MEMORANDUM

Date: January 28, 2014
To: Chris Moore, Executive Director
From: Jessica Coakley, Staff
Subject: Scup Gear Restricted Areas (GRAs) - Framework Meeting One

The following are included for your consideration on the above subject: 1) Draft Framework 8 to the Summer Flounder, Scup, and Black Sea Bass Plan, and 2) Working paper prepared by Mark Terceiro and Alicia Miller (NMFS-NEFSC) entitled, "Scup discarding in the NEFSC statistical areas that include the Gear Restricted Areas."

The Northern and Southern Scup GRAS were implemented in 2000 to reduce scup mortality resulting from discards in the scup fishery and in other small mesh fisheries, particularly for juvenile scup. Adjustments to the GRAs were made in the first few years and are described in the Framework. The condition of the scup stock has improved and post-recruitment survival of small scup is higher post-2000 versus pre-2000 (Figure 1). Draft alternatives are included within the Framework that maintain, modify, or eliminate the GRAs. The Council may add, eliminate, or modify alternatives, including changes to GRA boundaries and gear restriction times. Additional analyses are being developed by NEFSC staff and will be available at the February Council meeting, to help guide the Council in alternative consideration.

![Figure 1. Scup Spawning Stock Biomass and Recruitment (Terceiro 2012).](image)
FRAMEWORK ADJUSTMENT 8

TO THE

SUMMER FLOUNDER, SCUP, AND BLACK SEA BASS

FISHERY MANAGEMENT PLAN

(Includes Environmental Assessment, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis)

February 2014

Mid-Atlantic Fishery Management Council

in cooperation with

the National Marine Fisheries Service

First Framework Meeting: February 11, 2014
Second Framework Meeting: XXXXXXXXXXXX
Final approved by NOAA: XXXXXXXX (Effective XXXXXXXX)

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1.0 EXECUTIVE SUMMARY

This document was prepared by the Mid-Atlantic Fishery Management Council (Council) in consultation with the National Marine Fisheries Service (NMFS). The purpose of this framework is to consider modification of the Scup Northern and Southern Gear Restricted Areas (GRAs) as described in §648.124. The need for this action is to consider the effectiveness of the current gear restricted areas (as configured) relative to updated analyses on the impact of the GRAs on the discard mortality and survival of small scup. Scup (*Stenotomus chrysops*) are managed under the Summer Flounder, Scup, and Black Sea Bass FMP.

**Summary of Alternatives**

Alternative 1 is the status quo/no action alternative. Alternatives 2 and 3 propose modifications to the boundaries of the Northern and Southern GRAs, respectively. Possible modifications are presented as sub-alternatives. Alternatives 4 and 5 propose elimination of the Northern and Southern GRAs, respectively.

A summary of the impacts of the alternatives will be completed prior to the second of the required meeting for framework adjustments, when the Environmental Assessment (EA) is completed.

**Cumulative Impacts**

This section to be completed prior to the second required framework meeting.

**Conclusions**

This section to be completed prior to the second required framework meeting.
### 2.0 LIST OF ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CEA</td>
<td>Cumulative Effects Assessment</td>
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<tr>
<td>CEQ</td>
<td>Council on Environmental Quality</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>DPS</td>
<td>Distinct Population Segment</td>
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<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>EFH</td>
<td>Essential Fish Habitat</td>
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<td>EIS</td>
<td>Environmental Impact Statement</td>
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<td>Executive Order</td>
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<td>Endangered Species Act</td>
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<td>FR</td>
<td>Federal Register</td>
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<td>FMP</td>
<td>Fishery Management Plan</td>
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<td>FONSI</td>
<td>Finding of No Significant Impact</td>
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<tr>
<td>LOF</td>
<td>List of Fisheries</td>
</tr>
<tr>
<td>MAFMC</td>
<td>Mid-Atlantic Fishery Management Council</td>
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<tr>
<td>MMPA</td>
<td>Marine Mammal Protection Act</td>
</tr>
<tr>
<td>MSA</td>
<td>Magnuson-Stevens Fishery Conservation and Management Act</td>
</tr>
<tr>
<td>NAO</td>
<td>National Oceanic and Atmospheric Administration Administrative Order</td>
</tr>
<tr>
<td>NEFSC</td>
<td>Northeast Fisheries Science Center</td>
</tr>
<tr>
<td>NEFOP</td>
<td>Northeast Fisheries Observer Program</td>
</tr>
<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
</tr>
<tr>
<td>NERO</td>
<td>Northeast Regional Office</td>
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<tr>
<td>NMFS</td>
<td>National Marine Fisheries Service</td>
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<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
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<tr>
<td>PRA</td>
<td>Paperwork Reduction Act</td>
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<td>Regulatory Flexibility Analysis</td>
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<td>Regulatory Impact Review</td>
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<td>SBA</td>
<td>Small Business Administration</td>
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<tr>
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<td>United States</td>
</tr>
<tr>
<td>VECs</td>
<td>Valued Ecosystem Components</td>
</tr>
</tbody>
</table>
# 3.0 TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY ......................................................................................................................... I
2.0 LIST OF ACRONYMS .................................................................................................................................. I
3.0 TABLE OF CONTENTS ............................................................................................................................... 2
4.0 PURPOSE AND NEED AND BACKGROUND .......................................................................................... 3
5.0 MANAGEMENT ALTERNATIVES ............................................................................................................... 5
   5.1 ALTERNATIVE 1 (STATUS QUO/NO ACTION) ......................................................................................... 6
   5.2 ALTERNATIVE 2 (MODIFY THE NORTHERN GRA) ............................................................................... 8
   5.3 ALTERNATIVE 3 (MODIFY THE SOUTHERN GRA) .............................................................................. 9
   5.4 ALTERNATIVE 4 (ELIMINATE THE NORTHERN GRA) ......................................................................... 11
   5.5 ALTERNATIVE 5 (ELIMINATE THE SOUTHERN GRA) ......................................................................... 11
6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES ................................................. 12
   6.1 DESCRIPTION OF THE MANAGED RESOURCE ............................................................................... 12
   6.2 HABITAT (INCLUDING ESSENTIAL FISH HABITAT) .......................................................................... 17
   6.3 ESA-LISTED SPECIES AND MMPA PROTECTED SPECIES ............................................................. 19
   6.4 HUMAN COMMUNITIES AND ECONOMIC ENVIRONMENT ............................................................ 19
7.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES .................................................................... 19
8.0 APPLICABLE LAWS ............................................................................................................................... 19
9.0 LITERATURE CITED ............................................................................................................................. 19
10.0 LIST OF AGENCIES AND PERSONS CONSULTED ............................................................................ 19
APPENDIX A .................................................................................................................................................. 20
4.0 PURPOSE AND NEED AND BACKGROUND

The purpose of this action (Framework Adjustment 8) is to modify the Scup Northern and Southern Gear Restricted Areas (GRAs). This action is needed to optimize the effectiveness of the current gear restricted areas (as configured) relative to updated analyses on the impact of the GRAs on the discard mortality and survival of small scup.

The first broad scale gear restricted areas for scup were implemented in 2000. In 2000, the 31st Stock Assessment Review Committee (SARC 31) emphasized the need to reduce scup mortality resulting from discards in the scup fishery and in other fisheries. In response to that recommendation, GRAs were established during the 2000 fishing year (65 FR 33486, May 24, 2000, and 65 FR 81761, Dec. 27, 2000) and modified for the 2001 fishing year (66 FR 12902, March 1, 2001). The GRAs prohibit trawl vessels from fishing for, or possessing, certain non-exempt species (Loligo squid, black sea bass, and silver hake (whiting)) when fishing with mesh smaller 5.0-inch (12.7-cm; as described in §648.124) during the effective periods (January 1 through March 15 for the Southern GRA, and November 1 through December 31 for the Northern GRA). For the 2003 fishing year, the Council recommended allowing vessels to fish for non-exempt species with small mesh in the GRAs, provided they use specially modified trawl nets and carry observers, consistent with Atlantic Coastal Cooperative Statistics Program observer standards. Instead, NMFS implemented an alternative program (the GRA Exemption Program) requiring 100 percent observer coverage for all vessels fishing with small mesh for non-exempt species in the GRAs using the modified gear. This alternative imposed significantly fewer administrative and enforcement complexities and was intended to provide more data to evaluate the effectiveness of the gear modifications (68 FR 60, January 2, 2003). NMFS maintained the GRA Exemption Program for 2004 (69 FR 2074, January 14, 2004). In 2005, the entire Southern GRA was shifted by 3 longitudinal minutes to the west (70 FR 303, January 4, 2005). The recommendation to move the Southern GRA followed an industry request and subsequent analysis by the Northeast Fisheries Science Center (NEFSC). NMFS also terminated the existing GRA Exemption Program, because no vessels had participated to date.

This framework was developed in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA)\(^1\) and National Environmental Protection Act (NEPA), the former being the primary domestic legislation governing fisheries management in the U.S. Exclusive Economic Zone (EEZ), and the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP). The management regime and objectives of the fishery are detailed in the FMP, including any subsequent amendments, and are available at: [http://www.mafmc.org](http://www.mafmc.org)

This Environmental Assessment (EA) examines the impacts of each proposed action and their alternatives on the human environment. The aspects of the human environment that are likely to be directly or indirectly affected by the actions proposed in this document are described as valued ecosystem components (VECs; Beanlands and Duinker 1984). These VECs comprise the affected environment and are specifically defined as the managed resource (scup) and any non-\(^1\) Magnuson-Stevens Fishery Conservation and Management Act (MSA), portions retained plus revisions made by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA).
target species; habitat, including EFH for the managed resource and non-target species; Endangered Species Act (ESA) listed and Marine Mammal Protection Act (MMPA) protected species; and any human communities (social and economic aspects of the environment). The impacts of the alternatives are evaluated with respect to these VECs.

All management alternatives under consideration were analyzed. A full description of each alternative and a discussion of a no action/status quo alternative are given in section 5.0. The Council-preferred alternative has not yet been specified. These impacts of the alternatives are described in section 7.0
5.0 MANAGEMENT ALTERNATIVES

The proposed action alternatives described would modify or eliminate the Scup Northern and/or Southern Gear Restricted Areas (GRAs). Comprehensive descriptions of the regulations for scup, as detailed in the Code of Federal Regulations (CFR), are available through the website for the Northeast Regional Office (NERO) of NMFS: http://www.nero.noaa.gov/nero/regs/.

Mark Terceiro and Alicia Miller of the NMFS Northeast Fisheries Science Center prepared an unpublished working paper entitled, "Scup discarding in the NEFSC statistical areas that include the Gear Restricted Areas." Analyses presented in that paper provided the basis for action alternative development.

Figure 1. NEFSC statistical areas relative to the Northern and Southern gear restricted areas (GRAs). Source: Terceiro and Miller, 2014 unpublished.
5.1 Alternative 1 (Status Quo/No action)

Alternative 1 is the status quo/no action alternative. Under this alternative, the Scup Northern and Southern GRAs (Figure 1) would remain unchanged and as described in the current fishing regulations, as specified at § 648.124. The GRAs as presently implemented were identified in 2005 Summer Flounder, Scup, and Black Sea Bass Specifications final rule (70 FR 303, January 4, 2005). Section 4.0 provides additional background on the GRAs and their history.

**Northern GRA**

The Northern GRA 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, including longfin squid, black sea bass, and silver hake (whiting) must fish with nets of 5.0-inch 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 throughout the net.

The Northern Gear Restricted Area 1 is bounded by straight lines connecting the following points in the order below:

<table>
<thead>
<tr>
<th>Northern GRA</th>
<th>N. latitude</th>
<th>W. longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGA1</td>
<td>41°00'</td>
<td>71°00'</td>
</tr>
<tr>
<td>NGA2</td>
<td>41°00'</td>
<td>71°30'</td>
</tr>
<tr>
<td>NGA3</td>
<td>40°00'</td>
<td>72°40'</td>
</tr>
<tr>
<td>NGA4</td>
<td>40°00'</td>
<td>72°05'</td>
</tr>
<tr>
<td>NGA1</td>
<td>41°00'</td>
<td>71°00'</td>
</tr>
</tbody>
</table>

**Southern GRA**

The Southern GRA 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 (Longfin squid, black sea bass, and silver hake (whiting)) must fish with nets that have a minimum mesh size of 5.0-inch 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 throughout the net.

The Southern Gear Restricted Area is bounded by straight lines connecting the following points in the order below:
<table>
<thead>
<tr>
<th>Point</th>
<th>N. latitude</th>
<th>W. longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGA1</td>
<td>39° 20'</td>
<td>72° 53'</td>
</tr>
<tr>
<td>SGA2</td>
<td>39° 20'</td>
<td>72° 28'</td>
</tr>
<tr>
<td>SGA3</td>
<td>38° 00'</td>
<td>73° 58'</td>
</tr>
<tr>
<td>SGA4</td>
<td>37° 00'</td>
<td>74° 43'</td>
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<td>SGA5</td>
<td>36° 30'</td>
<td>74° 43'</td>
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<td>SGA6</td>
<td>36° 30'</td>
<td>75° 03'</td>
</tr>
<tr>
<td>SGA7</td>
<td>37° 00'</td>
<td>75° 03'</td>
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<td>SGA8</td>
<td>38° 00'</td>
<td>74° 23'</td>
</tr>
<tr>
<td>SGA1</td>
<td>39° 20'</td>
<td>72° 53'</td>
</tr>
</tbody>
</table>
5.2 Alternative 2 (Modify the Northern GRA)

- **Sub - Alternative 2a:** Under this alternative, the Northern GRA boundaries would be expanded to include additional areas in statistical area 613 (Figure 2; as indicated in black). NEFSC analyses suggest that this statistical area 613 is significantly contributing to the discarding of scup in "small" net mesh (between 2.125 and 4.5 or 5.0 inches) and "squid" mesh (equal to or smaller than 2.125 inches) during November and December, when the Northern GRA is in effect.

![Figure 2. Expansion of the Northern GRA to encompass more of statistical area 613.](image-url)

- **Sub - Alternative 2b:** Under this alternative, the Council could consider modification of other aspects of the Northern GRA. These could include, but are not limited to, changes to the seaward or landward boundaries, northern or southern boundaries, or changes to the time period the GRA is in effect. [The Council will need to be specific and describe those modifications]
5.3 Alternative 3 (Modify the Southern GRA)

- **Sub - Alternative 3a:** Under this alternative, the Southern piece of the Southern GRA (Figure 3; as indicated in black) would be removed. NEFSC analyses suggest that this statistical area 632 is not significantly contributing to the discarding of scup.

![Figure 3. Removal of the southern-most piece of the Southern GRA.](image-url)
• **Sub - Alternative 3b:** Under this alternative, the Southern GRA boundaries would be expanded to include additional areas in statistical area 616 (Figure 4; as indicated in black). NEFSC analyses suggest that this statistical area 616 is significantly contributing to the discarding of scup in all net mesh types (large, small, and squid) during January to March, when the Southern GRA is in effect.

![Figure 4. Expansion of the Southern GRA to encompass more of statistical area 616.](image)

• **Sub - Alternative 3c:** Under this alternative, the Council could consider modification of other aspects of the Southern GRA. These could include, but are not limited to, changes to the seaward or landward boundaries, Northern or Southern boundaries, or changes to the time period the GRA is in effect.

[The Council will need to be specific and describe those modifications]
5.4 Alternative 4 (Eliminate the Northern GRA)

Under this alternative, the Scup Northern GRA (as described above under Alternative 1: No action/status quo) would be eliminated from the regulations.

5.5 Alternative 5 (Eliminate the Southern GRA)

Under this alternative, the Scup Southern GRA (as described above under Alternative 1: No action/status quo) would be eliminated from the regulations.
6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES

6.1 Description of the Managed Resources

The scup GRAs primarily impact the longfin squid, black sea bass, and silver hake (whiting) fisheries, in addition to the impact on the scup resources itself. Below is a brief description of these fisheries.

Additional information on the scup, black sea bass, and longfin squid fisheries can be found on the Council website at: www.mafmc.org. The whiting fishery is managed by the New England Fishery Management Council, and additional information can be found on their website at: www.nefmc.org.

6.1.1 Description of the Fisheries

6.1.1.1 Scup

The management unit for scup (*Stenotomus chrysops*) is the U.S. waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the U.S.-Canadian border. Otter trawls and pots/traps are utilized in the commercial fishery for scup, and are considered a bottom tending mobile gear and bottom tending fixed gear, respectively. Total (commercial and recreational) landings peaked in 1981 at over 27.0 million lb, and in 2012 were about 19.9 million lb total (Figure 5).

![Figure 5. Commercial and Recreational U.S. Scup Landings (millions of pounds) from Maine to North Carolina, 1981-2012.](image-url)
6.1.1.1 Description of the Stock (Including Status, Stock Characteristics, and Ecological Relationships)

Reports on stock status, including Stock Assessment Workshop (SAW) reports, and Stock Assessment Review Committee (SARC) reports, and assessment update reports are available online at the NEFSC website: [http://www.nefsc.noaa.gov/](http://www.nefsc.noaa.gov/). EFH Source Documents, which include details on stock characteristics and ecological relationships, are available at the following website: [http://www.nefsc.noaa.gov/nefsc/habitat/efh/](http://www.nefsc.noaa.gov/nefsc/habitat/efh/).

The most recent assessment (Terceiro 2012) indicated that the scup stock was not overfished and overfishing is not occurring relative to the biological reference points. The 2011 F = 0.034, is below the reference point $F_{MSYPROXY} = 0.177$. Spawning stock biomass was estimated to be 190,424 mt in 2011, above the $B_{MSYPROXY} = 92,044$ mt.

6.1.1.2 Non-Target Species

The scup fishery is a mixed species fishery where summer flounder, scup, and black sea bass are harvested with squid, Atlantic mackerel, silver hake, skates, and other species. Section 5.1.9 of Amendment 13 to the FMP (MAFMC 2002) provides a full description of bycatch and/or non-target species in these fisheries. The term "bycatch," as defined by the MSA, means fish that are harvested in a fishery but that are not sold or kept for personal use. Bycatch 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 fish released alive under a recreational catch-and-release fishery management program.

6.1.2 Longfin Squid

The management unit for longfin squid (*Doryteuthis (Amerigo) pealeii*) is the U.S. waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the U.S.-Canadian border. Otter trawls are utilized in the commercial fishery for longfin squid, and are considered a bottom tending mobile gear. Total domestic commercial landings peaked in 1989 at around 23,738 mt, and in 2012 were about 12,750 mt total (Figure 6).

The domestic fishery currently occurs primarily in Southern New England and Mid-Atlantic waters, but some fishing also occurs along the southern edge of Georges Bank. Spatial patterns in fishing effort reflect seasonal Longfin migration patterns whereby effort is generally directed offshore during October-March and inshore during April-September. The fishery is dominated by small-mesh otter trawlers, modal codend mesh size = 50 mm inside stretched mesh, but near-shore pound net and weir fisheries also occur during spring and summer.
6.1.1.2.1 Description of the Stock (Including Status, Stock Characteristics, and Ecological Relationships)

Reports on stock status, including Stock Assessment Workshop (SAW) reports, and Stock Assessment Review Committee (SARC) reports, and assessment update reports are available online at the NEFSC website: http://www.nefsc.noaa.gov/. EFH Source Documents, which include details on stock characteristics and ecological relationships, are available at the following website: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

The most recent assessment (SAW 51, 2010) indicated that the longfin stock was not overfished, but overfishing status could not be determined because no overfishing threshold was recommended. The biomass estimate, which is based on the two-year average of catchability-adjusted spring and fall survey biomass during 2008-2009, was 54,442 mt.

6.1.1.2.2 Non-Target Species

The longfin fishery is a mixed species fishery where longfin squid are harvested with butterfish, Illex squid, spiny dogfish, whiting and other hakes, scup, and other species. Amendment 10 to the Atlantic Mackerel, Squids, and Butterfish FMP (MAFMC 2010) provides a full description of bycatch and/or non-target species in these fisheries. The term "bycatch," as defined by the MSA, means fish that are harvested in a fishery but that are not sold or kept for personal use.

6.1.1.3 Black Sea Bass

The management unit for black sea bass (Centropristis striata) is the U.S. waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the U.S.-Canadian border. Otter trawls and pots/traps are utilized in the commercial fishery for black sea bass, and are considered a bottom tending mobile gear and bottom tending fixed gear, respectively. Total
(commercial and recreational) landings peaked in the late 1980s at over 16 million lb, and in 2012 were about 5 million lb total (Figure 7).

Figure 7. Commercial and Recreational U.S. Scup Landings (millions of pounds) from Maine to North Carolina, 1981-2012.

6.1.1.3.1 Description of the Stock (Including Status, Stock Characteristics, and Ecological Relationships)

Reports on stock status, including Stock Assessment Workshop (SAW) reports, and Stock Assessment Review Committee (SARC) reports, and assessment update reports are available online at the NEFSC website: [http://www.nefsc.noaa.gov/](http://www.nefsc.noaa.gov/). EFH Source Documents, which include details on stock characteristics and ecological relationships, are available at the following website: [http://www.nefsc.noaa.gov/nefsc/habitat/efh/](http://www.nefsc.noaa.gov/nefsc/habitat/efh/).

The most recent accepted benchmark assessment on black sea bass, which used a statistical catch at length (SCALE) model, was peer-reviewed and accepted in December 2008 by the Data Poor Stock Working Group (DPSWG) Peer Review Panel (DPSWG 2009). Reports on “Stock Status,” including annual assessment and reference point update reports, Stock Assessment Workshop (SAW) reports, Stock Assessment Review Committee (SARC) panelist reports, and DPSWG reports and peer-review panelist reports are available online at the NEFSC website: [http://www.nefsc.noaa.gov/saw/](http://www.nefsc.noaa.gov/saw/).

Based on the July 2012 assessment update, the stock was not overfished and overfishing was not occurring in 2011, relative to the DPSWG biological reference points. The 2011 stock was at 102% of the spawning stock biomass at maximum sustainable yield (SSB_{MSY}). Fishing mortality (F_{MULT}) in 2011 was F = 0.21, a decrease from F=0.41 in 2010. This point estimate of F in 2011 is below the fishing mortality threshold of F=0.44. Estimates for 2011 total biomass were at 28.0
million lb (12,700 mt), above the value for $B_{MSY}$. Spawning stock biomass (SSB) in 2011 was estimated at 24.6 million lb (11,145 mt). 2011 SSB was 102% of $SSB_{MSY}$ (24.0 million lb, 10,880 mt).

### 6.1.1.3.1 Non-Target Species

The black sea bass fishery is a mixed species fishery where summer flounder, scup, and black sea bass are harvested with squid, Atlantic mackerel, silver hake, skates, and other species. Section 5.1.9 of Amendment 13 to the FMP (MAFMC 2002) provides a full description of bycatch and/or non-target species in these fisheries. The term "bycatch," as defined by the MSA, means fish that are harvested in a fishery but that are not sold or kept for personal use.

### 6.1.1.4 Silver Hake (Whiting)

The management unit for silver hake (*Merluccius bilinearis*) is the U.S. waters in the western Atlantic Ocean from North Carolina northward to the U.S.-Canadian border, and is managed by the New England Fishery Management Council through the Northeast Multispecies Fishery Management Plan. The species is divided into two stock areas (northern and southern). The southern stock area is roughly the same as the Southern New England and Mid-Atlantic Exemption Areas, combined, as defined in § 648.80(b)(10) and (c)(5), respectively. Otter trawls are utilized in the commercial fishery for whiting, and are considered a bottom tending mobile gear. Total commercial landings peaked in were dominated by the distant water fleet for much of the fishery's history, and have recently remained relatively stable at fairly low levels. Figure 8 shows the recent landings in the southern stock area.

![Landings of Southern Silver Hake (mt) 1996-2010](image)

**Figure 8. Commercial U.S. Southern Silver Hake Landings (metric tons), 1996-2010.**
6.1.1.4.1 Description of the Stock (Including Status, Stock Characteristics, and Ecological Relationships)

Reports on stock status, including Stock Assessment Workshop (SAW) reports, and Stock Assessment Review Committee (SARC) reports, and assessment update reports are available online at the NEFSC website: http://www.nefsc.noaa.gov/. EFH Source Documents, which include details on stock characteristics and ecological relationships, are available at the following website: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

The most recent assessment (SAW 51) indicated that the southern stock of silver hake was not overfished and overfishing is not occurring relative to the biological reference points.

6.1.1.3.1 Non-Target Species

The whiting fishery is a mixed species fishery where hakes are harvested with squid, scup, Atlantic mackerel, skates, and other species. Section 7.1.4 of Amendment 19 to the Northeast Multispecies FMP (NEFMC 2012) provides a full description of bycatch and/or non-target species in these fisheries. The term "bycatch," as defined by the MSA, means fish that are harvested in a fishery but that are not sold or kept for personal use.

6.2 Habitat (Including Essential Fish Habitat)

A description of the habitat associated with the scup fishery is presented in section 3.2 of Amendment 13 to the FMP (MAFMC 2002), and a brief summary of that information is given here. The impact of fishing on scup habitat (and EFH) and the impact of the scup fishery on other species’ habitat and EFH can be found in Amendment 13 to the FMP (section 3.2; MAFMC 2002). Potential impacts associated with the measures proposed in this framework document on habitat (including EFH) are discussed in section 7.2.

6.2.1 Physical Environment

Detailed information on the affected physical and biological environments inhabited by the managed resource is available in Stevenson et al. (2004). The managed resource inhabits the Northeast U.S. Shelf Ecosystem, which has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. The continental slope includes the area east of the shelf, out to a depth of 2000 m. Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.
The environment that could potentially be affected by the proposed action overlaps with EFH for the managed resource. The following sections describe where to find detailed information on EFH and any past actions taken in the FMPs to minimize adverse EFH effects to the extent practicable.

### 6.2.2 Essential Fish Habitat (EFH)

Information on scup habitat requirements can be found in the document titled, "Essential Fish Habitat Source Document: Scup, *Stenotomus chrysops*, Life History and Habitat Characteristics" (Steimle et al. 1999). An electronic version of this source document is available at the following website: [http://www.nefsc.noaa.gov/nefsc/habitat/efh/](http://www.nefsc.noaa.gov/nefsc/habitat/efh/). The current designations of EFH by life history stage for scup are provided in Table 1 in Appendix A, and are also available at the following website: [http://www.nero.noaa.gov/hcd/list.htm](http://www.nero.noaa.gov/hcd/list.htm). A summary description of EFH for scup is provided here.

Scup spawn once annually, over weedy or sand-covered areas in the spring. Scup eggs and newly hatched larvae are found in open water in bays and sounds of Southern New England during the spring-summer. Juvenile and adult scup are demersal using inshore waters in the spring and moving offshore in the winter. EFH includes demersal waters, sands, mud, mussel and seagrass beds, from the Gulf of Maine through Cape Hatteras, North Carolina.

There are other federally-managed species with life stages that occupy essential benthic habitats that may be susceptible to adverse impacts bottom otter trawls; descriptions of these are given in Table 1 of Appendix A (from Stevenson et al. 2004) and are available at: [http://www.nero.noaa.gov/hcd/list.htm](http://www.nero.noaa.gov/hcd/list.htm).

### 6.2.3 Fishery Impact Considerations

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 (MAFMC 2002). In the commercial fisheries, scup are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. Amendment 13 included alternatives to minimize the adverse impacts of fishing gear on EFH (as required pursuant to section 303(a)(7) of the MSA). As stated in section 3.2 of Amendment 13, the Council determined that both mobile bottom tending and stationary gear have a potential to adversely impact EFH. The analysis in that document also indicated that no management measures were needed, because in Federal waters the fishery is conducted primarily in high energy mobile sand and bottom habitat, where gear impacts are minimal and/or temporary in nature. On that basis, the Council selected the no action alternative, from among the suite of alternatives to minimize fishing gear impacts on EFH in Amendment 13 to the FMP. There has not been a significant change to the manner in which the scup fishery is prosecuted, and none of the alternatives being considered in this document would adversely affect EFH (see section 7.0). Therefore, the effects of fishing on EFH have not been re-evaluated since Amendment 13 to the FMP, and no alternatives to minimize adverse effects on EFH are presented in this document. The FMP limits recreational specifications for scup to minimum fish size requirements, possession limits, and restrictions on the open fishing season. The principal gears used in the recreational fishery for scup are rod and reel and handline. The
potential adverse impacts of these gears on EFH for any of the federally-managed species in the region are minimal (Stevenson et al. 2004).

6.3 ESA-Listed Species and MMPA Protected Species
To be completed prior to Framework Meeting 2.

6.4 Human Communities and Economic Environment
To be completed prior to Framework Meeting 2.

7.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES
The impacts of the alternatives will be completed prior to Framework Meeting 2.

8.0 APPLICABLE LAWS
To be completed prior to Framework Meeting 2.

9.0 LITERATURE CITED


10.0 LIST OF AGENCIES AND PERSONS CONSULTED
In preparing this document, the Council consulted with 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. To ensure compliance with NMFS formatting requirements, the advice of NMFS NERO personnel was sought.

Copies of the document, including the Environmental Assessment and Initial Regulatory Flexibility Analysis and other supporting documents are available from Dr. Christopher M. Moore, Executive Director, Mid-Atlantic Fishery Management Council, Suite 201, 800 North State Street, Dover, DE 19901
APPENDIX A

Scup EFH Designations

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 °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 °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 °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 °F.
Table 1. Essential Fish Habitat descriptions for federally-managed species/life stages in the U.S. Northeast Shelf Ecosystem that are vulnerable to bottom tending fishing gear.

<table>
<thead>
<tr>
<th>Species</th>
<th>Life Stage</th>
<th>Geographic Area of EFH</th>
<th>Depth (meters)</th>
<th>Bottom Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>American plaice</td>
<td>juvenile</td>
<td>GOM, including estuaries from Passamaquoddy Bay to Saco Bay, ME and from Massachusetts Bay to Cape Cod Bay</td>
<td>45 - 150</td>
<td>Fine grained sediments, sand, or gravel</td>
</tr>
<tr>
<td>American plaice</td>
<td>adult</td>
<td>GOM, including estuaries from Passamaquoddy Bay to Saco Bay, ME and from Massachusetts Bay to Cape Cod Bay</td>
<td>45 - 175</td>
<td>Fine grained sediments, sand, or gravel</td>
</tr>
<tr>
<td>Atlantic cod</td>
<td>juvenile</td>
<td>GOM, GB, eastern portion of continental shelf off SNE, these estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay</td>
<td>25 - 75</td>
<td>Cobble or gravel</td>
</tr>
<tr>
<td>Atlantic cod</td>
<td>adult</td>
<td>GOM, GB, eastern portion of continental shelf off SNE, these estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay</td>
<td>10 - 150</td>
<td>Rocks, pebbles, or gravel</td>
</tr>
<tr>
<td>Atl halibut</td>
<td>juvenile</td>
<td>GOM and GB</td>
<td>20 - 60</td>
<td>Sand, gravel, or clay</td>
</tr>
<tr>
<td>Atl halibut</td>
<td>adult</td>
<td>GOM and GB</td>
<td>100 - 700</td>
<td>Sand, gravel, or clay</td>
</tr>
<tr>
<td>Barndoor skate</td>
<td>juvenile/adult</td>
<td>Eastern GOM, GB, SNE, Mid-Atlantic Bight to Hudson Canyon</td>
<td>10-750, most &lt; 150</td>
<td>Mud, gravel, and sand</td>
</tr>
<tr>
<td>Black sea bass</td>
<td>juvenile</td>
<td>GOM to Cape Hatteras, NC, including estuaries from Buzzards Bay to Long Island Sound, Gardiners Bay, Barnegat Bay to Chesapeake Bay, Tangier/ Pocomoke Sound, and James River</td>
<td>1 - 38</td>
<td>Rough bottom, shellfish/ eelgrass beds, manmade structures, offshore clam beds, and shell patches</td>
</tr>
<tr>
<td>Black sea bass</td>
<td>adult</td>
<td>GOM to Cape Hatteras, NC, including Buzzards Bay, Narragansett Bay, Gardiners Bay, Great South Bay, Barnegat Bay to Chesapeake Bay, and James River</td>
<td>20 - 50</td>
<td>Structured habitats (natural and manmade), sand and shell substrates preferred</td>
</tr>
<tr>
<td>Clearnose skate</td>
<td>juvenile/adult</td>
<td>GOM, along continental shelf to Cape Hatteras, NC, including the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem</td>
<td>0 – 500, most &lt; 111</td>
<td>Soft bottom and rocky or gravelly bottom</td>
</tr>
<tr>
<td>Haddock</td>
<td>juvenile</td>
<td>GB, GOM, and Mid-Atlantic south to Delaware Bay</td>
<td>35 - 100</td>
<td>Pebble and gravel</td>
</tr>
<tr>
<td>Haddock</td>
<td>adult</td>
<td>GB, eastern side of Nantucket Shoals, and throughout GOM</td>
<td>40 - 150</td>
<td>Broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches</td>
</tr>
<tr>
<td>Little skate</td>
<td>juvenile/adult</td>
<td>GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes estuaries from Buzzards Bay south to mainstem Chesapeake Bay</td>
<td>0-137, most 73 - 91</td>
<td>Sandy or gravelly substrate or mud</td>
</tr>
<tr>
<td>Ocean pout</td>
<td>eggs</td>
<td>GOM, GB, SNE, and Mid-Atlantic south to Delaware Bay, including the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay and Cape Cod Bay</td>
<td>&lt;50</td>
<td>Generally sheltered nests in hard bottom in holes or crevices</td>
</tr>
<tr>
<td>Ocean pout</td>
<td>juvenile</td>
<td>GOM, GB, SNE, Mid-Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay, and Cape Cod Bay</td>
<td>&lt; 50</td>
<td>Close proximity to hard bottom nesting areas</td>
</tr>
<tr>
<td>Ocean pout</td>
<td>adult</td>
<td>GOM, GB, SNE, Mid-Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay, MA Bay, Boston Harbor, and Cape Cod Bay</td>
<td>&lt; 80</td>
<td>Smooth bottom near rocks or algae</td>
</tr>
<tr>
<td>Pollock</td>
<td>adult</td>
<td>GOME, GB, SNE, and Mid-Atlantic south to New Jersey and the following estuaries: Passamaquoddy Bay, Damariscotta R., MA Bay, Cape Cod Bay, Long Island Sound</td>
<td>15 – 365</td>
<td>Hard bottom habitats including artificial reefs</td>
</tr>
<tr>
<td>Species</td>
<td>Life Stage</td>
<td>Geographic Area of EFH</td>
<td>Depth (meters)</td>
<td>Bottom Type</td>
</tr>
<tr>
<td>------------------</td>
<td>------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Red hake</td>
<td>juvenile</td>
<td>GOM, GB, continental shelf off SNE, and Mid-Atlantic south to Cape Hatteras, including the following estuaries: Passamaquoddy Bay to Saco Bay, Great Bay, MA Bay to Cape Cod Bay; Buzzards Bay to CT River, Hudson River, Raritan Bay, and Chesapeake Bay</td>
<td>&lt; 100</td>
<td>Shell fragments, including areas with an abundance of live scallops</td>
</tr>
<tr>
<td>Red hake</td>
<td>adult</td>
<td>GOM, GB, continental shelf off SNE, Mid-Atlantic south to Cape Hatteras, these estuaries: Passamaquoddy Bay to Saco Bay, Great Bay, MA Bay to Cape Cod Bay; Buzzards Bay to CT River, Hudson River, Raritan Bay, Delaware Bay, and Chesapeake Bay</td>
<td>10 - 130</td>
<td>In sand and mud, in depressions</td>
</tr>
<tr>
<td>Redfish</td>
<td>juvenile</td>
<td>GOM, southern edge of GB</td>
<td>25 - 400</td>
<td>Silt, mud, or hard bottom</td>
</tr>
<tr>
<td>Redfish</td>
<td>adult</td>
<td>GOM, southern edge of GB</td>
<td>50 - 350</td>
<td>Silt, mud, or hard bottom</td>
</tr>
<tr>
<td>Rosette skate</td>
<td>juvenile/adult</td>
<td>Nantucket shoals and southern edge of GB to Cape Hatteras, NC</td>
<td>33-530, most 74-274</td>
<td>Soft substrate, including sand/mud bottoms</td>
</tr>
<tr>
<td>Scup</td>
<td>juvenile/adult</td>
<td>GOM to Cape Hatteras, NC, including the following estuaries: MA Bay, Cape Cod Bay to Long Island Sound, Gardiners Bay to Delaware inland bays, and Chesapeake Bay</td>
<td>0-38 for juv 2-185 for adult</td>
<td>Demersal waters north of Cape Hatteras and inshore estuaries (various substrate types)</td>
</tr>
<tr>
<td>Silver hake</td>
<td>juvenile</td>
<td>GOM, GB, continental shelf off SNE, Mid-Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Casco Bay, ME, MA Bay to Cape Cod Bay</td>
<td>20 – 270</td>
<td>All substrate types</td>
</tr>
<tr>
<td>Summer Flounder</td>
<td>juvenile/adult</td>
<td>GOM to Florida – estuarine and over continental shelf to shelf break</td>
<td>0-250</td>
<td>Demersal/estuarine waters, varied substrates. Mostly inshore in summer and offshore in winter.</td>
</tr>
<tr>
<td>Smooth skate</td>
<td>juvenile/adult</td>
<td>Offshore banks of GOM</td>
<td>31-874, most 110-457</td>
<td>Soft mud (silt and clay), sand, broken shells, gravel and pebbles</td>
</tr>
<tr>
<td>Thorny skate</td>
<td>juvenile/adult</td>
<td>GOM and GB</td>
<td>18-2000, most 111-366</td>
<td>Sand, gravel, broken shell, pebbles, and soft mud</td>
</tr>
<tr>
<td>Tilefish</td>
<td>juvenile/adult</td>
<td>Outer continental shelf and slope from the U.S./Canadian boundary to the Virginia/North Carolina boundary</td>
<td>100 - 300</td>
<td>Burrows in clay (some may be semi-hardened into rock)</td>
</tr>
<tr>
<td>White hake</td>
<td>juvenile</td>
<td>GOM, southern edge of GB, SNE to Mid-Atlantic and the following estuaries: Passamaquoddy Bay, ME to Great Bay, NH, Massachusetts Bay to Cape Cod Bay</td>
<td>5 - 225</td>
<td>Seagrass beds, mud, or fine grained sand</td>
</tr>
<tr>
<td>Winter flounder</td>
<td>adult</td>
<td>GB, inshore areas of GOM, SNE, Mid-Atlantic south to Delaware Bay and the estuaries from Passamaquoddy Bay, ME to Chincoteague Bay, VA</td>
<td>1 - 100</td>
<td>Mud, sand, and gravel</td>
</tr>
<tr>
<td>Winter skate</td>
<td>juvenile/adult</td>
<td>Cape Cod Bay, GB, SNE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem</td>
<td>0 - 371, most &lt; 111</td>
<td>Sand and gravel or mud</td>
</tr>
<tr>
<td>Witch flounder</td>
<td>juvenile</td>
<td>GOM, outer continental shelf from GB south to Cape Hatteras</td>
<td>50 - 450 to 1500</td>
<td>Fine grained substrate</td>
</tr>
<tr>
<td>Witch flounder</td>
<td>adult</td>
<td>GOM, outer continental shelf from GB south to Chesapeake Bay</td>
<td>25 - 300</td>
<td>Fine grained substrate</td>
</tr>
<tr>
<td>Yellowtail flounder</td>
<td>adult</td>
<td>GB, GOM, SNE and Mid-Atlantic south to Delaware Bay and these estuaries: Sheepscot River and Casco Bay, ME, MA Bay to Cape Cod Bay</td>
<td>20 - 50</td>
<td>Sand or sand and mud</td>
</tr>
</tbody>
</table>
Scup discarding in the NEFSC statistical areas that include the Gear Restricted Areas (GRAs)

by

Mark Terceiro and Alicia Miller
NEFSC Population Dynamics Branch

Executive Summary: The NEFSC Observer data show that since 1989 most of the observed commercial fishery scup discards occurred in small mesh tows in the Statistical Areas that include the GRAs. The NEFSC Observer and Trawl Survey data, and the stock size and mortality estimates that result once this information is integrated within the stock assessment, indicate that the GRAs likely reduce the discard mortality of small scup, and are responsible for the improved post-recruitment survival of these small scup.

Broad scale Gear Restricted Areas (GRAs) for scup were implemented in November 2000 under the framework provisions of the FMP to reduce discards of scup in the small mesh fisheries for Loligo squid and silver hake. Initially two Northern Areas off Long Island were implemented for November through January, while a Southern Area off the mid-Atlantic coast was implemented for January through April. The size, boundaries, and other measures of the GRAs were modified in late 2000 and again in 2001 and 2005 in response to commercial fishing industry recommendations. Currently the single Northern GRA restricts the use of codend mesh less than 5.0 inches (127 mm) during November and December, while a Southern GRA is in effect from January 1 through March 15.

The Northern and Southern GRAs lie mainly in NEFSC statistical reporting areas (statistical areas) 537, 539, and 613 (Northern GRA) and 615, 616, 621, 622, 623, 626, and 632 (Southern GRA; Figure 1). Over the 1989-2013 (preliminary) time series, very little scup discard was observed in statistical area 632. Statistical areas 611 and 538, which are not included in the GRAs, also were the source of ‘significant’ discards (cumulative total observed scup discards > 10,000 lbs; Figure 2). The other nine statistical areas that include the GRAs accounted for 1.474 million (84%) of the 1.767 million lbs of cumulative total observed scup discards from January 1989 through December 2013 (Figure 3). It should be noted that about 80% of the cumulative total observed scup discards in area 623 occurred in a single tow (158,000 lbs) in 1998 (Figure 3).

Both the observed discards (as a function of both increased fishing activity for scup and increased sampled trip number) and estimated fishery discards (as a function of increased fishery quotas and therefore increased fishing activity for scup) have generally increased as the fishery quotas have increased since 2005 (Figure 4), although the observed discard percentage of total catch has decreased (Figures 5-6). Scup commercial fishery estimated discards remain an important component of the commercial fishery removals and averaged about 25% of the estimated commercial catch during 2010-2012 (100% commercial fishery discard mortality is assumed).

Within the nine important GRA statistical areas that account for 84% of observed scup discards over the 1989-2013 time series, 24% was observed in ‘large’ mesh tows (codend or liner < 4.5 [114 mm] or 5.0 in [127 mm], 35% in ‘small’ mesh tows (larger than 2.125 in [54 mm] and smaller than 4.5 or 5.0 inch), and 41% in ‘squid' mesh tows (equal to or less than 2.125 inch;
The distribution of observed discards varies by statistical area, season, and mesh size. In the northern GRA statistical areas (537, 539, 613) ‘large’ mesh discards were observed mainly in November and December, although large mesh discards also occur in January and May in area 613 (Figure 8). Northern GRA area ‘small’ mesh discards were observed mainly in November and December in area 613 (Figure 9). Northern GRA area ‘squid’ mesh discards were observed mainly in May and June in areas 537 and 539 and in November and December in area 613 (Figure 10). In the important southern GRA statistical areas (615, 616, 621, 622, 623, 626), ‘large’, ‘small’ and ‘squid’ mesh discards were observed mainly in January through April (Figures 11-13).

The NEFSC Observer data show that since 1989 most of the observed scup discards occurred in small mesh tows in the Statistical Areas that include the GRAs. In the winter-spring (February-April in NEFSC survey data; January-March in Observer data) during the pre-GRA years of 1998-2000, most scup were distributed within the eventual Southern GRA (Figure 14). Observer data indicated scup discards both within the eventual Southern GRA and northward into the eventual Northern GRA. During 2010-2012, scup continued to be distributed within the Southern GRA. Observer data continued to indicate scup discards both within and along the northeastern boundaries of the Southern GRA and northward along the 50 fathom depth contour into the Northern GRA (Figure 15).

In the fall (September-October in NEFSC survey data; November-December in Observer data) during the pre-GRA years of 1998-2000, survey data indicated that nearly all scup were distributed well inshore of the eventual Northern GRA (Figure 16). Observer data from 1-2 months later in the year, however, indicated scup discards both within the eventual Southern GRA and northward along the border of the eventual Northern GRA. During 2010-2012, scup continued to be distributed inshore of the GRAs at the time of the fall survey. Observer data continued to indicate scup discards within the Southern GRA and northward along the 50 fathom depth contour into and around the Northern GRA (Figure 17).

Observed discard length frequencies for both the pre-GRA years of 1998-2000 and the most recent years of 2010-2012 within the important Northern and Southern GRA Areas indicate the observed discards at length consist of sublegal fish (less than 9 inches total length <= 8 inches fork length <= 20 cm fork length; Figures 18-19). NEFSC survey length data indicated that during 1998-2000 most of the fish sampled from offshore Long Island and to the south in the winter, spring and fall were fish <= 20 cm fork length (ages 1 and 2 in the spring, ages 0 and 1 in the fall; Figures 20-22). During 2010-2012, increased numbers of fish > 20 cm fork length were evident in waters north of Hudson Canyon (Figures 23-24). In the winter and spring surveys, scup were distributed mostly within the Southern GRA. Fish sampled in the fall survey during September-October were nearly all still outside the Northern GRA, but as noted earlier, the Observer data indicate that by November significant amounts of scup were discarded within the Northern GRA.

In summary, the NEFSC Observer and Trawl Survey data, and the stock size and mortality estimates that result once this information is integrated within the stock assessment, indicate that the GRAs likely reduce the discard mortality of small scup, and are responsible for the improved post-recruitment survival of these small scup.
Figure 1. NEFSC Statistical Reporting Areas and Scup Gear Restricted Areas (GRAs).
Figure 2. Observed scup discards (lbs) by NEFSC Statistical Area.
Figure 3. Observed scup discards (lbs) for statistical areas within the GRAs with time series total greater than 10,000 lbs.

Scup: Observed Discards by Year and Area:
1989-2013
Figure 4. Estimated (metric tons) and Observed (lbs) scup discard trends.

Scup: Estimated Discards - Left
Observed Discards - Right

Year

Est Disc Obs Disc
Figure 5. Observed Kept (blue; KLB; Landings) and Discard (red; DLB).
Figure 6. Observed Discard Percentage of Total Scup Catch.
Figure 7. Observed scup discards by statistical area and codend/liner mesh categories. ‘Large’ is equal to or larger than 4.5 or 5.0 inch, depending on year; ‘small’ is between 2.125 and 4.5 or 5.0 inch; ‘squid’ is equal or smaller than 2.125 inch.
Figure 8. Northern GRA statistical areas ‘large’ mesh (equal to or larger than 4.5 or 5.0 inch, depending on year) Observed discards by month (Jan = 1, Dec = 12).
Figure 9. Northern GRA statistical area ‘small’ mesh (between 2.125 and 4.5 or 5.0 inch) Observed discards by month (Jan = 1, Dec = 12).
Figure 10. Northern GRA statistical area ‘squid’ mesh (equal to or smaller than 2.125 inch) Observed discards by month (Jan = 1, Dec = 12).
Figure 11. Southern GRA statistical areas ‘large’ mesh (equal to or larger than 4.5 or 5.0 inch, depending on year) Observed discards by month (Jan = 1, Dec = 12).
Figure 12. Southern GRA statistical area ‘small’ mesh (between 2.125 and 4.5 or 5.0 inch) Observed discards by month (Jan = 1, Dec = 12).
Figure 13. Southern GRA statistical area ‘squid’ mesh (equal to or smaller than 2.125 inch) Observed discards by month (Jan = 1, Dec = 12). The large bar in area 623 in March is a single tow discard event in 1998 that was observed to be an estimated 158,000 lbs.
Figure 14. NEFSC winter and spring trawl survey catches of scup (kg/tow; February-March) and observed scup aggregate discard (metric tons; January-March) during 1998-2000. Gear Restricted Areas (GRAs) outlined in red; depth contours in gray are 50 and 100 fathoms.
Figure 15. NEFSC winter and spring trawl survey catches of scup (kg/tow; February-March) and Observed scup aggregate discard (metric tons; January-March) during 2010-2012. Gear Restricted Areas (GRAs) outlined in red; depth contours in gray are 50 and 100 fathoms.
Figure 16. NEFSC fall trawl survey catches of scup (kg/tow; September-October) and Observed scup aggregate discard (metric tons; November-December) during 1998-2000. Gear Restricted Areas (GRAs) outlined in red; depth contours in gray are 50 and 100 fathoms.
Figure 17. NEFSC fall trawl survey catches of scup (kg/tow; September-October) and Observed scup aggregate discard (metric tons; November-December) during 2010-2012. Gear Restricted Areas (GRAs) outlined in red; depth contours in gray are 50 and 100 fathoms.
Figure 18. Observed scup discard lengths (cm fork length) in Northern GRA statistical areas during November-December: top 1998-2000, bottom 2010-2012.
Figure 19. Observed scup discard lengths (cm fork length) in Southern GRA statistical areas during January-March: top 1998-2000, bottom 2010-2012.
Figure 20. Size distributions of scup in NEFSC winter surveys 1998-2000. Yellow parts of the circles are fish $\leq$20 cm fork length and ages 0 and 1 fish; green slices are fish $>20$ cm fork length and ages 2 and older. Size of the circle is proportional to stock size in numbers.
Figure 21. Size distributions of scup in NEFSC spring surveys 1998-2000. Yellow parts of the circles are fish $\leq 20$ cm fork length and ages 0 and 1 fish; green slices are fish $> 20$ cm fork length and ages 2 and older. Size of the circle is proportional to stock size in numbers.
Figure 22. Size distributions of scup in NEFSC fall surveys 1998-2000. Yellow parts of the circles are fish <=20 cm fork length and ages 0 and 1 fish; green slices are fish > 20 cm fork length and ages 2 and older. Size of the circle is proportional to stock size in numbers.
Figure 23. Size distributions of scup in NEFSC spring surveys 2010-2012. Yellow parts of the circles are fish \( \leq 20 \) cm fork length and ages 0 and 1 fish; green slices are fish \( > 20 \) cm fork length and ages 2 and older. Size of the circle is proportional to stock size in numbers.
Figure 24. Size distributions of scup in NEFSC fall surveys 2010-2012. Yellow parts of the circles are fish $\leq 20$ cm fork length and ages 0 and 1 fish; green slices are fish $> 20$ cm fork length and ages 2 and older. Size of the circle is proportional to stock size in numbers.
Supplemental Analyses on Scup Discards (Mark Terceiro, NMFS-NEFSC)

Standardized Bycatch Reporting Methodology (SBRM) estimates of scup discards (the ratio of trip scup discards to trip all species landings, raised by all species landings) were made by calendar quarter (4), stat area (20), and three mesh category (large, small, squid). This provided 240 annual estimation strata, compared to the 4 strata used in the current assessment discard method (2 half years, directed trips, non-directed trips). Data were not sufficient to develop SBRM monthly estimates (too many of the 720 annual strata with no data).

This SBRM approach indicates that scup discards decreased from about 3,300 mt 1991 to about 500 mt 2000, with most discards (59%) occurring in areas that would eventually be in the gear restricted areas (GRAs) (615, 616, 621, 622, 625, 626 in quarter 1; 537, 539, 613 in quarter 4). Discards have ranged between 500 and 1,500 mt since 2001, with the exception of 2009 and 2010 (3,200 and 2,600 mt, respectively). Since 2001, 53% of the discards have occurred outside the GRAs. The large discards in 2009-2010 were due mostly to squid mesh discards outside the GRAs: in squid mesh trips in the Northern GRA areas but in quarter 2.

The plots below show a) Total discards and percent of discards in the GRAs, b) discard components in the Northern and Southern GRAs compared to discards in all other stat areas and quarters, and c) same as b, but in a 100% stacked histogram.

The bottom line is that discards (in absolute estimate terms) have been reduced in the GRA areas and months since 2001. Relatively high discards have occurred recently (2009-2010) outside the GRA areas and months.

a)