourth most numerically depleted large cetacean worldwide. 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 after their return (Waring et al. 2002). Only one of these feeding areas, the GOM, lies within U.S. waters and is within the action area of this consultation. Most of the humpbacks that forage in the GOM 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. 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 targeting fish schools and filtering large amounts of water for their associated prey. Humpback whales have also been observed feeding on krill (Wynne and Schwartz 1999).

Various papers (Barlow & Clapham 1997; Clapham et al. 1999) summarized information gathered from a catalogue of photographs of 643 individuals from the western North Atlantic population of humpback whales. These photographs identified reproductively mature western North Atlantic humpbacks wintering in tropical breeding grounds in the Antilles, primarily on Silver and Navidad Banks, north of the Dominican Republic. The primary winter range also includes the Virgin Islands and Puerto Rico (Waring et al. 2002). In general, it is believed that calving and copulation take place on the winter range. Calves are born from December through March and are about 4 meters at birth. Sexually mature females give birth approximately every 2 to 3 years. Sexual maturity is reached between 4 and 6 years of age for females and between 7 and 15 years for males. Size at maturity is about 12 meters.

Humpback whales use the mid-Atlantic as a migratory pathway, but it may also be an important feeding area for juveniles. Since 1989, observations of juvenile humpbacks in the mid-Atlantic have been increasing during the winter months, peaking January through March (Swingle et al. 1993). Biologists speculate that non-reproductive animals may be establishing a winter feeding range in the mid-Atlantic since they are not participating in reproductive behavior in the Caribbean. Swingle et al. (1993) identified a shift in distribution of juvenile humpback whales in the nearshore waters of Virginia, primarily in winter months. Those whales using this mid-Atlantic area that have been identified were found to be residents of the GOM and Atlantic Canada (Gulf of St. Lawrence and Newfoundland) feeding groups, suggesting a mixing of different feeding stocks in the mid-Atlantic region. A shift in distribution may be related to winter prey availability. Studies conducted by the Virginia Marine Science Museum indicate that these whales are feeding on, among other things, bay anchovies and menhaden. In concert with the increase in mid-Atlantic whale sightings, strandings of humpback whales have increased between New Jersey and Florida since 1985. Strandings were most frequent during September through April in North Carolina and Virginia waters, and were comprised primarily of juvenile humpback whales of no more than 11 meters in length (Wiley et al. 1995). Six of 18 humpbacks for which the cause of mortality was determined were killed by vessel strikes. An additional humpback had scars and bone fractures indicative of a previous vessel strike that may have contributed to the whale's mortality. Sixty percent of those mortalities that were closely investigated showed signs of entanglement or vessel collision.

New information has recently become available on the status and trends of the humpback whale population in the North Atlantic. Although current and maximum net productivity rates are unknown at this time, the population is apparently increasing. It has not yet been determined whether this increase is uniform across all six feeding stocks (Waring et al. 2002). For example, the overall rate of increase has been estimated at 9.0% (CV=0.25) by Katona and Beard (1990), while a 6.5% rate was reported for the Gulf of Maine by Barlow and Clapham (1997) using data through 1991. The rate reported by Barlow and Clapham (1997) may roughly approximate the rate of increase for the portion of the population within the action area.

Estimating abundance for the Gulf of Maine stock has proved problematic. Three approaches have been investigated: mark-recapture estimates, minimum population size, and line-transect estimates. Most of the mark recapture estimates were affected by heterogeneity of sampling, which was heavily focused on the southwestern Gulf of Maine. However, an estimate of 652 (CV=0.29) derived from the more extensive and representative YONAH sampling in 1992 and 1993 was probably less subject to this bias. The second approach uses photo-identification data to establish the minimum number of humpback whales known to be alive in a particular year, 1997. By determining the number of identified individuals seen either in that year, or in both a previous and subsequent year, it is possible to determine that at least 497 humpbacks were alive in 1997. This figure is also likely to be negatively biased, again because of heterogeneity of sampling. A similar calculation for 1992 (which would correspond to the YONAH estimate for the Gulf of Maine) yields a figure of 501 whales (Waring et al. 2002).

In the third approach, data were used from a 28 July to 31 August 1999 line-transect sighting survey conducted by a ship and airplane covering waters from Georges Bank to the mouth of the Gulf of St. Lawrence. Total track line length was 8,212 km. However, in light of the information on stock identity of Scotian Shelf humpback whales noted above, only the portions of the survey covering the Gulf of Maine were used; surveys blocks along the eastern coast of Nova Scotia were excluded. Shipboard data were analyzed using the modified direct duplicate method (Palka 1995) that accounts for school size bias and g(0), the probability of detecting a group on the track line. Aerial data were not corrected for g(0) (Palka 2000). These surveys yielded an estimate of 816 humpbacks (CV = 0.45). However, given that the rate of exchange between the Gulf of Maine and both the Scotian Shelf and mid-Atlantic region is not zero, this estimate is likely to be somewhat conservative. Accordingly, inclusion of data from 25% of the

Scotian Shelf survey area (to reflect the match rate of 25% between the Scotian Shelf and the Gulf of Maine) gives an estimate of 902 whales (CV=0.41). Since the mark-recapture figures for abundance and minimum population size given above falls above the lower bound of the CV of the line transect estimate, and given the known exchange between the Gulf of Maine and the Scotian Shelf, we have chosen to use the latter as the best estimate of abundance for Gulf of Maine humpback whales (Waring et al. 2002).

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the lognormally distributed best abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for Gulf of Maine humpback whales is 902 (CV=0.41). The minimum population estimate for this stock is 647 (Waring et al. 2002).

As detailed below, current data suggest that the Gulf of Maine humpback whale stock is steadily increasing in size. This is consistent with an estimated average trend of 3.2% (SE=0.005) in the North Atlantic population overall for the period 1979–1993 (Stevick et al. 2001), although there are no other feeding-area-specific estimates. Barlow and Clapham (1997) applied an interbirth interval model to photographic mark-recapture data and estimated the population growth rate of the Gulf of Maine humpback whale stock at 6.5% (CV=0.012). Maximum net productivity is unknown for this population, although a theoretical maximum for any humpback population can be calculated using known values for biological parameters (Brandão et al. 2000, Clapham et al. 2001b). For the Gulf of Maine, data supplied by Barlow and Clapham (1997) and Clapham et al. (1995) gives values of 0.96 for survival rate, 6y as mean age at first parturition, 0.5 as the proportion of females, and 0.42 for annual pregnancy rate. From this, a maximum population growth rate of 0.072 is obtained according to the method described by Brandão et al. (2000). This suggests that the observed rate of 6.5% (Barlow and Clapham 1997) was close to the maximum for this stock. Clapham et al. (2001a) updated the Barlow and Clapham (1997) analysis using data from the period 1992 to 2000. The estimate was either 0% (for a calf survival rate of 0.51) or 4.0% (for a calf survival rate of 0.875). Although confidence limits are not available (because maturation parameters could not be estimated), both estimates of population growth rate are outside the 95% confidence intervals of the previous estimate of 6.5% for the period 1979 to 1991 (Barlow and Clapham 1997). It is unclear whether this apparent decline is an artifact resulting from a shift in distribution; indeed, such a shift occurred during exactly the period (1992-95) in which survival rates declined. It is possible that this shift resulted in calves born in those years imprinting on (and thus subsequently returning to) areas other than those in which intensive sampling occurs. If the decline is a real phenomenon it may be related to known high mortality among young-of-the-year whales in the waters of the U.S. Mid-Atlantic states. However, calf survival appears to have increased since 1996, presumably accompanied by an increase in population growth. In light of the uncertainty accompanying the more recent estimate of population growth rate for the Gulf of Maine, for purposes of this assessment the maximum net productivity rate was assumed to be the default value for cetaceans of 0.04 (Barlow et al. 1995). Current and maximum net productivity rates are unknown for the North Atlantic population overall (Waring et al. 2002). As noted above, Stevick et al.

(2001) calculated an average population growth rate of 3.2% (SE=0.005) for the period 1979–1993.

PBR is the product of minimum population size, one-half the maximum productivity rate, and a “recovery” factor (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 647. The maximum productivity rate is the default value of 0.04. The “recovery” factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.10 because this stock is listed as an endangered species under the ESA. PBR for the Gulf of Maine humpback whale stock is 1.3 whales (Waring et al. 2002).

The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear and ship strikes. Based on photographs of the caudal peduncle of humpback whales, Robbins and Mattila (1999) estimated that at least 48% --- and possibly as many as 78% --- of animals in the Gulf of Maine exhibit scarring caused by entanglement. Several whales have apparently been entangled on more than one occasion. These estimates are based on sightings of free-swimming animals that initially survive the encounter. Because some whales may drown immediately, the actual number of interactions may be higher. In addition, the actual number of species-gear interactions is contingent on the intensity of observations from aerial and ship surveys.

For the period 1996 through 2000, the total estimated human-caused mortality and serious injury to the Gulf of Maine humpback whale stock is estimated as 3.0 per year (USA waters, 2.4; Canadian waters, 0.6). This average is derived from two components: 1) incidental fishery interaction records, 2.8 (USA waters, 2.2; Canadian waters, 0.6); and 2) records of vessel collisions, 0.2 (USA waters, 0.2; Canadian waters, 0). There were additional humpback mortalities and serious injuries that occurred in the southeastern and Mid-Atlantic states that could not be confirmed as involving members of the Gulf of Maine stock (Waring et al. 2002). These records represent an additional minimum annual average of 1.6 human-caused mortalities and serious injuries to humpbacks over the time period, of which 1.0 per year are attributable to incidental fishery interactions and 0.6 per year are attributable to vessel collisions (Waring et al. 2002).

As with right whales, human impacts (vessel collisions and entanglements) are factors which may be slowing recovery of the humpback whale population. There is an average of four to six entanglements of humpback whales a year in waters of the southern Gulf of Maine and additional reports of vessel-collision scars (unpublished data, Center for Coastal Studies). Of 20 dead humpback whales (principally in the mid-Atlantic, where decomposition did not preclude examination for human impacts), Wiley et al. (1995) reported that 6 (30%) had major injuries possibly attributable to ship strikes, and 5 (25%) had injuries consistent with possible entanglement in fishing gear. One whale displayed scars that may have been caused by both ship strike and entanglement. Thus, 60% of the whale carcasses which were suitable for examination showed signs that anthropogenic factors may have contributed to, or been responsible for, their death. Wiley et al. (1995) further reported that all stranded animals were sexually immature, suggesting a winter or migratory segregation and/or that juvenile animals are more susceptible to human impacts.

An updated analysis of humpback whale mortalities from the Mid-Atlantic states region has recently been produced by Barco et al. (2001). Between 1990 and 2000, there were 52 known humpback whale mortalities in the waters of the U.S. Mid-Atlantic states (summarized by Barco et al. 2001). Length data from 48 of these whales (18 females, 22 males and 8 of unknown sex) suggested that 39 (81.2%) were first-year animals, 7 (14.6%) were immature and 2 (4.2%) were adults. However, sighting histories of 5 of the dead whales indicate that some were small for their age, and histories of live whales further indicate that the population contains a greater percentage of mature animals than is suggested by the stranded sample. In their study of entanglement rates estimated from caudal peduncle scars, Robbins and Mattila (2001) found that males were more likely to be entangled than females. The scarring data also suggested that yearlings were more likely than other age classes to be involved in entanglements. Finally, female humpbacks showing evidence of prior entanglements produced significantly fewer calves, suggesting that entanglement may significantly impact reproductive success. Humpback whale entanglements also occur in relatively high numbers in Canadian waters. Reports of collisions with fixed fishing gear set for groundfish around Newfoundland averaged 365 annually from 1979 to 1987 (range 174-813). An average of 50 humpback whale entanglements (range 26-66) were reported annually between 1979 and 1988, and 12 of 66 humpback whales that were entangled in 1988 died (Lien et al. 1988). Volgenau et al. (1995) also summarized existing data and concluded that in Newfoundland and Labrador, cod traps caused the most entanglements and entanglement mortalities (21%) of humpbacks between 1979 and 1992. They also reported that gillnets are the gear that has been the primary cause of entanglements and entanglement mortalities (20%) of humpbacks in the Gulf of Maine between 1975 and 1990.

Humpback whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries.

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).

As in the case of right and humpback whales, fin whale populations were heavily affected by commercial whaling. However, commercial exploitation of fin whales occurred much later than for right and humpback whales. Although some fin whales were taken as early as the 17th century by the Japanese using a fairly primitive open-water netting technique

(Perry et al. 1999) and were hunted occasionally by sailing vessel whalers in the 19th century (Mitchell and Reeves 1983), wide-scale commercial exploitation of fin whales did not occur until the 20th century when the use of steam power and harpoon- gun technology made exploitation of this faster, more offshore species feasible. In the southern hemisphere, over 700,000 fin whales were landed in the 20th century. More than 48,000 fin whales were taken in the North Atlantic between 1860 and 1970 (Perry et al. 1999). Fisheries existed off of Newfoundland, Nova Scotia, Norway, Iceland, the Faroe Islands, Svalbard (Spitsbergen), the islands of the British coasts, Spain and Portugal. Fin whales were rarely taken in U.S. waters, except when they ventured near the shores of Provincetown, MA, during the late 1800's (Perry et al. 1999).

Various estimates have been provided to describe the current status of fin whales in western North Atlantic waters. Based on the catch history and trends in Catch Per Unit Effort, an estimate of 3,590 to 6,300 fin whales was obtained for the entire western North Atlantic (Perry et al. 1999). Hain et al. (1992) estimated that about 5,000 fin whales inhabit the Northeastern U.S. continental shelf waters. The latest (Waring et al. 2002) SAR gives a best estimate of abundance for fin whales of 2,814 (CV = 0.21). The minimum population estimate for the western North Atlantic fin whale is 2,362. This is currently 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.

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 (Waring et al. 2002). 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 overharvesting supported the existence of North Atlantic fin whale subpopulations. Others have used genetics information to provide support for the belief that there are several subpopulations of fin whales in the North Atlantic and Mediterranean (Bérubé et al. 1998). In 1976, the IWC's Scientific Committee proposed seven stocks for North Atlantic fin whales. These are: (1) North Norway; (2) West Norway-Faroe Islands; (3) British Isles-Spain and Portugal; (4) East Greenland-Iceland; (5) West Greenland; (6) Newfoundland-Labrador; and (7) Nova Scotia (Perry et al. 1999). However, it is uncertain whether these stock boundaries define biologically isolated units (Waring et al. 2002). The NMFS has designated one stock of fin whale for U.S. waters of the North Atlantic where the species is commonly found from Cape Hatteras northward.

During 1978-1982 aerial surveys, fin whales accounted for 24% of all cetaceans and 46% of all large cetaceans sighted over the continental shelf between Cape Hatteras and Nova Scotia (Waring et al. 1998). Underwater listening systems have also demonstrated that the fin whale is the most acoustically common whale species heard in the North Atlantic (Clark 1995). The single most important area for this species appeared to be from the Great South Channel, along the 50 meter isobath past Cape Cod, over Stellwagen Bank, and past Cape Ann to Jeffrey's Ledge (Hain et al. 1992).

Despite our broad knowledge of fin whales, less is known about their life history as compared to right and humpback whales. Age at sexual maturity for both sexes ranges from 5-15 years. Physical maturity is reached at 20-30 years. Conception occurs during a 5 month winter period in either hemisphere. After a 12 month gestation, a single calf is born. The calf is weaned between 6 and 11 months after birth. The mean calving interval is 2.7 years, with a range of between 2 and 3 years (Agler et al. 1993). Like right and humpback whales, fin whales are believed to use northwestern North Atlantic waters primarily for feeding and migrate to more southern waters for calving. However, the overall pattern of fin whale movement consists of a less obvious north-south pattern of migration than that of right and humpback whales. Based on acoustic recordings from hydrophone arrays, Clark (1995) reported a general pattern of fin whale movements in the fall from the Labrador/Newfoundland region, south past Bermuda, and into the West Indies. However, evidence regarding where the majority of fin whales winter, calve, and mate is still scarce. Some populations seem to move with the seasons (e.g., one moving south in winter to occupy the summer range of another), but there is much structuring in fin whale populations that what animals of different sex and age class do is not at all clear. Neonate strandings along the U.S. mid-Atlantic coast from October through January suggest the possibility of an offshore calving area.

The overall distribution of fin whales may be based on prey availability. This species preys opportunistically on both invertebrates and fish. 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. 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).

As discussed above, fin whales were the focus of commercial whaling, primarily in the 20th century. The IWC did not begin to manage commercial whaling of fin whales in the North Atlantic until 1976. In 1987, fin whales were given total protection in the North Atlantic with the exception of a subsistence whaling hunt for Greenland. The IWC set a catch limit of 19 whales for the years 1995-1997 in West Greenland. All other fin whale stocks had a zero catch limit for these same years. However, Iceland reported a catch of 136 whales in the 1988/89 and 1989/90 seasons, and has since ceased reporting fin whale kills to the IWC (Perry et al. 1999). In total, there have been 239 reported kills of fin whales from the North Atlantic from 1988 to 1995.

The major known sources of anthropogenic mortality and injury of fin whales include ship strikes and entanglement in commercial fishing gear. 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 proximal cause of mortality was not known. The following injury/mortality events are those reported from 1996 to the present for which source was determined. These numbers should be viewed as absolute minimum numbers; the total number of mortalities and injuries cannot be estimated but is believed to be higher since it is unlikely that all carcasses will be observed. 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. Fin whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries. The fin whale was listed as endangered throughout its range on June 2, 1970 under the ESA. Hain et al. (1992) estimated that about 5,000 fin whales inhabit the northeastern U.S. continental shelf waters. Waring et al. 2002 present a more recent estimate of 2,814 (CV=0.21) fin whales based on aerial and shipboard surveys of the area from Georges Bank to the mouth of the Gulf of S. Lawrence in 1999.

Sei Whale

Sei whales are a widespread species in the world's temperate, subpolar and subtropical and even tropical marine waters. However, they appear to be more restricted to temperate waters than other balaenopterids (Perry et al. 1999). The IWC recognized three stocks in the North Atlantic based on past whaling operations as opposed to biological information: (1) Nova Scotia; (2) Iceland Denmark Strait; (3) Northeast Atlantic (Donovan 1991 in 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 northeastern U.S., 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 longitude 42° (Waring et al. 2002). This is the only sei whale stock within the action area.

Sei whales became the target of modern commercial whalers primarily in the late 19th and early 20th century after stocks of other whales, including right, humpback, fin and blues, had already been depleted. Sei whales were taken in large numbers by Norway and Scotland from the beginning of modern whaling. More than 700 sei whales were killed off of Norway in 1885, alone. Small numbers were also taken off of Spain, Portugal and in the Strait of Gibraltar beginning in the 1920's, and by Norwegian and Danish whalers off of West Greenland from the 1920's to 1950's (Perry et al. 1999). In the western North Atlantic, sei whales were originally hunted off of Norway and Iceland; from 1967-1972, sei whales were also taken off of Nova Scotia (Perry et al. 1999). A total of 825 sei whales were taken on the Scotian Shelf between 1966 and 1972, and an additional 16 were taken from the same area during the same time by a shore based Newfoundland whaling station (Perry et al. 1999). The species continued to be exploited in Iceland until 1986 even though measures to stop whaling of sei whales in other areas had been put into place in the 1970's (Perry et al. 1999). There is no estimate for the abundance of sei whales prior to commercial whaling. Based on whaling records, approximately14,295 sei whales were taken in the entire North Atlantic from 1885 to 1984 (Perry et al. 1999).

Sei whales winter in warm temperate or subtropical waters and summer in more northern latitudes. In the northern Atlantic, most births occur in November and December when the whales are on the wintering grounds. Conception is believed to occur in December and January. Gestation lasts for 12 months and the calf is weaned at 6-9 months when the whales are on the summer feeding grounds. Sei whales reach sexual maturity at 5-15 years of age. The calving interval is believed to be 2-3 years (Perry et al. 1999).

Sei whales occur in deep water throughout their range, typically over the continental slope or in basins situated between banks. In the northwest Atlantic, the whales travel along the eastern Canadian coast in autumn, June and July on their way to and from the Gulf of Maine and Georges Bank where they occur in winter and spring. Within the action area, the sei whale is most common on Georges Bank and into the Gulf of Maine/Bay of Fundy region during spring and summer, primarily in deeper waters. 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 GOM in 1986. The basis for this phenomenon is not clear.

Although sei whales may prey upon small schooling fish and squid in the action area, available information suggests that calanoid copepods and euphausiids 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. Sei whales are occasionally seen feeding in association with right whales in the southern Gulf of Maine and in the Bay of Fundy. However, there is no evidence to demonstrate interspecific competition between these species for food resources. There is very little information on natural mortality factors for sei whales. Possible causes of natural mortality, particularly for young, old or otherwise compromised individuals are shark attacks, killer whale attacks, and endoparasitic helminths. Baleen loss has been observed in California sei whales, presumably as a result of an unknown disease (Perry et al. 1999).

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 NMFS management purposes (Waring et al. 2002). Abundance surveys are problematic not only because this species is difficult to distinguish from the fin whale but more significant is that too little is known of the sei whale's distribution, population structure and patterns of movement; thus survey design and data interpretation are very difficult.

Few instances of injury or mortality of sei whales due to entanglement or vessel strikes have been recorded in U.S. waters. Entanglement is not known to impact this species in the U.S. Atlantic, 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. A small number of ship strikes of this species have been recorded. The most recent documented incident occurred in 1994 when a carcass was brought in on the bow of a container ship in Charlestown, Massachusetts. Other 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 (Waring et al. 2002).

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). Three subspecies have been identified: *Balaenoptera musculus musculus, B.m. intermedia*, and *B.m. brevicauda* (Waring et al. 2002). Only *B. musculus* occurs in the northern hemisphere. Blue whales range in the North Atlantic extends from the subtropics to Baffin Bay and the Greenland Sea. The IWC currently recognizes these whales as one stock (Perry et al. 1999).

Blue whales were intensively hunted in all of the world's oceans from the turn of the century to the mid-1960s. Blue whales were occasionally hunted by sailing vessel whalers in the 19th century. However, development of steam-powered vessels and deck-mounted harpoon guns in the late 19th century made it possible to exploit them on an industrial scale. Blue whale populations declined worldwide as the new technology spread and began to receive widespread use (Perry et al. 1999). Subsequently, the whaling industry shifted effort away from declining blue whale stocks and targeted other large species, such as fin whales, and then resumed hunting for blue whales when the species appeared to be more abundant (Perry et al. 1999). The result was a cyclical rise and fall, leading to severe depletion of blue whale stocks worldwide (Perry et al. 1999). In the North Atlantic, Norway shifted operations to fin whales as early as 1882 due to the scarcity of blue whales (Perry et al. 1999). In all, at least 11,000 blue whales were taken in the North Atlantic from the late 19th century through the mid-20th century. Blue whales were given complete protection in the North Atlantic in 1955 under the International Convention for the Regulation of Whaling. However, Iceland continued to hunt blue whales until 1960. There are no good estimates of the pre-exploitation size of the western North Atlantic blue whale stock but it is widely believed that this stock was severely depleted by the time legal protection was introduced in 1955 (Perry et al. 1999). Mitchell (1974) suggested that the stock numbered in the very low hundreds during the late 1960's through early 1970's (Perry et al. 1999). Photo-identification studies of blue whales in the Gulf of St. Lawrence from 1979 to 1995 identified 320 individual whales. The NMFS recognizes a minimum population estimate of 308 blue whales for the western North Atlantic (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 other areas of the North Atlantic. It is assumed that blue whale distribution is governed largely by food requirements. In the Gulf of St. Lawrence, blue whales appear to predominantly feed on *Thysanoessa raschii* and *Meganytiphanes norvegica*. In the eastern North Atlantic, *T. inermis* and *M. norvegica* appear to be the predominant prey.

Compared to the other species of large whales, relatively little is known about this species. Sexual maturity is believed to occur in both sexes at 5-15 years of age. Gestation lasts 10-12 months and calves nurse for 6-7 months. The average calving interval is estimated to be 2-3 years. Birth and mating both occur during the winter season, but the location of wintering areas is speculative (Perry et al. 1999). In 1992 the U.S. Navy and contractors conducted an extensive blue whale acoustic survey of the North Atlantic and found concentrations of blue whales on the Grand Banks and west of the British Isles. One whale was tracked for 43 days during which time it traveled 1,400 nautical miles around the general area of Bermuda (Perry et al. 1999).

There is limited information on the factors affecting natural mortality of blue whales in the North Atlantic. Ice entrapment is known to kill and seriously injure some blue whales, particularly along the southwest coast of Newfoundland, during late winter and early spring. Habitat degradation has been suggested as possibly affecting blue whales such as in the St. Lawrence River and the Gulf of St. Lawrence where habitat has been degraded by acoustic and chemical pollution. However, there is no data to confirm that blue whales have been affected by such habitat changes (Perry et al. 1999).

Entanglement in fishing gear, and ship strikes are believed to be the major sources of anthropogenic mortality and injury of blue whales. However, confirmed deaths or serious injuries from either are few. In 1987, 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. In March 1998, a juvenile male blue whale was carried into Rhode Island waters on the bow of a tanker. The cause of death was determined to be due to a ship strike, although not necessarily caused by the tanker on which it was observed, and the strike may have occurred outside the U.S. EEZ (Waring et al. 2002). No recent entanglements of blue whales have been reported from the U.S. Atlantic. Other impacts noted above for other baleen whales may occur.

Sperm Whale

Sperm whales inhabit all ocean basins, from equatorial waters to 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). The minimum population estimate for the western North Atlantic sperm whale is 3,505 (CV=0.36). Sperm whales present in the Gulf of Mexico are considered by some researchers to be endemic, and represent a separate stock from whales in other portions of the North Atlantic. However, NMFS currently uses the

IWC stock structure guidance which recognizes one stock for the entire North Atlantic (Waring et al. 2002).

The International Whaling Commission estimates that nearly a quarter-million sperm whales were killed worldwide in whaling activities between 1800 and 1900 (IWC 1971). However, estimates of the number of sperm whales taken during this time are difficult to quantify since sperm whale catches from the early 19th century through the early 20th century were calculated on barrels of oil produced per whale rather than the actual number of whales caught (Perry et al. 1999). With the advent of modern whaling the larger rorqual whales were targeted. However as their numbers decreased, greater attention was paid to smaller rorquals and sperm whales. From 1910 to 1982 there were nearly 700,000 sperm whales killed worldwide from whaling activities (Clarke 1954). Whale catches for the southern hemisphere is 394,000 (including revised Soviet figures). Sperm whales were hunted in America from the 17th century through the early 20th century. In the North Atlantic, hunting occurred off of Iceland, Norway, the Faroe Islands, coastal Britain, West Greenland, Nova Scotia, Newfoundland/Labrador, New England, the Azores, Madeira, Spain, and Spanish Morocco (Waring et al. 1998). Some whales were also taken off the U.S. Mid-Atlantic coast (Reeves and Mitchell 1988; Perry et al. 1999), and in the northern Gulf of Mexico (Perry et al. 1999). There are no catch estimates available for the number of sperm whales caught during U.S. operations (Perry et al. 1999). Recorded North Atlantic sperm whale catch numbers for Canada and Norway totaled 1,995 from 1904 to 1972. All killing of sperm whales was banned by the IWC in 1988. However, at the 2000 meetings of the IWC, Japan indicated it would include the take of sperm whales in its scientific research whaling operations. Although this action was disapproved of by the IWC, Japan has reported the take of 5 sperm whales from the North Pacific as a result of this research.

Sperm whales generally occur in waters greater than 180 meters in depth. While they may be encountered almost anywhere on the high seas, their distribution shows a preference for continental margins, sea mounts, 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 much 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. Like swordfish, which feed on similar prey, sperm whales migrate to higher latitudes during summer months, when they are concentrated east and northeast of Cape Hatteras. In the U.S. EEZ, sperm whales occur on the continental shelf edge, over the continental slope, and into the mid-ocean regions, and are distributed in a distinct seasonal cycle; concentrated east-northeast of Cape Hatteras in winter and shifting northward in spring when whales are found throughout the mid-Atlantic Bight. Distribution extends 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 whale distribution may be linked to their social structure as well as distribution of their prey (Waring et al. 2002). Sperm whale populations are organized into two types of groupings: breeding schools and bachelor schools. Older males are often solitary (Best 1979). Breeding schools consist of females of all ages, calves and juvenile males. In the Northern Hemisphere, mature females ovulate April through August. During this season one or more large mature bulls temporarily join each breeding school. A single calf is born after a 15-month gestation. A mature female will produce a calf every 4-6 years. Females attain sexual maturity at a mean age of nine years, while males have a prolonged puberty and attain sexual maturity at about age 20 (Waring et al. 2002). Bachelor schools consist of maturing males who leave the breeding school and aggregate in loose groups of about 40 animals. As the males grow older they separate from the bachelor schools and remain solitary most of the year (Best 1979). Male sperm whales may not reach physical maturity until they are 45 years old (Waring et al. 2002). The sperm whales prey consists of larger mesopelagic squid (e.g., *Architeuthis* and *Moroteuthis*) and fish species (Perry et al. 1999). Sperm whales, especially mature males in higher latitude waters, have been observed to take significant quantities of large demersal and mesopelagic sharks, skates, and bony fishes (Clarke 1962, 1980).

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 right or humpback whales.

Documented takes primarily involve offshore fisheries such as the offshore lobster pot fishery and pelagic driftnet and pelagic longline fisheries. The NMFS Sea Sampling program recorded three entanglements (in 1989, 1990, and 1995) of sperm whales in the swordfish drift gillnet fishery prior to permanent closure of the fishery in January 1999. All three animals were injured, found alive, and released. However, at least one was still carrying gear. Opportunistic reports of sperm whale entanglements for the years 1993-1997 include three records involving offshore lobster pot gear, heavy monofilament line, and fine mesh gillnet from an unknown source. Sperm whales may also interact opportunistically with fishing gear. Observers aboard Alaska sablefish and Pacific halibut longline vessels have documented sperm whales feeding on longline caught fish in the Gulf of Alaska (Perry et al. 1999). Behavior similar to that observed in the Alaskan longline fishery has also been documented during longline operations off South America where sperm whales have become entangled in longline gear, have been observed feeding on fish caught in the gear, and have been reported following longline vessels for days (Perry et al. 1999).

Sperm whales are also struck by ships. In May 1994 a ship struck sperm whale was observed south of Nova Scotia (Waring et al. 2002). A sperm whale was also seriously injured as a result of a ship strike in May 2000 in the western Atlantic. Due to the offshore distribution of this species, interactions that do occur are less likely to be reported than those involving right, humpback, and fin whales that more often occur in nearshore areas. Other impacts noted above for baleen whales may also occur.

Due to their offshore distribution, sperm whales tend to strand less often than, for example, right whales and humpbacks. Preliminary data for 2000 indicate that of ten sperm whales reported to the stranding network (nine dead and one injured) there was one possible fishery interaction, one ship strike (wounded with bleeding gash on side) and eight animals for which no signs of entanglement or injury were sighted or reported. No sperm whales have stranded or been reported to the stranding network as of February 2001.

Atlantic Bottlenose dolphin

Most of the information which follows concerning Atlantic bottlenose dolphin was excerpted from the most recent stock assessment for this species (Waring et al. 2002). The coastal morphotype of the Atlantic bottlenose dolphin is continuously distributed along the Atlantic coast south of Long Island, around peninsula Florida and along the Gulf of Mexico coast. Within the western North Atlantic, the stock structure of coastal bottlenose dolphins is complex. Scott et al. (1988) hypothesized a single coastal migratory stock ranging seasonally from as far north as Long Island, NY, to as far south as central Florida, citing stranding patterns during a high mortality event in 1987-88 and observed density patterns along the US Atlantic coast. The continuous distribution of dolphins along the coast seemed to support this hypothesis. It was recognized that bottlenose dolphins were resident in some estuaries; these were considered to be separate from the coastal migratory animals. However, recent studies suggest that the single coastal migratory stock hypothesis is incorrect and that there is likely a complex mosaic of stocks. For example, year-round resident populations have been reported at a variety of sites in the southern part of the range, from Charleston, South Carolina (Zolman 1996) to central Florida (Odell and Asper 1990); seasonal residents and migratory or transient animals also occur in these areas (summarized in Hohn 1997). In the northern part of the range the patterns reported include seasonal residency, year-round residency with large home ranges, and migratory or transient movements (Barco and Swingle 1996, Sayigh et al. 1997). Communities of dolphins have been recognized in embayments and coastal areas of the Gulf of Mexico (Wells et al. 1996; Scott et al. 1990; Weller 1998) so it is not surprising to find similar situations along the Atlantic coast (Waring et al. 2002).

Recent genetic analyses of samples from Jacksonville, FL, southern South Carolina (primarily the estuaries around Charleston), southern North Carolina, and coastal Virginia, using both mitochondrial DNA and nuclear microsatellite markers, indicate that a significant amount of the overall genetic variation can be explained by differences between the groups (NMFS 2001). These results indicate a minimum of four populations of coastal bottlenose dolphins in the Northwest Atlantic and reject the null hypothesis of one homogeneous population of bottlenose dolphins. Integration of the preliminary results from genetics, photo-identification, satellite telemetry, and stable isotope studies confirms a complex mosaic of stocks of coastal bottlenose dolphins in the western North Atlantic (Waring et al. 2002). As an interim measure, pending additional results, seven management units within the range of the “coastal migratory stock” have been defined. The true population structure is likely more than the seven units identified in Waring et al. (2002); research efforts continue in an attempt to identify that structure.

Earlier aerial (CETAP 1982) and shipboard (NMFS unpublished data) surveys north of Cape Hatteras identified two concentrations of bottlenose dolphins, one inshore of the 25 m isobath and the other offshore of the 25 m isobath. The lowest density of bottlenose dolphins was observed over the continental shelf, with higher densities along the coast and near the continental shelf edge. It was suggested that the coastal morphotype is restricted to waters < 25 m in depth north of Cape Hatteras (Kenney 1990). There was no apparent longitudinal discontinuity in bottlenose dolphin herd sightings during aerial surveys south of Cape Hatteras in the winter (Blaylock and Hoggard 1994). NMFS surveys conducted from 1992-1998 show a clustering of bottlenose dolphins nearshore and then additional bottlenose dolphins in the offshore areas. Unfortunately, the morphotype of bottlenose dolphins (WNA offshore or WNA coastal) cannot be determined from the air so attributing each sighting to a specific morphotype is not possible. There is also a potential for confusing immature spotted dolphins, with few or no spots dorsally, with bottlenose dolphins where the two species co-occur. In 1995, NMFS conducted two aerial surveys along the Atlantic coast (Blaylock 1995; Garrison and Yeung 2001). One survey was conducted during summer 1995 between Cape Hatteras, NC, and Sandy Hook, NJ, and included three replicate surveys. The second survey was conducted during winter 1995 between Cape Hatteras, NC, and Ft. Pierce, FL. A distributional analysis identified a significant spatial pattern in bottlenose dolphin sightings as a function of distance from shore (Garrison 2001a). During the northern (summer) surveys, the significant spatial boundary occurred at 12 km from shore. During the southern (winter) survey, the significant spatial boundary occurred at 27 km from shore. The gap in sightings best defines, for the time being, the eastern extent of the coastal morphotype for purposes of habitat definition and abundance estimates. NMFS continues to collect biopsy samples from Tursiops throughout the possible range of the coastal morphotype so that stock boundaries can be confirmed or modified on the basis of a more comprehensive data set (Waring et al. 2002).

The 1995 aerial surveys were conducted to estimate population size of the hypothesized single coastal migratory stock (Blaylock 1995; Garrison and Yeung 2001). The summer aerial survey was conducted between July 1 and August 14, 1995, covering Cape Hatteras, NC, to Sandy Hook, NJ, (35.23oN-40.5oN), and from the mainland shore to the 25 m isobath. This survey provided coverage and abundance estimates for the Northern Migratory (NM) and Northern North Carolina (NNC) management units. However, coverage of the NNC unit was incomplete as the surveys did not cover the region south of Cape Hatteras, NC, to Cape Lookout, NC. Abundance was estimated for each stratum pooling across the three replicate surveys. The winter survey was conducted between January 27 and March 6, covering from Fort Pierce, FL, to Cape Hatteras, NC, from the mainland shore to 9.25 km (5 Nautical Miles) beyond the inshore edge of the Gulf Stream or <200 km offshore. This survey included coverage of the NNC, Southern North Carolina (SNC), South Carolina (SC), Georgia (GA), Northern Florida (NFL) and Central Florida (CFL) management units. However, the coverage of the NNC management unit was incomplete and did not include the region north of Cape Hatteras, NC. These abundance estimates also include NM unit animals that have migrated south of the NC/VA border during winter. Abundance for each management unit was estimated using line transect methods and the program DISTANCE (Buckland et al. 1993) for both the winter and summer surveys. There was no significant difference between the abundance estimates for the combined NM and NNC management units in summer and the combined NM, NNC, and SNC stocks in winter. Another set of aerial surveys was conducted parallel to the coastline from the North Carolina/South Carolina border to the Maryland/Delaware border during 1998 and 1999 to document the distribution of dolphins and fishing gear in nearshore waters (Hohn et al. unpubl. data). These strip/ transect surveys were conducted weekly, weather permitting, over 12 months in most of North Carolina and for six months (May to December) in Virginia and Maryland. In retrospect, they provide seasonal coverage of the Southern North Carolina, Northern North Carolina, and Northern Migratory management units. The strip transect surveys cannot be used directly for abundance estimation because they did not follow the design constraints of line transect survey methods and covered only a small proportion of the habitat of coastal bottlenose dolphin. The density of dolphins near the coastline is high relative to habitats farther offshore, and the use of density estimates in this region to calculate overall abundance would likely result in significant positive bias. However, these surveys do provide information on the relative abundance of dolphins between regions that may be used to supplement the abundance estimates from the line transect surveys conducted in 1995 (Garrison and Hohn 2001). Both sets of aerial surveys covered ocean coasts only. An abundance estimate was generated for bottlenose dolphins in estuarine waters of North Carolina using mark-recapture methodology (Read et al. In review). It is possible to post-stratify the mark-recapture estimates consistent with management unit definitions (Palka et al. 2001). Abundance estimates for each management unit are the sum of estimates, where appropriate, from the recent analyses. Estimated overall abundance was 9,206 from summer surveys and 19,459 from winter surveys. However, for consistency with achieving the goals of the MMPA, such as maintaining marine mammals as functioning components of their ecosystems, it is more appropriate to establish abundance estimates for each management unit. Abundance for each management unit was estimated by post-stratifying sightings and effort data consistent with geographic and seasonal management unit boundaries (Garrison and Yeung 2001; Palka et al. 2001). Although these estimates are improved relative to previous abundance estimates for coastal bottlenose dolphins, potential biases remain. The aerial survey estimates are not corrected for g(0), the probability of detecting a group on the track line as a function of perception bias and availability bias. The exclusion of g(0) from the abundance estimate results in a negative bias of unknown magnitude. A positive bias may occur if the longitudinal boundaries have been extended too far offshore resulting in offshore dolphins being included in the abundance estimates for the coastal morphotype or if estuarine dolphins were over-represented in coastal waters during the time of the survey. Further uncertainties in the abundance estimates result from incomplete coverage of some seasonal management units during the line transect surveys. While the strip transect surveys were used to supplement the survey coverage, uncertainties associated with that analysis also introduce uncertainty in the overall abundance estimate (Garrison and Hohn 2001).

The minimum population size (NMIN) for each management was calculated by Waring et al. (2002) according to he Potential Biological Removal (PBR) Guidelines (Wade and

Angliss 1997): NMIN= N/exp(0.842×[ln(1+[CV(N)]2)]½). It was recognized that these estimates may be negatively biased because they do not include corrections for g(0) and, for some of the managements units, do not include the entire spatial range of the unit during that season. The strip transect surveys compensate for some of the abundance omitted during line-transect survey; nonetheless, for some management units the entire range was not covered. There are insufficient data to determine the population trend for this stock (Waring et al. 2002).

In addition, Current and maximum net productivity rates are not known for the WNA coastal morphotype. The maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive life history (Barlow et al. 1995; Waring et al. 2002).

PBR is the product of the minimum population size, one-half the maximum productivity rate, and a "recovery" factor (Wade and Angliss 1997). The "recovery" factor is assumed to be 0.50, the default for depleted stocks and stocks of unknown status. At least part of the range-wide stock complex is depleted; for the remainder, status is unknown. For consistency with achieving the goals of the MMPA, such as maintaining marine mammals as functioning components of their ecosystems, it is more appropriate to establish separate PBRs for each management unit.

Total estimated average annual fishery-related mortality or serious injury resulting from observed fishing trips during 1996-2000 was 233 bottlenose dolphins (CV=0.16) in the mid-Atlantic coastal gillnet fishery (Waring et al. 2002). The management units affected by this fishery would be the NM, NNC, and SC. An estimated 24 (CV=0.89) were taken in the shark drift gillnet fishery off the coast of Florida during 1999-2000, affecting the Central and Northern Florida management units. No estimates of mortality from observed trips are available for any of the other fisheries that interact with WNA coastal bottlenose dolphins. Therefore, the total average annual mortality estimate is considered to be a lower bound of the actual annual human-caused mortality and serious injury (Waring et al. 2002).

Bottlenose dolphins are known to interact with commercial fisheries and occasionally are taken in various kinds of fishing gear including gillnets, seines, long-lines, shrimp trawls, and crab pots (Read 1994; Wang et al. 1994) especially in near-shore areas where dolphin densities and fishery efforts are greatest. There are nine Category II commercial fisheries that interact with WNA coastal bottlenose dolphins in the 2001 MMPA List of Fisheries (LOF), six of which occur in North Carolina waters. Category II fisheries include the mid-Atlantic coastal gillnet, NC inshore gillnet, mid-Atlantic haul/beach seine, NC long haul seine, NC stop net, Atlantic blue crab trap/pot, Southeast Atlantic gillnet, Southeastern U.S. Atlantic shark gillnet and the Virginia pound net (see 2001 List of Fisheries, 66 FR 42780, August 15, 2001; Waring et al. 2002). The mid-Atlantic haul/beach seine fishery also includes the haul seine and swipe net fisheries. There are five Category III fisheries that may interact with WNA coastal bottlenose dolphins. Three of these are inshore gillnet fisheries: the Delaware Bay inshore gillnet, the Long Island

Sound inshore gillnet, and the Rhode Island, southern Massachusetts, and New York Bight inshore gillnet. The remaining two are the shrimp trawl and mid-Atlantic menhaden purse seine fisheries. There have been no takes observed by the NMFS observer programs in any of these fisheries (Waring et al. 2002).

The mid-Atlantic coastal gillnet fishery is actually a combination of small-vessel fisheries that target a variety of fish species, including bluefish, croaker, spiny and smooth dogfish, kingfish, Spanish mackerel, spot, striped bass, and weakfish (Steve et al. 2001). These fisheries operate in different seasons targeting different species in different states throughout the range of the coastal morphotype. Most nets are set gillnets without anchors and are fished close to shore. Anchored set gillnets or drift gillnets are used in some fisheries (e.g., monkfish or dogfish). A comprehensive description of coastal gillnet gears and fishing effort in North Carolina is available in Steve et al. (2001). This fishery has the highest documented level of mortality of WNA coastal bottlenose dolphins; the North Carolina sink gillnet fishery is its largest component in terms of fishing effort and observed takes. Bycatch estimates are available for the period 1996-2000 (Waring et al. 2002). Of 12 observed mortalities from 1995-2000, 5 occurred in sets targeting spiny or smooth dogfish and another in a set targeting “shark” species, 2 occurred in striped bass sets, 2 occurred in Spanish mackerel sets, and the remainder were in sets targeting kingfish, weakfish, or "finfish" (Rossman and Palka 2001; Waring et al. 2002).

The shark gillnet fishery operates in Federal waters from southern Florida to southern Georgia. The fishery is defined by vessels using relatively large mesh nets (>10 inches) and net lengths typically greater than 1500 feet. The fishery primarily uses drifting nets that are set overnight; however, recently it has been employing a small number of shorter duration “strike” sets that encircle targeted schools of sharks. Since 1999, the Atlantic Large Whale Take Reduction Plan restricted the activities of the fishery to waters south of 27° 51’ N latitude during the critical right whale season from 15 November – 31 March and mandated 100% observer coverage during this period. During the remainder of the year, these vessels generally operate north of Cape Canaveral, FL and there is little observer coverage of the fleet. The fishery potentially interacts with the Georgia, Northern Florida, and Central Florida management units of coastal bottlenose dolphin. During an observer program in 1993 and 1994 and limited observer coverage during the summer of 1998, no takes of bottlenose dolphin were observed (Trent et al. 1997; Carlson and Lee, 2000). However, takes resulting in mortality were observed in the Central Florida management unit during 1999 and 2000. Total bycatch mortality for this management unit has been estimated for 1999 and 2000 (Garrison 2001b).

A beach seine fishery operates along northern North Carolina beaches targeting striped bass, mullet, spot, weakfish, sea trout, and bluefish. The fishery operates on the Outer Banks of North Carolina primarily in the spring (April through June) and fall (October through December). It uses two primary gear types: a “beach anchored gill net” and a “beach seine.” Both systems utilize a small net anchored to the beach. The beach seine system also uses a bunt and a wash net that are attached to the beach and are in the surf (Steve et al. 2001). The North Carolina beach seine fishery has been observed since April 7, 1998 by the NMFS fisheries sampling program (observer program) based at the

Northeast Fisheries Science Center. Through 2001, there were 101 sets observed during the winter season (Nov-Apr) and 65 sets observed during the summer season (May-Oct). A total of 2 coastal bottlenose dolphin takes were observed, 1 in May 1998 and 1 in December 2000. The beach seine observer data are currently being reviewed but estimates of mortality are not yet available (Waring et al. 2002).
Between 1994 and 1998, 22 bottlenose dolphin carcasses (4.4 dolphins per year on average) recovered by the Stranding Network between North Carolina and Florida's Atlantic coast displayed evidence of possible interaction with a trap/pot fishery (i.e., rope and/or pots attached, or rope marks). Additionally, at least 5 dolphins were reported to be released alive (condition unknown) from blue crab traps/pots during this time period. In recent years, reports of strandings with evidence of interactions between bottlenose dolphins and both recreational and commercial crab-pot fisheries have been increasing in the Southeast Region (McFee and Brooks 1998). The increased reporting may result from increased effort towards documenting these marks or increases in mortality (Waring et al. 2002).

Data from the Chesapeake Bay suggest that the likelihood of bottlenose dolphin entanglement in pound net leads may be affected by the mesh size of the lead net (Bellmund et al. 1997), but the information is not conclusive. Stranding data for 1993-1997 document interactions between WNA coastal bottlenose dolphins and pound nets in Virginia. Two bottlenose dolphin carcasses were found entangled in the leads of pound nets in Virginia during 1993-1997, for an average of 0.4 bottlenose dolphin strandings per year. A third record of an entangled bottlenose dolphin in Virginia in 1997 may have been applicable to this fishery. This entanglement involved a bottlenose dolphin carcass found near a pound net with twisted line marks consistent with the twine in the nearby pound net lead rather than with monofilament gillnet gear. Given that other sources of annual serious injury and mortality estimates (e.g., observer data) are not available, the stranding data (0.4 bottlenose dolphins per year) were used as a minimum estimate of annual serious injury and mortality and this fishery was classified as a Category II fishery in the 2001 List of Fisheries (Waring et al. 2002).

The shrimp trawl fishery operates from North Carolina through northern Florida virtually year around, moving seasonally up and down the coast. One bottlenose dolphin was recovered dead from a shrimp trawl in Georgia in 1995 (Southeast USA Marine Mammal Stranding Network unpublished data), and another was taken in 1996 near the mouth of Winyah Bay, SC, during a research survey. No other bottlenose dolphin mortality or serious injury has been previously reported to NMFS (Waring et al. 2002).

The Atlantic menhaden purse seine fishery targets the Atlantic menhaden in Atlantic coastal waters. Smith (1999) summarized menhaden fishing patterns by the Virginia-North Carolina vessels from 1985-1996. Most of the catch and sets during that time occurred within three miles of the shore. Between 1994 and 1997, menhaden were processed at only three facilities, two in Reedville Beach, VA, and one in Beaufort, NC. Each of the Virginia facilities had a fleet of 9-10 vessels while the Beaufort facility is supported by 2-6 vessels. Since 1998, only one plant has operated in Virginia and the number of vessels has been reduced to ten in Virginia and two in North Carolina

(Vaughan et al. 2001). The fishery moves seasonally, with most effort occurring off of North Carolina from November-January and moving northward to southern New England during warmer months. Menhaden purse seiners have reported an annual incidental take of 1 to 5 bottlenose dolphins, although observer data are not available (Waring et al. 2002).

From 1997-1999, 995 bottlenose dolphins were reported stranded along the Atlantic coast from New York to Florida (Hohn and Martone 2001; Hohn et al. 2001; Palka et al. 2001). Of these, it was possible to determine whether a human interaction had occurred for 449 (45%); for the remainder it was not possible to make that determination. The proportion of carcasses determined to have been involved in a human interaction averaged 34%, but ranged widely from 11-12% in Delaware and Georgia to 49% and 53% in Virginia and North Carolina, respectively.

The nearshore habitat occupied by the coastal morphotype is adjacent to areas of high human population and in the northern portion of its range is highly industrialized. The blubber of stranded dolphins examined during the 1987-88 mortality event contained anthropogenic contaminants in levels among the highest recorded for a cetacean (Geraci 1989). There are no estimates of indirect human-caused mortality resulting from pollution or habitat degradation.

The coastal migratory stock is designated as depleted under the MMPA. From 1995-2001, NMFS recognized only a single migratory stock of coastal bottlenose dolphins in the WNA and, therefore, the entire stock was listed as depleted. The management units in this report now replace the single coastal migratory stock. A re-analysis of the depletion designation on a management unit basis needs to be undertaken. In the interim, because one or more of the management units may be depleted, all management units retain the depleted designation. In addition, mortality in multiple units exceeded PBR (Waring et al. 2002). There are no rigorous results that would provide reliable information on current abundance relative to historical abundance. All prior estimates cover only part of the range of management units spatially or temporally, include the offshore morphotype, or are otherwise compromised. Population trends cannot be determined due to insufficient data. Over the past five years, estimated average annual mortality exceeded PBR in the mid-Atlantic gillnet fisheries for the northern migratory and northern NC management units during summer and for the NC mixed management units in winter (Waring et al. 2002).

The species is not listed as threatened or endangered under the Endangered Species Act, but because, as noted above, the stock is listed as depleted under the MMPA it is a strategic stock. This stock is also considered strategic under the MMPA because fishery-related mortality and serious injury exceed the potential biological removal level.

Leatherback Sea Turtle

Leatherback turtles are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and

Barbour 1972). The leatherback sea turtle is the largest living turtle and ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS and USFWS, 1995). Evidence from tag returns and strandings in the western Atlantic suggests that adults engage in routine migrations between boreal, temperate and tropical waters (NMFS and USFWS, 1992). In the U.S., leatherback turtles are found throughout the action area of this consultation. Located in the northeastern waters during the warmer months, this species is found in coastal waters of the continental shelf and near the Gulf Stream edge, but rarely in the inshore areas. However, leatherbacks may migrate close to shore, as a leatherback was satellite tracked along the mid-Atlantic coast, thought to be foraging in these waters. 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. Shoop and Kenney (1992) also observed concentrations of leatherbacks during the summer off the south shore of Long Island and off New Jersey. Leatherbacks in these waters are thought to be following their preferred jellyfish prey. This 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).

Compared to the current knowledge regarding loggerhead populations, the genetic distinctness of leatherback populations is less clear. However, genetic analyses of leatherbacks to date indicate female turtles nesting in St. Croix/Puerto Rico and those nesting in Trinidad differ from each other and from turtles nesting in Florida, French Guiana/Suriname and along the South African Indian Ocean coast. Much of the genetic diversity is contained in the relatively small insular subpopulations. Although populations or subpopulations of leatherback sea turtles have not been formally recognized, based on the most recent reviews of the analysis of population trends of leatherback sea turtles, and due to our limited understanding of the genetic structure of the entire species, the most conservative approach would be to treat leatherback nesting populations as distinct populations whose survival and recovery is critical to the survival and recovery of the species. Further, any action that appreciably reduces the likelihood for one or more of these nesting populations to survive and recover in the wild, would appreciably reduce the species' likelihood of survival and recovery in the wild.

Leatherbacks are predominantly a pelagic species and feed on jellyfish (i.e., *Stomolophus, Chryaora*, and *Aurelia* (Rebel 1974)), cnidarians (*medusae, siphonophores*) and tunicates (*salps, pyrosomas*). Time-Depth-Recorder data recorded by Eckert et al. (1998b) indicate that leatherbacks are night feeders and are deep divers, with recorded dives to depths in excess of 1000 meters. However, leatherbacks may come into shallow waters if there is an abundance of jellyfish nearshore. Leary (1957) reported a large group of up to 100 leatherbacks just offshore of Port Aransas, Texas associated with a dense aggregation of *Stomolophus*. Leatherbacks also occur annually in places such as Cape Cod and Narragansett Bays during certain times of the year, particularly the fall.
Although leatherbacks are a long lived species (> 30 years), they are somewhat faster to mature than loggerheads, with an estimated age at sexual maturity reported as about 13-14 years for females, and an estimated minimum age at sexual maturity of 5-6 years, with 9 years reported as a likely minimum (Zug and Parham 1996) and 19 years as a likely

maximum (NMFS 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. During each nesting, they produce 100 eggs or more in each clutch and thus, can produce 700 eggs or more per nesting season (Schultz 1975). The eggs will incubate for 55-75 days before hatching. The habitat requirements for post-hatchling leatherbacks are virtually unknown (NMFS and USFWS 1992).

Anthropogenic impacts to the leatherback population are similar to those discussed above for the loggerhead sea turtle, including fishery interactions as well as intense exploitation of the eggs (Ross 1979). Eckert (1996) and Spotila et al. (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries. Zug and Parham (1996) attribute the sharp decline in leatherback populations to the combination of the loss of long-lived adults in fishery related mortality, and the lack of recruitment stemming from elimination of annual influxes of hatchlings because of intense egg harvesting.

Poaching is not known to be a problem for U.S. nesting populations. However, numerous fisheries that occur in both U.S. state and Federal waters are known to negatively impact juvenile and adult leatherback sea turtles. These include incidental take in several commercial and recreational fisheries. Fisheries known or suspected to incidentally capture leatherbacks include those deploying bottom trawls, off-bottom trawls, purse seines, bottom longlines, hook and line, gill nets, drift nets, traps, haul seines, pound nets, beach seines, and surface longlines (NMFS and USFWS 1992). At a workshop held in the Northeast in 1998 to develop a management plan for leatherbacks, experts expressed the opinion that incidental takes in fisheries were likely higher than is being reported.

Leatherback interactions with the southeast shrimp fishery are also common. Turtle Excluder Devices (TEDs), typically used in the southeast shrimp fishery to minimize sea turtle/fishery interactions, are less effective for the large-sized leatherbacks. Therefore, the NMFS has used several alternative measures to protect leatherback sea turtles from lethal interactions with the shrimp fishery. These include establishment of a Leatherback Conservation Zone (60 FR 25260). NMFS established the zone to restrict, when necessary, shrimp trawl activities from off the coast of Cape Canaveral, Florida to the Virginia/North Carolina Border. It allows the NMFS to quickly close the area or portions of the area to the shrimp fleet on a short-term basis when high concentrations of normally pelagic leatherbacks are recorded in more coastal waters where the shrimp fleet operates. Other emergency measures may also be used to minimize the interactions between leatherbacks and the shrimp fishery. For example, in November 1999 parts of Florida experienced an unusually high number of leatherback strandings. In response, the NMFS required shrimp vessels operating in a specified area to use TEDs with a larger opening for a 30-day period beginning December 8, 1999 (64 FR 69416) so that leatherback sea turtles could escape if caught in the gear.

Leatherbacks are also susceptible to entanglement in lobster and crab gear, possibly as a result of attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, attraction to the buoys which could appear as prey, or the gear configuration which may be more likely to wrap around flippers. The total number of leatherbacks reported entangled from New York through Maine from all sources for the years 1980 - 2000 is 119; out of this total, 92 of these records occurred from1990-2000. Entanglements are also 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. It is unclear how leatherbacks become entangled in such gear. Prescott (1988) reviewed stranding data for Cape Cod Bay and concluded that for those turtles where cause of death could be determined (the minority), entanglement in fishing gear is the leading cause of death followed by capture by dragger, cold stunning, or collision with boats.

Spotila et al. (1996) describe a hypothetical life table model based on estimated ages of sexual maturity at both ends of the species' natural range (5 and 15 years). The model concluded that leatherbacks maturing in 5 years would exhibit much greater population fluctuations in response to external factors than would turtles that mature in 15 years. Furthermore, the simulations indicated that leatherbacks could maintain a stable population only if both juvenile and adult survivorship remained high, and that if other life history stages (i.e., egg, hatchling, and juvenile) remained static. Model simulations indicated that an increase in adult mortality of more than 1% above background levels in a stable population was unsustainable. As noted, there are many human-related sources of mortality to leatherbacks; a tally of all leatherback takes anticipated annually under current biological opinions completed for the NMFS June 30, 2000, biological opinion on the pelagic longline fishery projected a potential for up to 801 leatherback takes, although this sum includes many takes expected to be nonlethal. Leatherbacks have a number of pressures on their populations, including injury or mortality in fisheries, other Federal activities (e.g., military activities, oil and gas development, etc.), degradation of nesting habitats, direct harvest of eggs, juvenile and adult turtles, the effects of ocean pollutants and debris, lethal collisions, and natural disturbances such as hurricanes (which may wipe out nesting beaches).

Spotila et al. (1996) recommended not only reducing mortalities resulting from fishery interactions, but also advocated protection of eggs during the incubation period and of hatchlings during their first day, and indicated that such practices could potentially double the chance for survival and help counteract population effects resulting from adult mortality. They conclude, "stable leatherback populations could not withstand an increase in adult mortality above natural background levels without decreasing . . . the Atlantic population is the most robust, but it is being exploited at a rate that cannot be sustained and if this rate of mortality continues, these populations will also decline. ".

Estimated to number approximately 115,000 adult females globally in 1980 (Pritchard 1982) and only 34,500 by 1995 (Spotila et al. 1996), leatherback populations have been decimated worldwide, not only by fishery related mortality but, at least historically, primarily due to intense exploitation of the eggs (Ross 1979). On some beaches nearly 100% of the eggs laid have been harvested (Eckert 1996). Eckert (1996) and Spotila et al. (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries. Spotila (2000) states that a conservative estimate of annual leatherback fishery-related mortality (from longlines, trawls and gillnets) in the Pacific during the 1990s is 1,500 animals. He estimates that this represented about a 23% mortality rate (or 33% if most mortality was focused on the East Pacific population).

Nest counts are currently the only reliable indicator of population status available for leatherback turtles. The status of the leatherback population in the Atlantic is difficult to assess since major nesting beaches occur over broad areas within tropical waters outside the U.S.. Recent information suggests that Western Atlantic populations declined from 18,800 nesting females in 1996 (Spotila et al. 1996) to 15,000 nesting females by 2000. Eastern Atlantic (i.e., off Africa, numbering ~ 4,700) and Caribbean (4,000) populations appear to be stable, but there is conflicting information for some sites and it is certain that some populations (e.g., St. John and St. Thomas, U.S. Virgin Islands) have been extirpated (NMFS and USFWS 1995). It does appear, however, that the Western Atlantic population is being subjected to mortality beyond sustainable levels, resulting in a continued decline in numbers of nesting females.

Loggerhead Sea Turtle

The loggerhead sea turtle occurs throughout the temperate and tropical regions of the Atlantic, Pacific and Indian Oceans (Dodd 1998). The loggerhead turtle was listed as "threatened" under the ESA on July 28, 1978, but is considered endangered by the World Conservation Union (IUCN) and under the Convention on International Trade in Endangered Species of Flora and Fauna (CITES). Loggerhead sea turtles are found in a wide range of habitats throughout the temperate and tropical regions of the Atlantic. These include open ocean, continental shelves, bays, lagoons, and estuaries (NMFS& FWS 1995).

Since they are limited by water temperatures, sea turtles do not usually appear on the summer foraging grounds in the Gulf of Maine until June, but are found in Virginia as early as April. They remain in these areas until as late as November and December in some cases, but the large majority leaves the Gulf of Maine by mid-September. Loggerheads are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks (NMFS & FWS 1995). Under certain conditions they also feed on finfish, particularly if they are easy to catch *(e.g.,* caught in gillnets or inside pound nets where the fish are accessible to turtles).

A Turtle Expert Working Group (TEWG 2000), conducting an assessment of the status of the loggerhead sea turtle population in the Western North Atlantic (WNA), concluded that there are at least four loggerhead subpopulations separated at the nesting beach in the WNA. However, the group concluded that additional research is necessary to fully address the stock definition question. The four nesting subpopulations include the following areas: northern North Carolina to northeast Florida, south Florida, the Florida Panhandle, and the Yucatan Peninsula. Genetic evidence indicates that loggerheads from Chesapeake Bay southward to Georgia appear nearly equally divided in origin between

South Florida and northern subpopulations. Additional research is needed to determine the origin of turtles found north of the Chesapeake Bay.

The TEWG (1998) analysis also indicated the northern subpopulation of loggerheads is stable or declining. A recovery goal of 12,800 nests has been assumed for the Northern Subpopulation, but TEWG (1998) reported nest number at around 6,200 (TEWG 1998). More recently, the addition of nesting data from the years 1996, 1997 and 1998, did not change the assessment of the TEWG that the number of loggerhead nests in the Northern Subpopulation is stable or declining (TEWG 2000). Since the number of nests has declined in the 1980's, the TEWG concluded that it is unlikely that this subpopulation will reach this goal given this apparent decline and the lack of information on the subpopulation from which loggerheads in the WNA originate. Continued efforts to reduce the adverse effects of fishing and other human-induced mortality on this population are necessary.

The most recent 5-year ESA sea turtle status review (NMFS & USFWS 1995) highlights the difficulty of assessing sea turtle population sizes and trends. Most long-term data comes from nesting beaches, many of which occur extensively in areas outside U.S. waters. Because of this lack of information, the TEWG was unable to determine acceptable levels of mortality. This status review supports the conclusion of the TEWG that the northern subpopulation may be experiencing a decline and that inadequate information is available to assess whether its status has changed since the initial listing as threatened in 1978. NMFS & USFWS (1995) concluded that loggerhead turtles should remain designated threatened but noted that additional research will be necessary before the next status review can be conducted.

Hawksbill Sea Turtle

The following is a summary of information on the Hawksbill sea turtle made available by NMFS at the following website:
http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.html

The hawksbill occurs in tropical and subtropical seas of the Atlantic, Pacific and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean, with representatives of at least some life history stages regularly occurring in southern Florida and the northern Gulf of Mexico (especially Texas); in the Greater and Lesser Antilles; and along the Central American mainland south to Brazil. Within the U.S., hawksbills are most common in Puerto Rico and its associated islands, and in the U.S. Virgin Islands. In the continental U.S., the species is recorded from all the gulf states and from along the eastern seaboard as far north as Massachusetts, with the exception of Connecticut, but sightings north of Florida are rare.

The hawksbill is a small to medium-sized sea turtle. In the U.S. Caribbean, nesting females average about 62-94cm in straight carapace length. Weight is typically to 80 kg in the wider Caribbean, with a record weight of 127 kg. Hatchlings average about 42 mm straight carapace length and range in weight from 13.5-19.5 g. The following characteristics distinguish the hawksbill from other sea turtles: two pairs of prefrontal scales; thick, posteriorly overlapping scutes on the carapace; four pairs of coastal scutes; two claws on each flipper; and a beak-like mouth. The carapace is heart-shaped in very young turtles, and becomes more elongate or subovate with maturity. Its lateral and posterior margins are sharply serrated in all but very old individuals.

Hawksbills utilize different habitats at different stages of their life cycle. Posthatchling hawksbills occupy the pelagic environment, taking shelter in weedlines that accumulate at convergence points. Hawksbills reenter coastal waters when they reach approximately 20-25 cm carapace length. Coral reefs are widely recognized as the resident foraging habitat of juveniles, subadults and adults. This habitat association is undoubtedly related to their diet of sponges, which need solid substrate for attachment. The ledges and caves of the reef provide shelter for resting both during the day and night. Hawksbills are also found around rocky outcrops and high energy shoals, which are also optimum sites for sponge growth. Hawksbills are also known to inhabit mangrove-fringed bays and estuaries, particularly along the eastern shore of continents where coral reefs are absent. In Texas, juvenile hawksbills are associated with stone jetties.

Hawksbills utilize both low- and high-energy nesting beaches in tropical oceans of the world. Both insular and mainland nesting sites are known. Hawksbills will nest on small pocket beaches, and, because of their small body size and great agility, can traverse fringing reefs that limit access by other species. They exhibit a wide tolerance for nesting substrate type. Nests are typically placed under vegetation.

The hawksbill turtle's status has not changed since it was listed as endangered in 1970. It is a solitary nester, and thus, population trends or estimates are difficult to determine. The decline of nesting populations is accepted by most researchers. In 1983, the only known apparently stable populations were in Yemen, northeastern Australia, the Red Sea, and Oman. Commercial exploitation is the major cause of the continued decline of the hawksbill sea turtle. There is a continuing demand for the hawksbill's shell as well as other products including leather, oil, perfume, and cosmetics. Prior to being certified under the Pelly Amendment, Japan had been importing about 20 metric tons of hawksbill shell per year, representing approximately 19,000 turtles. A negotiated settlement was reached regarding this trade on June 19, 1992. The hawksbill shell commands high prices (currently $225/kilogram), a major factor preventing effective protection.

Incidental catch of hawksbill turtles during fishing operations is an unquantified and potentially significant source of mortality. Gill nets, longlines and shrimp trawls all take turtles in Gulf of Mexico waters. The extent to which hawksbills are killed or debilitated after becoming entangled in marine debris are unknown, but it is believed to be a serious and growing problem. Hawksbills have been reported entangled in monofilament gill nets, "fish nets", fishing line and rope. Hawksbill turtles eat a wide variety of debris such as plastic bags, plastic and styrofoam pieces, tar balls, balloons and plastic pellets. Effects of consumption include interference in metabolism or gut function, even at low levels of ingestion, as well as absorption of toxic byproducts.

Kemp’s Ridley Sea Turtle

The Kemp's ridley is probably the most endangered of the world's 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 population reached a low of 1,050 in 1985, but increased to 3,000 individuals in 1997. First-time nesting adults have increased from 6% to 28% from 1981 to 1989, and from 23% to 41% from 1990 to 1994, indicating that the ridley population may be in the early stages of growth (TEWG 1998). More recently the TEWG (2000) concluded that the Kemp's Ridley population appears to be in the early stages of exponential expansion. While the number of females nesting annually is estimated to be orders of magnitude less than historical levels, the mean rate of increase in the annual number of nests has accelerated over the period 1987-1999. Preliminary analyses suggest that the intermediate recovery goal of 10,000 nesting females by 2020 may be achievable (TEWG 2000).

Juvenile Kemp's ridleys inhabit northeastern US coastal waters where they forage and grow in shallow coastal areas during the summer months. Juvenile ridleys migrate southward with autumnal cooling and are found predominantly in shallow coastal embayments along the Gulf Coast during the late fall and winter months.

Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 cm in carapace length, and weighing less than 20 kg. After loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in there during May and June and then emigrating to more southerly waters from September to November. In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles.

The model presented by Crouse et al. (1987) illustrates the importance of subadults to the stability of loggerhead populations and may have important implications for Kemp's ridleys. The vast majority of ridleys identified along the Atlantic Coast have been juveniles and subadults. Sources of mortality in this area include incidental takes in fishing gear, pollution and marine habitat degradation, and other man-induced and natural causes. Loss of individuals in the Atlantic, therefore, may impede recovery of the Kemp's ridley sea turtle population. Sea sampling data from the northeast otter trawl fishery and southeast shrimp and summer flounder bottom trawl fisheries has recorded takes of Kemp's ridley turtles.

Green Sea Turtle

Green sea turtles are more tropical in distribution than loggerheads, and are generally found in waters between the northern and southern 20°C isotherms. In the western Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and the North Carolina sounds, and south throughout the tropics (NMFS 1998). Most of the individuals reported in U.S. waters are immature (NMFS 1998). Green sea turtles found north of Florida during the summer must return to southern waters in autumn or risk the adverse effects of cold temperatures.

There is evidence that green turtle nesting has been on the increase during the past decade. For example, increased nesting has been observed along the Atlantic coast of Florida on beaches where only loggerhead nesting was observed in the past (NMFS 1998). Recent population estimates for the western Atlantic area are not available. Green turtles are threatened by incidental captures in fisheries, pollution and marine habitat degradation, destruction/disturbance of nesting beaches, and other sources of man-induced and natural mortality.

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 (NMFS 1998). Post-pelagic green turtles feed primarily on sea grasses and benthic algae, but also consume jellyfish, salps, and sponges. Known feeding habitats along U.S. coasts of the western Atlantic include shallow lagoons and embayments in Florida, and similar shallow inshore areas elsewhere (NMFS 1998).

Sea sampling data from the scallop dredge fishery and southeast shrimp and summer flounder bottom trawl fisheries have recorded incidental takes of green turtles

Shortnose Sturgeon

Shortnose sturgeon occur in large rivers along the western Atlantic coast from the St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while northern populations are amphidromous (NMFS 1998). Population sizes vary across the species' range with the smallest populations occurring in the Cape Fear and Merrimack Rivers and the largest populations in the Saint John and Hudson Rivers (Dadswell 1979; NMFS 1998).

Shortnose sturgeon are benthic and mainly inhabit the deep channel sections of large rivers. They feed on a variety of benthic and epibenthic invertebrates including mollusks, crustaceans (amphipods, chironomids, isopods), and oligochaete worms (Vladykov and Greeley 1963; Dadswell 1979). Shortnose sturgeon are long-lived (30 years) and mature at relatively old ages. In northern areas, males reach maturity at 5-10 years, while females reach sexual maturity between 7 and 13 years.

In the northern part of their range, shortnose sturgeon exhibit three distinct movement patterns that are associated with spawning, feeding, and overwintering periods. In spring, as water temperatures rise above 8° C, pre-spawning shortnose sturgeon move from overwintering grounds to spawning areas. Spawning occurs from mid/late April to mid/late May. Post-spawned sturgeon migrate downstream to feed throughout the summer.

As water temperatures decline below 8° C again in the fall, shortnose sturgeon move to overwintering concentration areas and exhibit little movement until water temperatures rise again in spring (NMFS 1998). Young-of-the-year shortnose sturgeon are believed to move downstream after hatching (NMFS 1998) but remain within freshwater habitats. Older juveniles tend to move downstream in fall and winter as water temperatures decline and the salt wedge recedes. Juveniles move upstream in spring and feed mostly in freshwater reaches during summer.

Shortnose sturgeon spawn in freshwater sections of rivers, typically below the first impassable barrier on the river (e.g., dam). Spawning occurs over channel habitats containing gravel, rubble, or rock-cobble substrates (NMFS 1998). Environmental conditions associated with spawning activity include decreasing river discharge following the peak spring freshet, water temperatures ranging from 9 -12 C, and bottom water velocities of 0.4 - 0.7 m/sec (NMFS 1998).

Atlantic salmon

The recent ESA-listing for Atlantic salmon covers the wild population of Atlantic salmon found in rivers and streams from the lower Kennebec River north to the U.S.-Canada border. These include the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers and Cove Brook. Atlantic salmon are an anadromous species with spawning and juvenile rearing occurring in freshwater rivers followed by migration to the marine environment. Juvenile salmon in New England rivers typically migrate to sea in May after a two to three year period of development in freshwater streams, and remain at sea for two winters before returning to their U.S. natal rivers to spawn from mid October through early November. While at sea, salmon generally undergo an extensive northward migration to waters off Canada and Greenland. Data from past commercial harvest indicate that post-smolts overwinter in the southern Labrador Sea and in the Bay of Fundy. The numbers of returning wild Atlantic salmon within the Gulf of Maine Distinct Population Segment (DPS) are perilously small with total run sizes of approximately 150 spawners occurring in 1999 (Baum 2000). Although capture of Atlantic salmon has occurred in commercial fisheries (usually otter trawl or gillnet gear) or by research/survey, no salmon have been reported captured in the Atlantic surfclam and ocean quahog fisheries.

Smalltooth sawfish

NMFS issued a final rule to list the DPS of smalltooth sawfish in the U.S. as an endangered species on April 1, 2003. Smalltooth sawfish are tropical marine and estuarine fish that have the northwestern terminus of their Atlantic range in the waters of the eastern U.S.. In the U.S., smalltooth sawfish are generally a shallow water fish of inshore bars, mangrove edges, and seagrass beds, but larger animals can be found in deeper coastal waters. In order to assess both the historic and the current distribution and abundance of the smalltooth sawfish, a status review team collected and compiled literature accounts, museum collection specimens, and other records on the species. This information indicated that prior to around 1960, smalltooth sawfish occurred commonly in shallow waters of the Gulf of Mexico and eastern seaboard up to North Carolina, and more rarely as far north as New York. Subsequently their distribution has contracted to peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state. The current distribution is centered in the Everglades National Park, including Florida Bay (NMFS 2003).

Smalltooth sawfish have declined dramatically in U.S. waters over the last century, as indicated by publication and museum records, negative scientific survey results, anecdotal fishermen observations, and limited landings per unit effort (NMFS 2003). The fact that documented smalltooth sawfish catch records have declined during the twentieth century despite tremendous increases in fishing effort underscores the population reduction in the species. While NMFS lacks time-series abundance data to quantify the extent of the DPS's decline, the best available information indicates that the abundance of the U.S. DPS of smalltooth sawfish is at an extremely low level relative to historic levels.

The smalltooth sawfish continues to face threats from: (1) loss of wetlands, (2) eutrophication, (3) point and non point sources of pollution, (4) increased sedimentation and turbidity, (5) hydrologic modifications, and (6) incidental catch in fisheries (NMFS 2003). Commercial bycatch has played the primary role in the decline of this species. While Federal, state, and interjurisdictional laws, regulations, and policies lead to overall environmental enhancements indirectly aiding smalltooth sawfish, very few have been applied specifically for the protection of smalltooth sawfish. Based on the species' low intrinsic rate of increase resulting from their slow growth, late maturation, and low fecundity, population recovery potential for the species is limited and the species is at risk of extinction. Current protective measures and conservation efforts underway to protect the smalltooth sawfish are confined to: actions directed at increasing general awareness of this species and the risks it faces; possession prohibitions in the state waters of Florida and Louisiana; and research being pursued by the Mote Marine Laboratory's Center for Shark Research. There are no Federal or state conservation plans for the smalltooth sawfish.

Seabirds

Most of the following information about seabirds is taken from the Mid-Atlantic Regional Marine Research Program (1994) and Peterson (1963). Fulmars occur as far south as Virginia in late winter and early spring. Shearwaters, storm petrels (both Leach's and Wilson's), jaegers, skuas, and some terns pass through this region in their annual migrations. Gannets and phalaropes occur in the Mid-Atlantic during winter months. Nine species of gulls breed in eastern North America and occur in shelf waters off the northeastern US. These gulls include: glaucous, Iceland, great black-backed, herring, laughing, ring-billed, Bonaparte's and Sabine's gulls, and black-legged caduceus. Royal and sandwich terns are coastal inhabitants from Chesapeake Bay south to the Gulf of Mexico. The Roseate tern is listed as endangered under the ESA, while the least tern is considered threatened (Safina pers. comm.). In addition, the bald eagle is listed as threatened under the ESA and is a bird of aquatic ecosystems. Piping plover are listed as threatened and their critical habitat includes prairie alkali wetlands and surrounding shoreline; river channels and associated sandbars and islands; and reservoirs and inland lakes and their sparsely vegetated shorelines, peninsulas, and islands. These areas provide primary courtship, nesting, foraging, sheltering, brood-rearing and dispersal habitat for piping plovers.

Like marine mammals, seabirds are vulnerable to entanglement in commercial fishing gear. Human activities such as coastal development, habitat degradation, and the presence of organochlorine contaminants are considered the major threats to some seabird populations.