Northeast Skate Complex
Fishery Management Plan

Including an Environmental Impact Statement,
Regulatory Impact Review,
Regulatory Flexibility Analysis, and
Stock Assessment and Fishery Evaluation

Final
September 18, 2003

Prepared by the
New England Fishery Management Council
In consultation with the
National Marine Fisheries Service

New England
Fishery Management Council

EXECUTIVE SUMMARY

The following Fishery Management Plan (FMP) initiates a management program for the Northeast Region's skate complex by the New England Fishery Management Council (NEFMC, Council), in partnership with the National Marine Fisheries Service (NMFS). This integrated document contains all elements of the Skate FMP as well as the Final Environmental Impact Statement (FEIS). It includes: a description of the proposed action; description of the non-preferred alternatives and the alternatives considered but rejected by the Council; analyses of the potential biological, economic, and social impacts of the proposed action; background information about the biological, physical, and human environments affected by the proposed action; and discussion of this FMP's consistency with the Magnuson-Stevens Fishery Conservation and Management Act as well as all other existing applicable laws.

Included in this FMP are the following management measures for the northeast skate fishery:

- A management unit that encompasses the Northeast Region (federal waters from Maine to North Carolina);
- A fishing year that is the same as the multispecies (groundfish) fishing year;
- Statements related to MSY and OY;
- Overfishing definitions for each of the seven species in the Northeast skate complex;
- EFH designations for each of the seven species in the Northeast skate complex;
- A rebuilding program for overfished skate species;
- A process for FMP reviewing and monitoring;
- A framework adjustment process;
- An open-access federal permit program;
- A requirement to report skate landings by individual species and skate discards by general categories (large/small);
- A prohibition on the possession of barndoor skate;
- A prohibition on the possession of thorny skate;
- A prohibition on the possession of smooth skate in the Gulf of Maine (defined by the Gulf of Maine Regulated Mesh Area boundary);
- A 10,000-pound per day/20,000-pound per trip possession limit on skate wings;
- A letter of authorization for bait-only vessels that are exempt from the skate wing possession limit;
- A baseline of management measures in other fisheries that benefit skates; and
- A process for reviewing changes to the baseline of management measures in other fisheries that benefit skates.

During the development of this FMP, the Council considered several alternatives to the proposed action. The alternatives that the Council considered were analyzed in the Draft FMP/EIS and are discussed in the "Alternatives to the Proposed Action" section of this Final FMP. The following matrix outlines the alternatives that the Council considered in relation to the proposed action.

		Skate Committee Recommendation	Skate Advisory Panel Recommendation	Proposed Action and Additional Information
Fishery Management Program				
	Management Unit – Northeast Region	**Unanimous Support**	Consensus Support	• Proposed Action – Northeast Region
	Fishing Year–Multispecies Fishing Year	**Unanimous Support**	Consensus Support	• Proposed Action – multispecies fishing year
	MSY – cannot specify	**Unanimous Support**	Consensus Support	• Proposed Action includes MSY statement
	OY – cannot specify, stronger statement to be made with selection of final measures in Final FMP	**Unanimous Support**, with revisions based on the selection of final measures	Consensus Support	• OY statement made stronger in Final FMP to reflect final measures and to address NMFS' comments on Draft FMP/EIS
4 Options	**Skate Overfishing Definitions** **Option 1:** SAW 30 **Option 2:** Modified SAW 30 **Option 3:** Modified SAW 30 **Option 4:** No Action	**Unanimous Support Option 2**	Consensus Support Option 2	• Proposed Action – Option 2
6 Options	**EFH Designation** **Alt. 1:** No Designation **Alt. 2:** NMFS Survey Data **Alt. 3:** High Percentage of Survey Data **Alt. 4:** Physical Characteristics **Alt. 5:** Survey Data and Physical Char. **Alt. 6:** EFH Everywhere	**Unanimous Support Alternative 2**	Consensus Support Alternative 2 with future consideration of Alternative 5 as more information becomes available	• Proposed Action – Alternative 2 • Habitat Committee also supported Alternative 2 • Council selected 100% of survey data for barndoor skate EFH and 90% for all other skate species; figures are provided in Skate FMP document
5 Options	**Rebuilding Programs** **Option 1:** No Significant Declines **Option 2:** Consistent Increase **Option 3:** Skate PDT Determination **Option 4:** Significant Increases Annually **Option 5:** No Action	**Unanimous Support Option 2** with slightly modified calculation of three-year averages for comparison	General Consensus Support Option 2	• Proposed Action in Skate FMP represents Option 2, with slight modification to calculation of three-year averages, as recommended by the Committee and approved by the Council
	FMP Reviewing and Monitoring – annual PDT review, biennial SAFE Report	**Unanimous Support**	Consensus Support	• Proposed Action is consistent with Draft FMP
	Framework Adjustment Process – similar to other FMPs	**Unanimous Support**	Consensus Support	• Proposed Action is consistent with Draft FMP

		Skate Committee Recommendation	Skate Advisory Panel Recommendation	Proposed Action and Additional Information
4+ Options	**Federal Permit Program** **Option 1A:** Open access permit **Option 1B:** Open access permit for possession of more than 100 pounds **Option 2:** "Directed" and "Incidental Catch" Permits **Option 3:** Other Federal Permits **Option 4:** No Action	**Unanimous Support Permit Option 1A issued on an annual basis**	Consensus Support Option 1A	• Proposed Action – Permit Option 1A issued on an annual basis
7 Options	**Catch Reporting Requirements** **Option 1:** No Action **Option 2:** General Categories **Option 3:** Landings/discards by species **Option 4:** Landings by species, sea sampling/study fleets for species discards **Option 5:** Landings by species and volunteer program for species discards **Option 6:** General categories and volunteer program for species discards and landings **Option 7:** Dealer reporting by species	**Support Option 4 (3-0-1)**	Consensus Support Option 4	• Proposed Action – Option 4
2 Options	**LOA for Direct Sales of Skate Bait** **Option 1:** Require LOA **Option 2:** No Action	**Unanimous Support Option 1;** modified to reflect that all bait-only vessels will be required to obtain a LOA	Consensus Support Option 1	• Proposed Action – Option 1 for all bait-only vessels, as modified by the Committee and approved by the Council • Modified to improve enforcement of skate wing possession limit
4 Options	**Measures to Address Barndoors** **Option 1:** Prohibit Possession **Option 2:** Prohibit Landing **Option 3:** Prohibit Sale **Option 4:** No Action	**Unanimous Support Option 1**	Consensus Support Option 1	• Proposed Action – Option 1
4 Options	**Measures to Address Thornies** **Option 1:** Prohibit Possession **Option 2:** Prohibit Landing **Option 3:** Prohibit Sale **Option 4:** No Action	**Unanimous Support Option 1**	Consensus Support Option 1	• Proposed Action – Option 1
		Skate Committee Recommendation	**Skate Advisory Panel Recommendation**	**Proposed Action and Additional Information**

4+ Options	**Measures to Address Smooths** **Option 1A:** Prohibit Possession **Option 1B:** Prohibit Possession in GOM **Option 2:** Prohibit Landing **Option 3:** Prohibit Sale **Option 4:** No Action	**Support Option 1B (3-0-1)**	Consensus Support Option 4; one advisor expressed concern about no action for smooths	• Proposed Action – Option 1B
4 Options	**Possession Limits for the Wing Fishery** **Option 1:** 10,000 pounds (22,700 whole) **Option 2:** 20,000 pounds (45,400 whole) **Option 3:** 30,000 pounds (68,100 whole) **Option 4:** No Action	**Support Combo Options 1 and 2 –** 10,000 pounds per day less than 24 hours/20,000 pounds per trip **(3-0-1)**	No Consensus – 50% support Option 1, 50% support Option 2	• Proposed Action – Options 1 and 2, as combined by the Committee and approved by the Council
Management Measures in Other Fisheries				
		Skate Committee Recommendation	**Skate Advisory Panel Recommendation**	**Proposed Action and Additional Information**
	Identification of Baseline Measures Multispecies Year-Round Closed Areas Multispecies DAS Gillnet Gear Restrictions Lobster RGAs Small Mesh Gear Restrictions Monkfish DAS Scallop DAS	**Unanimous Support for proposed baseline measures**	Consensus Support for Baseline Measures	• Proposed Action – proposed baseline measures
	Baseline Review Process	**Unanimous Support for the process,** with modifications intended to streamline the process	General support for process, no consensus on some details	• Proposed Action – proposed review process, with some modifications intended to streamline the process

Other important issues discussed in this FMP are the need for more biological and fishery information for skates and the challenges of species-specific skate identification. Descriptions of the skate species in the Northeast complex are included in the FMP, and supplementary information on the Essential Fish Habitat for skates and the physical environment in which these species live is available in supplemental volumes of this document.

Biological, social, and economic impacts of the measures proposed in this FMP are evaluated. The measures proposed in this FMP that are likely to have the most direct biological impact on skates in the short-term are the proposed prohibitions for certain species, possession limits for the skate wing fishery, and the management measures in other fisheries that form the "baseline" for this FMP. The measures proposed in this FMP to collect better species-specific and fishery information may prove to be most beneficial in the long-term by providing more accurate information to monitor the FMP and enhance management decision-making.

The effects of a prohibition on possession of smooth skates would likely be minor at present, but would discourage development of any markets for this species and prevent retention from any previously unreported fishery. While the benefits of prohibition on the possession of barndoor and thorny skates cannot be quantitatively analyzed due to lack of landings data, it is expected that conservation benefits would be gained by the survival of discarded thorny and barndoor skates caught incidentally in mixed demersal or other targeted fisheries. In summary, the positive biological impacts resulting from the proposed prohibitions will be realized through discard survival and the preclusion of fishery and market expansion targeting these species.

The smaller species of skates (little skate, smooth skate, clearnose skate, and rosette skate) are not expected to be directly impacted by management strategies in the skate wing fishery. In the most optimistic scenario under the possession limits considered for the wing fishery, (1) all discards would survive, and (2) landings would be reduced by shortened trips. Based on observed trips from 1995-2000, this scenario could produce a conservation gain of as much as 2.24 million pounds of skates. Expected conservation gains (expected reductions in landings) resulting from the from the possession limits that the Council considered ranged from 1.4%-14%, depending on assumptions about discard mortality.

The closed areas designated by other fishery management plans are likely to afford additional protection to skates. Because skates are relatively sedentary species, existing year-round closed areas in the Northeast Region are thought to be particularly beneficial for the skate resources. As a result, the Multispecies year-round closed areas were included in the "baseline" of management measures in other fisheries for this FMP. The Skate FMP/EIS also includes a qualitative biological assessment of the potential benefits of the closed areas on skates.

Overall, the economic impacts of the management measures proposed in the Skate FMP are expected to be minor for ports, vessels, and dealers. Of the measures proposed in this plan, only restrictions on the possession of skates (i.e., possession limits) could potentially have economic impacts on northeast fisheries and related businesses and consumers. While it is not possible to draw absolute conclusions about the economic impacts of possession prohibitions, the information provided by fishermen and processors suggests that these prohibitions would produce only a small negative impact. It is more difficult to assess potential impacts on the wing fishery due to the lack of species-specific landings data and the incidental nature of the wing fishery. However, the overfished status of thorny and barndoor skates and the geographic range of winter skates suggest that winter skates are likely to comprise the bulk of wing landings at this time and that measures to manage this species will most likely create the greatest impact on the wing industry.

More than 95% of the trips that landed at least 10,000 pounds of skate wings during 1995-2000 were made by trawl vessels that landed in New Bedford, Massachusetts, while 3.5% were made by trawl vessels that landed in Provincetown, Massachusetts. Although landings were concentrated in these two ports, the economic impacts of the proposed measures on New Bedford and Provincetown are expected to be minimal. In the year 2000, total skate wing revenues on trips landing at least 10,000 pounds were $0.893 million (0.6%) in New Bedford and $0.028 million (0.7%) in Provincetown. The possible reduction in skate revenues due to the possession limits that the Council considered in this FMP would be an even smaller percentage of port total revenues.

In general, the social impacts of the management measures proposed in the Skate FMP are likely to be minor. It is important to remember that vessels and communities most dependent on skates are those that participate in the bait fishery. Since none of the measures proposed in this FMP impact revenues or opportunities in the bait fishery, the scope and magnitude of negative social impacts is lessened significantly.

New Bedford and Provincetown are identified as the two communities that are likely to be most affected by the proposed management measures. New Bedford has emerged as the top port of landing for skate wings. In addition to landings, New Bedford processes the majority of skate wings landed throughout the region. However, completely eliminating the skate fishery in New Bedford would be expected to impact the community's fisheries revenues by less than 3%. Although the absolute numbers are far less in Provincetown than New Bedford, landings and revenues of skates are more economically important to vessels in Provincetown. Provincetown's geographic location and isolation as well as the nature of its fishing fleet make it more vulnerable to significant changes to management measures not only for skates, but also for other fisheries. For both New Bedford and Provincetown, it is important to remember that while the overall community's dependence on skates may be low, it is likely that there are individual vessels that will experience losses greater than those predicted for the community as a whole.

Over the short-term, any negative social impacts of the measures proposed in this FMP are most likely to result from changes to reporting requirements, regulatory discarding from species prohibitions and possession limits (these impacts are expected to be relatively minor), and the proposed possession limits (these impacts are expected to be significant to only a few individual vessels). Over the long-term, the social impacts of this FMP are expected to be positive. Collecting better fishery information will ultimately improve the effectiveness of the skate management measures and rebuild the resources to their long-term sustainable levels.

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1.0 INTRODUCTION

This Fishery Management Plan (FMP) initiates a management program for the Northeast Region's skate complex by the New England Fishery Management Council (NEFMC, Council), in partnership with the National Marine Fisheries Service (NMFS). This FMP is being developed in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, Magnuson-Stevens Act, M-S Act), the primary domestic legislation governing management of the nation's marine fisheries and resources. In 1996, Congress passed the Sustainable Fisheries Act (SFA), which amended and reauthorized the MSFCMA and included a new emphasis on precautionary management in U.S. fishery management policy. 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 FMP has been prepared primarily in response to the requirements of the MSFCMA, it also addresses the requirements of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). However, these are not the only laws and administrative orders that the Council must consider in developing an FMP. In preparing a Fishery Management Plan, the Council must comply with the requirements of the National Environmental Policy Act (NEPA), and Regulatory Flexibility Act (RFA), the Administrative Procedures Act (APA), the Paperwork Reduction Act (PRA), the Coastal Zone Management Act (CZMA), and Executive Orders 12612 (Federalism), 12630 (Property Rights), 12866 (Regulatory Planning), and 13158 (Marine Protected Areas). These other applicable laws and administrative orders help ensure that in developing an FMP, the Council considers the full range of alternatives and their expected impacts on the marine environment, living marine resources, and the affected human environment. This integrated Skate FMP document contains all required elements of the Fishery Management Plan, including an Environmental Impact Statement (EIS), which is required by NEPA.

1.1 DOCUMENT ORGANIZATION

This FMP document is organized into the following three volumes:

Volume I: Skate FMP/EIS Document

This document represents Volume I and includes the FMP itself as well as its supplemental Environmental Impact Statement. Appendix I-A of Volume I is included within Volume I and contains summaries of the skate public hearings as well as written comments received during the Draft Skate FMP 45-day comment period.

Volume II: 2000 Skate SAFE Report

Immediately prior to developing this FMP, the Skate Plan Development Team (PDT) prepared a 2000 Skate Stock Assessment and Fishery Evaluation (SAFE) Report, the first of its kind for the Northeast skate complex. The SAFE Report serves as a source document for this FMP and should be reviewed in conjunction with it. To the extent possible, information presented in the 2000 SAFE Report is *not* repeated in this FMP/EIS document. Instead, the information in this

FMP/EIS document is intended to update and supplement the information contained in the SAFE Report. Appendix I to the SAFE Report, included in Volume II, contains the NEFSC trawl survey distribution maps for each of the skate species.

Volume III: EFH Supporting Documents

Volume III of this FMP includes all supplemental information regarding essential fish habitat (EFH) for skates. The EFH Source Documents for the seven species in the Northeast skate complex are in Volume III (Vol. III, Appendix A), as well as two reports entitled, *The Effects of Fishing on Marine Habitats of the Northeastern United States* (Vol. III, Appendix B) and *Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern United States* (Vol. III, Appendix C).

2.0 BACKGROUND AND PURPOSE

2.1 BACKGROUND

Table 1 describes the seven species in the Northeast Region's skate complex, including each species common name(s), scientific name, size at maturity, and general distribution.

Table 1 Skate Species Description for Northeast Complex

SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	GENERAL DISTRIBUTION	SIZE AT MATURITY	OTHER COMMON NAMES
Winter Skate	*Leucoraja ocellata*	Inshore and offshore GB and SNE with lesser amounts in GOM or MA	Large (> 100 cm)	• **Big Skate** • **Spotted Skate** • **Eyed Skate**
Barndoor Skate	*Dipturis laevis*	Offshore GOM (Canadian waters), offshore GB and SNE (very few inshore or in MA region)	Large (> 100 cm)	
Thorny Skate	*Amblyraja radiata*	Inshore and offshore GOM, along the 100 fm edge of GB (very few in SNE or MA)	Large (> 100 cm)	• **Mud Skate** • **Starry Skate** • **Spanish Skate**
Smooth Skate	*Malacoraja senta*	Inshore and offshore GOM, along the 100 fm edge of GB (very few in SNE or MA)	Small (< 100 cm)	• **Smooth-tailed Skate** • **Prickly Skate**
Little Skate	*Leucoraja erinacea*	Inshore and offshore GB, SNE, and MA (lower abundance in GOM)	Small (< 100 cm)	• **Common Skate** • **Summer Skate** • **Hedgehog Skate** • **Tobacco Box Skate**
Clearnose Skate	*Raja eglanteria*	Inshore and offshore MA	Small (< 100 cm)	• **Brier Skate**
Rosette Skate	*Leucoraja garmani*	Offshore MA	Small (< 100 cm)	• **Leopard Skate**

Abbreviations are for Gulf of Maine (GOM), Georges Bank (GB), Southern New England (SNE), and the Mid-Atlantic (MA) regions.

The seven species in the Northeast Region skate complex (Maine to North Carolina) are distributed along the coast of the northeast United States from near the tide line to depths exceeding 700 m (383 fathoms). In the Northeast Region, the center of distribution for the little and winter skates is Georges Bank and Southern New England. The barndoor skate is most common in the Gulf of Maine, on Georges Bank, and in Southern New England. The thorny and smooth skates are commonly found in the Gulf of Maine. The clearnose and rosette skates have a more southern distribution, and are found primarily in Southern New England and the Chesapeake Bight. Skates are not known to undertake large-scale migrations, but they do move seasonally in response to changes in water temperature, moving offshore in summer and early autumn and returning inshore during winter and spring. Members of the skate family lay eggs that are enclosed in a hard, leathery case commonly called a mermaid's purse. Incubation time is six to twelve months, with the young having the adult form at the time of hatching (Bigelow and Schroeder 1953). A description of the available biological information about these species can be found in Section 7.1 of this document.

Skates are harvested in two very different fisheries, one for lobster bait and one for wings for food. The fishery for lobster bait is a more historical and directed skate fishery, involving vessels primarily from Southern New England ports that target a combination of little skates (>90%) and, to a much lesser extent, juvenile winter skates (<10%). The catch of juvenile winter skates mixed in with little skates are difficult to differentiate due to their nearly identical appearance. The fishery for skate wings evolved in the 1990s as skates were promoted as "underutilized species," and fishermen shifted effort from groundfish and other troubled fisheries to skates and dogfish. The wing fishery is a more incidental fishery that involves a larger number of vessels located throughout the region. Vessels tend to catch skates when targeting other species like groundfish, monkfish, and scallops and land them if the price is high enough. A complete description of available information about these fisheries can be found in Section 7.3 of this document.

On January 15, 1999, NMFS requested information from the public on barndoor skate for possible inclusion on the list of candidate species under the Endangered Species Act (ESA). On March 4, 1999, NMFS received a petition from GreenWorld to list barndoor skate as endangered or threatened and to designate Georges Bank and other appropriate areas as critical habitat. The petitioners also requested that barndoor skate be listed immediately, as an emergency matter. On April 2, 1999, NMFS received a petition from the Center for Marine Conservation (now the Ocean Conservancy) to list barndoor skate as an endangered species. The second petition was considered by NMFS as a comment on the first petition submitted by GreenWorld. Both the petition and comment referenced a paper in the journal *Science*, which presents data on the decline of barndoor skates (Casey and Myers, 1998). These petitions provided the impetus to complete a benchmark stock assessment for the entire skate complex.

The Northeast skate complex was assessed in November 1999 at the 30th Stock Assessment Workshop (SAW 30) in Woods Hole, Massachusetts. The work completed at SAW 30 indicated that four of the seven species of skates were in an overfished condition: winter, barndoor, thorny and smooth. In addition, overfishing was thought to be occurring on winter skate. In March 2000, NMFS informed the Council of its decision to designate the NEFMC as the responsible body for the development and management of the seven species included in the Northeast Region's skate complex. NMFS identified the need to develop an FMP to end overfishing and rebuild the resources based on the conclusions presented at SAW 30.

During the development of this FMP, the Skate PDT has continued to update the status determinations for the skate species based on the biomass reference points used during SAW 30. Currently (through the Autumn 2001 survey), only two species remain in an overfished condition: barndoor and thorny skates. The most recent status information for all seven of the skate species is presented in Section 7.1.1 of this document. The overfished status of these two species necessitates development of management measures to end overfishing and rebuild these resources in accordance with the Magnuson-Stevens Fishery Conservation and Management Act.

On September 27, 2002, NMFS published its findings relative to the petitions to list barndoor skate as an endangered species. NMFS determined, after review of the best available scientific and commercial information that listing the barndoor skate is not warranted at this time. The following factors all indicate a positive trend for barndoor skate populations: recent increases in abundance of barndoor skate observed during trawl surveys; the expansion of known areas where barndoor skate have been encountered; increases in size range; and the increase in the number of small barndoor skate that have been collected. These trends are not consistent with a species that is in danger of extinction throughout all or a significant portion of its range or likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS will retain the species on its candidate species list.

Very little information is available about the individual skate species and the fisheries of which they are a component. Because skates have not been managed through a federal FMP until now, very little accurate and complete fishery data are available (for example, landings and discards by species, amount of skate bait sold directly to lobster vessels, etc.). Without this information, uncertainty will continue to constrain the ability of the Council to take appropriate management actions to conserve these resources as necessary. As an example, while developing the measures proposed in this FMP, the Council wrestled with difficult issues related to overfishing definition reference points and appropriate management measures to address individual skate species in need of rebuilding. Much of the difficulties arose due to the lack of information and data to support management action that the Council is required by law to take at this time. Moreover, effective plan monitoring and appropriate recommendations for management adjustments, especially for fisheries in which skates are caught incidentally, hinge on the availability of more comprehensive information about these species. It is important to acknowledge existing uncertainties in the context of the various management measures that the Council is proposing in this FMP. A complete discussion of data and research needs can be found in Section 8.0 of this document.

2.2 STATEMENT OF THE PROBLEM AND NEED FOR ACTION

This FMP is being developed to address two primary problems. All actions considered and proposed in this FMP are intended to be directly or indirectly related to solving one or both of these problems.

Overfishing/Overfished Condition of Two Skate Species. Based on the reference points developed at SAW 30 and the proposed overfishing definitions for each skate species, barndoor skate and thorny skate are currently considered to be in an overfished condition. At the time that SAW 30 was conducted, overfishing was thought to be occurring on winter skate. Fishing mortality estimates for winter skate are not considered to be reliable, so it is not possible to determine whether or not overfishing is still occurring on winter skate. Subsequent to SAW 30, the Council’s Scientific and Statistical Committee (SSC) reviewed the proposed reference points for skates. The SSC concluded that fishing mortality-based reference points currently could not be adequately estimated in a way that can inform management because although it might be possible to calculate F_{MAX}, there is not a reliable time series of fishing mortality estimates to compare with F_{MAX}. Regardless, this FMP proposes precautionary measures intended to ensure that overfishing on winter skate and other skate species does not occur. The estimation of F-based reference points in the future may be possible with the collection of additional biological and fishery data.

Overfishing of skate resources is of particular concern due to the nature of the species. Skates have a limited reproductive capacity, and stock size could be quickly reduced through intensive exploitation. In particular, the larger species in the Northeast skate complex (> 100 cm maximum total length: barndoor, winter, and thorny skate) are thought to be relatively slow-growing, long-lived, and late maturing. These characteristics infer a relatively low natural mortality rate, and render them more vulnerable to overfishing than faster growing, shorter lived species.

Lack of Adequate Information. As previously mentioned, adequate biological, socio-economic, and fishery data for individual skate species and skate fisheries is severely lacking. Currently, skate landings and discards are not separated by species, and 99% of skates that are landed are reported as "unclassified." This means that no time series of landings and/or discards are available for any of the seven species individually. In addition, because skates were not formally incorporated into a federal FMP until now, the fishery information that does exist is known to be incomplete. Available fishery data do not capture activity occurring on state-waters vessels and skate-only vessels (if they exist), and skate-specific fishery information reported from other federally-permitted vessels is likely to be incomplete. This presents a significant impediment to developing skate-specific management measures, evaluating the potential effectiveness of these measures, and monitoring the success of the FMP at least in the short-term. As a result, one of the most important objectives of this FMP is to collect information critical for substantially improving knowledge of skate fisheries by species and for monitoring: (a) the status of skate fisheries, resources, and related markets and (b) the effectiveness of skate management approaches.

2.3 OTHER ISSUES TO BE RESOLVED

In addition to the two primary problems identified above, there are other issues that should be addressed, if not resolved, in this FMP. This section offers a brief summary of these issues. Each issue is discussed in more detail throughout this FMP, in the appropriate sections.

Skate Species Identification Problems: Perhaps the most difficult obstacle to overcome in order to obtain better skate fishery information is the problem of species identification. A few of the seven species of skates in the northeast complex are very difficult to distinguish from one another, making the reporting of landings and discards by species a significant challenge. For example, in a high volume fishery like the bait fishery, it may not be reasonable to expect that fishermen will be able to examine each skate individually to determine the species since it is almost impossible to distinguish a little skate from a juvenile winter skate. This problem is complicated due to the co-occurrence of these species within geographic areas. Successful identification of these skates to the species level requires additional knowledge of their anatomy and other physical characteristics. Some of the small-sized skate species are also difficult to differentiate (clearnose, little, smooth, rosette), as are some of the large-sized species (thorny and winter; barndoor skates can be more easily identified).

The Council clearly recognizes the problems associated with skate species identification. Because species-specific information is critical to the long-term success of this FMP, the Council is working closely with NMFS and the Northeast Fisheries Science Center (NEFSC) to develop a species identification guide for skate vessels and dealers as well as enforcement agents, sea samplers, and port agents. Draft copies of this guide were made available at the skate public hearings for review and comment. Final copies of the guide are expected to be distributed prior to implementation of the Skate FMP.

The reporting requirements proposed in this document include two reporting categories that address some of the potential identification problems: (1) little/winter skate, primarily for use in the bait fishery for the portion of the catch that cannot be separated into either little skate or juvenile winter skate, and (2) unclassifiable skate, for those that vessels and/or dealers cannot identify, even with the assistance of a guide.

State-Waters Skate Activity: The nature and extent of skate fishing activity occurring in state waters is currently unknown. It is believed that the majority of skate activity in state waters is in the bait fishery, through smaller vessels selling their skate catches to local lobster vessels. The Council anticipates working closely with states to coordinate the collection of fishery information for vessels fishing only in state waters. The measures proposed in this FMP that are intended to resolve this issue include the permit and catch reporting systems and the letter of authorization for vessels engaged in the bait-only fishery that are not subject to the wing possession limit.

3.0 SKATE FMP GOALS AND OBJECTIVES

The overall goal of the Skate FMP is:

> Consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act and other applicable laws, to develop a Fishery Management Plan (FMP) to research and manage the Northeast skate complex at long-term sustainable levels.

To achieve this goal, the Council has identified several FMP objectives:

1. Collect information critical for substantially improving knowledge of skate fisheries by species and for monitoring: (a) the status of skate fisheries, resources, and related markets and (b) the effectiveness of skate management approaches.
2. Implement measures to: protect the two currently overfished species of skates (barndoor and thorny) and increase their biomass to target levels, reduce fishing mortality on winter skate, and prevent overfishing of the other species in the Northeast skate complex – this may be accomplished through management measures in other FMPs (groundfish, monkfish, scallops), skate-specific management measures, or a combination of both as necessary.
3. Develop a skate permit system, coordinate data collection with appropriate state agencies for vessels fishing for skates or catching skates as bycatch only in state waters, and work with

the fishing industry to establish a catch reporting system consistent with industry capabilities, including the use of study fleets.

4. Minimize the bycatch and discard mortality rates for skates caught in both directed and non-directed fisheries through the promotion and encouragement of experimentation, conservation engineering, and gear development.
5. Promote and encourage research for critical biological, ecological, and fishery information based on the research needs identified in the Skate SAFE Report and scoping document, including the development and dissemination of a skate species identification guide.
6. Minimize, to the extent possible, the impacts of skate management approaches on fisheries for other species on which New England and Mid-Atlantic fishermen depend (for example, groundfish, monkfish, scallops, and fluke), recognizing the interconnected nature of skate and other fisheries in the Northeast Region.
7. To the extent possible, manage clearnose and rosette skates separately from the other five species in the skate complex, recognizing that these two species are distributed primarily in the Mid-Atlantic and South Atlantic regions.

4.0 PROPOSED ACTION

The following subsections describe the actions proposed in this FMP and the rationale for the Council's choices. Additional information about the Council's choices can be found within the analyses of the proposed action and the discussion of the alternatives that were considered but rejected by the Council during the development of this FMP. Alternatives to the proposed action, including the no action alternative, non-preferred alternatives, and alternatives that the Council considered but rejected, are described in Section 5.0 of this document.

4.1 MANAGEMENT UNIT

For this FMP, the management unit will be the **Northeast Region (Maine–North Carolina)**. The northern and western boundaries of the management unit are the coastline of the continental United States, and the eastern boundary is the Hague Line and the outer edge of the U.S. Exclusive Economic Zone (EEZ). The southern boundary of the management unit is Cape Hatteras, North Carolina (35º 15.3' North Latitude).

Discussion: The Council must specify a management unit for the Skate FMP. The choice of a management unit depends on the FMP's objectives and may be organized around geographic, economic, technical, social, and/or ecological perspectives. The management unit includes the species of concern, the identification of distinct stocks (if any), and the geographic area subject to management.

The species to which this management unit applies are those in the Northeast skate complex:

- Winter Skate (*Leucoraja ocellata*)
- Barndoor Skate (*Dipturis laevis*)
- Thorny Skate (*Amblyraja radiata*)
- Smooth Skate (*Malacoraja senta*)

- Little Skate (*Leucoraja erinacea*)
- Clearnose Skate (*Raja eglanteria*)
- Rosette Skate (*Leucoraja garmani*)

4.2 FISHING YEAR

The skate fishing year will be the same as the multispecies fishing year, currently May 1 – April 30. If the multispecies fishing year changes in the future, the skate fishing year will change automatically to remain consistent with the multispecies fishing year.

Discussion: Establishment of a fishing year for the Skate FMP provides a clear starting date for any new regulations and controls or adjustments to the fishery that may take place on an annual schedule. Currently, the Council is not proposing any measures in this FMP that rely on an annual schedule, but it may do so in the future.

Since the majority of skate fishing occurs under Multispecies DAS, which do rely on an annual schedule, the Council proposes that the skate fishing year be the same as the multispecies fishing year. Currently, the multispecies fishing year begins on May 1. If this date changes in the future (for example, through Amendment 13 to the Northeast Multispecies FMP, which is currently under development), the skate fishing year would change in accordance so that the skate fishing year is always the same as the multispecies fishing year.

4.3 MAXIMUM SUSTAINABLE YIELD (MSY) AND OPTIMUM YIELD (OY)

4.3.1 Introduction

National Standard 1 of the Magnuson-Stevens Act states that:

> (1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the *optimum yield* from each fishery for the United States fishing industry.

The Magnuson-Stevens Act requires that the conservation and management measures contained in an FMP achieve optimum yield (OY) from the fishery on a continuing basis. The Act defines OY as follows:

> **Definition of Optimum Yield [16 U.S.C. 1802 § 3]:**
>
> (28) The term "optimum," with respect to the yield from a fishery, means the amount of fish which --
>
> (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
>
> (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and
>
> (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

The National Standard Guidelines (NSGs) define MSY as "the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions." The NSGs also provide some guidance for cases in which MSY cannot be estimated directly:

> When data are insufficient to estimate MSY directly, Councils should adopt other measures of productive capacity that can serve as reasonable proxies for MSY, *to the extent possible* (emphasis added). Examples include various reference points defined in terms of relative spawning per recruit. For instance, the fishing mortality rate that reduces the long-term average level of spawning per recruit to 30-40 percent of the long-term average that would be expected in the absence of fishing mortality may be a reasonable proxy for the MSY fishing mortality rate. The long-term average stock size obtained by fishing year after year at this rate under average recruitment may be a reasonable proxy for MSY. The natural mortality rate may also be a reasonable proxy for the MSY fishing mortality rate. If a reliable estimate of pristine stock size is available, a stock size approximately 40% of this value may be a reasonable proxy for the MSY stock size, and the product of this stock size and the natural mortality rate may be a reasonable proxy for MSY.

Unfortunately, as discussed in the following subsections, these approaches to developing MSY proxies cannot be utilized for skates at this time because the basic information needed to develop them is not currently available. Fishing mortality rates on these species are unknown, as are absolute stock sizes and pristine stock sizes. F_{MSY} estimates are not available, and the Council's Scientific and Statistical Committee (SSC) concluded that estimates of natural mortality are unreliable at this time as well. Additional discussion is provided below.

4.3.2 MSY

MSY for the individual skate species and/or the complex as a whole cannot be estimated at this time. Estimating MSY for the Northeast skate complex was explored by the SAW 30 Working Group in November 1999 as well as the Skate PDT in developing this FMP. A discussion of the alternatives that were considered to estimate MSY and the conclusions that were drawn is provided below.

Traditional Approaches Used to Estimate MSY

<u>Sequential Population Analysis</u>

The sequential population analysis (SPA) is an age-structured model that uses catch and fishery-independent data broken down by age class to estimate population numbers and fishing mortality. It is also known as virtual population analysis, or VPA. This model cannot be used to derive estimates of MSY for skates at this time because catch data is incomplete and unreliable. In addition, age data and other necessary biological data are lacking.

Biomass Dynamics

Biomass dynamic models use total catch combined with fishery-independent data to estimate fishing mortality and population biomass for a species or species complex. This type of model has been utilized in other skate fisheries that have very good catch data (in aggregate) and moderate catch-per-unit-effort (CPUE) data (see Agnew et al, 2000, for a study of the Falkland Island skate complex). Even with reliable catch data, however, the biomass dynamic model did not perform well in the Agnew et al. study, and several varied estimates of MSY for the skate complex were obtained. The situation with the Northeast skate complex is more difficult because of the lack of catch data. Given the inadequate catch data for both the complex as a whole and the individual species, this model cannot be used to estimate MSY for the species in the Northeast skate complex at this time.

Dynamic Pool Models

The dynamic pool model utilizes linkages between various biological relationships such as yield-per-recruit as well as spawning stock biomass and recruitment. Much of the information required comes from an age-structured assessment (such as SPA). This approach is very data-intensive, and for the same reasons discussed for SPA, dynamic pool models cannot be used to estimate MSY for the species in the Northeast skate complex at this time.

SAW 30 Conclusions

The following Terms of Reference were provided by the SAW Steering Committee for the benchmark assessment of the Northeast skate complex reviewed in the SAW 30 Report in November 1999: (1) Summarize available biological studies (age and growth, maturity, etc.) for the seven species in the skate complex; (2) Update commercial and recreational landings and survey indices through 1998/1999; (3) To the extent practicable, summarize fishery discard rates through the use of sea sampling data or other information sources; (4) Estimate fishing mortality rates, and trends in relative or absolute stock size, and consider appropriate reference points for stock size and fishing mortality rate consistent with the provisions of the Sustainable Fisheries Act (SFA); and (5) Provide an assessment of the status of the species in the complex relative to overfishing criteria, and evaluate the status of the barndoor skate resource relative to listing factors considered in the Endangered Species Act.

The following conclusions were reached at SAW 30 regarding the species in the Northeast skate complex:

- Yield-per-recruit-based reference points for winter skate in the Northeast Region are unreliable due to the use of growth parameters from Canadian waters and the uncertainty of partial recruitment to the commercial fishery.
- Yield-per-recruit-based reference points for little skate in the Northeast Region are unreliable due to the use of outdated growth parameters from the 1970s and the uncertainty of partial recruitment to the commercial fishery.
- For barndoor skate, there are insufficient data on age and growth to determine fishing mortality rates or propose SFA fishing mortality reference points.

- There are insufficient data on age and growth of thorny skate to determine fishing mortality rates or propose SFA fishing mortality reference points.
- There are insufficient data on age and growth of smooth skate to determine fishing mortality rates or propose SFA fishing mortality reference points.
- There are insufficient data on age and growth of clearnose skate to determine fishing mortality rates or propose SFA fishing mortality reference points.
- There are insufficient data on age and growth of rosette skate to determine fishing mortality rates or propose SFA fishing mortality reference points.

The SARC noted that the landings attributable to individual species are very uncertain, since over 99% of the landings records are reported as "unclassified skates." The SARC also discussed species identification problems, which may exist in the survey data, particularly for winter and little skates at sizes less than 35 cm. There was general discussion among SARC members as to whether sustainable yield reference points were appropriate for large sized skates such as winter, thorny and barndoor, since they are generally characterized by relatively slow growth and low intrinsic rates of population increase. It was noted that reference points based on threshold levels or indices of spawning biomass may be more appropriate for these species, since recruitment success is more closely related to standing spawning stock biomass than for most teleost stocks. It was also noted that a major source of fishing mortality is bycatch-related and therefore yield based reference points may not be appropriate. The SARC acknowledged, however, that as SFA reference points can be developed, consideration of maximum sustainable yields should be addressed.

The majority of the SAW 30 Report is included in Volume II of this FMP (2000 Skate SAFE Report) and should be referenced for additional information and discussion regarding this issue. In conclusion, the best available scientific information, as reported by the SARC in the SAW 30 Report, is insufficient to provide a basis for developing estimates of MSY for the species in the Northeast skate complex using traditional approaches.

Other Approaches Considered

<u>MSY Based on Catch History</u>

Restrepo et al. (1998) provide technical guidance on implementing National Standard 1 of the SFA in data-poor situations such as the one that the Council currently faces with skates. Restrepo et al. suggest that if there is no reliable information available to estimate fishing mortality or biomass reference points, it may be reasonable to use the historical average catch as a proxy for MSY, taking care to select a period when there is no evidence that abundance was declining. Unfortunately, as noted in Section 7.3.2, this approach cannot be utilized at this time to develop an MSY proxy for individual skate species or the complex as a whole. The available time series of commercial landings is known to be incomplete and is considered unreliable. Almost all skates that have been reported in the past are reported as "unclassified skates," so no time series of landings for individual species is available. Reporting of "unclassified skates" is incomplete because skates are not currently a federally-managed species (with permit and reporting requirements), and it is likely that some unreported skate fishing activity is occurring in federal waters. Also, the time series of landings does not capture skate activity by state permit holders, which may be a significant component of the bait fishery. This means that the time series of landings of "unclassified skates" probably (and potentially significantly) underestimates total skate landings. The other important unknown is the extent to which these species are caught as bycatch by various gears in various fisheries. Bycatch could be another significant component of the overall yield from these species.

The Northeast skate complex could be characterized as a "reverse data-poor situation" in that the data that are lacking for these species is opposite from the data that are usually lacking for species that are characterized as "data poor." The method for determining MSY in data poor situations described in Restrepo et al. (1998) requires catch or landings with little or no fishery-independent data. In the case of the Northeast skate complex, the fishery-independent data are generally available through a long time series of NEFSC trawl survey data. However, as discussed above, catch information is inadequate and misrepresentative of actual activity in the fishery. Most data-poor fisheries are facing the opposite situation.

Aggregate MSY for the Skate Complex

In the context of an aggregate overfishing definition for the seven skate species, the Skate PDT considered estimating MSY for the skate complex as a whole and concluded that this approach is not appropriate at this time for several reasons:

- The life histories and distributions of the individual species are different, and an aggregate approach would not capture considerations unique to the individual species. Productivity, therefore, is also different for the individual species in the complex.
- An aggregate approach would still need to be based on data and information from the individual species, most of which is not available at this time.
- As previously discussed, the time series of skate landings is considered incomplete and unreliable and therefore does not lend itself well to an estimation of MSY even for the complex in aggregate. For many reasons, the time series of skate landings likely underestimates the true level of historical and recent skate activity.
- The economics are different for different skate species and fisheries (wings vs. bait). The PDT expressed concern that an aggregate approach could produce economically inefficient management measures and/or would not capture the unique economics and other characteristics of the very different skate fisheries.
- Similar to the point above, catchability (vulnerability) of co-occurring species of skates by different kinds of fishing gear will vary. Fishing mortality rates for these species will not be affected equally if effort in a particular fishery is reduced.
- If an aggregate approach were to be based on indicator stocks within the complex, remaining stocks may be over- or under-exploited with respect to their individual MSY levels (which would remain unknown). If the indicator stock(s) is more productive than other species in the complex, some stocks in the complex may not be able to withstand the same level of fishing effort associated with the MSY estimate for the complex.

Estimates of MSY Based on Carrying Capacity

The Skate PDT considered the possibility of estimating MSY for these species based on considerations of carrying capacity (K), derived from the biomass reference points. In general, carrying capacity equates to a biomass that is twice the B_{MSY} level. In theory, since B_{MSY} proxies have been developed for these species, one approach would be to derive MSY estimates from these reference points. Two species, clearnose and rosette skates, are already at levels that are more than twice their B_{MSY} levels, suggesting that these species are above their theoretical carrying capacities.

The general formula for calculating MSY based on carrying capacity is that MSY = (Kr)/4, where r is the species' intrinsic rate of increase. In the case of the species in the Northeast skate complex, estimates of K are available only in survey units (kg/tow) and no estimates of r are available. Therefore, MSY cannot be calculated from K. Even if r could be estimated using some assumptions, converting trawl survey units into absolute biomass units requires knowledge of catchability, which currently remains unknown for the species in the Northeast skate complex. Therefore, this approach cannot be utilized to estimate MSY at this time.

Summary

As previously discussed, reliable estimates of MSY are not available and cannot be derived for the skate species in the Northeast complex at this time. There is no reliable time series of commercial fishery landings or discards for any of the individual species, and the time series for the complex as a whole is considered to be incomplete. In addition, very little reliable and current growth and maturity information is available for any of the species in the complex. Very little information is available on the length composition of the landings and discards. Together, these factors preclude the estimation of MSY from sequential population (e.g., age- or length-based virtual population analysis), biomass dynamics (e.g., surplus production models), or dynamic pool models (e.g., yield-per-recruit analysis). The NSGs state that status determination criteria and reference points must be specified only "to the extent possible." Since it is not possible to estimate a reasonable proxy for MSY at this time, it would be inappropriate to give the impression otherwise.

Nevertheless, it is important to define management strategies that have a high probability of ensuring that fishing mortality rates do not increase to levels that will compromise the long-term rebuilding of these stocks to their biomass targets. Even in this situation of extremely sparse data, it is possible to judge whether current management strategies are sustainable or whether fishing needs to be curtailed to facilitate rebuilding. The Council has specified management measures in this FMP and in other fisheries that enhance the probability of future stock increases with the expectation that progressively more data will become available to continually evaluate management strategies and more reliably estimate SFA reference points over time. A precautionary approach implements conservation measures even in the absence of scientific certainty that fish stocks are being overexploited. The stocks of most concern at this time are barndoor and thorny skates. The following discussion of OY as well as other components of this FMP (Sections 4.4, 4.5, and 4.7) underscore the Council's intent relative to defining appropriate management strategies, rebuilding these stocks, and continuously monitoring and evaluating progress as more and better information becomes available.

The primary objective of this FMP is to collect the information necessary to manage and monitor the skate fisheries and assess the status of the skate resources. As more information becomes available, it may be possible to develop estimates of MSY and other reference points that currently cannot be estimated. The Council intends to update the reference points and status determination criteria in this FMP as necessary data become available. The specification of MSY and OY, therefore, are items that the Council can adjust through a framework adjustment to this FMP (Section 4.8), provided that the specifications do not require management adjustments that are outside of the realm of the framework adjustment process. The Skate PDT will annually review available information and consider developing estimates of MSY when possible (Section 4.7).

4.3.3 OY

4.3.3.1 Overview

Specifications of optimum yield (OY) for these species is hampered by many of the same limitations that preclude reliable specifications of MSY (see above discussion). If quantitative estimates of MSY were available, then they could serve as starting points for estimating OY for each of the species in the skate complex. Similarly, an aggregate estimation of MSY for the complex could lend itself to the development of an aggregate OY estimate for the complex. The NSGs provide for specification of a fishery-wide OY for a mixed-stock fishery, where management measures for separate target harvest levels for individual stocks may be specified, but are not required. For the same reasons discussed relative to MSY, these approaches cannot be adopted to estimate OY at this time. For some species in the skate complex (for example, smooth skate), it is currently unknown whether the species is caught and/or landed in any fisheries. Nevertheless, the Council is again taking a precautionary approach to specifying OY, implementing conservation measures even in the absence of scientific information, and focusing special attention on barndoor and thorny skates, the two overfished species.

In general, optimum yield will equate to the yield of skates that results from effective implementation of the Skate FMP. Consistent with the NSGs and the Magnuson-Stevens Act, the Council intends that OY cannot exceed MSY or the allowable portion of MSY necessary to be consistent with the MSY-based control rule (see Section 4.5.2 for a discussion of control rules). If the Skate FMP is successful in achieving its objective of rebuilding the skate species to their long-term target biomass levels, then the measures in the FMP should provide for extraction of the optimal amount of skates.

The following OY specifications for each species in the Northeast skate complex are based on the management measures that the Council has selected to be included in this FMP. For example, in the cases where possession of a certain species is prohibited, the Council has set OY for the species at zero. Setting OY at zero for some skate species, especially those that are overfished, is consistent with the approach suggested by Restrepo et al. regarding the MSY-based control rule (see Section 4.5.2). Note that setting OY at zero for some species may result in continued difficulty estimating MSY in the future.

Related to OY are the following important considerations:

- The Council is proposing a management regime that it believes includes the most appropriate management measures to protect and rebuild the skate resources, maintain sustainable levels of fishing effort for some skate species, and has the least impact on other fisheries in the Northeast Region.
- Based on available information and the analyses presented in this document, the proposed action provides sufficient protection for the resources to prevent overfishing and rebuild overfished stocks.
- Landings that occur under the measures proposed in this FMP are intended to equate to OY.

The following paragraphs address OY for each skate species individually.

Winter Skate. Winter skate is the primary species harvested for skate wings, and it also represents a small fraction of the bait fishery. Winter skate is not overfished, but it has not yet rebuilt to its long-term biomass target. Measures proposed in this FMP to reduce fishing mortality on winter skates and ensure rebuilding to long-term sustainable levels include possession limits for the wing fishery. In addition, the overlap between skate wing fishing and multispecies fishing suggests that more benefits will be afforded to the winter skate resource as effort is reduced in the multispecies fishery. Moreover, the groundfish closed areas, as they are currently defined, provide a great deal of protection to the winter skate resource.

Because fishery data are lacking, there is currently no time series of catch or landings of winter skate on which to base an absolute specification of OY. OY for winter skate will therefore be defined as the amount of winter skates that are harvested legally under the provisions of this FMP and the yield that results from the management measures in other fisheries to the extent that these measures further impact (and likely reduce) the harvest of winter skates (see Section 4.16). Consistent with the National Standard Guidelines, the Council intends that OY cannot exceed MSY or the allowable portion of MSY necessary to be consistent with the MSY-based control rule. As better fishery information becomes available, this specification may be revised and/or refined.

Little Skate. Little skate is the primary target species for the skate bait fishery and is considered to be "rebuilt" (above its biomass target). There are no measures proposed in this FMP specific to the little skate resource; however, an overfishing definition for little skate is proposed, and permit options, reporting requirements, and other provisions of this FMP apply to the harvest and sale of little skates. These tools provide a framework for collecting better information and implementing management measures specific to little skates in the future if such measures are warranted.

Because fishery data are lacking, there is currently no time series of catch or landings of little skate on which to base an absolute specification of OY. Anecdotal information suggests that the bait fishery is a relatively stable fishery that has occurred regularly for many years, responding to demand for bait primarily from southern New England lobster vessels. Since abundance of the little skate resource has increased considerably over a time period that coincides with the operation of the bait fishery, it can be assumed that the resource is being harvested at a fishing mortality rate that is below F_{MSY}. OY for little skate will therefore be defined as the amount of little skates that are harvested legally for bait under the provisions of this FMP. Consistent with the National Standard Guidelines, the Council intends that OY cannot exceed MSY or the allowable portion of MSY necessary to be consistent with the MSY-based control rule. As better fishery information becomes available, this specification may be revised and/or refined.

Barndoor Skate. Barndoor skate is thought to represent a very small component of the skate wing fishery. Because barndoor skate is in an overfished condition, the Council is proposing action to rebuild the resource to its long-term sustainable level. This FMP proposes to prohibit the possession of barndoor skate on all vessels fishing in federal waters. The interaction of skate fishing and multispecies fishing suggests that even more benefits will be afforded to barndoor skates as effort is further reduced in the multispecies fishery. Moreover, the groundfish closed areas, as they are currently defined, provide a great deal of protection to the barndoor skate resource.

To be as precautionary as possible, the Council is setting OY for barndoor skate at **zero**. As better fishery information becomes available, this specification may be revised and/or refined.

Thorny Skate. Thorny skate is thought to represent a component of the skate wing fishery. Because thorny skate is in an overfished condition, the Council is proposing action to rebuild the resource to its long-term sustainable level. This FMP proposes to prohibit the possession of thorny skate on all vessels fishing in federal waters. The interaction of skate fishing and multispecies fishing suggests that even more benefits will be afforded to thorny skates as effort is further reduced in the multispecies fishery. Moreover, the groundfish closed areas, as they are currently defined, provide a great deal of protection to the thorny skate resource.

To be as precautionary as possible, the Council is setting OY for thorny skate at **zero**. As better fishery information becomes available, this specification may be revised and/or refined.

Smooth Skate. Smooth skate is not overfished, but it has not yet rebuilt to its long-term biomass target. This FMP proposes to prohibit the possession of smooth skate on all vessels fishing in the GOM. Smooth skate is distributed almost exclusively in the GOM, so this prohibition is intended to address the majority of the species' range. The interaction of skate fishing and multispecies fishing suggests that even more benefits will be afforded to smooth skates as effort is further reduced in the multispecies fishery. Moreover, the groundfish closed areas in the GOM, as they are currently defined, provide a great deal of protection to the smooth skate resource.

To be as precautionary as possible, the Council is setting OY for smooth skate at **zero**. Through this FMP, the Council intends to prevent the development and/or expansion of a fishery for this species. As better fishery information becomes available, this specification may be revised and/or refined.

Clearnose Skate. Clearnose skate is considered to be "rebuilt" and is more than two times its target biomass level. There are no measures proposed in this FMP specific to the clearnose skate resource; however, an overfishing definition for clearnose skate is proposed, and permit requirements, reporting requirements, and other provisions of this FMP apply to the harvest and sale of clearnose skates. These tools provide a framework for collecting better information and implementing management measures specific to clearnose skates in the future if such measures are warranted.

Because fishery data are lacking, there is currently no time series of catch or landings of clearnose skate on which to base an absolute specification of OY. Since abundance of the clearnose skate resource has increased considerably over a time period and in an area that coincides with the operation of many fisheries, it can be assumed that the resource is being harvested at a fishing mortality rate that is below F_{MSY}. OY for clearnose skate will therefore be defined as the amount of clearnose skates that are harvested legally under the provisions of this FMP. Consistent with the National Standard Guidelines, the Council intends that OY cannot exceed MSY or the allowable portion of MSY necessary to be consistent with the MSY-based control rule. As better fishery information becomes available, this specification may be revised and/or refined.

Rosette Skate. Rosette skate is considered to be "rebuilt" and is more than two times its target biomass level. There are no measures proposed in this FMP specific to the rosette skate resource; however, an overfishing definition for rosette skate is proposed, and permit requirements, reporting requirements, and other provisions of this FMP apply to the harvest and sale of rosette skates. These tools provide a framework for collecting better information and implementing management measures specific to rosette skates in the future if such measures are warranted.

Because fishery data are lacking, there is currently no time series of catch or landings of rosette skate on which to base an absolute specification of OY. Since abundance of the rosette skate resource has increased considerably over a time period and in an area that coincides with the operation of many fisheries, it can be assumed that the resource is being harvested at a fishing mortality rate that is below F_{MSY}. OY for rosette skate will therefore be defined as the amount of rosette skates that are harvested legally under the provisions of this FMP. Consistent with the National Standard Guidelines, the Council intends that OY cannot exceed MSY or the allowable portion of MSY necessary to be consistent with the MSY-based control rule. As better fishery information becomes available, this specification may be revised and/or refined.

4.3.3.2 Summary of OY Specifications

Table 2 summarizes the proposed OY specifications for the seven species in the skate complex.

Table 2 Proposed OY Specifications

Species	OY Specification	Action	Comments
Winter Skate	Yield from FMP measures and management measures in other fisheries	10,000/20,000-pound possession limit for wing fishery	• Management measures in other fisheries highly likely to further reduce mortality
Little Skate	Status quo catch	Status quo	• Management measures in other fisheries likely to further reduce mortality
Barndoor Skate	0	No possession	• Discard mortality unknown • Management measures in other fisheries highly likely to further reduce mortality
Thorny Skate	0	No possession	• Discard mortality unknown • Management measures in other fisheries highly likely to further reduce mortality
Smooth Skate	0	No possession in GOM	• Prevents development of a fishery for smooth skate • Management measures in other fisheries likely to reduce mortality
Clearnose Skate	Status quo catch	Status quo	
Rosette Skate	Status quo catch	Status quo	

4.4 OVERFISHING DEFINITIONS

4.4.1 Introduction

The Magnuson-Stevens Act includes a requirement that all FMPs "specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished." NMFS' National Standard Guidelines (NSGs) require the specification of "status determination criteria" (63 FR 24212). These criteria are to be "expressed in a way that enables the Council and Secretary to monitor the stock or stock complex and determine annually whether overfishing is occurring and whether the stock or stock complex is overfished."

The NSGs call for the specification of a maximum fishing mortality rate and a minimum stock size within the overfishing definition. Further, the guidelines state that the minimum stock size threshold should be the larger of ½ the MSY stock size or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years. In the Council's arena, these principles are well known and have been translated into the terms $F_{threshold}$ and $B_{threshold}$ with the minimum stock size level usually set at ½ B_{MSY} (see the Glossary in Section 13.0 of this document for definitions of these terms).

Before presenting the proposed skate overfishing definitions, it is useful to examine the information base available for the skate complex. The NEFSC trawl survey, conducted in the fall (since 1963), the spring (since 1968) and winter (since 1992) currently provides the only region-wide information about skate biomass. These fishery-independent data, collected using standardized bottom trawl gear, may be sufficient in describing biomass trends in the various skate stocks. These data cannot, however, characterize the absolute level of biomass.

Other, more analytical approaches to estimating biomass such as direct estimation via an area-swept calculation, the use of various biomass dynamics models, sequential population estimates and dynamic pool modeling are not possible in this case without the acquisition of additional information (see Section 4.3.2 for more discussion of these analytical approaches).

Among the key components in advancing knowledge of stock levels is fisheries dependent information on catches, effort, and the length and age composition of the catch. Fisheries dependent data on the magnitude of landings, discards by species, and length composition would allow estimation of fishing mortality rates. Unfortunately, these data are currently not available for the Northeast skate complex.

4.4.2 FMP Relationship to National Standard 1

Given the background on overfishing definitions and the limited information available for constructing such definitions for the species in the skate complex, it is useful to examine how the overfishing definitions proposed for skates relate to National Standard 1 and NMFS' National Standard Guidelines (NSGs). According to the NSGs, an overfishing definition must provide, at a minimum, a specification of a maximum fishing mortality threshold (or a reasonable proxy), and specification of a minimum stock size threshold (or a reasonable proxy). It also follows that specification of the biomass threshold stand in some relation to the biomass that produces MSY (B_{MSY}) and that specification of a fishing mortality rate threshold should have some relationship to the fishing mortality rate that produces MSY (F_{MSY}).

In the case of skates, it is not currently possible to formally estimate reference points such as B_{MSY} and F_{MSY}. Instead, the Council has reviewed all available information and taken the following general approach to constructing overfishing definitions that are in compliance with the NS1 Guidelines.

Since there are no direct estimates of biomass available for these species, biomass indices from the Northeast Fisheries Science Center trawl surveys have been used to characterize stock size. More specifically, for each species in the complex, information on the weight of the catch per tow (kg/tow) from the most representative trawl survey series over the longest possible time span was assembled. The data in the selected series were then used to characterize the distribution of biomass over the examined time period. Finally, candidate reference points were selected from the distribution so as to provide proxies for biomass targets that have a high probability of correctly characterizing the stock level that produces MSY. Minimum biomass threshold levels were taken to be half of these values, as referenced in the NS1 Guidelines. Further discussion of this approach and specific recommendations for each skate species are provided below.

Determining the maximum fishing mortality rate threshold for these stocks is quite problematic given the current inability to directly estimate fishery exploitation rates. To address this, the Council considered two different approaches. One approach to determining a maximum fishing mortality threshold in data poor situations is suggested in the NS1 Guidelines – that a Council could adopt the natural mortality rate, M, as a proxy for F_{MSY}, and hence the maximum fishing mortality rate threshold. Alternatively, one could use the biomass levels as indexed by the NEFSC trawl surveys as an indicator of exploitation. More specifically, if the biomass of a species is in decline (for several years or in a moving average sense, see discussion below), one can be certain that current/recent removals are in excess of the stock's ability to maintain its current population size. This situation is in fact, a diagnosis of overexploitation, or in SFA terms, overfishing. Therefore, under this approach, the Council would determine, via examination of biomass levels, that the stock was or had been overexploited and would adopt measures to eliminate such overfishing. This second approach is the basis of the proposed overfishing definitions, which are described below.

4.4.3 Skate Overfishing Definitions

The overfishing definitions for the skate species represent a slightly modified version of the reference points developed at SAW 30. Instead of using the fishing mortality thresholds for winter and little skates from SAW 30 and not specifying thresholds for the other skate species, the proposed overfishing definitions establish fishing mortality thresholds for all seven skate species based on a percentage decline in the NEFSC trawl survey. The thresholds for fishing mortality are based on annual percentage declines of the three-year average of the NEFSC trawl survey (spring or autumn, depending on the species). The percentages are specified for each species individually based on historical variation within the survey. The fishing mortality thresholds also include a precautionary "backstop" that indicates that overfishing is occurring if the trawl survey mean weight per tow declines for three consecutive years. The language for the overfishing definitions is presented below. The reference points are summarized in Table 3.

Winter skate is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series. Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines ***20% or more, or when the autumn survey mean weight per tow declines for three consecutive years****. The reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.*

Little skate is in an overfished condition when the three-year moving average of the spring survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the spring trawl survey from the selected reference time series. Overfishing occurs when the three-year moving average of the spring survey mean weight per tow declines ***20% or more, or when the spring survey mean weight per tow declines for three consecutive years****. The reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.*

Barndoor skate is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the mean weight per tow observed in the autumn trawl survey from 1963-1966 (currently 0.81 kg/tow). Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines ***30% or more, or when the autumn survey mean weight per tow declines for three consecutive years****. The reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.*

Thorny skate is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series. Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines ***20% or more, or when the autumn survey mean weight per tow declines for three consecutive years****. The reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.*

Smooth skate is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series. Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines ***30% or more, or when the autumn survey mean weight per tow declines for three consecutive years****. The reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.*

Clearnose skate is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series. Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines ***30% or more, or when the autumn survey mean weight per tow declines for three consecutive years****. The reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.*

Rosette skate is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series. Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines ***60% or more, or when the autumn survey mean weight per tow declines for three consecutive years****. The reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.*

Table 3 Proposed Overfishing Definition Reference Points

SKATE SPECIES	TARGET BIOMASS, B_{target} (kg/tow)	THRESHOLD BIOMASS, $B_{threshold}$ (kg/tow)	TARGET FISHING MORTALITY F_{target}	THRESHOLD FISHING MORTALITY $F_{threshold}$
Winter	6.46	3.23	N/S	A decline of **20% or more** in the three-year moving average of the autumn trawl survey, or a decline in the autumn survey mean weight per tow for three consecutive years
Little	6.54	3.27	N/S	A decline of **20% or more** in the three-year moving average of the spring trawl survey, or a decline in the spring survey mean weight per tow for three consecutive years
Barndoor	1.62	0.81	N/S	A decline of **30% or more** in the three-year moving average of the autumn trawl survey, or a decline in the autumn survey mean weight per tow for three consecutive years
Thorny	4.41	2.20	N/S	A decline of **20% or more** in the three-year moving average of the autumn trawl survey, or a decline in the autumn survey mean weight per tow for three consecutive years
Smooth	0.31	0.16	N/S	A decline of **30% or more** in the three-year moving average of the autumn trawl survey, or a decline in the autumn survey mean weight per tow for three consecutive years
Clearnose	0.56	0.28	N/S	A decline of **30% or more** in the three-year moving average of the autumn trawl survey, or a decline in the autumn survey mean weight per tow for three consecutive years
Rosette	0.03	0.01	N/S	A decline of **60% or more** in the three-year moving average of the autumn trawl survey, or a decline in the autumn survey mean weight per tow for three consecutive years

Discussion: These overfishing definitions incorporate the biomass targets and thresholds that were developed at SAW 30. At SAW 30, the panel used a comprehensive approach where, for each species, the longest available survey biomass time series was used to index the recent range of stock biomass. Additionally, there was some discussion as to which survey series (spring or fall) and which strata sets of the survey were most appropriate in characterizing total stock biomass. With the exception of little skate, the SARC recommended that the fall trawl survey be used to index biomass, as that series represents a longer interval for observing the dynamic range of stock size.

With respect to specification of a biomass threshold, the SARC took the general approach of examining the high point of the survey time series. Without fisheries-dependent data, it is not possible to relate biomass to exploitation rates. However, two possible scenarios were examined with respect to historical peak abundance (as reflected in the survey). One possibility is that the maximal value might represent a proxy for the stock's carrying capacity, known as K and numerically equal to twice B_{MSY}. Thus, the biomass target would be ½ this peak value. This follows if one assumes that the stock was not exploited (or very lightly exploited) at the point in time maximal biomass was observed. A second possibility is that the upper value represents some period of stock stability in the face of an approximate match between stock productivity and fishery exploitation. Under that scenario, the upper value could stand as a proxy for the biomass target or B_{MSY} and, therefore, an appropriate $B_{threshold}$ would be ½ that value.

Given this background and a subsequent conversion of this concept to a statistical basis which examines smoothed series and percentiles of distribution of the range of observations, the panel's two choices can be translated into a selection of the 100th percentile or the 50th percentile as a biomass target. Since neither polar set of assumptions was likely to be true, the SARC chose the 75th percentile of the appropriate series as the best approximation of a reasonable biomass target. Thresholds were specified as equal to ½ of that target value.

The following bullets provide additional discussion of the rationale for the biomass reference points for each skate species.

Winter Skate

The selected reference time series currently encompasses the GOM-MA offshore region from 1967-1998. The target biomass reference point for winter skate is the 75th percentile value of the NEFSC autumn biomass index for the GOM-MA offshore region from 1967-1998, and the threshold biomass is one-half of that value.

- This incorporates data from the longest and most geographically comprehensive time series of survey data available for winter skate. The autumn trawl survey dates back to 1963, but the Mid-Atlantic region was not included until 1967. Given the range of this species, it may be inappropriate and inconsistent to include years prior to 1967.
- The autumn survey was selected instead of the spring survey primarily because it is the longer time series. (In this case, it is only longer by one year.) Generally, the trends in the spring and autumn surveys are similar in time and area. In addition, a different net was used in the spring survey from 1973-1981, and there is some uncertainty associated with the conversion factors to adjust for the differences. The autumn survey time series was not affected by the spring survey net modifications.
- The winter survey began in 1992. It was developed primarily to catch flatfish and therefore catches skates. However, it does not cover the same area as the autumn and spring surveys. It does not sample in the Gulf of Maine, and samples on Georges Bank are inconsistent. It may become more useful in the future for comparison purposes as the time series grows.

Little Skate

The selected reference time series currently encompasses the GOM-MA inshore and offshore regions from 1982-1999. The target biomass reference point for little skate is the 75th percentile value of the NEFSC spring biomass index for the GOM-MA offshore region from 1982-1999, and the threshold biomass is one-half of that value.

- This is the only skate species for which spring survey data are used to develop biomass estimates and overfishing definition reference points. Trends in the spring and autumn surveys as well as trends in survey catchability for this species are more variable than they are for other skate species. The spring survey was selected instead of the autumn survey for little skate because the distribution of the fish during the spring survey results in higher catchability and potentially more reliable indices of abundance.
- A spring survey time series throughout the geographic range of little skate exists since 1975, but because of changes in the survey net from 1973-1981 (and uncertainties associated with the catch conversion factors), the proposed time series for the overfishing definition begins in 1982. Using a reference time series from 1975-1999 would result in less certain data from 1975-1981 that would be inconsistent with the data from 1982-1999.
- Similar to winter skate, the catchability of little skate in the winter survey is significantly higher than in the spring and autumn surveys. However, inconsistent area coverage on Georges Bank, the absence of sampling in the Gulf of Maine, and the short time series prevent the winter survey from being used to develop an overfishing definition reference point for little skate at this time. It may become more useful in the future as the time series grows.

Barndoor Skate

The selected reference time series currently encompasses the GOM-SNE offshore region from 1963-1966. The target biomass reference point for barndoor skate is mean value of the NEFSC autumn biomass index for the GOM-SNE offshore region from 1963-1966, and the threshold biomass is one-half of that value.

- 1963-1966 are the years of greatest abundance in the time series (62-120 individuals), with greatly reduced observations thereafter (until more recently). Given the numbers of barndoor skates that were captured from 1963-1966, it is likely that barndoors were more abundant before the contemporary autumn trawl survey began in 1963. Historical survey data (1948-1962) are being analyzed for consideration in the next barndoor skate stock assessment. This historical survey data is in an inconsistent format (within itself and inconsistent with contemporary data) and cannot be developed into a reliable time series without considerable work and a peer-reviewed analysis. Historical surveys were opportunistic; in other words, data were not collected for the purposes of establishing a time series that could characterize trends in abundance for barndoor skate. It is unknown at this time whether survey data from 1948-1963 will provide any information that can be used to develop overfishing definition reference points for barndoor skate.
- Using a longer time series and incorporating all of the near-zero and zero survey observations since 1966 would underestimate the long-term sustainable biomass of

barndoor skates. It is inappropriate to use a time period when the barndoor skate resource was essentially "collapsed" to estimate B_{MSY}. As an example, using 1963-1998 would approximate B_{MSY} at about 0.1 kg/tow. A stock's carrying capacity is generally estimated to be twice the level of B_{MSY} (in this example, carrying capacity would be 0.2 kg/tow). This approach would lead to a conclusion that the barndoor skate resource is currently above carrying capacity, which is scientifically infeasible given the significantly higher survey indices during the mid-1960s (well above 1.5 kg/tow).

- In the future, as the time series grows longer, the winter survey may become more useful as an indicator for barndoor skates than for some other skate species. The catchability of barndoor skates appears to be higher in the winter survey (123 barndoors were caught in the last winter survey). However, there are still problems with its inconsistent sampling on Georges Bank and the absence of sampling in the Gulf of Maine.

Thorny Skate

The selected reference time series currently encompasses the GOM-SNE offshore region from 1963-1998. The target biomass reference point for thorny skate is the 75th percentile value of the NEFSC autumn biomass index for the GOM-SNE offshore region from 1963-1998, and the threshold biomass is one-half of that value.

- This incorporates the longest and most geographically comprehensive time series of survey data for thorny skates. The survey from the Mid-Atlantic region is insignificant due to the distribution of the stock, so the time series dates back further than it would if the Mid-Atlantic component were included (the Mid-Atlantic component was incorporated in 1967). The autumn survey was chosen instead of the spring survey because it is five years longer (1963 versus 1968). In addition, as previously discussed, the spring survey net was modified for several years, and there are uncertainties associated with conversion factors. The autumn survey time series therefore appears to be more robust.
- The winter survey does not adequately sample thorny skates, which are distributed primarily in the Gulf of Maine. The winter survey does not sample the Gulf of Maine.
- The shrimp survey may become a more valuable indicator of thorny skate in the future as the time series grows, but it covers a relatively small area and has been rather variable to date.

Smooth Skate

The selected reference time series currently encompasses the GOM-SNE offshore region from 1963-1998. The target biomass reference point for smooth skate is the 75th percentile value of the NEFSC autumn biomass index for the GOM-SNE offshore region from 1963-1998, and the threshold biomass is one-half of that value.

- This incorporates the longest and most geographically comprehensive time series of survey data for smooth skates. The survey from the Mid-Atlantic region is insignificant due to the distribution of the stock, so the time series dates back further than it would if the Mid-Atlantic component were included (the Mid-Atlantic component was incorporated in 1967). The autumn survey was chosen instead of the spring survey because it is five years longer (1963 versus 1968). In addition, as previously discussed, the spring survey net was modified for several years, and there are uncertainties associated with conversion factors. The autumn survey time series therefore appears to be more robust.

- The winter survey does not adequately sample smooth skates, which are distributed primarily in the Gulf of Maine. The winter survey does not sample the Gulf of Maine.

Clearnose Skate

The selected reference time series currently encompasses the Mid-Atlantic inshore and offshore region from 1975-1998. The target biomass reference point for clearnose skate is the 75th percentile value of the NEFSC autumn biomass index for the Mid-Atlantic inshore and offshore region from 1975-1998, and the threshold biomass is one-half of that value.

- This incorporates the longest and most geographically comprehensive time series of survey data for clearnose skates. This stock is primarily an inshore species, especially in the autumn. Since the Mid-Atlantic inshore autumn survey did not begin until 1975, it would be inappropriate to use a reference time series that includes years prior to 1975.
- The autumn survey was selected instead of the spring survey because a greater portion of the population may be within the survey range (through North Carolina) in the autumn. Clearnose skate are thought to inhabit waters farther south and offshore during the spring.
- The winter survey may become a more useful indicator for clearnose skate as the time series grows.

Rosette Skate

The selected reference time series currently encompasses the Mid-Atlantic offshore region from 1967-1998. The target biomass reference point for rosette skate is the 75th percentile value of the NEFSC autumn biomass index for the Mid-Atlantic offshore region from 1967-1998, and the threshold biomass is one-half of that value.

- This incorporates the longest and most geographically comprehensive time series of survey data for rosette skates, which is distributed primarily in offshore Mid-Atlantic waters. The Mid-Atlantic region of the autumn trawl survey was incorporated in 1967. Since the inshore component of the survey is not necessary to capture the range of this stock, the time series is able to date back further (versus the clearnose time series, which dates back to 1975 when the inshore component of the survey was incorporated).
- The reference points are low because the species is distributed only in the most offshore sample strata. It is likely that rosette skates range farther offshore than the NEFSC survey samples.
- The winter survey may become a more useful indicator for rosette skate as the time series grows.

The proposed skate overfishing definitions incorporate the Council's Scientific and Statistical Committee's recommendation to not use the fishing mortality reference points developed at SAW 30, but it does utilize the SAW 30 biomass reference points (targets and thresholds).

At its September 7, 2001 meeting, the Council's Scientific and Statistical Committee (SSC) reviewed available information about skates and the overfishing definition reference points developed at SAW 30. The SSC concluded that fishing mortality-based reference points currently could not be adequately estimated in a way that can inform management because although it might be possible to calculate F_{MAX}, there is not a reliable time series of fishing mortality estimates to compare with F_{MAX}. The SSC considered but did not recommend that Hoenig-based Fs be used (for winter and little skate) because equilibrium assumptions might not be valid.

As an example of how the approach embedded in these overfishing definitions would be used, consider the current status of barndoor skate. The three-year biomass index for 1999-2001 is 0.375, and the characteristic CV is 30%. Thirty percent of the current index is 0.30*0.375 = 0.113. So, if the 2000-02 three-year average index declines to below 0.375-0.113 = 0.263, then the decline in biomass is assumed to be real, and therefore $F > F_{MSY}$, and overfishing is occurring.

Using this approach means that a decline in survey biomass indicates that fishing mortality is greater than F_{MSY}. In a production model, if biomass declines, then F is assumed to be greater than F_{MSY}. (By definition, if $F<F_{MSY}$, then biomass increases and stabilizes above B_{MSY}; if $F= F_{MSY}$, then biomass stabilizes at B_{MSY}; if $F>F_{MSY}$, then biomass declines and stabilizes below B_{MSY}.) Given the variability inherent in the survey, it is important to be sure that an observed decline is "real" and a reliable indication that $F>F_{MSY}$.

This kind of "control rule" approach is based on the statistical theory of process control, where the primary concern is to keep a process (such as a manufacturing process) at a stable level. In process control, past and current observations of the process are used as aids to infer the current and future behavior of the process. A measure of the "characteristic" variability of the process is determined from the data, and "control limits" established which define the region within which sampling noise is causing the fluctuations in the process. If the state of the process is outside these "control limits," one assumes that the change in the process level is real. The narrower the "control limits," the more power the control rule has to detect a real change in the process level (e.g., Shewhart control charts; Rickmers and Todd, 1967).

For skates, one possibility is to base the required percentage decline in the biomass index (i.e., to define the lower "control limit") on the variation observed in the survey time series used in the biomass reference points. Applying the general theory to skates, the question to address is how much change in the biomass index is necessary for the change to be declared "real." While it is important to not overreact to annual variability in the survey indices, it is also important to not miss a true signal of overfishing.

As a starting point, one may conclude that declines equal to or less than the current index minus one coefficient of variation (CV; standard error/mean, in %) are not "real" declines (i.e., are within the "control limits" and therefore simply reflective of sampling noise in the index). However, if a three-year average biomass index declines by more than one CV (%), one would conclude that the decline in the biomass index is "real," and therefore $F > F_{MSY}$, and overfishing is occurring.

Further, a survey index plus/minus one CV corresponds to about a 67% confidence interval. So, if the current index declines below the last value minus one CV (below the "lower control limit"), one is at least 84% sure (67% + 16.5%) that the current value of the index is below the last index.

The Skate PDT calculated the average annual CVs of the biomass indices included in the biomass reference points as candidates for these "characteristic" CVs for use in defining the lower "control limits." These average annual CVs range from about 60% for rosette skate, to 30% for barndoor, clearnose, and smooth skates, to about 20% for winter, thorny, and little skates (see Table 3).

The Skate PDT considered several approaches for defining the baseline against which fishing mortality would be measured for the purposes of the threshold. These approaches included: comparing the current three-year average to the three-year average when the FMP is implemented (i.e., a fixed baseline); comparing the current three-year average to the most recent three-year average (i.e., a moving baseline); and comparing the current three-year average to a shifting three-year average (i.e., re-fixing the baseline every three years). To test the validity of these approaches, the PDT simulated the performance of them over the historical survey time series. The results of this simulation led the PDT to conclude that the moving baseline is the most appropriate metric. The approach using the moving baseline is embedded in the proposed fishing mortality thresholds.

In addition to the “control rule” approach, these overfishing definitions include a precautionary “backstop” for monitoring fishing mortality until better information becomes available on which to base the reference points. The proposed backstop states that overfishing is assumed to be occurring if the NEFSC survey mean weight per tow (spring or autumn, depending on the species) declines for three consecutive years. This approach may more adequately address the variable nature of the trawl surveys, which are being used to monitor fishing mortality, and may be more useful in capturing slower declines in abundance. For example, if a species’ survey index is slowly declining over time, it is possible that the decline will never reach the required decline in the three-year moving average for an “overfishing” determination to be made. However, consecutive declines in the survey index often indicate that fishing mortality is too high and that overfishing may be occurring. This approach acknowledges this possibility and requires that an “overfishing” determination be made if the survey index declines for three consecutive years.

4.5 REBUILDING PROGRAMS FOR OVERFISHED SPECIES

4.5.1 Overview

The proposed rebuilding program described in this section applies to species that are considered to be in an overfished condition upon implementation of the Skate FMP or at any time in the future. A determination of "overfished" is made based on the biomass reference points contained in the overfishing definition (see Section 4.4). A stock is considered to be in an overfished condition if it falls below the biomass threshold component of the overfishing definition. Once the "overfished" determination is made, then the provisions of the rebuilding program apply.

Currently, barndoor and thorny skates are considered to be in an overfished condition (based on the proposed overfishing definitions) and will be subject to a rebuilding program when the Skate FMP is implemented. Consistent with NMFS' NSGs, the rebuilding programs for barndoor and thorny skates will commence as soon as the management measures in the Skate FMP are implemented.

Section 304(e)(4)(A) of the Magnuson-Stevens Act states that:

(4) For a fishery that is overfished, any fishery management plan, amendment, or proposed regulations…shall--

> *(A) specify a time period for ending overfishing and rebuilding the fishery that shall--*
>
> *(i) be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock of fish within the marine ecosystem; and*
>
> *(ii) not exceed 10 years, except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise;*

NMFS' NSGs provide the following guidance relative to specifying a rebuilding program for overfished species (§600.310(e)(4)(ii)(B)):

(1) The lower limit of the specified time period for rebuilding is determined by the status and biology of the stock or stock complex and its interactions with other components of the marine ecosystem, and is defined as the amount of time that would be required for rebuilding if fishing mortality were eliminated entirely.

(2) If the lower limit is less than 10 years, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities…, except that no such upward adjustment can result in the specified time period exceeding 10 years,…

(3) If the lower limit is 10 years or greater, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities…, except that no such upward adjustment can exceed the rebuilding period calculated in the

absence of fishing mortality, plus one mean generation time or equivalent period based on the species' life-history characteristics.

4.5.2 Rebuilding Programs and "Control Rules"

A control rule describes a variable over which management has some direct control as a function of some other variable(s) related to the status of the stock. It represents a pre-agreed plan for adjusting management measures depending on the condition of the resource. Most times, the control rule is described in terms of a fishing mortality rate as a function of stock size.

The NSGs link biomass and fishing mortality reference points to an "MSY control rule" that specifies how fishing mortality or catches could vary as a function of stock biomass in order to achieve yields close to MSY. The NSGs define an MSY control rule as a harvest strategy which, if implemented, would be expected to result in a long-term average catch approximating MSY. Development of such a control rule for skates is obviously hampered by the inability to estimate MSY for the species in the skate complex or for the complex as a whole. In addition, information does not exist to estimate fishing mortality rates and/or determine the effects of specific management actions on fishing mortality for these species.

Restrepo et. al. (1998) provide guidance on developing MSY control rules in data-poor situations, such as the one with skates. Restrepo et. al. recommend that the default limit control rule be developed by multiplying the average catch from a time period when there is no quantitative or qualitative evidence of declining abundance by a factor depending on a qualitative estimate of relative stock size. Restrepo et. al. recommend the following as a default limit control rule in data-poor situations:

Above B_{MSY}	Target Catch = 1.00*(Recent Catch).
Above biomass threshold but below B_{MSY}	Target Catch = 0.67*(Recent Catch).
Below biomass threshold (i.e., overfished)	Target Catch = 0.33*(Recent Catch).

For reasons discussed in Section 4.3, this approach cannot be adopted as a control rule for the species in the skate complex at this time. The principal problem is that recent and historical catches of the individual species are unknown. It should be noted, however, that for the two overfished species (barndoor and thorny skates), prohibitions on possession are expected to result in target catches as close to zero as possible (assuming that discard mortality is low), which would fall below the Restrepo-proposed control rule limit for overfished species. This applies as well to smooth skate, although it is not considered overfished and subject to a formal rebuilding program.

Restrepo et. al. note that in cases of severe data limitations, qualitative approaches may be necessary for developing default control rules. Such approaches were considered for the skate complex through the development of four options for rebuilding programs for overfished skate species. While the proposed rebuilding program does not fit the standard definition of a control rule, it serves as a proxy for a control rule until better information becomes available on which to base a more quantitative rule. It does fulfill the basic function of a control rule; that is, it establishes specific criteria to determine when additional action is necessary to ensure the continued rebuilding of an overfished species to its long-term target biomass level. While the criteria in the rebuilding program cannot be linked to specific management actions, they relate to the actions that a Council may take through a framework adjustment to this FMP (Section 4.8). Presumably, if management action is triggered as a result of the criteria specified in the rebuilding program, the Council could address the issue expeditiously through a framework adjustment to this FMP. Certainly, as more and better information becomes available, the Skate PDT will develop an appropriate control rule that provides a direct link to specific fishing mortality rates and management measures.

4.5.3 Rebuilding Time Periods

The above guidance provides a mechanism to develop initial estimates of the rebuilding time periods necessary to rebuild the overfished species in the skate complex. The first step in developing an initial estimate is to determine whether it is likely that the overfished skate species (barndoor skate and thorny skate) could be rebuilt within 10 years, even in the complete absence of fishing mortality. If they cannot, the M-S Act maximum rebuilding period is extended to the time necessary to rebuild in the absence of fishing mortality plus one mean generation.

To implement the rebuilding ‘philosophy’ of the M-S Act and the NSGs, it is necessary to have some means of projecting stock biomass under various fishing mortality scenarios (including a no-fishing scenario). This must be done, as a first step, to determine whether the 10-year horizon trigger is met, and at a more direct level, to determine the particular value of the fishing mortality rate, F, that will result in the attainment of the chosen biomass target over the chosen rebuilding period. Unfortunately, for the reasons identified in the preceding sections of this document, such analytical tools are not available for modeling skate population response to fishing pressure at this time. To comply with the provisions of the M-S Act and the intent of the National Standard 1 Guidelines, an adaptive approach is necessary.

The general conclusion that the Skate PDT and the Council reached is that **rebuilding time periods for the species in the skate complex will be on the order of decades**. The following discussion provides examples of the potential rebuilding time periods for the currently overfished species and provides context for concluding that rebuilding will likely occur on the scale of decades. These examples should be considered only as ballpark estimates of rebuilding time periods and may actually be only *minimum* estimates, as some life history parameters were estimated using very limited data and making many assumptions.

There are several factors that contribute to the likelihood of a species being rebuilt within ten years: (1) whether the species is long-lived or not; (2) the time it takes for individuals of the species to mature; (3) the growth rate of the species; and (4) fecundity, or the number of offspring generated per mature female. Basically, slow-growing, long-lived, late-maturing species with low fecundity are expected to rebuild slower than fast-growing, short-lived, early maturing species with high fecundity.

Most skate species have life history characteristics that suggest they would rebuild much slower than many finfish species. Based on Frisk et al. (2001), certain life history characteristics were estimated for the species of skates in the Northeast skate complex (see Table 4). These include estimates of maximum age of approximately 24 years for barndoor and thorny skates; estimates of age at maturity of approximately 10.6 and 8.4 years for barndoor and thorny skates, respectively; estimates of fecundity of 14.8 and 13.6 for barndoor and thorny skates, respectively; and estimates of potential population increase (in the absence of fishing mortality) of 0.25 and 0.31 for barndoor and thorny skates, respectively. By comparison, haddock are estimated to have an age at maturity of 2.2 years, fecundity of 169,050, and a potential population increase of 5.47. On average for the seven species of skates in the complex, contrasted against seven species of regulated finfish (cod, haddock, pollock, whiting, yellowtail flounder, winter flounder, and monkfish), the finfish mature in only 34% of the time it takes the skates, are more than 38,000 times more fecund than the skates, and have populations that can increase more than 15 times as fast as the skates.

While the above are averages of broad estimates for these species and should not be considered as absolute, they do indicate the scale of the differences between the two groups of species. Thus, in general, skates would be expected to rebuild much slower than the other regulated species contrasted above. Given this conclusion, it seems reasonable to conclude that barndoor and thorny skates, in particular, could not be rebuilt from an overfished state in less than 10 years, even in the complete absence of fishing mortality.

The guidance in the NSGs can be used to develop ballpark estimates of rebuilding time periods that reflect the relatively slow rebuilding expected for skate species. The rebuilding time periods are estimated based on the conclusion that it would take *at least 10 years*, in the absence of fishing mortality, for these species to rebuild, plus the allowable upward adjustment of one mean generation time.

For barndoor and thorny skates, Frisk et al. (2001) can be used to estimate age at maturity as 10.58 years and 8.35 years, respectively. Frisk et al. (2001) also provide generalized estimates based on size classes of elasmobranches that equal approximately 11 years for both barndoor and thorny skates. Based on this information, the age at maturity for barndoor skates likely ranges from 10.6 to 11 years; and the age at maturity for thorny skates likely ranges from 8.4 to 11 years. Applying this range to the minimum 10 years required to rebuild in the absence of fishing mortality, the rebuilding time periods could be estimated as **approximately 21 years for barndoor skates, and approximately 18.4 to 21 years for thorny skates** (see Table 4).

These estimates should be considered as **minimum** estimates of the allowable rebuilding time periods. The NSGs state that when the lower limit is 10 years or greater, the rebuilding time period cannot exceed the "rebuilding period calculated in the absence of fishing mortality, plus one mean generation time." Thus, if the lower limit is 15 years and the mean generation time is 10 years, the maximum rebuilding period would be 25 years. Because the actual lower limit for the skate species cannot be calculated but, in all likelihood, exceeds 10 years, adding one mean generation time to 10 years results in the lower limit of the likely maximum rebuilding time period rather than the actual maximum rebuilding time period.

The utility of this exercise, despite its imprecision and providing only a lower limit, is that it provides an estimate of the scale of the time periods that would be required to rebuild the overfished skate species. Given the requirement of the Magnuson-Stevens Act and the NSGs to "specify a time period for rebuilding," this approach may prove a better solution than failing to provide any estimate at all. As previously noted, the general conclusion is that the scale of the time periods that would be required to rebuild the overfished skate species is on the order of **decades**, as illustrated by the above discussion and the information presented in Table 4.

Table 4 Life History Parameters Used to Estimate Minimum Rebuilding Time Periods for Skates, Including Comparisons with Other Species

Species	L(max)	T(max)-A	T(m)-A	f-A	T(m)-B	f-B	k-B	r'-B	M-B
Barndoor skate (#)	180	~ 24	~ 11	~ 31	10.58	14.82	0.09	0.25	0.03
Thorny skate (*)	116	~ 24	~ 11	~ 31	8.35	13.55	0.16	0.31	0.06
Smooth skate (*)	71	~ 14	~ 5	~ 21	5.87	9.08	0.25	0.38	0.10
Clearnose skate (#)	95	~ 14	~ 5	~ 21	7.34	11.96	0.20	0.34	0.07
Little skate (*)	62	~ 14	~ 5	~ 21	5.18	7.69	0.27	0.39	0.11
Rosette skate (*)	57	~ 14	~ 5	~ 21	4.76	6.85	0.28	0.40	0.11
Winter skate (#)	150	~ 24	~ 11	~ 31	9.65	14.73	0.12	0.28	0.04
Average					7.39	11.24	0.19	0.34	0.07

Comparison Species	T(m)	f	r'
Atlantic cod	2.2	94,000	2.26
Haddock	2.2	169,050	5.47
Whiting	1.7	343,000	7.50
Pollock	2.0	200,000	6.10
Yellowtail flounder	1.8	400,000	7.17
Winter flounder	3.5	500,000	3.75
Monkfish	4.0	1,300,000	3.52
Average	2.5	429,436	5.11

mean comparison species to mean skate species	
r' ratio:	15.24
f ratio:	38,208
T(m) ratio:	0.34

(#) -- max length comes from Bigelow and Schroeder (2002)
(*) -- max length comes from largest specimen observed on NEFSC trawl survey

"-A" = generalized estimate based on size classes of elasmobranchs from Frisk et al. (2001)
"-B" = estimate based on formulas provided in Frisk et al. (2001)

T(max) = maximum age
T(m) = age at maturity
f = fecundity
k = growth rate
r' = potential population increase
M = natural mortality rate

Scientific uncertainty suggests that it is possible that the actual rebuilding of overfished skate species could occur either more quickly or more slowly than the minimum time frames estimated above. The rebuilding time period may not reflect reality if the assumptions of maximum age and age at maturity are estimated incorrectly. For example, if barndoor and thorny skates do not live to be more than twenty years old, rebuilding could occur much quicker than the two decade estimate would suggest. However, if the maximum age is much higher, then rebuilding could take more than three decades.

As more information becomes available after the implementation of this FMP, the Council intends to re-evaluate rebuilding time periods and possibly adjust them before the overfished stocks are rebuilt. For example, in the course of the first ten years of FMP implementation, data should become available that would facilitate calculation of the actual lower limit on the time it would take these species to rebuild in the absence of fishing mortality. At the same time, better information may become available on the age at maturity for these species. In conjunction, these two pieces of information would serve to refine and improve the rebuilding time period estimate.

4.5.4 Ex-Post Approach

Most rebuilding programs specify control rules, and evaluations are made "ex-ante." This means that once a stock is considered to be in an overfished condition, a control rule prescribes specific action (or specific fishing mortality targets) for the upcoming year(s). Without the appropriate fishery information, an ex-ante analysis cannot be completed. As a result, the skate rebuilding program must be based on an ex-post evaluation.

An ex-post rebuilding program provides a framework for annually evaluating progress towards rebuilding and adapting management measures to ensure that goals are met in as short a time frame as possible. An annual comparison of trawl survey moving averages provides a mechanism to monitor changes in stock abundance relative to changes in fishing mortality and, as a proxy, fishing mortality relative to F_{MSY}. This is an adaptive approach in the sense that the performance of rebuilding measures will be evaluated from the previous year, and management actions will be taken in the following year as necessary to ensure that rebuilding goals are met.

The Council recognizes that this is a relatively rudimentary approach, but it is the only approach available at this time. The Council intends to modify the mechanisms for determining the need for rebuilding action at the earliest possible opportunity. Hopefully, as more and better information becomes available from the managed skate fisheries and through the FMP, more robust approaches will emerge.

4.5.5 Dynamic Response Problem

It is important to understand the fundamental problems associated with all of the rebuilding programs considered during the development of this FMP given the paucity of biological information on which they must be based. All of the rebuilding programs considered in this FMP rely on evaluating trends in the NEFSC trawl surveys, as these are the only region-wide time series of species-specific information currently available for the northeast skate complex. Rebuilding evaluations, therefore, will be subject to the variability that occurs naturally within the NEFSC trawl survey and may encounter problems of *dynamic response*.

Because of the variability in the survey, it is possible that ex-post annual evaluations of progress towards rebuilding will result in inconsistent management advice. The survey is already being utilized in this FMP to generate proxies for biomass and fishing mortality reference points as well as to monitor the effectiveness of the FMP's measures to achieve rebuilding. Survey variability is an important consideration for many reasons:

- Survey variability could lead to a determination that management action is required despite progress towards rebuilding. It is possible that survey variability could produce this kind of situation several years in a row, or several times within the same rebuilding time period.
- As a stock rebuilds and grows towards its long-term target biomass level, slowed growth and even small declines in stock size are not uncommon, nor are they absolute signs of high F or declining biomass. In this situation, evaluating progress towards rebuilding based on the

annual three-year survey index may prove problematic, as different determinations may be reached every time the evaluation is conducted.

- B_{MSY} itself is a long-term equilibrium target level. Stock biomass is expected to fluctuate around B_{MSY} as the stock rebuilds and then stabilizes.

Survey biomass estimates are considered most reliable for displaying general trends in biomass. The precision associated with annual point estimates make their use as management triggers inappropriate. For this reason, a three-year moving average is included in the overfishing definitions and rebuilding program to account for inter-annual variation in survey estimates. An annual evaluation of rebuilding progress is proposed for overfished skate species. It should be understood that the three-year moving average may contradict the directionality of the survey index itself for the terminal year or two (see smooth or clearnose skate 1998-2000, winter skate 1975-1976).

The shortcomings of a survey-based approach to both status determinations and rebuilding progress can be addressed to some degree by allowing maximum flexibility for those who are evaluating progress towards rebuilding (presumably the Skate PDT). Flexibility and discretion should be provided under the rebuilding program so that those conducting the evaluation can apply their expertise in making determinations as to whether progress towards rebuilding is really being achieved. Such flexibility will allow the evaluators to consider factors external to the trawl survey, including but not limited to the status of the stock relative to its long-term biomass target, trends in the fishery, and the direct and indirect effects of management measures in other fisheries.

In addition to the no action alternative, four options for rebuilding programs were considered during the development of this FMP, all of which rely on the trawl survey and all of which are subject to the dynamic response problem identified above. A discussion of the non-preferred options is included in Section 5.2 of this document. A retrospective evaluation of the performance of several of the options, including the proposed rebuilding program, is provided in Section 6.1 of this document.

4.5.6 Skate Rebuilding Program

The rebuilding program for overfished skate species requires Council action if the three-year moving average of the appropriate survey mean weight per tow does not increase when compared to the average for the three years previous. The Skate PDT will be charged with annually updating NEFSC trawl survey data and stock status determinations for the seven species in the skate complex. The Skate PDT will report to the Council the difference between the current three-year average and the average from the three years prior, and Council action will be required any time that the current three-year average is not higher than the prior three-year average. The language for the proposed rebuilding program is provided below:

For overfished skate species, the Skate PDT and the Council will monitor the trawl survey index as a proxy for stock biomass. As long as the three-year average of the appropriate weight per tow increases above the average for the previous three years, it is assumed that the stock is rebuilding to target levels. If the three-year average of the appropriate survey mean weight per *tow declines below the average for the previous three years, then the Council would be required to take management action to ensure that stock rebuilding will continue to target levels.*

Discussion: This approach will be applied in the following manner for overfished skate species:

- In 2004, the 2001-2003 fall survey average would be compared to the 1998-2000 average. Council action would be required if the 2001-2003 average is below the 1998-2000 average.
- In 2005, the 2002-2004 fall survey average would be compared to the 1999-2001 average. Council action would be required if the 2002-2004 average is below the 1999-2001 average.
- In 2006, the 2003-2005 fall survey average would be compared to the 2000-2002 average. Council action would be required if the 2003-2005 average is below the 2000-2002 average.

The advantage to this rebuilding program is that it takes a proactive approach by requiring that the survey average must be increasing over time to ensure rebuilding. Nevertheless, it will be important to allow for maximum flexibility and discretion while evaluating progress towards rebuilding.

Additional discussion and a retrospective performance analysis of this rebuilding program are provided in Section 6.1.3 of this document (p. 165).

4.6 ESSENTIAL FISH HABITAT

4.6.1 Background

4.6.1.1 Legal Authority and Mandate

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, known as the Sustainable Fisheries Act (SFA), expanded the focus of the Magnuson-Stevens Act by emphasizing the importance of habitat protection to healthy fisheries and by strengthening the ability of the National Marine Fisheries Service (NMFS) and the Councils to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat" and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

To improve fish habitat protection, the Magnuson-Stevens Act now requires the Councils, NMFS, and other federal agencies to take specific new actions. The Magnuson-Stevens Act requires the Council, after receiving recommendations from NMFS, to complete the following for all new FMPs or FMP amendments:

EFH Designation Mandate [16 U.S.C. 1853]:

(a) Any fishery management plan which is prepared by any Council . . . shall --

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

The Magnuson-Stevens Act also now requires all federal agencies that authorize, fund or undertake activities that may adversely affect EFH to consult with NMFS regarding those activities. NMFS and the Councils may make suggestions on how to mitigate any potential habitat damage. Once these agencies receive NMFS' comments, they must respond in writing within 30 days, outlining the measures they are proposing to mitigate the impact of the activity on EFH. They must also explain any inconsistencies between the mitigation actions they propose with the recommendations made by NMFS. This is known as the "EFH Consultation Process" and is required and authorized under Section 305 of the Magnuson-Stevens Act:

EFH Consultation Mandate [16 U.S.C. 1853]:

(2) Each federal agency shall consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act.

(3) Each Council --

(A) may comment on and make recommendations to the Secretary and any federal or state agency concerning any activity authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by any federal or state agency that, in the view of the Council, may affect the habitat, including essential fish habitat, of a fishery resource under its authority; and

(B) shall comment on and make recommendations to the Secretary and any federal or state agency concerning such activity that, in the view of the Council, is likely to substantially affect the habitat, including essential fish habitat, of an anadromous fishery resource under it authority.

4.6.1.2 History

The Magnuson-Stevens Act required the Council to amend its existing FMPs to address the EFH provisions and submit these amendments to the Secretary of Commerce no later than October 11, 1998. To meet this requirement, the Council had to identify and describe essential fish habitat for 18 Council-managed species (sea scallops, monkfish, Atlantic herring, Atlantic salmon, and 14 species of groundfish), and, to the extent practicable, take action to minimize fishing-related adverse effects on EFH. The Council also identified and proposed measures to conserve and enhance EFH, and identified habitat-related research and information needs, as required by the Act.

The Council developed a single, stand-alone FMP amendment that addressed the EFH requirements of all 18 Council-managed species. This document, the "omnibus" EFH amendment, was submitted to NMFS on October 7, 1998. Following review by NMFS, the sea scallop, groundfish, and Atlantic salmon portions of the amendment were approved by the Secretary on March 3, 1999. The monkfish portions were approved on April 22, 1999. The portions of the amendment related specifically to Atlantic herring were approved with the Herring FMP. Amendment #12 to the Northeast Multispecies (Groundfish) FMP extended Council management to offshore hake, and included the required EFH designations and review for this species. The proposed FMP for deep-sea red crab includes the required EFH designation, impacts assessments, and conservation recommendations for this species.

Since Fishery Management Plans have been amended with EFH information, NMFS and the Councils are more proactive in protecting habitat areas by alerting other federal and state agencies about areas of concern. When projects are planned that may adversely affect EFH, the Councils and NMFS can recommend conservation measures to mitigate problems. Since submitting the omnibus EFH Amendment, the Council has supplemented the information in the Amendment with additional information and analyses in several framework adjustments to the Groundfish, Scallop, and Monkfish FMPs, most notably Framework Adjustment 14 to the Sea Scallop FMP. The information in these framework documents is incorporated here by reference.

4.6.1.3 Definitions

The Magnuson-Stevens Act defines essential fish habitat as follows:

> **Definition of EFH: [16 U.S.C. 1802]**
> (10) The term "essential fish habitat" means those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.

For the purposes of interpreting this definition, “waters” includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means the habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers a species' full life cycle (EFH Final Rule, 67 FR 2343, January 17, 2002).

Fish habitat is where a species is found during some or all of its life. Fish habitat is used here both in the traditional sense where structure or substrate delineates its geographic boundaries (e.g., coral reefs, marshes, and kelp beds) and in the less conventional sense where boundaries are more fluid (e.g., turbidity zones, thermoclines, and fronts separating water masses). Historical fish habitat is the geographic area where a species was found at some point in time; this habitat may not be used now if the species distribution has changed or has been reduced, or access has been altered by man or natural events. Fish use habitat for spawning, breeding, migration, feeding and growth, and for shelter to reduce mortality. Most habitats provide only a subset of these functions. Fish habitat can change with life stage, abundance, the presence of other species, and with temporal and spatial variability in the environment. The type of habitat available, its attributes, and its functions are important to the productivity of a species.

4.6.1.4 Guidelines

On January 17, 2002, NMFS published the Final Rule (67 FR 2343) on essential fish habitat. This rule established guidelines to assist the Councils and the Secretary of Commerce in the implementation of the EFH provisions of the Magnuson-Stevens Act, including the description and identification of EFH in fishery management plans (FMPs), the identification of adverse impacts from both fishing and non-fishing activities on EFH, and identification of actions required to conserve and enhance EFH. The regulations also detailed procedures the Secretary (acting through NMFS), other federal agencies, state agencies, and the Councils will use to coordinate, consult, or provide recommendations on federal and state activities that may adversely affect EFH.

According to the NMFS EFH Guidelines, EFH must be designated according to the level of information available on the species distribution, abundance, and habitat-productivity relationships. The levels of information, excerpted from the EFH Final Rule, are:

- **Level 1:** Distribution data are available for some or all portions of the geographic range of the species. At this level, only distribution data are available to describe the geographic range of a species (or life stage). Distribution data may be derived from systematic presence/absence sampling and/or may include information on species and life stages collected opportunistically. In the event that distribution data are available only for portions of the geographic area occupied by a particular life stage of a species, habitat use can be inferred on the basis of distributions among habitats where the species has been found and on information about its habitat requirements and behavior. Habitat use may also be inferred, if appropriate, based on information on a similar species or another life stage.
- **Level 2:** Habitat-related densities of the species are available. At this level, quantitative data (i.e., density or relative abundance) are available for the habitats occupied by a species or life stage. Because the efficiency of sampling methods is often affected by habitat characteristics, strict quality assurance criteria should be used to ensure that density estimates are comparable among methods and habitats. Density data should reflect habitat utilization, and the degree that a habitat is utilized is assumed to be indicative of habitat value. When assessing habitat value on the basis of fish densities in this manner, temporal changes in habitat availability and utilization should be considered.
- **Level 3:** Growth, reproduction, or survival rates within habitats are available. At this level, data are available on habitat-related growth, reproduction, and/or survival by life stage. The habitats contributing the most to productivity should be those that support the highest growth, reproduction, and survival of the species (or life stage).
- **Level 4:** Production rates by habitat are available. At this level, data are available that directly relate the production rates of a species or life stage to habitat type, quantity, quality, and location. Essential habitats are those necessary to maintain fish production consistent with a sustainable fishery and the managed species' contribution to a healthy ecosystem.

4.6.2 Identification and Description of EFH for Skates

4.6.2.1 Introduction

The EFH Final Rule (67 FR 2343) directs the Council to describe EFH in text that provides information on the biological requirements for each life history stage of the species. Tables are provided in individual species reports and summarize all available information on environmental and habitat variables that control or limit distribution, abundance, reproduction, growth, survival, and productivity of the managed species.

The EFH Final Rule also directs the Council to present the general distribution and geographic limits of EFH for each life history stage in the form of maps. These maps are presented as fixed in space and time, but they encompass all appropriate known temporal and spatial variability in the distribution of EFH. The EFH maps are a means to visually present the EFH described in the amendment.

There are two distinct but related components of the process to comply with the guidelines of the Final Rule: (1) developing the text description of essential fish habitat; and, (2) identifying the geographic extent of essential fish habitat. Together, they provide a picture of the EFH for Council-managed species.

To support the Council, NMFS develops individual species reports for most species managed by the Council. These reports consist of literature reviews documenting the life history and habitat requirements of the species, as well as food habits information and distribution and abundance information by life history stage. The species reports for the seven species of skates in the skate complex were developed by NMFS and are provided in Volume III, Appendix A of this FMP. The information presented in the species reports was used to develop the EFH text descriptions.

The text descriptions of essential fish habitat define the environmental parameters within the areas represented by the map designations. The EFH Final Rule requires that the text description take precedence when the text and EFH maps differ. These text descriptions identify the habitat requirements for each species by life history stage. They include the general geographic area(s) preferred by the species, the preferred substrate (if demersal), and ideal ranges of water temperature, depth, and salinity (where known). The descriptions reflect the best available information on the species' habitat requirements collected from the scientific literature and observations made during research surveys. To include information on the distribution and relative abundance of the skate complex in the estuaries and embayments of the Northeast, the Council is utilizing NOAA's Estuarine Living Marine Resources (ELMR) program reports. These reports are described and the process for including them in the EFH designations is explained in the Omnibus EFH Amendment (NEFMC 1998).

There are two parts to every EFH designation. The first part of the EFH designation for each species includes a text-based description of the habitat characteristics considered essential for that species at each major life history stage. The text descriptions include physical as well as oceanographic parameters. The second part of the EFH designation for each species includes a set of maps indicating the geographical extent of the EFH designation and the range of the species. A unique map is created for each major life history stage. The intent of the two-part EFH designation is for the map to indicate the geographical extent within which the text description applies. Thus, if the map indicates that eastern Georges Bank was EFH for a particular species and the text description indicates that sandy habitats within a depth range of 50 - 100 meters was EFH, then only those portions of eastern Georges Bank that met the physical characteristics would actually be considered EFH.

4.6.2.2 EFH Text Descriptions

4.6.2.2.1 Barndoor Skate (*Dipturus laevis*)

In its *Report to Congress: Status of the Fisheries of the United States* (January 2001), NMFS determined that barndoor skate is in an overfished condition, based on stock size assessment. Because recent assessments determined that more information is needed to draw valid conclusions regarding the status of this stock, it is not known whether overfishing is occurring. For barndoor skate, essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Figure 1-Figure 2 and meet the following conditions:

Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with mud, gravel, and sand substrates in the eastern Gulf of Maine, eastern Georges Bank, southern New England and the Mid-Atlantic Bight down to the Hudson Canyon. Generally, the following conditions exist where barndoor skate juveniles are found: *Depth:* Occurs from shoreline to 750 meters, but are most abundant at depths less than 150 meters. *Temperature:* Broad temperature range from 1.2-20 °C, but found in highest abundance between 4-11 °C. *Salinity:* Preferred range is 31-35 ppt.

Adults: Bottom habitats with mud, gravel, and sand substrates in the eastern Gulf of Maine, eastern Georges Bank, southern New England and the Mid-Atlantic Bight down to the Hudson Canyon. Generally, the following conditions exist where barndoor skate adults are found: *Depth:* Occurs from shoreline to 750 meters, but are most abundant at depths less than 150 meters. *Temperature:* Broad temperature range from 1.2-20 °C, but found in highest abundance over a range of 3-16 °C. *Salinity:* Preferred range is 31-35 ppt.

A table presenting summary information on the habitat affinities and requirements for each life stage of barndoor skate is provided in Appendix A of Volume III (EFH Supporting Materials). The Council acknowledges that there may be some potential seasonal and spatial variability of the environmental conditions generally associated with this species.

4.6.2.2.2 Clearnose Skate (*Raja eglanteria*)

In its *Report to Congress: Status of the Fisheries of the United States* (January 2001), NMFS determined that clearnose skate is not in an overfished condition, based on stock size assessment. Because recent assessments determined that more information is needed to draw valid conclusions regarding the status of this stock, it is not known whether overfishing is occurring. For clearnose skate, essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Figure 3 – Figure 4 and in Table 5 and meet the following conditions:

Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a substrate of soft bottom along the continental shelf and rocky or gravelly bottom, ranging from the Gulf of Maine south along the continental shelf to Cape Hatteras, North Carolina (the southern boundary of the NEFMC management unit). Generally, the following conditions exist where clearnose skate juveniles are found: *Depth:* Their full range is from the shore to 500 meters, but they are most abundant at depths less than 111 meters. *Temperature:* Occurs over a temperature range of 9-30 °C, but are most abundant from 9-21 °C in the northern part of its range and 19-30 °C around North Carolina.

Adults: Bottom habitats with a substrate of soft bottom along the continental shelf and rocky or gravelly bottom, ranging from the Gulf of Maine south along the continental shelf to Cape Hatteras, North Carolina (the southern boundary of the NEFMC management unit). Generally, the following conditions exist where clearnose skate adults are found: *Depth:* Their full range is from the shore to 400 meters, but they are most abundant at depths less than 111 meters. *Temperature:* Occurs over a temperature range of 9-30 °C, but are most abundant from 9-21 °C in the northern part of its range and 19-30 °C around North Carolina.

A table presenting summary information on the habitat affinities and requirements for each life stage of clearnose skate is provided in Appendix A of Volume III of this FMP. The bays and estuaries identified in Table 5 for the skate species complex apply to the above clearnose skate descriptions. The Council acknowledges that there may be some potential seasonal and spatial variability of the environmental conditions generally associated with this species.

4.6.2.2.3 Little Skate (*Leucoraja erinacea*)

In its *Report to Congress: Status of the Fisheries of the United States* (January 2001), NMFS determined that little skate is not in an overfished condition and that overfishing of this stock is not occurring, based on stock size assessment. For little skate, essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Figure 5 – Figure 6and in Table 5 and meet the following conditions:

Eggs: Bottom habitats with a sandy substrate from Georges Bank through to Southern New England to the Middle Atlantic Bight. Generally, the following conditions exist where little skate eggs are found: *Depths*: Less than 27 meters. *Temperature*: Greater than 7 ºC.

The EFH Source Document for little skate (Volume III, Appendix A) does identify the sediment type, depth, and temperature where little skate eggs are found. However, there is no map to accompany this designation because all of the EFH maps for the skate species are based on NMFS survey data, and there are no survey data for skate eggs. Therefore, only a text definition is provided for little skate eggs.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a sandy or gravelly substrate or mud, ranging from Georges Bank through the Mid-Atlantic Bight to Cape Hatteras, North Carolina. Generally, the following conditions exist where little skate juveniles are found: *Depth:* Full range is from the shore to 137 meters, with the highest abundance from 73-91 meters. *Temperature:* Most found between 4-15°C.

Adults: Bottom habitats with a sandy or gravelly substrate or mud, ranging from Georges Bank through the Mid-Atlantic Bight to Cape Hatteras, North Carolina. Generally, the following conditions exist where little skate adults are found: *Depth:* Full range is from the shore to 137 meters, with the highest abundance from 73-91 meters. *Temperature:* Most found between 2-15°C.

A table presenting summary information on the habitat affinities and requirements for each life stage of little skate is provided in Appendix A of Volume III of this FMP. The bays and estuaries identified in Table 5 for the skate species complex apply to the above little skate descriptions. The Council acknowledges that there may be some potential seasonal and spatial variability of the environmental conditions generally associated with this species.

4.6.2.2.4 Rosette Skate (*Leucoraja garmani)*

In its *Report to Congress: Status of the Fisheries of the United States* (January 2001), NMFS determined that rosette skate is not in an overfished condition, based on stock size assessment. Because recent assessments determined that more information is needed to draw valid conclusions regarding the status of this stock, it is not known whether overfishing is occurring. For rosette skate, essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Figure 7 – Figure 8 and meet the following conditions:

Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze, ranging from Nantucket Shoals and southern edge of Georges Bank to Cape Hatteras, North Carolina. Generally, the following conditions exist where rosette skate juveniles are found: *Depth:* Occurs from 33-530 meters but is most common between 74-274 meters. Rosette skate may have a more limited depth range in the southern part of its geographic range. *Temperature:* Most found at a temperature range of 5.3-15 °C but collected in waters as low as 4 °C and high as 25 °C.

Adults: Bottom habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze, ranging from Nantucket Shoals and southern edge of Georges Bank to Cape Hatteras, North Carolina. Generally, the following conditions exist where rosette skate adults are found: *Depth:* Occurs from 33-530 meters but is most common between 74-274 meters. Rosette skate may have a more limited depth range in the southern part of its geographic range. *Temperature:* Most found at a temperature range of 5.3-15 °C but collected in waters as low as 4 °C and high as 25 °C.

A table presenting summary information on the habitat affinities and requirements for each life stage of rosette skate is provided in Appendix A of Volume III of this FMP. The Council acknowledges that there may be some potential seasonal and spatial variability of the environmental conditions generally associated with this species.

4.6.2.2.5 Smooth Skate (*Malacoraja senta*)

In its *Report to Congress: Status of the Fisheries of the United States* (January 2001), NMFS determined that smooth skate is in an overfished condition, based on stock size assessment. Because recent assessments determined that more information is needed to draw valid conclusions regarding the status of this stock, it is not known whether overfishing is occurring. For smooth skate, essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Figure 9 – Figure 10 and meet the following conditions:

Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a substrate of soft mud (silt and clay) bottoms and also on sand, broken shells, gravel and pebbles on offshore banks of the Gulf of Maine. Generally, the following conditions exist where smooth skate juveniles are found: *Depth:* Found at depths from 31-874 meters and most abundant between 110-457 meters. *Temperature:* Found over a range of 1-16 °C with most found between 5-7 °C.

Adults: Bottom habitats with a substrate of soft mud (silt and clay) bottoms and also on sand, broken shells, gravel and pebbles on offshore banks of the Gulf of Maine. Generally, the following conditions exist where smooth skate adults are found: *Depth:* Found at depths from 31-874 meters and most abundant between 110-457 meters. *Temperature:* Found over a range of 1-16 °C with most found between 5-7 °C.

A table presenting summary information on the habitat affinities and requirements for each life stage of smooth skate is provided in Appendix A of Volume III of this FMP. The Council acknowledges that there may be some potential seasonal and spatial variability of the environmental conditions generally associated with this species.

4.6.2.2.6 Thorny Skate (*Amblyraja radiata*)

In its *Report to Congress: Status of the Fisheries of the United States* (January 2001), NMFS determined that thorny skate is in an overfished condition, based on stock size assessment. Because recent assessments determined that more information is needed to draw valid conclusions regarding the status of this stock, it is not known whether overfishing is occurring. For thorny skate, essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Figure 11 – Figure 12 and meet the following conditions:

Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud in the Gulf of Maine and Georges Bank. Generally, the following conditions exist where thorny skate juveniles are found: *Depth:* The full depth range is from 18-2000 meters, but they are most abundant between 111-366 meters. T*emperature:* Juveniles are found in waters with temperatures ranging from –1.3 °C to 17 °C, with most found between 5-9 °C.

Adults: Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud in the Gulf of Maine and Georges Bank. Generally, the following conditions exist where thorny skate adults are found: *Depth:* The full depth range is from 18-2000 meters, but they are most abundant between 111-366 meters. *Temperature:* Adults are found in waters with temperatures ranging from –1.3 °C to 17 °C, with most found between 5-8 °C.

A table presenting summary information on the habitat affinities and requirements for each life stage of thorny skate is provided in Appendix A of Volume III of this FMP. The Council acknowledges that there may be some potential seasonal and spatial variability of the environmental conditions generally associated with this species.

4.6.2.2.7 Winter Skate (*Leucoraja ocellata*)

In its *Report to Congress: Status of the Fisheries of the United States* (January 2001), NMFS determined that winter skate is in an overfished condition and that overfishing of this stock is occurring, based on stock size assessment. For winter skate, essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Figure 13 – Figure 14 and in Table 5 and meet the following conditions:

Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a substrate of sand and gravel or mud in Cape Cod Bay, on Georges Bank, the southern New England shelf, and through the Mid-Atlantic Bight to North Carolina. Generally, the following conditions exist where winter skate juveniles are found: *Depth:* Range from shoreline to about 400 meters and most abundant at depths less than 111 meters. *Temperature:* Range from -1.2°C to around 21°C, with most found from 4-16 °C, depending on the season.

Adults: Bottom habitats with a substrate of sand and gravel or mud in Cape Cod Bay, on Georges Bank, the southern New England shelf, and through the Mid-Atlantic Bight to North Carolina. Generally, the following conditions exist where winter skate adults are found: *Depth:* Range from shoreline to 371 meters and most abundant at depths 111 meters. *Temperature:* Range from –1.2 °C to around 20 °C, with most found from 5-15 °C, depending on the season.

A table presenting summary information on the habitat affinities and requirements for each life stage of winter skate is provided in Appendix A of Volume III of this FMP. The bays and estuaries identified in Table 5 for the skate species complex apply to the above winter skate descriptions. The Council acknowledges that there may be some potential seasonal and spatial variability of the environmental conditions generally associated with this species.

Table 5 Distribution and Abundance of the Skate Complex in Northeast Bays and Estuaries

Estuaries and Embayments	Eggs	Juveniles	Mating	Adults
Waquoit Bay				
Buzzards Bay	L,W	L,W	L,W	L,W
Narragansett Bay	L,W	L,W	L,W	L,W
Long Island Sound	L,W	L,W	L,W	L,W
Connecticut River		L,W		L,W
Gardiners Bay		L,W		L,W
Great South Bay		L,W		L,W
Hudson River/Raritan Bay	C,L,W	C,L,W	C,L,W	C,L,W
Barnegat Bay				C,L,W
New Jersey Inland Bays				C,L,W
Delaware Bay				C,L,W
Delaware Inland Bays				C,L,W
Chincoteague Bay				
Chesapeake Bay Mainstem	C,L,W	C,L,W		C,L,W
Chester River				
Choptank River				
Patuxent River				
Potomac River				
Tangier/Pocomoke Sound				
Rappahannock River				
York River				
James River				

The EFH information presented in this table are based on the NOAA Estuarine Living Marine Resource (ELMR) program (Jury et al. 1994; Stone et al. 1994). Unfortunately, the information presented in the ELMR reports does not differentiate among the species of skates in the complex. Thus, we know that skates occur in these bays and estuaries, but we cannot be certain of the particular species. The above table has been prepared in an attempt to identify the skate species that occur most proximate to these bays and estuaries and are therefore most likely to occur in the bays and estuaries. For the purposes of designating EFH, the bays and estuaries listed above are incorporated into the EFH designations for the species identified in the table (C≡clearnose skate; L≡little skate; and W≡winter skate). The Council recognizes that there may be spatial and temporal variability in the environmental conditions generally associated with these species in the bays and estuaries identified above.

4.6.2.3 EFH Designation Methodology – NMFS Survey Data

In most of the Council's previous EFH designations (NEFMC 1998), the areal extent of the EFH designations, as reflected in the EFH maps, were based upon an index of catch-per-unit-effort (CPUE) data resulting from the NMFS' Bottom Trawl and MARMAP Ichthyoplankton surveys (one of the few exceptions is deep-sea red crab, for which there are very few survey data available and the species distribution is located outside the survey area). All survey catches, on a per tow basis, were binned and averaged for each ten minute square of latitude and longitude. The averaged catch-per-tow data were then ranked from highest average catch-per-tow (per ten minute square) to lowest positive average catch-per-tow. Starting with the ten minute square with the highest average catch-per-tow, the averages for each ten minute square were summed and the cumulative percentage of the total average catch-per-tow was calculated for each ten minute square.

The ten minute squares were then categorized, using the cumulative percentages, into 50%, 75%, 90% and 100% groups. The 50% category represented the top two quartiles of ten minute squares, the 75% category the top three quartiles, the 90% the top nine deciles and the 100% category represented the full geographic range of the species within the survey. Because these categories reflect an index of catch, not area, the areal percentage of the range of the species is always less. For example, the 50% category of ten minute square includes the top two quartiles of catches and because the species is therefore more abundant (or concentrated) in these ten minute squares, there will be fewer ten minute squares in this category than in the bottom two quartiles. Thus, the 50% category might only represent 25-30% of the overall range of the species. The percentages selected as the basis for the EFH designation were determined on a species by species basis.

This approach was developed based on the available data (from the NMFS surveys) and is consistent with the regulations and technical guidance developed by NMFS on how to designate EFH based on the level of information available. NMFS described four levels of information to be used, from basic presence/absence data (Level 1) to habitat-specific production data (Level 4). The availability of relative abundance data from the NMFS surveys provided what were considered Level 2 data for most species managed by the New England Council. As such, the regulations and technical guidance indicated use of relative abundance data to differentiate areas with relatively greater abundance of a species as EFH in contrast to areas with relatively lower abundance. Ecologically, it follows that one can infer areas of relatively high abundance or density as indicative of more suitable habitats. Research has demonstrated that as populations decline, their range contracts and they focus in on areas of best suited habitat.

The EFH designations included in the omnibus EFH Amendment also utilized a variety of other information considered important in the identification and description of EFH. Because the NMFS surveys focus on offshore waters, several sources of information were needed to identify important areas in inshore areas. One such source of information was the Massachusetts Inshore Trawl Survey. Data from the Connecticut Long Island Sound Survey were also used in some cases. The NOAA Estuarine Living Marine Resources Program (ELMR) provided information on the presence/absence of many Council-managed species in a number of estuaries and embayments along the coast of New England and the Mid-Atlantic. Those bays and estuaries identified as supporting skates at the "common," "abundant," or "highly abundant" levels would be included as part of the EFH designation for those skate species most proximate to the bay or estuary. Historical information was also used in some cases, as was information provided by members of the fishing industry.

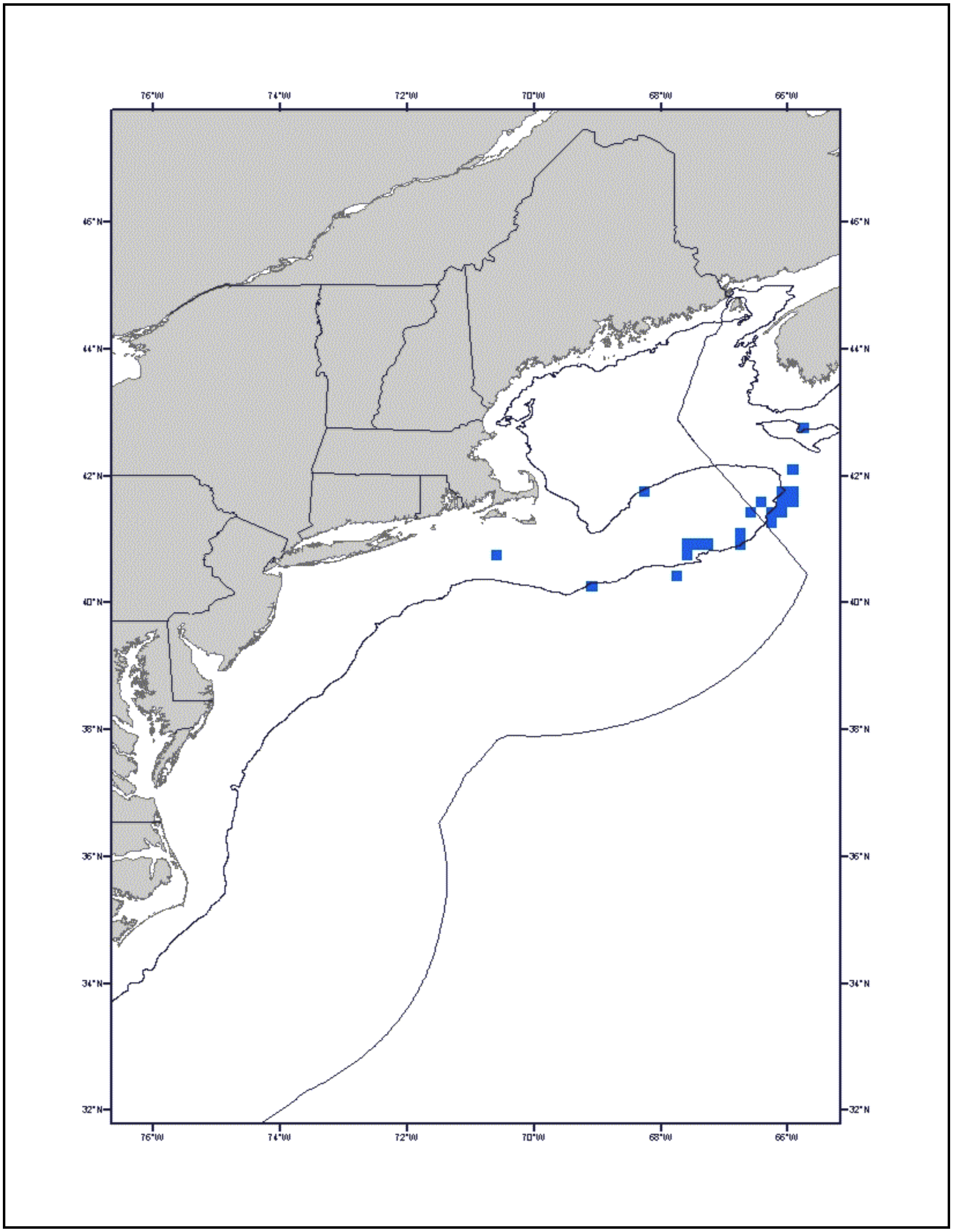
Skates are captured in the NMFS otter trawl survey and are reflected in the survey data. This approach would utilize the best available information on the distribution and relative abundance of the skate species. There are data available in the Massachusetts Inshore Trawl Survey on all but barndoor skate, and there are data available in the Hudson-Raritan Trawl Survey for little and clearnose skates. The NOAA ELMR program information does not differentiate between different species of skates, but provides information on the occurrence of skate species in the estuaries and embayments of New England and the Mid-Atlantic for the skate complex (identified as *Raja* spp.) as a whole.

4.6.2.4 Maps of EFH Designations

The following set of maps (Figure 1 – Figure 14) represents the EFH designation option chosen by the Council for each life stage (juveniles and adults) of each species of skate. The Council followed the recommendations of the Habitat Oversight Committee in designating EFH for all species. The Habitat Oversight Committee considered designating overfished skate stocks (barndoor, thorny and smooth) at the 100% level, but in looking at currently assigned EFH designations only halibut and redfish were so designated. The Committee instead passed a motion to designate barndoor skate at the 100% level and all other species at the 90% level.

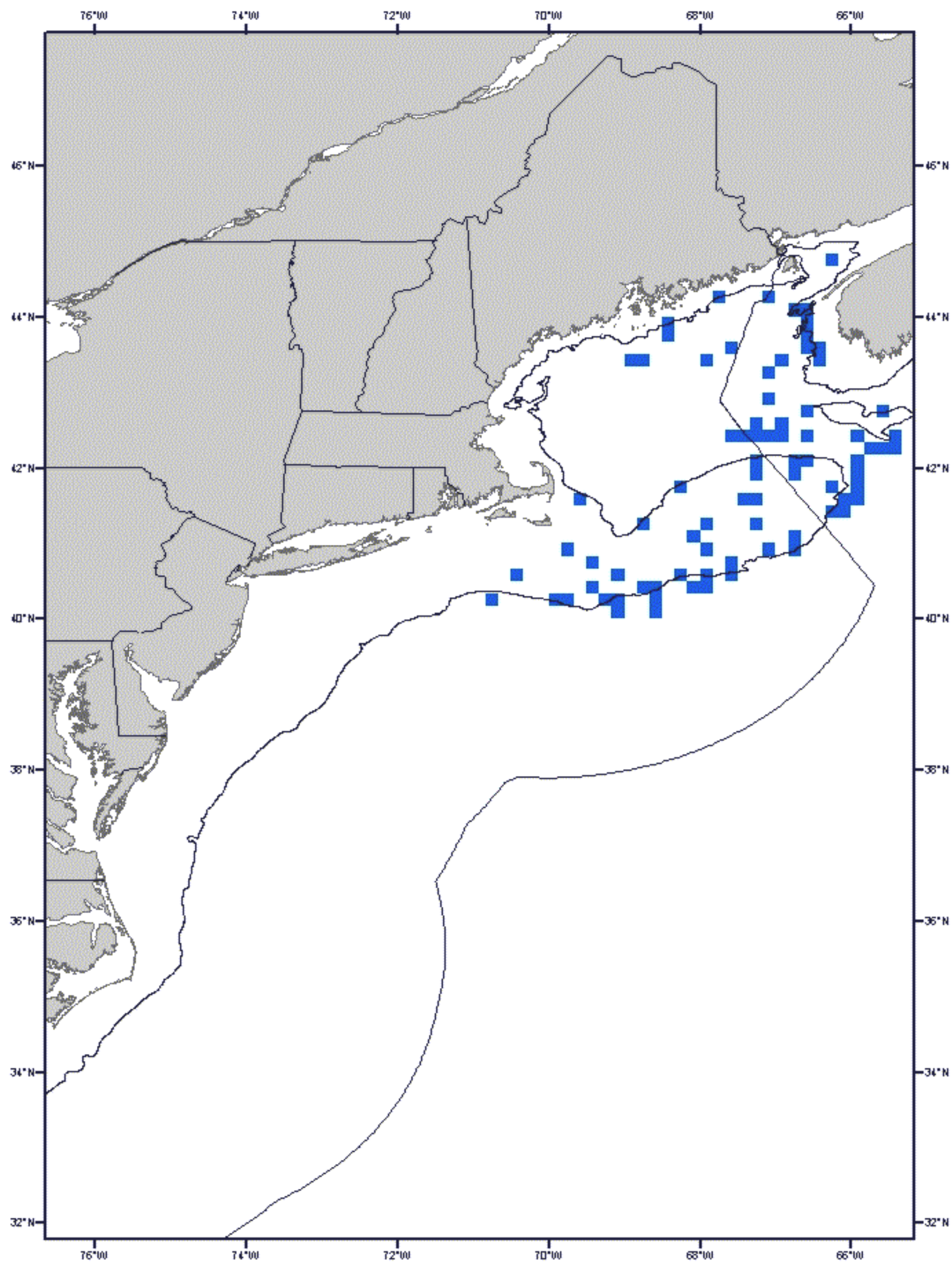
The EFH regulations require that EFH be designated only in U.S. waters, so while there may be important skate habitat in Canadian waters, this area will not be considered in the final EFH designations. Also, EFH for these species will not be designated outside the boundary of the Council's management unit, which is set at Cape Hatteras, North Carolina.

Figure 1 Barndoor Skate EFH Juvenile (100%)



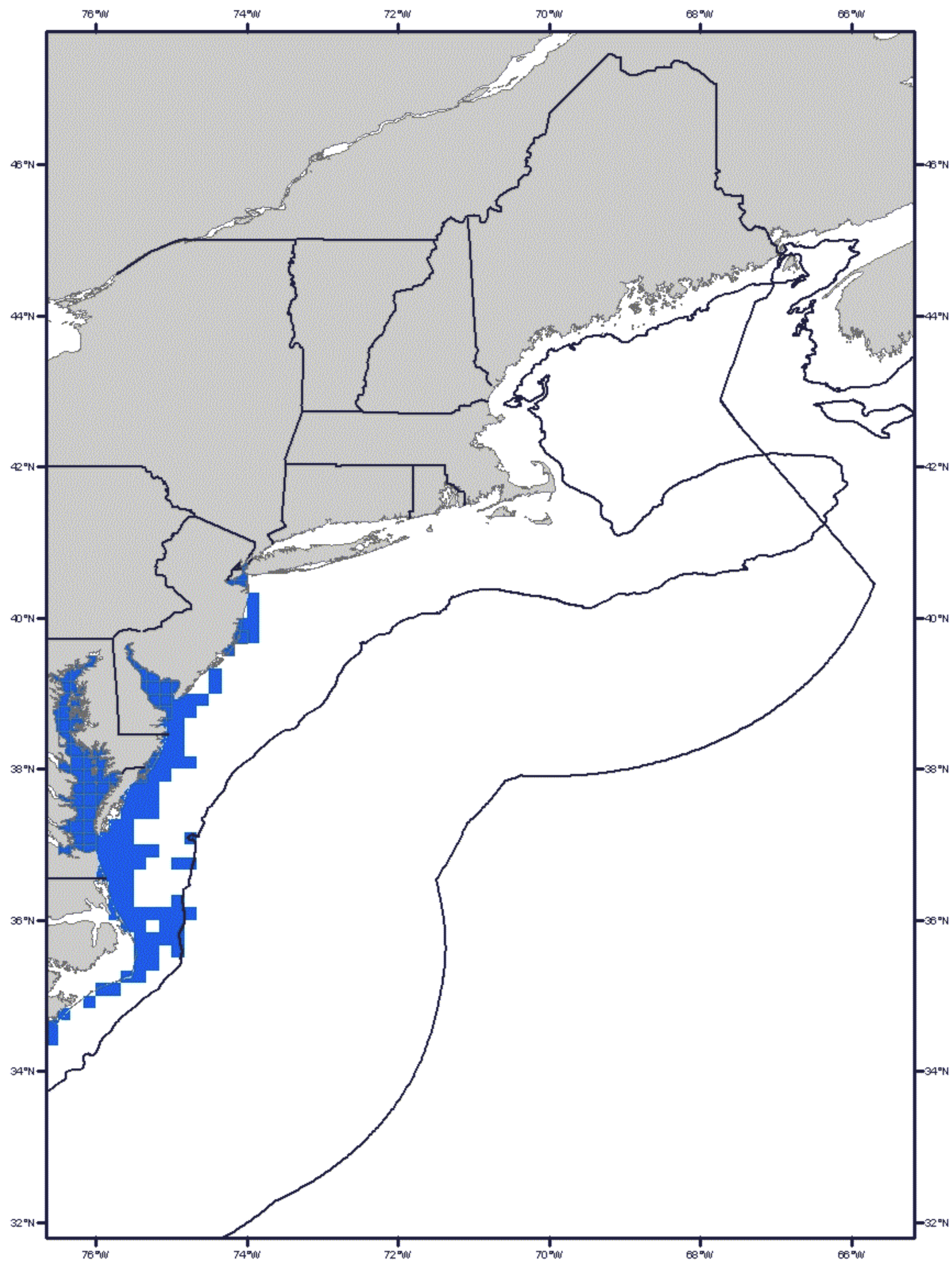
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 2 Barndoor Skate EFH Adult (100%)



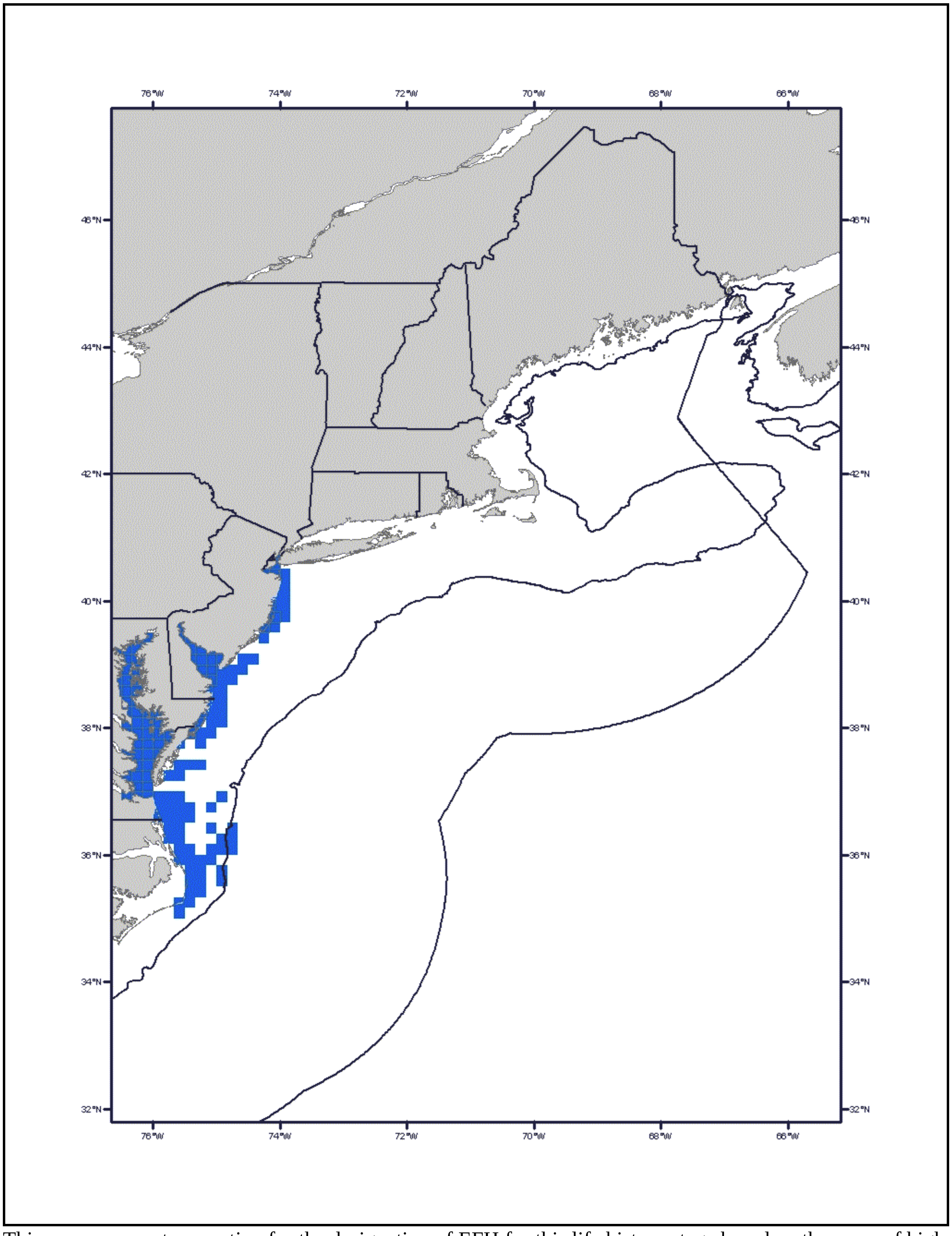
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 3 Clearnose Skate EFH Juvenile (90%)



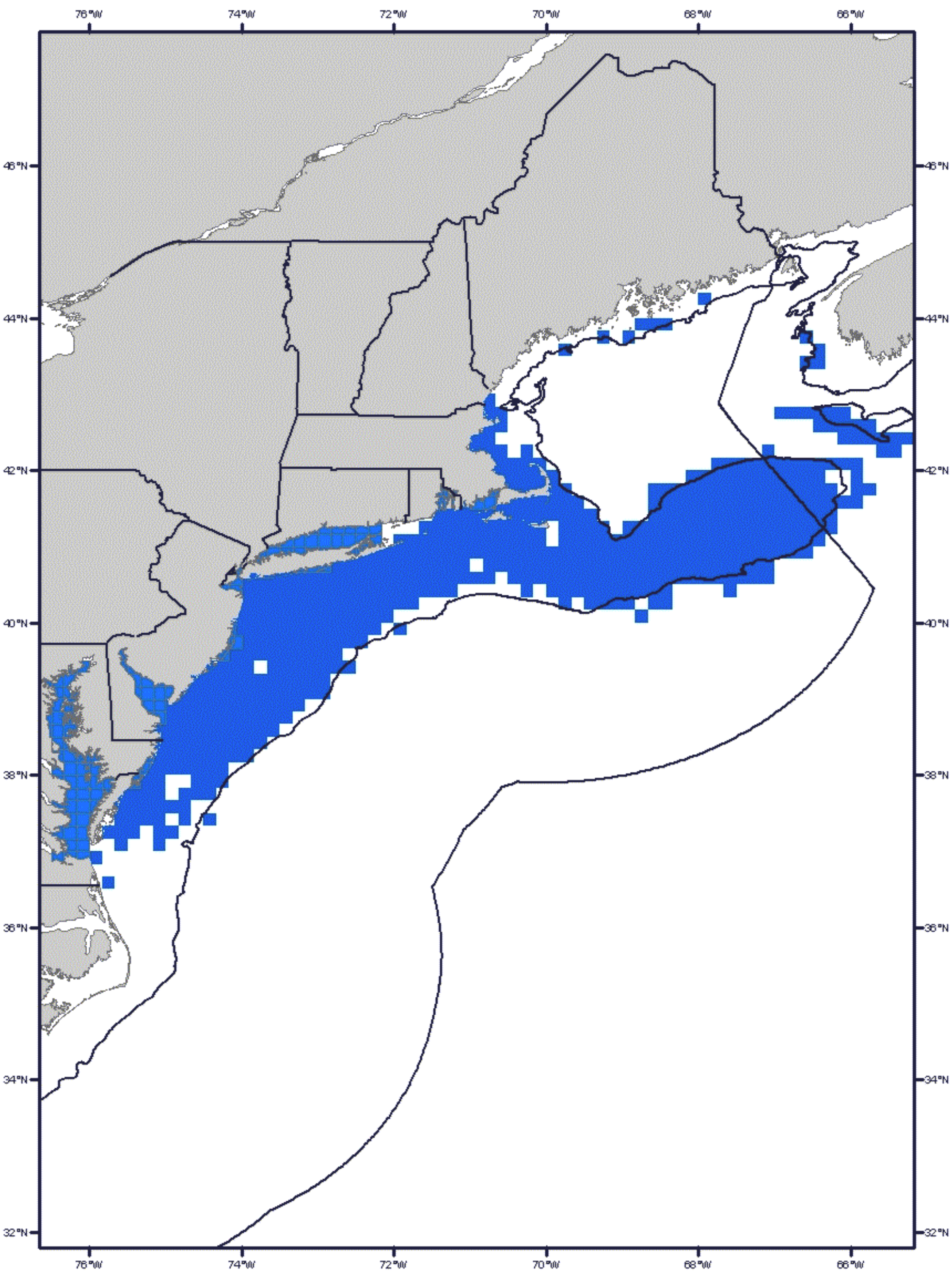
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 62% of the observed range of this life stage.

Figure 4 Clearnose Skate EFH Adult (90%)



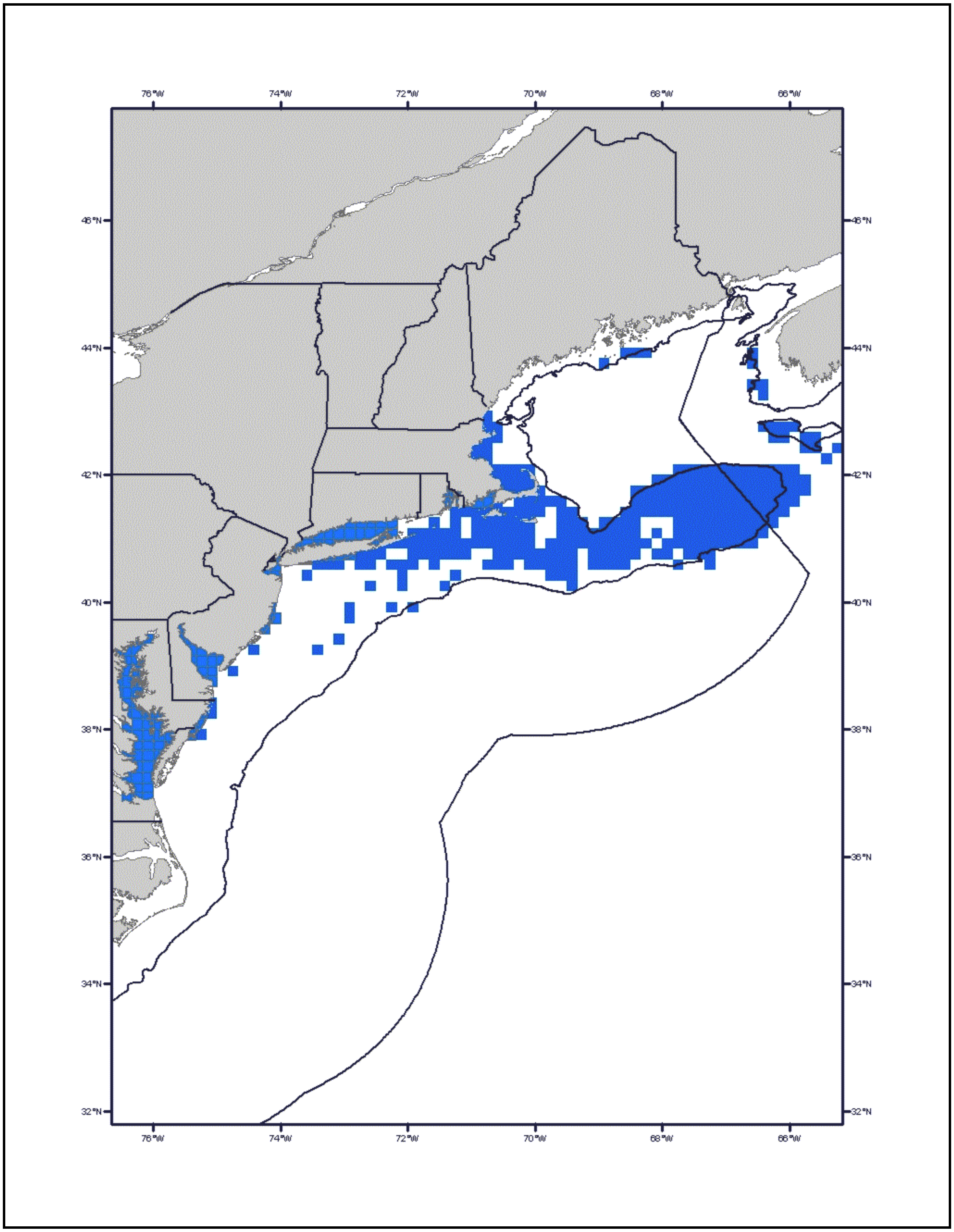
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 67% of the observed range of this life stage.

Figure 5 Little Skate EFH Juvenile (90%)



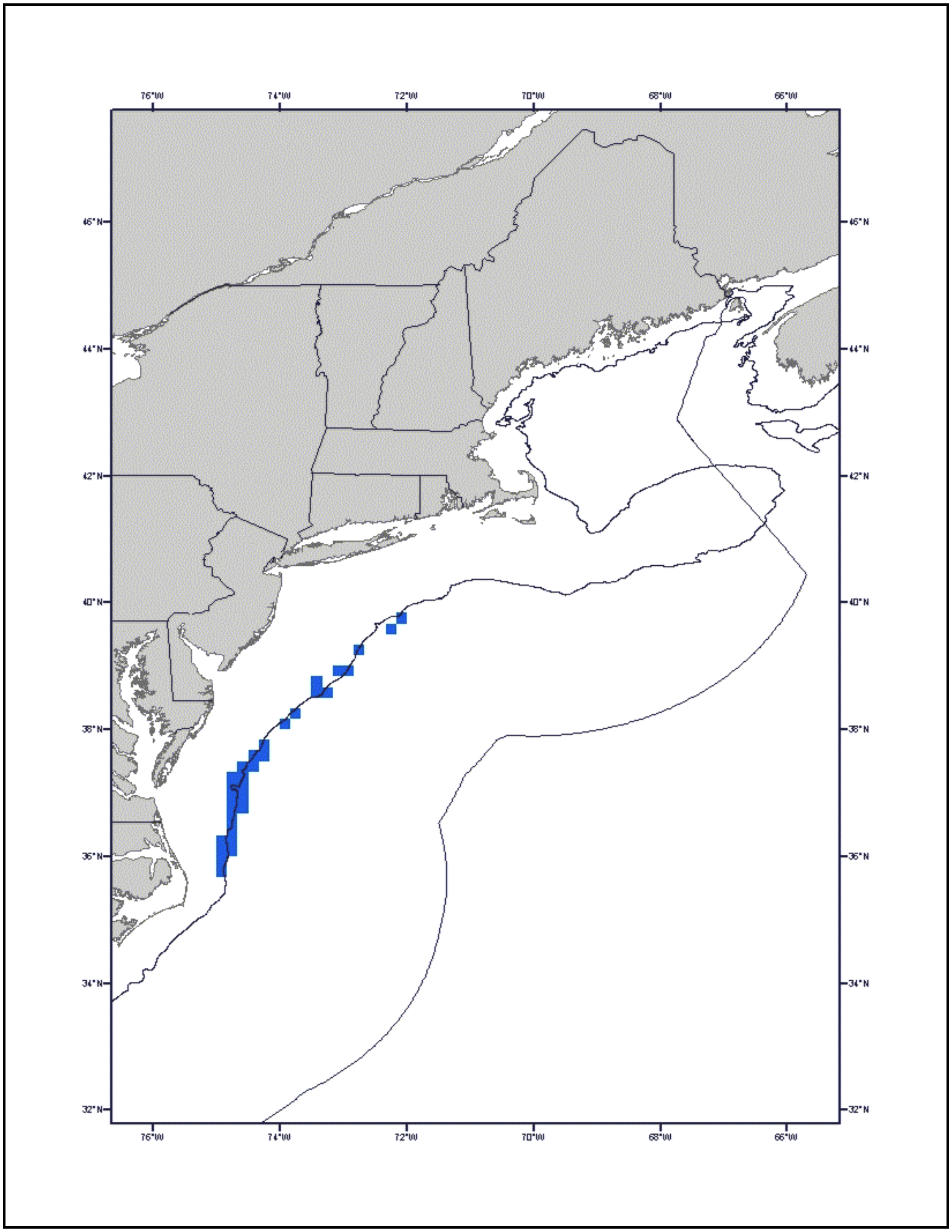
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 58% of the observed range of this life stage.

Figure 6 Little Skate EFH Adult (90%)



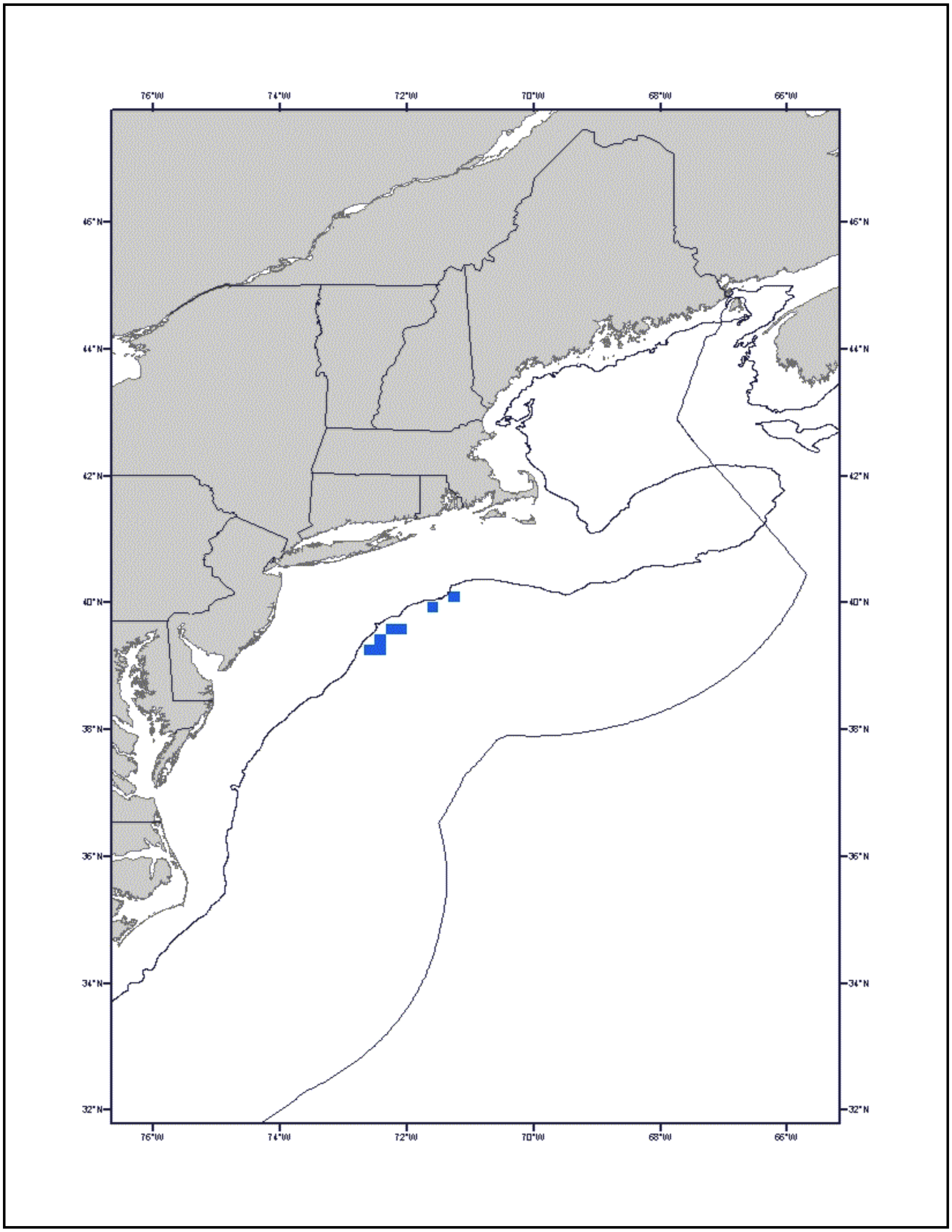
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 57% of the observed range of this life stage.

Figure 7 Rosette Skate EFH Juvenile (90%)



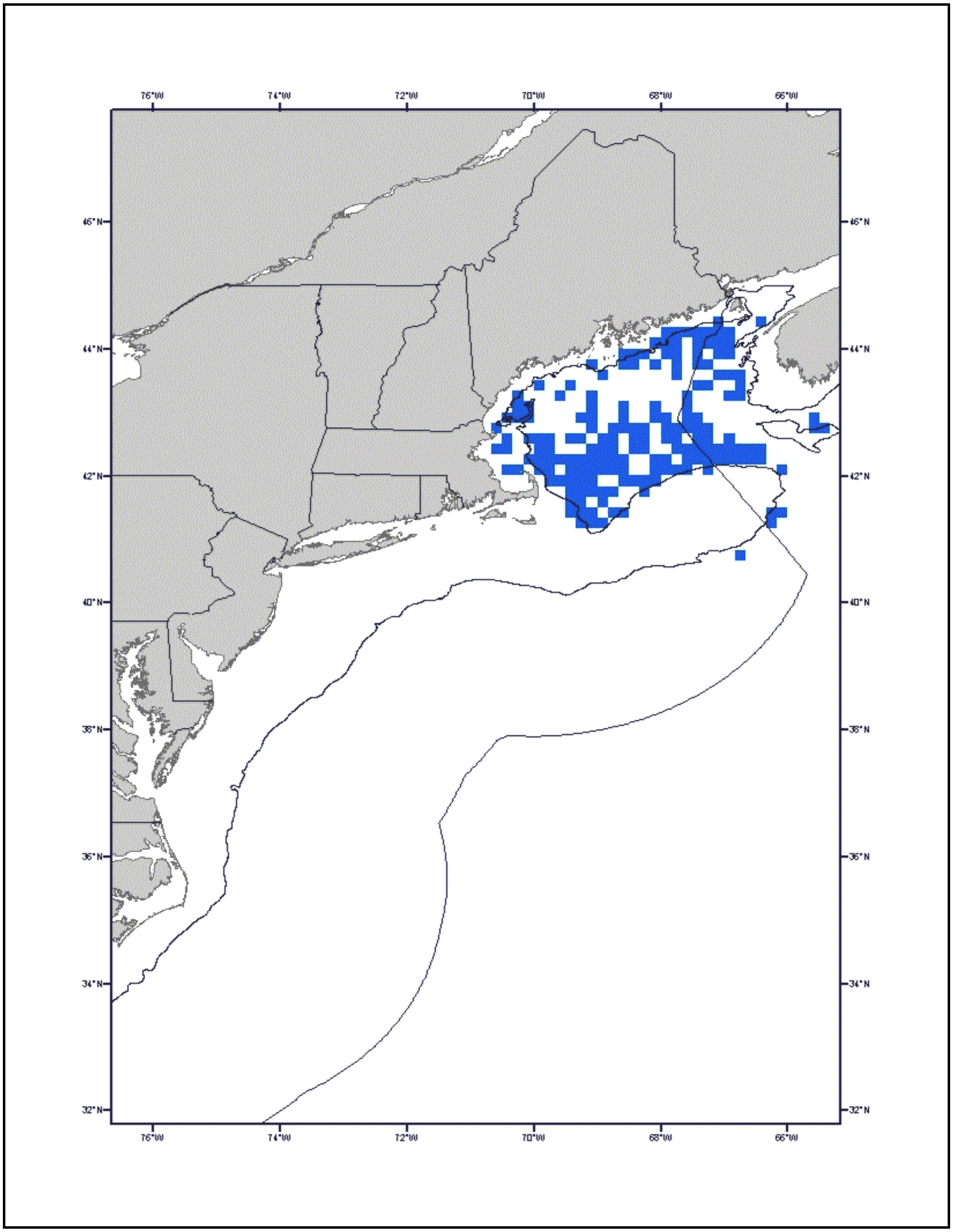
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 63% of the observed range of this life stage.

Figure 8 Rosette Skate EFH Adult (90%)



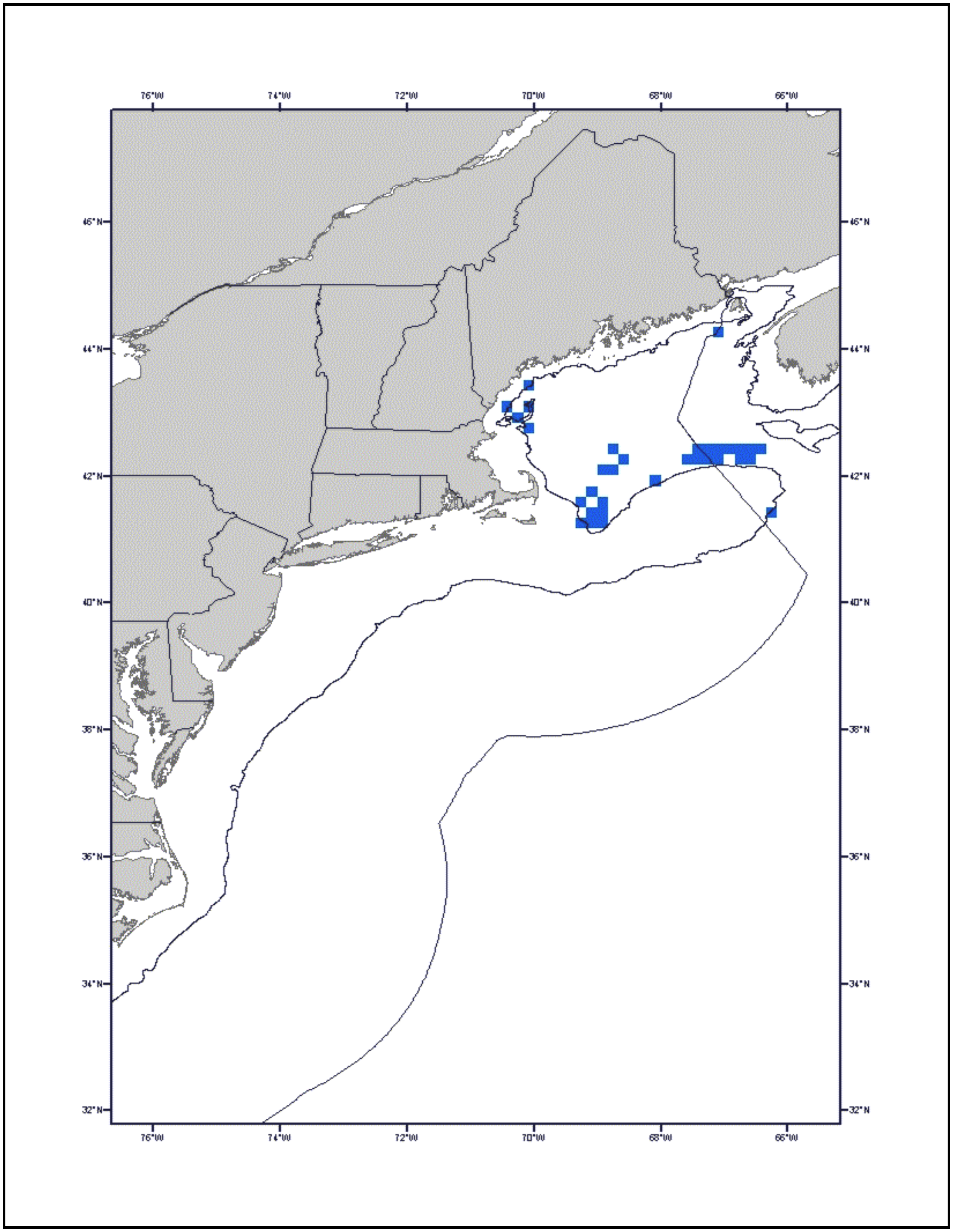
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 70% of the observed range of this life stage.

Figure 9 Smooth Skate EFH Juvenile (90%)



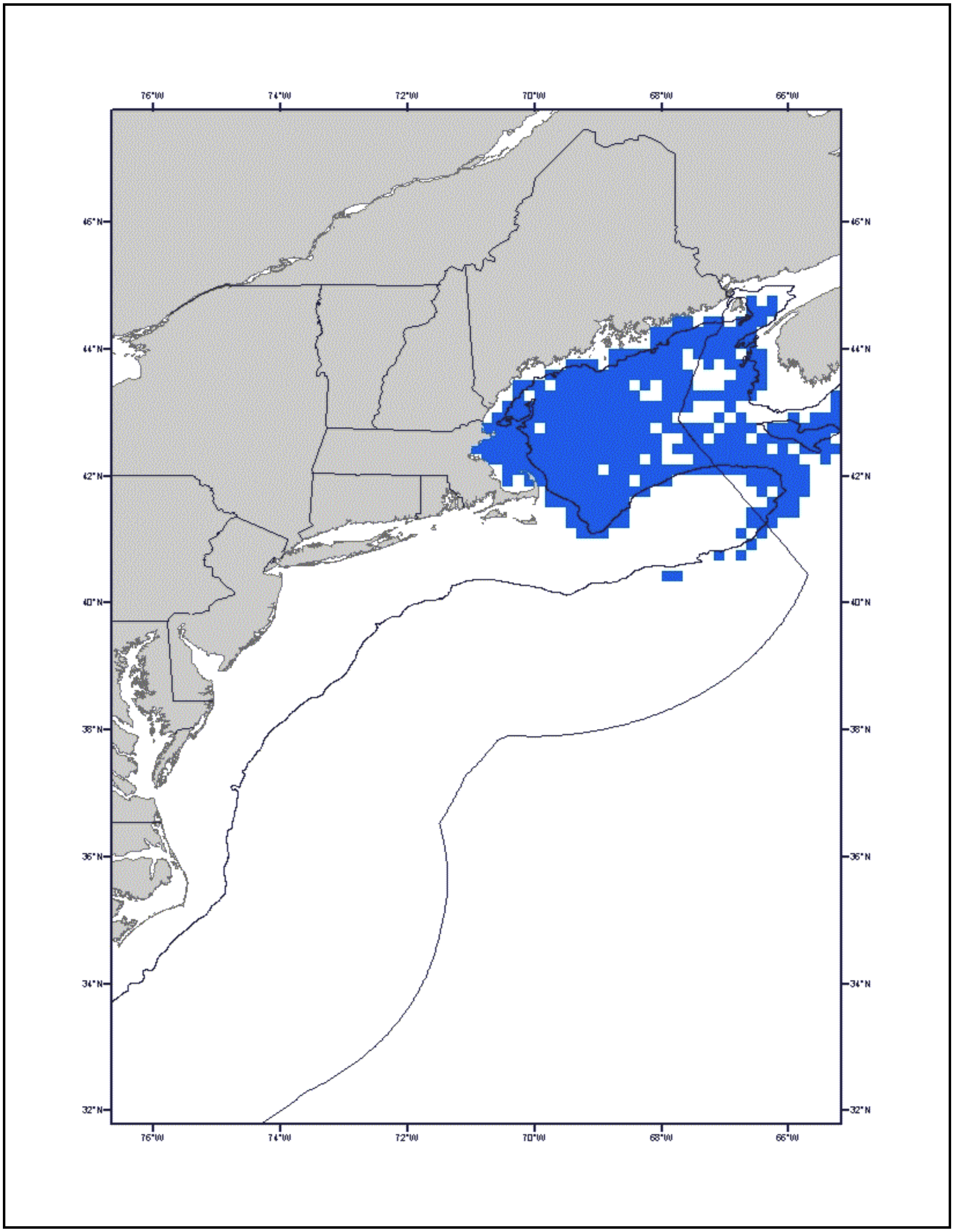
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 63% of the observed range of this life stage.

Figure 10 Smooth Skate EFH Adult (90%)



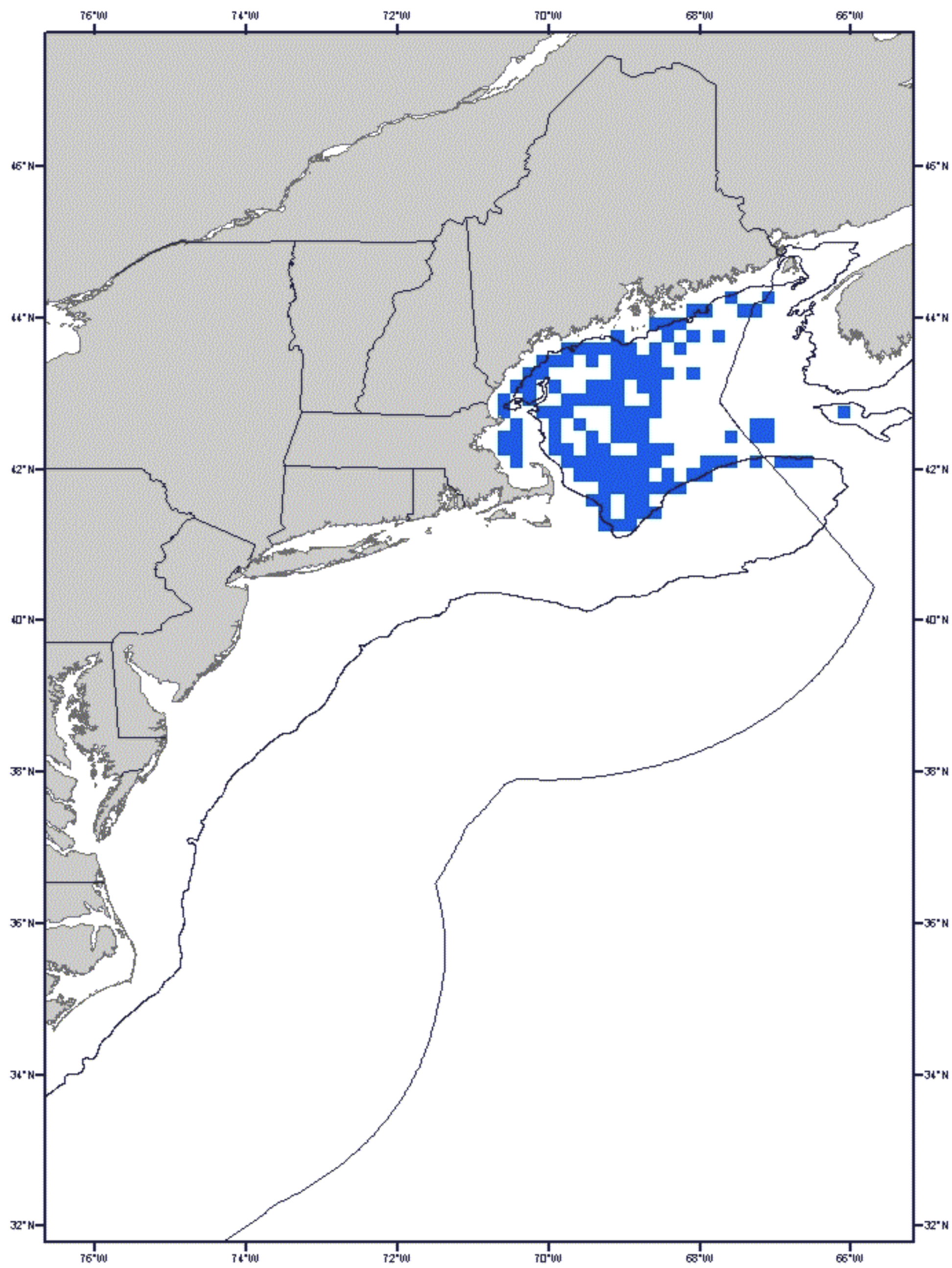
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 70% of the observed range of this life stage.

Figure 11 Thorny Skate EFH Juvenile (90%)



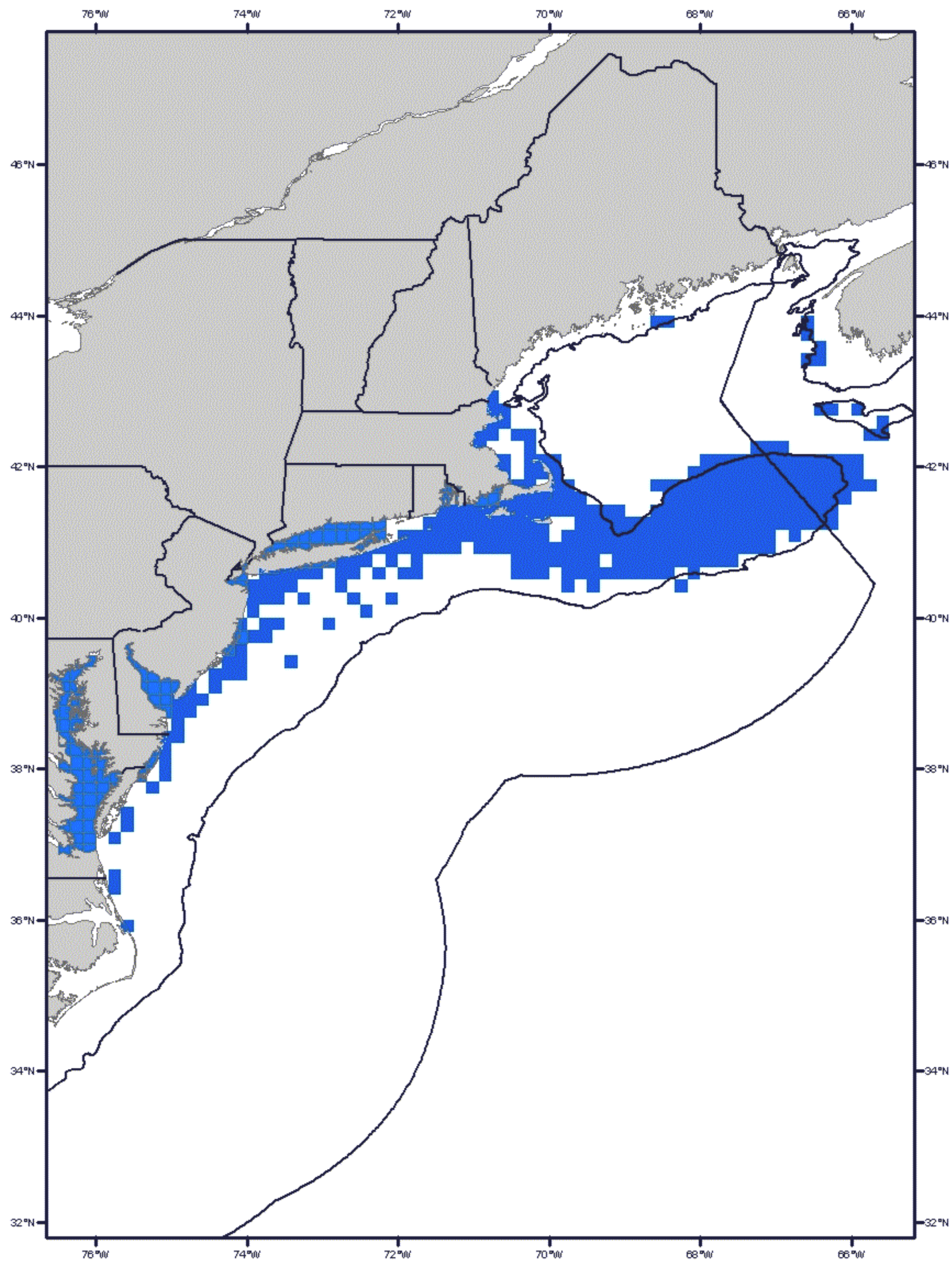
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 66% of the observed range of this life stage.

Figure 12 Thorny Skate EFH Adult (90%)



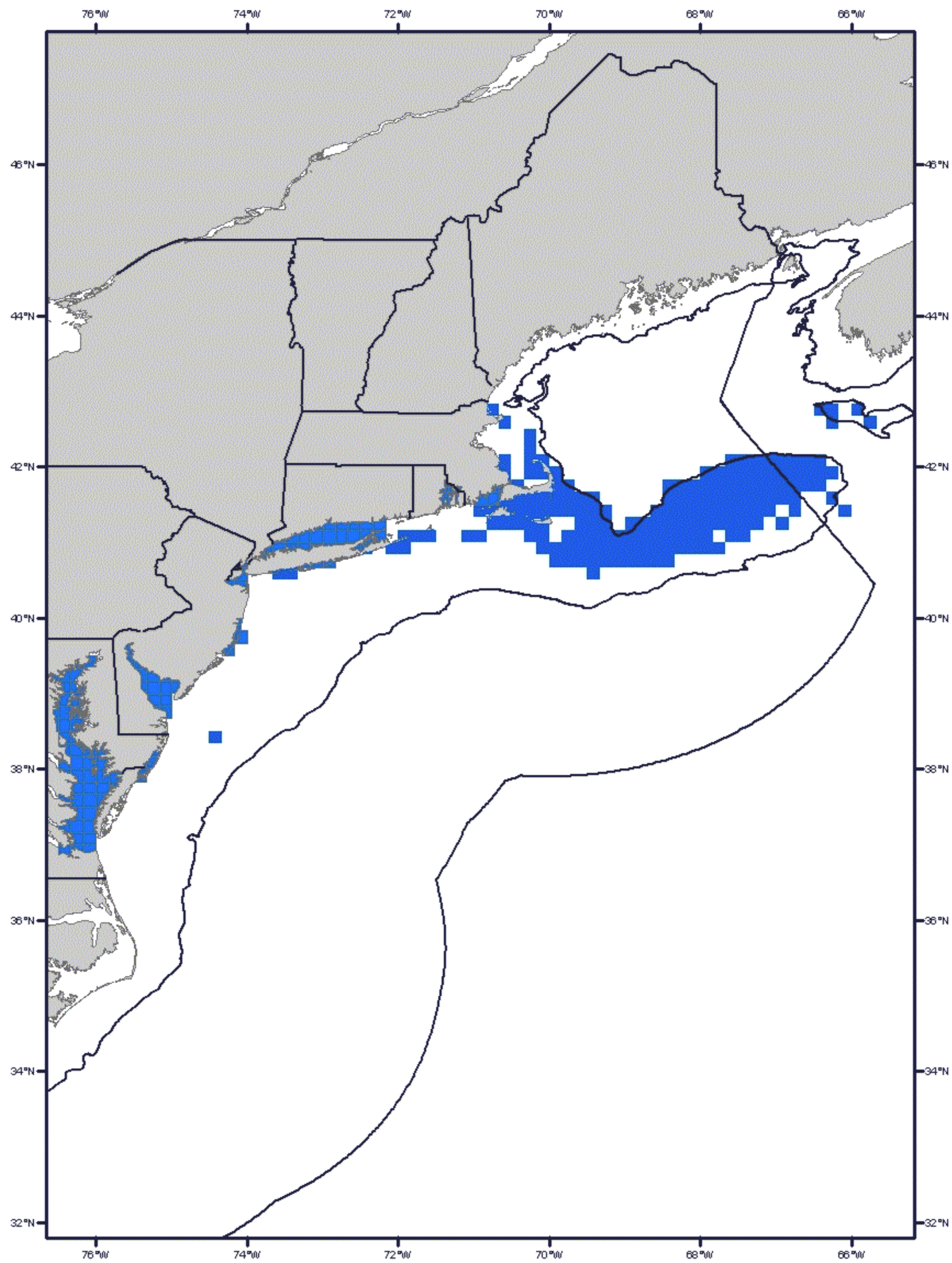
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 66% of the observed range of this life stage.

Figure 13 Winter Skate EFH Juvenile (90%)



This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 48% of the observed range of this life stage.

Figure 14 Winter Skate EFH Adult (90%)



This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 44% of the observed range of this life stage.

4.6.3 Review Process for Changes to the Measures to Minimize Adverse Effects of Skate Fishing on EFH

This FMP establishes a process for reviewing significant changes to the measures to minimize adverse effects of skate fishing on essential fish habitat as implemented by Amendment 13 to the Northeast Multispecies Plan. It has been determined that: 1. The Skate fishery is prosecuted predominantly under the Multispecies Fishery and 2. Skate fishing may adversely affect essential fish habitat. Because these adverse impacts are not minimized directly within the Skate FMP and are instead linked to the measures to minimize adverse impacts from groundfishing on EFH in Amendment 13 to the Northeast Multispecies FMP, it is necessary to establish a review process within the Skate FMP that anticipates and corrects any changes to the Multispecies FMP in the future that would result in the adverse impacts from skate fishing to no longer be minimized to the extent practicable. This approach establishes a concrete link between skates and management measures in the multispecies fishery that impact skates. Significant changes are defined as those that make measures less restrictive and/or substantially change the nature and scope of the measures in question. Changes that will further minimize the adverse effects of skate fishing without substantially changing the nature and scope of the measures will not be subject to the following review.

If the Council develops an action after Amendment 13 that may significantly change or make less restrictive one or more of the measures identified in Amendment 13, the Essential Fish Habitat Technical Team will evaluate the potential impacts of the proposed changes on habitat and develop, if necessary, management measures (or modifications to the proposed action) to mitigate the impacts of the changes on skate EFH. After reviewing the proposed changes to the measure(s), the EFH Technical Team also may recommend no action. If the EFH Technical Team recommends mitigating action, however, the Council will strive to adopt, within the timeline and context of the triggering action, measures to offset the changes to the measure(s). The mitigating measures adopted by the Council may be one or more of the measures recommended by the EFH Technical Team, or other suitable measures developed by the Council or its Habitat Oversight Committee. If the Council fails to act when the EFH Technical Team recommends action and cannot justify a lack of action, the Regional Administrator may implement one or more of the measures recommended by the EFH Technical Team through an agency framework adjustment to the relevant FMP.

The following outline summarizes the process described above.

I. Council initiates action in another FMP that significantly changes and/or makes less restrictive skate EFH protection;

II. EFH Technical Team reviews proposed changes to the measures and assess potential impacts on EFH from the skate fishery;

III. If necessary, EFH Technical Team develops recommendations for Council consideration to address adverse impacts on EFH by the skate fishery within the context of the triggering action (if time permits, the EFH Technical Team will forward its recommendations to the Habitat and Multispecies Oversight Committees for consideration prior to the full Council);

IV. Council finalizes action to change the measure(s), including considerations for protecting essential fish habitat, as necessary; the Council will not make any final decisions on the triggering action until the EFH Technical Team has completed its review of the potential impacts on the ability to minimize adverse effects of skate fishing on EFH and forwarded its recommendations to the Habitat and Multispecies Committees and/or the full Council.

4.6.4 Habitat Areas of Particular Concern

According to the EFH Final Rule (67 FR 2343), EFH that is judged to be particularly important to the long-term productivity of populations of one or more managed species, to be particularly vulnerable to degradation, or to be particularly rare should be identified as a "habitat area of particular concern" (HAPC) to help provide additional focus for conservation efforts. The rule provides four considerations for an HAPC designation:

(1) the importance of the ecological function provided by the habitat;
(2) the extent to which the habitat is sensitive to human-induced environmental degradation;
(3) whether, and to what extent, development activities are, or will be, stressing the habitat type; and,
(4) the rarity of the habitat type.

The EFH Final Rule also specifies that habitats that are particularly vulnerable to fishing activities should be identified for possible designation as habitat areas of particular concern. The intent of the HAPC designation is to identify those areas that are known to be important to species and which are in need of additional levels of protection from adverse impacts (fishing or non-fishing). Designation of habitat areas of particular concern is intended to determine what areas within EFH should receive more of the Council's and NMFS' attention when providing comments on federal and state actions, and in establishing higher standards to protect and/or restore such habitat.

For the purposes of the Council’s HAPC designation process, the criteria identified by NMFS in the EFH Final Rule are considered to be defined as follows:

Importance of *Historic* Ecological Function - The area or habitat feature proposed for HAPC designation at one time provided an important ecological function to a currently managed species, but no longer provides that function due to some form of degradation. An important ecological function could include, but is not limited to, protection from predation, increased food supply, appropriate spawning sites, egg beds, etc. The importance of the ecological function should be documented in scientific literature and based on either field studies, laboratory experiments, or a combination of the two.

Importance of *Current* Ecological Function - The area or habitat feature proposed for HAPC designation currently provides an important ecological function to a managed species. An important ecological function could include, but is not limited to, protection from predation, increased food supply, appropriate spawning sites, egg beds, etc. The importance of the ecological function should be documented in scientific literature and based on either field studies, laboratory experiments, or a combination of the two.

Sensitivity to Anthropogenic Stresses – The area or habitat feature proposed for HAPC designation is particularly sensitive (either in absolute terms or relative to other areas and/or habitat features used by the target species) to the adverse effects associated with anthropogenic activities. These activities may be fishing or non-fishing related. The stress or activity must be a recognizable threat to the area of the proposed HAPC.

Extent of Current or Future Development Stresses – The area or habitat feature proposed for HAPC designation faces either an existing and on-going development-related threat or a planned or foreseeable development-related threat. Development-related threats may result from, but are not limited to, activities such as sand mining for beach nourishment, gravel mining for construction or other purposes, the filling of wetlands, salt marsh, or tidal pools, shoreline alteration, channel dredging (but not including routine maintenance dredging), dock construction, marina construction, etc.

Rarity of the Habitat Type – The habitat feature proposed for HAPC designation is considered "rare" either at the scale of the New England region or at the scale of the range of at least one life history stage of one or more Council-managed species. A "rare" habitat feature is that which is considered to occur infrequently, is uncommon, unusual, or highly valued owing to its uniqueness. Keep in mind that the term "rare" usually implies unusual quality and value enhanced by permanent infrequency. We may usually think of rare habitats or features as those that are spatially or temporally very limited in extent, but it could also be applied to a unique combination of common features that occur only in a very few places.

The Council has reviewed the available information on skates and their habitat (see Appendix A in Volume III), and is not proposing any HAPCs for skates at this time. The current information suggests no areas or habitat types identified as EFH for skates that meet any of the considerations specified for an HAPC. If new or additional information on skates and their habitat is obtained by the Council that indicates there are specific areas or habitat types designated as EFH for skates that meet one or more of the above HAPC criteria, the Council would consider designating an HAPC at the appropriate time.

For example, barndoor skate recently has attracted attention as a species subject to significant depletion and possibly being threatened or endangered. The 1999 Stock Assessment Review Committee (SARC) reviewed the available information on barndoor skate and found that there was no evidence that it was in danger of extinction or likely to become endangered within the foreseeable future throughout all or a significant portion of its range (NEFMC 2001). Regarding habitat and potential impacts to habitat, the SARC concluded that the available evidence does not suggest that the habitat or range of barndoor skate has been destroyed, modified, or curtailed to an extent that threatens the existence of the species, and there is no scientific evidence to suggest that barndoor skate has been subject to unusual natural or anthropogenic factors that threaten its continued existence (NEFMC 2001).

The Council has developed a formal process for the solicitation, preparation, review and designation of potential HAPCs based on the best available information. This process is described in the Council's 2000 Habitat Annual Review Report (NEFMC 2000b). This process will apply to the future consideration of HAPCs for all species of skates. During the further development and implementation of the Skate FMP, the Council will specifically explore whether other information exists that would support consideration of an HAPC for barndoor skates. If this information exists and is available for review by the Council, the Council will identify potential barndoor skate HAPCs and utilize the aforementioned HAPC process to evaluate these areas. Any proposed HAPCs may be designated via a framework adjustment to the FMP (see Section 4.8).

4.7 FMP REVIEW AND MONITORING

The Council, its Skate Plan Development Team (PDT), and its Skate Advisory Panel plan to monitor the status of the fishery and the skate resources following implementation of this FMP and review, on a regular basis, the need to make adjustments to the regulatory framework.

Once the Skate FMP has been effective for at least one year (so that there is new fishery information to review), the Council's Skate PDT will prepare a biennial Stock Assessment and Fishery Evaluation (SAFE) Report for the Northeast skate complex. The SAFE Report will be the primary vehicle for the presentation of all updated biological and socio-economic information regarding the Northeast skate complex and its associated fisheries. The SAFE Report will supplement, expand, and update (where possible) the information contained in this FMP. This document also will provide source data for any adjustments to the management measures that may be needed to continue to meet the goals and objectives of this FMP.

Although the SAFE Report will be completed every other year, the Skate PDT will meet at least annually to review the status of the species in the skate complex and their associated fisheries. At a minimum, this review will include annual updates to survey indices and a re-evaluation of stock status based on the updated survey indices and the FMP's overfishing definitions. If new and/or additional information becomes available, the PDT will consider it during this review. Based on this review, the Skate PDT may provide guidance to the Committee and the Council regarding the need to adjust measures in the Skate FMP to better achieve the FMP's objectives. At any time, the Council may initiate action to modify the FMP's measures, either through a plan amendment or a framework adjustment, as specified in Section 4.8 of this document.

4.8 FRAMEWORK ADJUSTMENT PROCESS

To implement a framework adjustment to the Skate FMP, the Council will develop and analyze proposed actions over the span of at least two Council meetings, and provide advanced public notice of the availability of both the proposals and the analyses. Opportunity to provide written and oral comments will be provided throughout the process before the Council submits any recommendations to the Regional Administrator.

In response to a review of the status of the skate resources by the Skate PDT or at any other time, the Council may recommend adjustments to any of the measures proposed in this FMP. The Skate Committee also may request that the Council initiate a framework adjustment. Framework adjustments will require one initial Council meeting (the agenda must include notification of the impending proposal for a framework adjustment) and one final Council meeting.

After a framework action has been initiated, the Council will develop and analyze appropriate management actions within the scope identified below. The Council may refer the proposed adjustments to the Skate Committee for further development and review. Upon receiving the recommendations from the Skate Committee, the Council will publish notice of its intent to take action and provide the public with any relevant analyses and opportunity to comment on any possible actions. After receiving public comment, the Council must take action (to approve, modify, disapprove, or table) on the recommendation at the final meeting. The Council's recommendation for adjustments or additions to management measures must come from one or more of the categories listed in this section. Documentation and analyses for the framework adjustment will be available at least one week before the final meeting.

After developing management actions and receiving public testimony, the Council may make a recommendation to the Regional Administrator. The Council's recommendation will include supporting rationale and, if management measures are proposed, an analysis of impacts and a recommendation to the Regional Administrator on whether to issue the management measures as a final rule. If the Council recommends that the management measures should be issued directly as a final rule, the Council will consider at least the following four factors and provide support and analysis for each factor considered:

1. Whether the availability of data on which the recommended management measures are based allows for adequate time to publish a proposed rule, and whether regulations have to be in place for an entire harvest/fishing season;
2. Whether there has been adequate notice and opportunity for participation by the public and members of the affected industry in the development of the Council's recommended management measures;
3. Whether there is an immediate need to protect the resource or to impose management measures to resolve gear conflicts; and
4. Whether there will be a continuing evaluation of management measures adopted following their implementation as a final rule.

If the Regional Administrator concurs with the Council's recommended management measures they will be published as either a final rule based on the factors specified above or as a proposed rule in the *Federal Register*. If the Council's recommendation is first published as a proposed rule and the Regional Administrator concurs with the Council's recommendation after receiving additional public comment, the measures will then be published as a final rule in the *Federal Register*.

If the Regional Administrator approves the Councils' recommendations, the Secretary may, for good cause, waive the requirement for a proposed rule and opportunity for public comment in the *Federal Register*. The Secretary, in so doing, will publish only the final rule. Submission of recommendations does not preclude the Secretary from deciding to provide additional opportunity for prior notice and comment in the *Federal Register*, but it contemplates that the Council process will adequately satisfy that requirement.

The Regional Administrator may approve, disapprove, or partially disapprove the Council's recommendation. If the Regional Administrator does not approve the Council's specific recommendation, he/she must notify the Council in writing the reasons for his/her action prior to the first Council meeting following publication of his/her decision. Nothing in this proposal prevents the Secretary of Commerce from soliciting additional comment, but it is contemplated that the Council's process will adequately satisfy that requirement.

In general, changes to skate management measures within the range of those analyzed in this FMP/EIS are good candidates for abbreviated rulemaking, and it may be adequate to issue the action directly as a final rule. In these cases, little or no supplemental analysis may be required. However, if the proposed changes are not within the range of what was contemplated and analyzed in this EIS, it is likely that additional analyses and both proposed and final rulemaking would be required.

The following management measures may be implemented and/or adjusted through a framework adjustment to the Skate FMP:

- Skate permitting and reporting requirements
- Overfishing definitions and related targets and thresholds
- Prohibitions on possession and/or landing of individual skate species
- Skate possession limits
- Skate closed areas (and consideration of exempted gears and fisheries)
- Seasonal skate fishery restrictions and specifications
- Target TACs for individual skate species
- Hard TACs/quotas for skates, including species-specific quotas, fishery quotas, and/or bycatch quotas for non-directed fisheries
- TAC set-asides to mitigate bycatch, conduct scientific research, or for other reasons
- Onboard observer requirements
- Gear modifications, requirements, restrictions, and/or prohibitions
- Minimum and/or maximum sizes for skates
- Adjustments to exemption and/or management lines established by the Skate FMP
- Measures to address protected species issues, if necessary
- Description and identification of essential fish habitat (EFH)
- Description and identification of habitat areas of particular concern
- Measures to protect essential fish habitat
- Adjustments and or/resetting of the "baseline" of management measures in other fisheries, described in Section 4.16.1 of this document
- Any other measures contained in the Skate FMP.

In addition, MSY and OY specifications may be implemented through a framework adjustment to this FMP, provided that any corresponding management adjustments can also be implemented through a framework adjustment. If a new MSY or OY specification necessitates a change in a management measure that cannot be implemented through a framework, or if the change to the measure is likely to result in significant impacts, then a formal EIS will be required for the MSY or OY specification and associated management adjustments.

Because of the scope of its potential impacts, a limited access program for skates can not be implemented through a framework adjustment. Any limited access program that the Council develops should be implemented through an amendment to the plan, accompanied by a comprehensive Environmental Impact Statement (EIS).

4.9 FEDERAL PERMIT PROGRAM

Until this FMP is implemented, there is no requirement for a specific permit in order to fish for skates in the U.S. EEZ (although most skate fishing occurs on groundfish and/or monkfish-permitted vessels). To track fishing effort on skates within the Council's management area and to better achieve the objectives of this FMP, federal skate permits will be required for vessels, operators, and dealers engaged in any aspect of the skate fisheries. At this time, all skate permits will be open-access permits.

4.9.1 Vessel Permit

Upon implementation of the Skate FMP, vessels fishing for or landing skates from the U.S. Exclusive Economic Zone for commercial sale will be required to obtain a federal permit from NMFS to do so. As a condition of this permit (and similar to conditions for permits in other federal fisheries), vessel owners who apply for a skate permit must agree that all of their vessel's skate fishing, catch, and gear will be subject to the requirements of the Skate FMP, regardless of whether the vessel is fishing in the U.S. EEZ or in state waters. If a requirement in this FMP differs from a state or local law, the vessel owner/operator must comply with the more restrictive requirement.

Federal skate permits for vessels must be renewed annually, through a process established by the Regional Administrator. In the Northeast Region, NMFS requires vessels with federal permits to comply with the vessel identification and marking requirements in 50 CFR 648.8.

This skate permit will be an open access permit that any vessel could obtain from the National Marine Fisheries Service to fish for and land skates from the EEZ. Skates taken from the EEZ by any federally-permitted vessel may only be sold to federally-permitted skate dealers.

There is no fee for skate permits at this time; however, this does not preclude the Regional Administrator from charging a fee at some time in the future to recover administrative expenses of issuing the permits. The amount of the fee would be calculated in accordance with the procedures of the NOAA Finance Handbook, available from the Regional Administrator, for determining administrative costs of each special product or service. The fee may not exceed such costs and would be specified with each application form.

Discussion: A separate federal skate permit improves enforcement of the Skate FMP management measures and is consistent with permitting in other federal fisheries in the Northeast Region. It establishes a database of potentially affected entities and provides a mechanism for NMFS to notify the industry of regulatory changes and other important skate developments. It also establishes a potential parameter or criterion for a future limited access program. For example, if limited access is adopted for the skate fishery in the future, the qualification criteria could be based on possession of a federal skate permit combined with some level of skate landings and/or other criteria. This may provide an incentive for some skate vessels fishing only in state waters to obtain the federal permit now (in hopes of obtaining a limited access permit in the future, should one be established with qualification criteria based on previous possession of the federal permit). Any state waters vessels that can be incorporated into the federal permit database with the implementation of the Skate FMP will improve the accuracy of skate fishery data, as these vessels also would be required to submit logbooks once they obtain the federal permit (see Section 4.10).

4.9.2 Operator Permit

Operators of commercial vessels permitted to harvest skates will be required to possess a federal operator permit. An operator is defined as the master, captain, or other individual on board a fishing vessel, who is in charge of that vessel's operations. Persons wishing to obtain an operator permit will be required to submit an application supplied by the Regional Administrator. Operator permits are usually issued for up to three years and may be suspended or revoked for violation of fishing regulations. No performance or competency tests will be required to obtain a permit.

4.9.3 Dealer Permit

Skate dealers will be required to obtain a federal dealer permit for skates to purchase skates harvested from the EEZ. According to current regulations for other fisheries, a skate dealer would be defined as any person who receives, for a commercial purpose (other than solely for transport on land), from the owner or operator of a vessel issued a valid federal skate permit, any species of skate managed under the Skate FMP. The dealer will be required to submit an application, supplied by the Regional Administrator for a dealer permit that is valid until it expires or is suspended or revoked. Skates taken from the EEZ may only be sold to federally-permitted dealers, and federally-permitted dealers may only purchase skates from federally-permitted vessels.

There is no fee for dealer permits at this time; however, this does not preclude the Regional Administrator from charging a fee at some time in the future to recover administrative expenses of issuing the permits. The amount of the fee would be calculated in accordance with the procedures of the NOAA Finance Handbook, available from the Regional Administrator, for determining administrative costs of each special product or service. The fee may not exceed such costs and would be specified with each application form.

4.10 CATCH REPORTING REQUIREMENTS

4.10.1 Overview

Reporting requirements for the skate fishery will be based on existing requirements for other federal fisheries in the Northeast Region, as specified in 50 CFR 648.7. The proposed reporting requirements for skates also are intended to be consistent with provisions adopted through the Atlantic Coastal Cooperative Statistics Program (ACCSP). The ACCSP is a state and federal coastal marine fisheries data collection and data management program. Its purpose is to coordinate and standardize the collection, processing, and storage of all marine statistics, resulting in a coastwide program that is timely, credible, ensures compatibility, and eliminates duplicative reporting. The overriding goal of ACCSP is to implement coastwide standards and protocols for the way in which all Atlantic coastal agencies collect, manage, and disseminate fisheries statistics.

The operator of any vessel issued a federal skate permit must maintain on board the vessel and must submit an accurate daily fishing log report for all fishing trips, regardless of species fished for or taken, on forms supplied by the Regional Administrator (Vessel Trip Reports, VTRs, or logbooks). This requirement mirrors reporting requirements for the multispecies, scallop, monkfish, and other fisheries in the Northeast Region, specified in 50 CFR 648.7(b). Vessel owners and/or operators who already submit logbooks for other federal fisheries in the Northeast Region will not be required to submit an additional logbook to comply with the Skate FMP, but will be required to specify more detailed skate catch information on existing logbooks, as described below.

A dealer who has been issued an annual dealer permit for skates must provide, on forms supplied by or approved by the Regional Administrator, information about all skate purchases and prices paid. The dealer reporting requirements for skates are intended to mirror those for other federal fisheries in the Northeast Region, specified in 50 CFR 648.7(a)(I). Dealers who already submit reports for other fisheries will not be required to submit an additional report for skates, but will be required to record more detailed information about skate purchases on existing reports, as described below.

The Council recognizes that some skate fishing (particularly for bait) occurs within state waters. Close coordination with state agencies will be required to obtain data from skate fishermen and dealers who do not possess any federal permits and are therefore not required to submit logbooks or dealer reports under the regulations specified in 50 CFR 648.7. The Council intends to work closely with state agencies to encourage development of permit and data collection programs for these vessels and dealers.

The Council clearly recognizes the problems associated with skate species identification. Because species-specific information is critical to the long-term success of this FMP, the Council is working closely with NMFS and the Northeast Fisheries Science Center to develop a species identification guide for skate vessels and dealers as well as sea samplers and enforcement agents. The Council intends for this guide to be made available prior to the implementation of the Skate

FMP. The reporting requirements described below include two reporting categories that address some of the identification problems: (1) little/winter skate, primarily for use in the bait fishery for the portion of the catch that cannot be separated into either little skate or juvenile winter skate, and (2) unclassifiable skate, for the catch that vessels and/or dealers cannot identify, even with the assistance of a guide.

4.10.2 Skate-Specific Reporting Requirements

The Skate FMP will implement the following reporting requirements for **all** federally-permitted vessels and dealers (not just those with skate permits):

- Vessels will be required to report all skate landings in logbooks (VTRs) by individual species in the following categories:
  1. Winter Skate
  2. Little Skate
  3. Little/Winter Skate
  4. Barndoor Skate
  5. Smooth Skate
  6. Thorny Skate
  7. Clearnose Skate
  8. Rosette Skate
  9. Unclassifiable Skate
- Vessels will be required to report all skate discards in logbooks (VTRs) by the following categories:
  1. Small Skates (less than 23 inches or 58 cm, total length)
  2. Large Skates (23 inches or 58 cm or greater, total length)
- Dealers will be required to report all skate purchases in their weighout reports by individual species in the following categories:
  1. Winter Skate
  2. Little Skate
  3. Little/Winter Skate
  4. Barndoor Skate
  5. Smooth Skate
  6. Thorny Skate
  7. Clearnose Skate
  8. Rosette Skate
  9. Unclassifiable Skate

The Council will rely on data from sea sampling trips and study fleets to obtain species-specific discard information. To the extent possible, the Skate PDT will use these data to characterize the species composition of skate discards in the various fisheries of which skates are a component. The Council urges sea samplers to make species-specific skate data collection a higher priority. The Council also recommends that training programs be established for sea samplers and fishermen participating in study fleets to improve skate identification by species.

Discussion: Mandating the reporting of skate landings by individual species represents a significant step towards improving fishery information and achieving the objectives of the Skate FMP. The Council recognizes that mandating the reporting of discards by individual species may not be practical and may actually increase discard mortality for some species of skates. It is likely that unwanted skates would stay on the deck of a fishing vessel longer if the crew is required to sort the bycatch and differentiate the species that are being discarded. For this reason, the Council is requiring that discards be reported only by size category.

Congress appropriated substantial funds in 2000 for cooperative research projects within the Northeast Region. Specifically, funds were targeted for collaborative research projects involving the fishing industry and community to address problems in the groundfish fishery. The concept of "study fleets" was developed to collect essential fishery-dependent data that is not reflected in the current Vessel Trip Reports.

The study fleet program is scheduled to commence as soon as possible. The objective of the study fleet is to sample fishing vessels to collect high quality data on catch, fishing effort, gear characteristics, area fished, and biological observations. *This information would be useful for purposes of managing the skate fishery, through the collection of more fine-scale data on skate species, especially discards.* Vessels would fish in their normal commercial mode, and would be selected to be representative of the larger fleet. Study fleets have the potential to greatly improve the accuracy, timeliness, and usefulness of fishery-dependent data. Fishermen are an integral part of the study fleet design to ensure that the data elements collected are organized in a way that does not interfere with normal fishing practices. The Skate PDT recommends that identification of skate by species be included as a data element.

Study fleets may only provide limited species-specific discard information for skates because of the potential for a small number of skates to be caught by vessels that enroll in the program as well as great temporal and spatial variation within the study fleet itself. However, the Council may recommend that some vessels that either directly or indirectly target skates be included in the study fleet.

4.11 PROHIBITION ON THE POSSESSION OF BARNDOOR SKATE (*DIPTURIS LAEVIS*)

This action prohibits the possession of barndoor skates (*Dipturis laevis*) on all vessels fishing in federal waters. Similarly, skate dealers are prohibited from purchasing barndoor skates.

Discussion: Because barndoor skate is in an overfished condition, it is important for the Council to take action to conserve the resource to the greatest extent possible. In addition to the benefits that are likely to accrue as a result of the groundfish regulations (closed areas, DAS reductions, mesh increases), the Council is proposing to prohibit the possession of barndoor skates.

General discussion of the impacts of a prohibition on possession relative to other kinds of prohibitions is provided in Section 6.1.4 of this document. Prohibiting the possession of barndoor skates on vessels fishing in federal waters is a relatively simple and effective step towards rebuilding the resource as quickly as possible. Although it is not known to be a significant component of any skate fisheries (bait or wings), the industry estimates that 1%-5% of skate wing landings are from barndoor skates. Prohibiting the possession of barndoor skates would discourage fishermen from targeting them or making them a more significant component of the wing fishery in the future.

While barndoor skates do not currently represent a substantial part of the wing fishery, anecdotal information suggests that there may be potential for an export market for barndoor skate wings to develop. Prohibiting the possession of barndoor skates now could preclude future market and fishery expansion without a significant negative impact on the industry. This measure is a proactive approach to protecting the barndoor skate resource and may prevent the need for more restrictive management measures that could create a significant negative economic impact on the industry in the future.

Because of their large size and distinct ventral coloration, barndoor skates are more easily identified than the other skate species, so fishermen should be able to successfully distinguish barndoors and return them to the water quickly. Although the survival rate of discarded barndoor skates is unknown, it is believed that a greater percentage of (barndoor and other skate) discards survive as compared to finfish (cod, flounder, etc.). Available information suggests that skates may be heartier than finfish and may have lower discard mortality rates. It is therefore assumed that a significant proportion of barndoor skates returned to the water quickly would survive.

The Council intends for this measure to be a proactive step towards protecting the barndoor skate resource and rebuilding it to long-term sustainable levels. Given the amount and nature of information available about the resource and its associated fisheries, the Council believes that this is the most conservative measure that it can implement to protect barndoor skates at this time.

4.12 PROHIBITION ON THE POSSESSION OF THORNY SKATE (*AMBLYRAJA RADIATA*)

This action prohibits the possession of thorny skates (*Amblyraja radiata*) on all vessels fishing in federal waters. Similarly, skate dealers are prohibited from purchasing thorny skates.

Discussion: The overfished status of thorny skate necessitates action to conserve the resource to the greatest extent possible and ensure that thorny skate biomass will increase to target levels. In addition to the benefits that are likely to accrue as a result of the groundfish regulations (closed areas, DAS reductions, mesh increases), the Council is proposing to prohibit the possession of thorny skates.

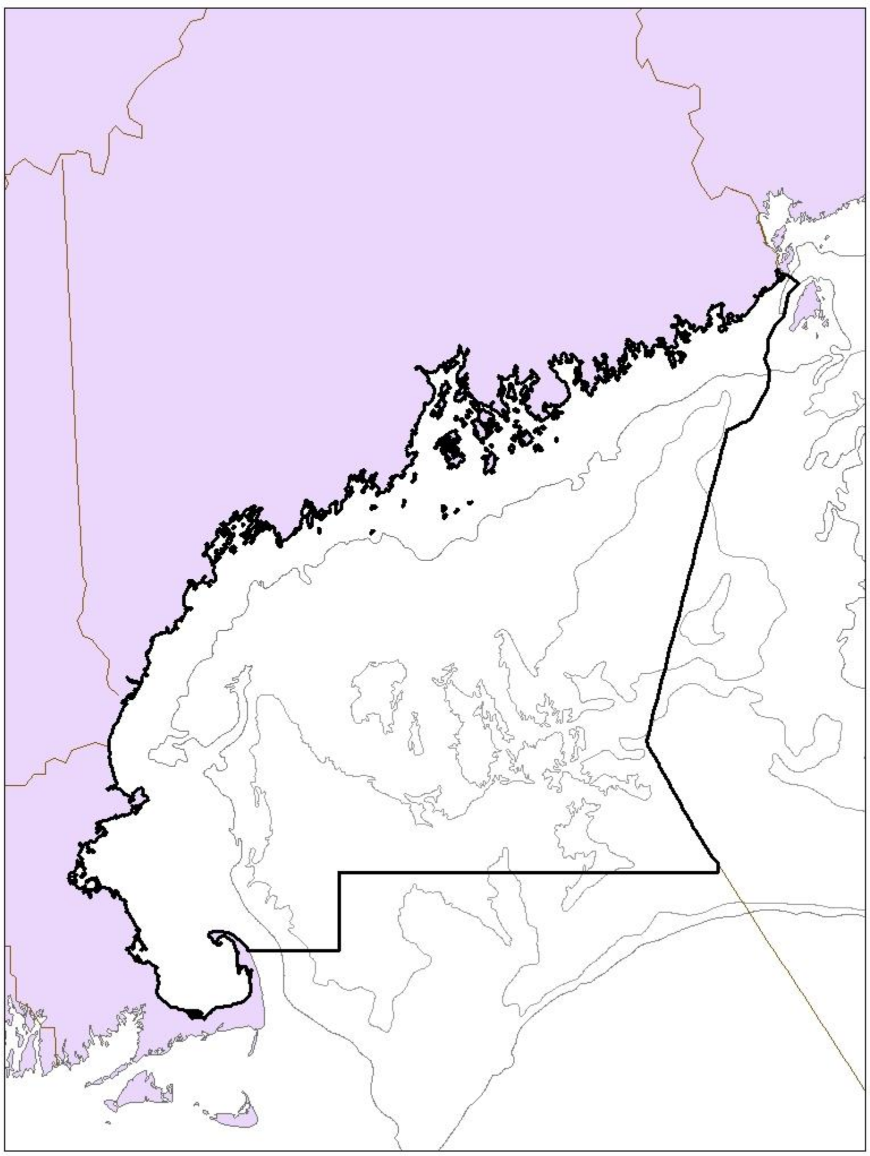
General discussion of the impacts of a prohibition on possession relative to other kinds of prohibitions is provided in Section 6.1.4 of this document. The Council intends for this measure to be a proactive step towards protecting the thorny skate resource and rebuilding it to long-term sustainable levels. Given the amount and nature of information available about the resource and its associated fisheries, the Council believes that this is the most conservative measure that it can implement to protect thorny skates at this time. This action is beneficial in that it should reduce fishing mortality on thorny skate and will not place significant burden on the wing fishery since thorny skate wings are not known to be preferred by processors.

Although the survival rate of discarded thorny skates is unknown, it is believed that a greater percentage of (thorny and other skate) discards survive as compared to finfish (cod, flounder, etc.). Available information suggests that skates may be heartier than finfish and may have lower discard mortality rates. It is therefore assumed that a significant proportion of thorny skates returned to the water quickly would survive.

4.13 PROHIBITION ON THE POSSESSION OF SMOOTH SKATE (*MALACORAJA SENTA*) IN THE GOM

This action prohibits the possession of smooth skates (*Malacoraja senta*) on all vessels fishing in the Gulf of Maine. Similarly, skate dealers are prohibited from purchasing smooth skates that are harvested from the Gulf of Maine. The Gulf of Maine is defined by the effective GOM Regulated Mesh Area boundary and depicted in Figure 15. If this boundary changes through the Multispecies FMP, the boundary for the smooth skate prohibition will change automatically to remain consistent with the GOM Regulated Mesh Area.

Figure 15 Current Boundary for the GOM Regulated Mesh Area



The possession of smooth skate will be prohibited north of this line.

Discussion: Although no longer considered to be in an overfished condition, the smooth skate resource is depleted and still well below its target biomass level. In addition to the benefits that are likely to accrue as a result of the groundfish regulations (closed areas, DAS reductions, mesh increases), the Council is proposing a prohibition on possession of smooth skates in the Gulf of Maine to conserve the smooth skate resource and promote the rebuilding of its biomass to target levels.

General discussion of the impacts of a prohibition on possession relative to other kinds of prohibitions is provided in Section 6.1.4 of this document. This action serves as a precautionary measure in case some smooth skates are currently being landed and is consistent with proposed prohibitions for the two overfished species of skates. More than anything, this measure serves to prevent the development of a fishery for smooth skates. Overlap of the smooth skate resource with the skate bait fishery is unknown; for this reason, the prohibition is limited to the Gulf of Maine only. This geographical limitation avoids potential problems with species identification in the high-volume bait fishery in southern New England. The majority of smooth skates are distributed in the Gulf of Maine, so the geographical limitation should not compromise the biological benefits of this action.

Although the survival rate of discarded smooth skates is unknown, it is believed that a greater percentage of (smooth and other skate) discards survive as compared to finfish (cod, flounder, etc.). Available information suggests that skates may be heartier than finfish and may have lower discard mortality rates. It is therefore assumed that a proportion of smooth skates returned to the water quickly would survive. However, it is noted that smooth skates are small in size and tend to be more fragile than larger skates like barndoor and thorny skates.

4.14 POSSESSION LIMIT FOR THE SKATE WING FISHERY

This action implements a possession limit for skate wings of **10,000 pounds per day (22,700 pounds whole weight) and 20,000 pounds per trip (45,400 pounds whole weight)**. A day is defined as any time period less than or equal to 24 hours. A trip is defined as any time period greater than 24 hours. The DAS call-in programs (groundfish, scallop, and monkfish) will be used to determine whether a vessel's trip is greater than 24 hours.

Vessels that fish for bait **only** and wish to be exempt from the wing possession limit may obtain a Letter of Authorization from the Regional Administrator, as specified in Section 4.15 of this document. Vessels that fish for a combination of bait and wings and vessels that do not obtain the Letter of Authorization described in Section 4.15 will be subject to the wing possession limit.

Discussion: By discouraging large-scale directed fishing for skate wings, the possession limit is expected to reduce fishing mortality on winter skates. The benefits of a wing possession limit include not only fishing mortality reductions for winter skate, but also long-term benefits to the wing species if the possession limit can discourage expansion of the fishery and/or an influx of new entrants into the fishery. Possession limits at the level which the Council is recommending should reduce landings of skate wings and will eliminate large-scale directed fishing for skate wings. Additional analysis of the proposed possession limits is provided in Section 6.2 of this document.

4.15 LETTER OF AUTHORIZATION FOR BAIT-ONLY VESSELS

Vessels that fish for skates for bait only (and not wings) may obtain a Letter of Authorization (LOA) from the Regional Administrator to indicate that they are exempt from the skate wing possession limits described in Section 4.14 of this document. The requirements of the LOA are as follows:

- Vessels that obtain the LOA are allowed to land skates only for bait and are exempt from the wing possession limits.
- Vessels that obtain the LOA must land small skates only for bait (less than 23 inches total length) and must land all skates whole.
- The minimum enrollment for the LOA would be one month.

Vessels that want to fish in a mixed fishery (bait and wings) may do so without obtaining an LOA, but their total catch of skates will be subject to the possession limits described in Section 4.14 of this document.

Discussion: Because the little skate resource is healthy and increasing, the possession limits in this FMP are not intended to apply to vessels that are fishing exclusively in the skate bait fishery. This LOA serves as a tool for enforcement personnel to easily identify the vessels that are not subject to the skate wing possession limits. It is expected that full-time bait vessels will obtain the LOA; in turn, the LOA may serve to identify the fleet of vessels that are most directly involved in the skate bait fishery and differentiate them from other vessels that may catch skates incidentally. Over the long-term, this LOA could help to improve fishery-specific information about skates.

4.16 MANAGEMENT MEASURES IN OTHER FISHERIES

In addition to the skate-specific management measures proposed in this FMP, the management measures implemented under several other FMPs (Multispecies, Sea Scallops, Monkfish, for example) provide controls on skate fishing effort and are expected to continue to help rebuild the overfished skate resources. This FMP identifies and characterizes a “baseline” of management measures in other fisheries that provide additional conservation benefits to skate species. This FMP also establishes a process for reviewing changes to the baseline, particularly a lessening of the restrictiveness of the baseline measures. This approach allows adjustments to measures in other fisheries to proceed while ensuring that skate rebuilding is not compromised by these adjustments. The proposed baseline measures and review process are described in detail below.

The philosophy behind this approach is to establish a formal process for considering management strategies as regulations in other fisheries that impact skates are adjusted. This FMP contains precautionary skate management measures and triggers/criteria to determine when additional action may be necessary (see Sections 4.4, 4.5, and 4.7). However, the long-term impacts of these measures and the acquisition of data necessary to better manage and assess these species will be slow to materialize. In the meantime, this baseline approach serves as another mechanism to ensure that skate rebuilding concerns continue to be addressed.

The baseline review should address potential significant impacts to skate mortality. Total skate mortality should be considered, including mortality resulting in increased directed fishing effort on skates and mortality resulting from the bycatch of skates. This approach therefore addresses National Standard 9, as considerations of bycatch and bycatch mortality are incorporated into the assessment of whether or not changes to the baseline measures will result in significant changes to skate mortality. In light of the current inability to *quantify* the specific contributions of the measures in the baseline, the review will focus on gauging the *directionality* of the changes to total skate mortality that are expected to occur as a result of changes to the baseline. Thus, in a *qualitative* sense, if a change to the baseline is expected to result in a general increase in skate mortality, then the PDT would recommend conservation-equivalent measures that would be expected to reduce skate mortality by approximately the same amount.

The Council recognizes that this approach is somewhat cumbersome and could result in protracted exchanges between the Council's Committees and the various needs of different fisheries managed through other FMPs. This potential outcome can be mitigated if the Skate PDT conducts the baseline review(s) holistically and in conjunction with the technical group (a species PDT, for example) that is developing the analyses to support the changes to the baseline measures. It may be that adjustments to the baseline measures can be developed in such a way that the action itself addresses and mitigates potential impacts on skates, thereby eliminating the need to initiate a skate-specific action immediately following the action to change the baseline measure. This is the intent of the baseline review process described in Section 4.16.2.

4.16.1 Identification of Baseline Measures

The following management measures in other fisheries compose the **baseline** of management measures on which the Skate FMP will rely, in part, to continue to protect and rebuild overfished species of skates. Significant adjustments to the measures identified in this section are subject to a review by the Skate PDT, as described in Section 4.16.2 of this document. Significant adjustments are defined as those that make measures less restrictive and/or substantially change the nature and scope of the measures in question. Adjustments that make the following measures more restrictive without substantially changing the nature and scope of the measures would not be subject to review.

The identification of baseline measures from the Multispecies FMP is intended to reflect the management measures effective as of August 1, 2002, including those implemented through the court order regarding CLF et al. vs. Evans (Framework 33 lawsuit).

The baseline of management measures in other fisheries that benefit skates includes:

- Multispecies Year-Round Closed Areas (Section 4.16.1.1)
- Multispecies Days-at-Sea (DAS) restrictions (Section 4.16.1.2)
- Gillnet Gear Restrictions (Section 4.16.1.3)
- Lobster Restricted Gear Areas (Section 4.16.1.4)

- Gear Restrictions for Small Mesh Fisheries (Section 4.16.1.5)
- Monkfish DAS restrictions for Monkfish-Only permit holders (Section 4.16.1.6)
- Scallop DAS restrictions (Section 4.16.1.7)

These baseline measures are discussed in more detail below. The Council may adjust or reset the baseline through a framework adjustment to the Skate FMP, as stated in Section 4.8 of this document.

4.16.1.1 Multispecies Year-Round Closed Areas

The Multispecies FMP utilizes both seasonal and year-round closed areas to reduce fishing mortality and protect spawning stocks of cod, haddock, and other groundfish species. Although the seasonal closures are known to benefit skates as well, the Skate FMP will rely most on the year-round closed areas to protect and rebuild skates. The baseline identified in this FMP, therefore, includes only year-round multispecies closed areas.

The current primary year-round closed areas are Closed Areas I and II on Georges Bank (CAI and CAII), the Nantucket Lightship Closed Area south of Cape Cod (NLSCA), the Western Gulf of Maine Closed Area (WGOM), and Cashes Ledge Closed Area (CLCA). CAI and CAII were first established as seasonal spawning protection areas under ICNAF, though the boundaries have changed over the years. In 1994, these areas were changed to year-round closures in order to reduce fishing mortality. The NLSCA was conceived as a closure to protect large concentrations of juvenile fish, but was also implemented as a year-round closure in 1994. The WGOM was established in 1998 primarily to reduce fishing mortality on Gulf of Maine cod stocks. The CLCA was first established as a seasonal closure in 1999 (Framework 27), but has since been closed year-round. The year-round area closures are illustrated in Figure 16 below. Table 6 provides a general characterization of the year-round groundfish closed areas and the skate species for which they provide the most protection.

Figure 16 Current Multispecies Year-Round Closed Areas

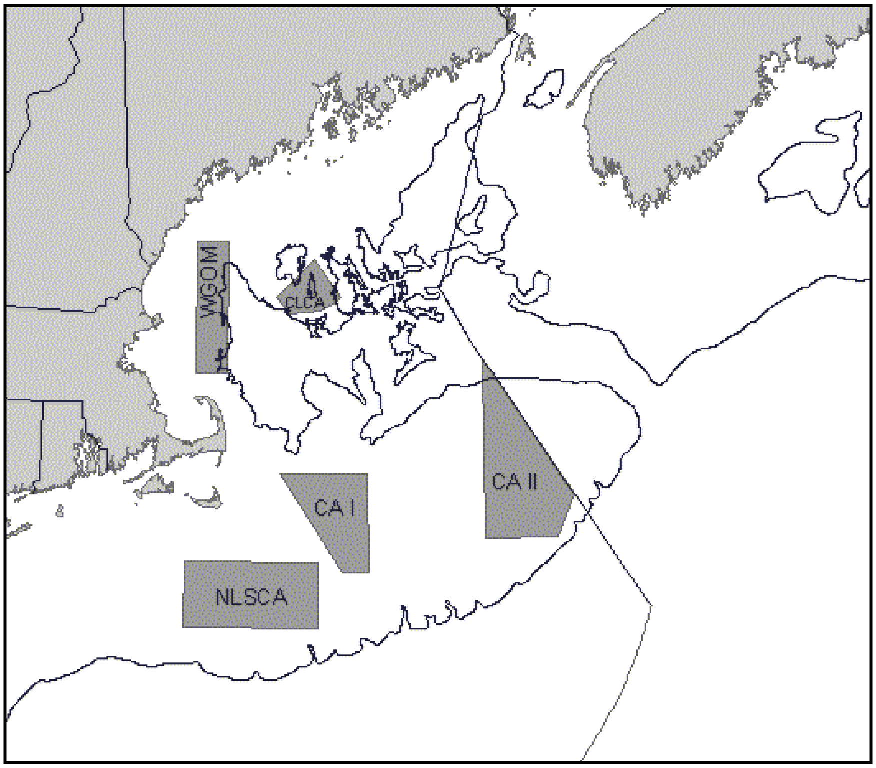


Table 6 Current Year-Round Multispecies Closed Areas Included in Skate FMP "Baseline"

CLOSED AREA	GENERAL LOCATION	SQUARE MILES CLOSED	SKATE SPECIES PROTECTED
Closed Area I	Western Georges Bank, near Great South Channel	1,520	• Winter (southern half) • Little (southern half) • Barndoor • Thorny (northern half) • Smooth (northern half)
Closed Area II	Eastern Georges Bank, near Hague Line	2,650	• Winter • Little • Barndoor
Nantucket Lightship	Eastern Georges Bank and Southern New England, south of Nantucket	2,412	• Winter • Little • Barndoor
Western GOM	Inshore Gulf of Maine	1,170	• Thorny • Smooth
Cashes Ledge	Offshore Gulf of Maine	530	• Thorny • Smooth
TOTAL SQUARE MILES	**8,282**		

**See Section 6.1.6 of this document for supplementary information about the benefits of year-round closed areas as well as charts of the closed areas overlaid with NEFSC trawl survey distributions of the skate species.*

The information provided in Table 6 should be considered if these closed areas become subject to a baseline review as part of the process described in Section 4.16.2 of this document. A baseline review should occur if:

- The total area covered by multispecies year-round closed areas decreases below approximately 8,200 square miles.
- One or more of the areas that protect a skate species under a formal rebuilding program decreases below the size identified above.
- One or more of the areas that protect a skate species under a formal rebuilding program changes in configuration and/or location.
- Restrictions in the area are adjusted (for example, closed area access programs, changes to the list of exempted gears).

Additional discussion of the benefits of the year-round closed areas is provided in Section 6.1.6 of this document.

4.16.1.2 Multispecies Days-at-Sea Restrictions

The multispecies effort reduction program initiated in Amendment 5 and expanded in Amendment 7 requires vessels to fish under a multispecies days-at-sea (DAS). Multispecies DAS were initially allocated based on vessels' groundfish fishing history; vessels had the option to either prove their history and receive an individual allocation of DAS or elect into the Fleet DAS category and receive a fleet average number of DAS. DAS were then reduced according to a schedule defined in Amendment 5, and then accelerated in Amendment 7. Ultimately, groundfish fishing effort was reduced 50% from the baseline levels that occurred before Amendment 5. Further reductions in DAS were recently implemented through the court decision regarding CLF et. al. v. Evans (Framework 33 lawsuit).

The Multispecies DAS effort reduction program substantially impacts skate fisheries, as the vast majority of skate fishing occurs under Multispecies DAS. If a vessel is fishing for skates in federal waters, it is fishing with gear capable of catching multispecies and is therefore required to use DAS unless it is fishing in an exempted fishery. It is believed that almost all skate wing fishing and a substantial portion of skate bait fishing occurs under Multispecies DAS in non-exempted fisheries. Most skate wings, in fact, are landed as incidental catch on groundfish trips. Since the majority of skate fishing effort is controlled by the multispecies effort reduction program, reductions in groundfish fishing effort through DAS restrictions have resulted in and will continue to result in proportional reductions in skate fishing effort.

Table 7 summarizes DAS allocations and usage since the 1995 fishing year. Note that a significant reduction in DAS allocated occurred after the implementation of Amendment 7 in 1996. Also note that 2001 fishing year data are preliminary and incomplete and cannot be compared to other years in the table. The total number of allocated Multispecies DAS averaged about 157,400 from fishing year 1997-2001. From fishing year 1997-2000, the total number of Multispecies DAS used averaged about 54,500.

Table 7 Average Percent of Multispecies Limited Access Days-at-Sea Used by Days-at-Sea Permit Category

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fishing Year	Total Number of Permitted Vessels	Total Days-at-Sea Allocated	Number of Permitted Vessels that Called In	DAS Allocated to Vessels that Called In	Total DAS Used by Vessels that Called In	% of DAS Used by Permitted Vessels ((5)/(2)*100)	% of DAS Used by Permitted Vessels that Called In ((5)/(4)*100)
1995	**769**	**140,956**	**440**	**83,695**	**38,527**	**27**	**46**
1996	**1,705**	**236,218**	**990**	**140,612**	**51,968**	**22**	**37**
1997	**1,713**	**155,270**	**1,090**	**101,905**	**49,464**	**32**	**49**
1998	**1,636**	**156,989**	**1,062**	**106,415**	**52,935**	**34**	**50**
1999	**1,646**	**160,452**	**1,067**	**106,506**	**54,271**	**34**	**51**
2000	**1,649**	**160,727**	**1,082**	**109,764**	**61,269**	**38**	**56**
2001*	**1,534**	**153,474**	**999**	**102,958**	**41,788**	**27**	**41**

**2001 FY data are current only through 12/31/01.*
Cells with shading are not comparable to previous years.
Source: NMFS Enforcement DAS Call-In Database

While Table 7 characterizes recent DAS activity in the multispecies fishery, the court decision regarding CLF et. al. v. Evans (Framework 33 lawsuit) and the associated interim action implemented by NMFS significantly changes DAS allocations and usage for the 2002 and 2003 fishing years (and until Amendment 13 is implemented).

Current DAS Baseline

The current DAS baseline for this FMP is based on the NMFS interim rule, implemented August 1, 2002 and effective until the implementation of Amendment 13 in August 2003. This interim action establishes a "used DAS baseline" for each vessel based on the vessel's permit history. The used DAS baseline for a limited access permit would be calculated based on the highest number of DAS that a vessel(s) fished during a single fishing year using the 1996 through 2000 fishing years, beginning May 1, 1996, through April 30, 2001, not to exceed the vessel's current DAS allocation in any given year. For vessels where the calculation of the baseline DAS would result in a net amount of DAS less than 10, the vessel would be allocated a used DAS baseline of 10 DAS.

The effort reduction measures in the interim action will reduce vessels' baseline level of used DAS, calculated as described above, by 20 percent. As of February 2003, NMFS estimated that under this interim rule, the initial allocation of DAS for the 2002 fishing year is 61,214 DAS, not including DAS that are allowed to be carried over from the previous fishing year. This represents a 60% reduction from allocated DAS for the 2001 fishing year and a 74% reduction from DAS that were allocated prior to the reductions that occurred in Amendment 7. Allowable fishing effort on groundfish and therefore on skates is significantly lower than in previous years.

Carryover DAS are not considered as part of this baseline because over time, carryover DAS should not affect total DAS usage. Average DAS usage over a period of years cannot exceed average DAS allocations for that time period even with carryover DAS. **The baseline Multispecies DAS for this FMP, therefore, will be 62,000 DAS available for use, not including carryover DAS** (the baseline of 61,214 DAS was rounded upwards to account for appeals and individual vessel considerations that may arise as the fishing year 2002 DAS allocations are implemented). Note that this includes DAS that are allocated to Monkfish Category C and D vessels. The relationship between Groundfish and Monkfish DAS is discussed further in Section 4.16.1.6.

The information provided above should be considered if Multispecies DAS adjustments become subject to a baseline review as part of the process described in Section 4.16.2 of this document. A baseline review should occur if:

- The total Multispecies DAS **available for use** exceeds **62,000 DAS**. (It is possible that more DAS will be allocated in the future, but some may be set-aside and not available for immediate use, so consideration should be given to those DAS that are available immediately following an action that changes DAS allocations.)
- The Council significantly changes (for example, the DAS accounting system is adjusted so that DAS are no longer counted at a 1:1 ratio) or abandons the Multispecies DAS effort reduction program.

One important consideration when reviewing changes to the DAS baseline is how fishermen may adjust fishing practices and behavior to adapt to the reduced number of allocated groundfish DAS. The most recent DAS reduction means that allowable fishing effort on groundfish and consequently skates will be significantly lower than in previous and even recent years. Because opportunities to fish for groundfish species like cod and haddock will be so limited, it is likely that vessels will try to maximize their remaining opportunities in the multispecies fishery and may decide not to target skates at all since skates are low-value species compared to groundfish. Vessels are likely to continue landing wings as incidental catch on groundfish trips, but decisions to target skates at any time during the year may be affected by significant reductions in groundfish fishing opportunities. This means that significant Multispecies DAS reductions could result in even more reductions in skate fishing effort than expected. This could impact the skate bait fishery more than the wing fishery because the bait fishery is a directed skate fishery that occurs under Multispecies DAS and because bait is even lower in value than wings.

On the other hand, vessels could utilize the southern New England exempted skate fishery areas to fish for skates more than in the past as a response to DAS reductions. Because opportunities to fish for groundfish species like cod and haddock will be so limited, vessels may elect to target skates without using DAS in the southern New England exempted fishery areas. This could mean that significant Multispecies DAS reductions could result in less reductions in skate fishing effort than expected. However, the industry indicated in the past that these areas are not very productive skate fishing areas. Fishermen in the southern New England bait fishery claim that they use DAS to target skates most of the time because the exempted fishery areas do not include large concentrations of bait skates. The response of fishermen to DAS reductions and the resulting impacts on skates should be explored further in the context of a baseline review of DAS, if one occurs in the future.

4.16.1.3 Gillnet Gear Restrictions

Limits on the numbers of gillnets limits the amount of fishing effort that gillnet vessels can exert. Gillnet vessels land mostly skate wings (winter, barndoor, thorny skates) and represented an average of 8.5% of total skate landings between fishing years 1994-2000. Reductions in the number of allowable gillnets were recently implemented as part of the CLF et. al. v. Evans decision (Framework 33 lawsuit), so the impact of the new net allowances is not reflected in the average participation of gillnet vessels in the skate fishery. It is expected that reductions in fishing effort from the reductions in the number of allowable nets will be reflected in future skate activity by this gear sector. As an additional benefit, reductions in the number of allowable gillnets should proportionately reduce skate bycatch, the extent of which is currently unknown.

The current gillnet baseline for this FMP is based on the NMFS interim rule, implemented August 1, 2002 and effective until the implementation of Amendment 13 in August 2003. Gillnet gear requirements in this interim action are based on area fished and are summarized as follows:

- Gulf of Maine Trip Gillnets – **150 nets (one tag), 6.5-inch mesh**
- Gulf of Maine Day Gillnets – **up to 100 nets: 100 flatfish nets (one tag), 7-inch mesh; or 50 stand-up nets July – February only (two tags), 6.5-inch mesh**
- Georges Bank Day and Trip Gillnets – **up to 50 nets (two tags), 6.5-inch mesh**
- Southern New England Day and Trip Gillnets – **up to 75 nets (two tags), 6.5-inch mesh**
- Mid-Atlantic Day and Trip Gillnets – **up to 160 nets**
- Category C or D Monkfish Gillnets – **up to 150 nets (one tag), 10-inch mesh**

The information provided above should be considered if gillnet gear allowances become subject to a baseline review as part of the process described in Section 4.16.2 of this document. A baseline review should occur if:

- The number of gillnets allowed for vessels fishing in the Gulf of Maine exceeds 150.
- The number of gillnets allowed for vessels fishing on Georges Bank exceeds 50.
- The number of gillnets allowed for vessels fishing in southern New England exceeds 75.
- The number of gillnets allowed for vessels fishing in the Mid-Atlantic exceeds 160.
- The Council lifts restrictions on the number of gillnets allowed in any area, therefore allowing vessels to use an unlimited number of nets.

Gillnet mesh size is not a consideration in this baseline. It is likely that the new minimum gillnet mesh sizes select for larger skates than previous minimum mesh sizes, but no selectivity information exists to determine what an appropriate mesh size for skates is or what the impact of increased mesh sizes may be.

4.16.1.4 Lobster Restricted Gear Areas (RGAs)

The Lobster Restricted Gear Areas (RGAs), established to moderate gear conflicts between lobster vessels and mobile gear vessels, seasonally rotate small closed areas for either mobile gear fishing or lobster pot fishing. Mobile gear is defined as trawls, beam trawls, and dredges that are designed to maneuver with that vessel. The RGAs were developed with the input of a substantial number of affected fishermen. The areas stretch from 68º40' to 72º20' West longitude and depths from 70 to 225 fathoms (see Figure 17). The coordinates of the RGAs are also specified in the regulations, 50 CFR §648.81(j)(k)(l)(m).

When they are closed to mobile gear fishing, these areas offer protection to skates similar to other closed areas. While these are only seasonal closures, they are closed for multiple consecutive months (in some cases 6-9 months), which is why they are included in the baseline (versus the seasonal groundfish rolling closures). To the extent that skates can be protected by these seasonal mobile gear closures, the RGAs may help to rebuild the protected species. Table 8 characterizes these closures as a baseline for this FMP and identifies the skate species most likely to benefit from the closures.

Figure 17 Current Lobster Restricted Gear Areas

Table 8 Current Lobster Restricted Gear Areas Included in Skate FMP "Baseline"

RGA	TIME CLOSED TO MOBILE GEAR FISHING*	SQUARE MILES CLOSED	SKATE SPECIES PROTECTED
1	October 1 – June 15 (8.5 months)	**222**	• Little • Barndoor • Rosette
2	November 27 – June 15 (6.5 months)	**278**	
3	June 16 – November 26 (5.3 months)	**880**	
4	June 16 – September 30 (3.3 months)	**503**	

**Mobile gear is defined as trawls, beam trawls, and dredges that are designed to maneuver with that vessel.*

The information provided in Table 8 should be considered if the RGAs become subject to a baseline review as part of the process described in Section 4.16.2 of this document. A baseline review should occur if:

- The size of the RGAs and/or the time that the areas are closed to mobile gear fishing decreases.
- The location of the RGAs are changed.
- The RGAs are eliminated.

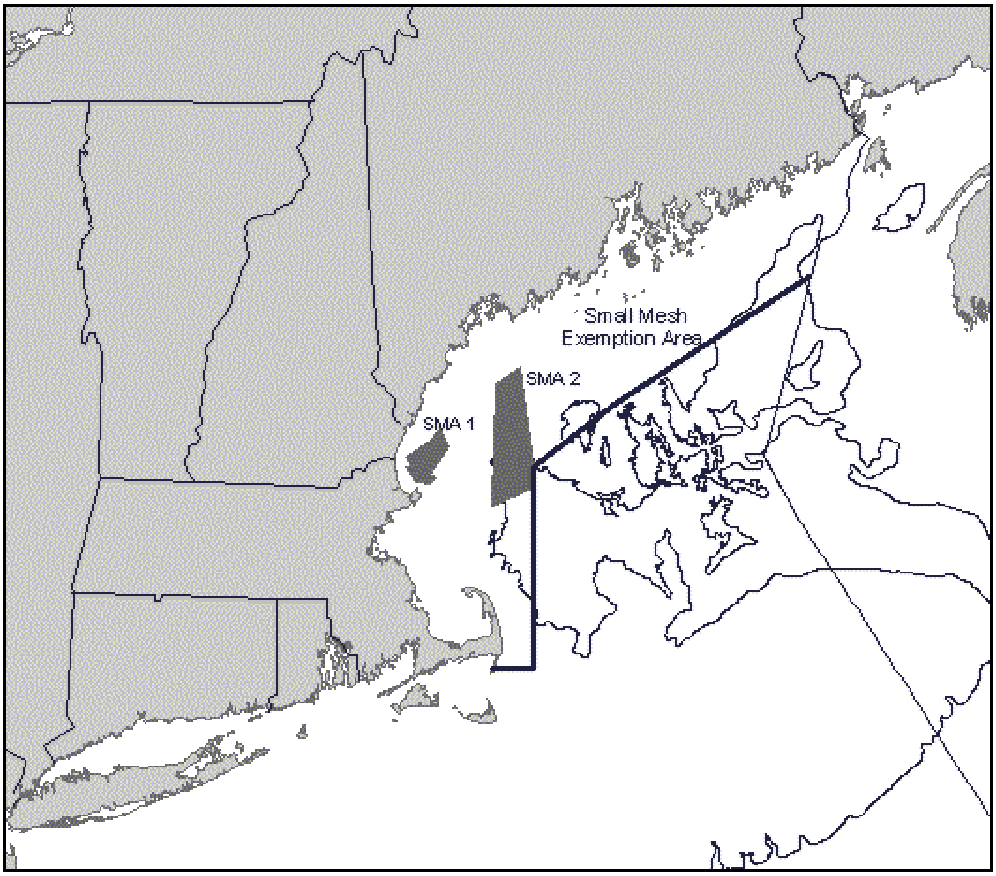
4.16.1.5 Gear Restrictions in Small Mesh Fisheries

Gear technology in New England's small mesh fisheries has minimized the level of groundfish bycatch (and consequently skate bycatch) in many areas. The Nordmore grate reduced bycatch in the northern shrimp fishery and the experimental whiting fisheries occurring in the small mesh exempted fishery area (Figure 18). The shrimp fishery requires the use of a separator grate (40 mm/1.57" bar spacing) installed in otter trawls with a minimum codend mesh of 1.75-inches. The grate prevents large fish and virtually all skates from passing into the codend while allowing shrimp and smaller fish like whiting and herring to pass through.

Richards and Henrickson (under review) examined catches of several species including skates before and after the Nordmore grate was implemented. Data in this paper indicate that the grate reduces the overall percent composition of skates in the catch, but one problem noted often is the clogging of the grate with skates. Some fishermen started inverting the grate to reduce this problem. If data from this study can be made available for the Final Skate FMP/EIS, they will be incorporated into this discussion.

In recent years, experimental whiting fisheries have occurred in this area using a combination of different mesh sizes and grate bar spacing in hopes of achieving a groundfish bycatch of less than 5%. Depending on the results of the most recent experiments, a whiting exempted fishery using some version of a Nordmore grate may be established in this area in the future.

Figure 18 Current Northern Shrimp Fishery Exemption Area (Small Mesh Areas 1 and 2 are also shown)



The raised footrope trawl has allowed whiting fisheries to emerge in the Gulf of Maine with a total multispecies bycatch well below 5%. This gear has been documented to eliminate almost all flatfish bycatch, so it can be assumed that skate bycatch using this gear is close to zero. In fact, during the experimental raised footrope trawl fisheries, sea samplers grouped skate bycatch with "other species" that included more than 40 species; the total bycatch of "other species" in the experimental fisheries averaged about 2% or less of total catch. Initial experimental and control tows were conducted to test the raised footrope trawl's effectiveness at eliminating bycatch. In 66 paired tows, the raised footrope trawl caught 1.83 lbs. of skates per hour, while the control trawl caught 8.53 lbs. of skates per hour. The raised footrope trawl reduced skate bycatch in the paired experimental tows by 6.7 lbs. per hour (78.5% reduction).

Currently, the raised footrope trawl is required in Small Mesh Areas 1 and 2 (also shown in Figure 18) and in the exempted raised footrope trawl fishery area near Cape Cod (Figure 19). Figure 19 depicts the slight modification to the raised footrope trawl fishery area that is proposed in Framework 37 to the Northeast Multispecies FMP, which will be incorporated into this baseline if it is approved. Small Mesh Area 1 is open from July 15 – November 15, and Small Mesh Area 2 is open from January 1 – June 30. The raised footrope trawl whiting fishery near Cape Cod operates from September 1 – November 20 in the entire area shown in Figure 19 and in the eastern part of the area from November 20 – December 31.

Figure 19 Current Raised Footrope Trawl Fishery Exemption Area (Showing the Current Boundary and the Proposed Change in Framework 37)

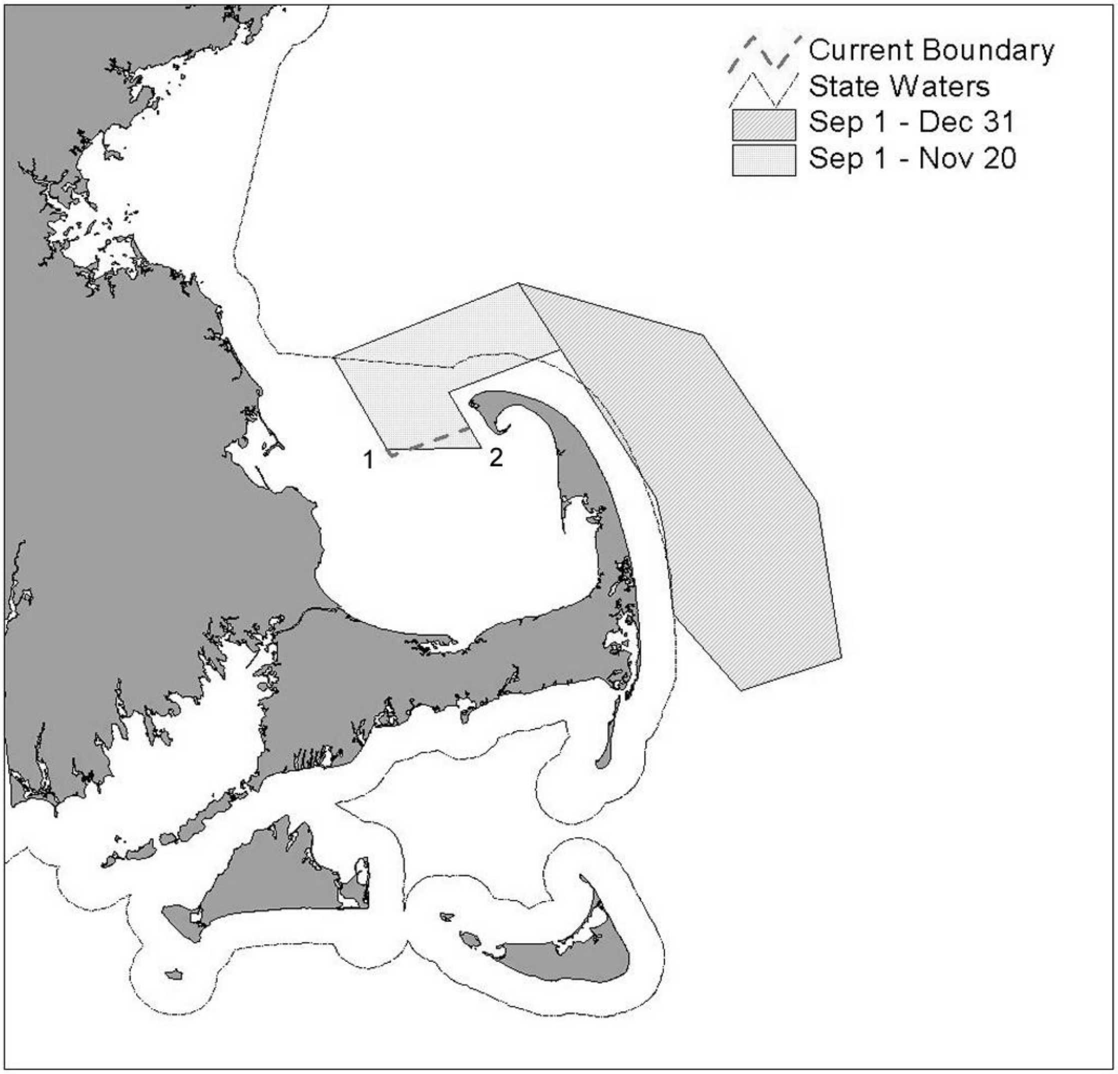


Table 9 characterizes these gear restrictions as a baseline for this FMP and identifies the skate species most likely to benefit from them.

Table 9 Current Gear Restrictions in Small Mesh Fisheries Included in Skate FMP "Baseline"

GEAR RESTRICTION	SKATE SPECIES PROTECTED
Nordmore Grate in Northern Shrimp Fishery	• Little • Winter • Thorny • Smooth
Raised Footrope Trawl in Small Mesh Areas 1 and 2	
Raised Footrope Trawl in Exempted Cape Cod Bay Area	

The information provided in Table 9 should be considered if changes to small mesh gear restrictions become subject to a baseline review as part of the process described in Section 4.16.2 of this document. A baseline review should occur if:

- The Nordmore grate is no longer required in the northern shrimp fishery.
- The size of the areas to which these gear restrictions apply decreases.
- Gear restrictions for the Nordmore grate or raised footrope trawl are eliminated in these fisheries.
- Exempted fishery areas using small mesh gear are added or deleted.

4.16.1.6 Monkfish DAS Restrictions

Days-at-sea (DAS) is one of the primary mechanisms for controlling effort and reducing fishing mortality in the monkfish fishery. While the absolute magnitude of skate catch (including bycatch) in the monkfish fishery is unknown, overlap between the two fisheries is known to occur, and monkfish vessels often land some skates (mostly wings) that they catch incidentally while fishing for monkfish. Therefore, to the extent that Monkfish DAS reduce fishing effort and mortality on monkfish, mortality on skates (in the form of landings and bycatch) should be reduced proportionately.

Limited access multispecies and scallop vessels that qualify for monkfish limited access permits (Categories C and D) receive 40 DAS, the same number of DAS that are allocated to monkfish-only permit categories (Categories A and B). When Category C and D vessels target monkfish and report a trip under the Monkfish DAS program, the trip also counts against their Multispecies or Scallop DAS, whichever is applicable. Consequently, Monkfish DAS allocations for these vessels (Categories C and D) are a subset of either their Multispecies or Scallop DAS. In terms of characterizing the Monkfish DAS baseline in this FMP, therefore, allocations for Category C and D vessels are already included in the baselines for Multispecies and Scallop DAS. As a result, the Monkfish DAS baseline specified below will only include DAS available for use by monkfish-only permit holders (Categories A and B).

The total number of Monkfish DAS allocated to and available for use by Category A and B vessels for the 2000 fishing year and beyond (unless the default measure is implemented) is 2,074 DAS (464 for Category A and 1,610 for Category B). The Year 4 default measure reduces Monkfish DAS allocations to zero (currently scheduled for May 1, 2003) if the FMP is not meeting its fishing mortality objectives. However, the implementation of the groundfish interim action as a result of CLF v. Daley (Framework 33 lawsuit) increased monkfish-only DAS because some groundfish vessels were allocated fewer Multispecies DAS than the allowable 40 Monkfish DAS. These vessels were allocated the difference between the Multispecies DAS and 40 Monkfish DAS as Monkfish-Only DAS. As a result, the total Monkfish-Only DAS allocation for the 2002 fishing year is approximately 4,240 DAS. The baseline for this FMP, therefore, will be **4,500 Monkfish-Only DAS** (the baseline of 4,240 DAS was rounded upwards to account for appeals and individual vessel considerations that may arise as the fishing year 2002 DAS allocations are implemented).

The information provided above should be considered if Monkfish-Only DAS adjustments become subject to a baseline review as part of the process described in Section 4.16.2 of this document. A baseline review should occur if:

- The total Monkfish-Only DAS (Categories A and B) **available for use** exceeds **4,500 DAS** (It is possible that more DAS will be allocated in the future, but some could be set-aside and not available for immediate use, so consideration should be given to those DAS that are available immediately following an action that changes DAS allocations).
- The Council changes the Monkfish DAS effort reduction program (for example, separates Monkfish DAS for Category C and D vessels from Multispecies and/or Scallop DAS, or changes the way that Monkfish DAS are counted).

4.16.1.7 Scallop DAS Restrictions

A days-at-sea (DAS) program is one of the primary effort reduction tools used to manage the sea scallop fishery. While scallop vessels do not land significant quantities of skates, they are known to catch skates incidentally and discard the majority of them. The primary source of skate mortality from the scallop fishery is from bycatch, although the absolute magnitude and extent of skate bycatch in the scallop fishery remains unknown. However, reductions in overall scallop fishing effort from DAS should result in proportional reductions in skate bycatch.

The Atlantic sea scallop fishery is divided into a limited access sector which is managed with DAS that are allocated to individual vessels and an open access (General category) sector that currently operates under a 400 pound trip limit. The DAS baseline for the limited access sector is based on vessel allocations that have been held constant since the 1999 fishing season (March 1 to February 28/29). Amendment 7 to the Atlantic Sea Scallop Fishery Management Plan set vessel allocations at the final year targets planned by Amendment 4 in 1999. These levels were extended to the 2000 season by Framework 12 and to the 2001 and 2002 seasons by Framework 14. Vessel allocations are defined by full-time (120 DAS), part-time (48 DAS), and occasional (10 DAS) categories which are differentiated by gear type (dredge or trawl).

Persons who qualified for the limited access fishery must apply each year for a fishing permit and DAS allocation. Those who do not apply for their DAS can maintain their Amendment 4 qualification by applying for a confirmation history permit. General category permits are also issued annually to whomever applies for one.

Overall scallop fishing effort has been reduced significantly in recent years from Scallop DAS levels around 51,000 in 1991. In recent years, the total number of DAS allocated to limited access scallopers (excluding carryover DAS) have been as follows: 30,346 in 1999; 31,118 in 2000; 33,010 in 2001; and 33,704 in 2002 (as of January 30, 2003). The increase above the 1999 level is probably partially due to activation of some historic permits as scallop biomass and access to the groundfish and scallop closed areas improved. DAS usage likewise increased from 23,087 in 1999, to 24,935 in 2000, and 28,192 in 2001.

The number of open access, General category permits increased from 2,096 in the 1999 season to 2,378 in 2001 and 2,158 in 2002 (as of July 10, 2002). The General category fishery has operated inshore on a seasonal basis, primarily in the Gulf of Maine and Cape Cod Bay. However, high scallop biomass and increased regulations in the multispecies and monkfish fisheries portend expansion of the open access fishery, including offshore and into the Mid-Atlantic. The Council is currently considering allocating a share of the Georges Bank/Mid-Atlantic total allowable catch (TAC) to the General category sector through Amendment 10 to the Atlantic Sea Scallop FMP.

The baseline of limited access Scallop DAS for the Skate FMP will be 34,000 DAS available for use. This figure does not include DAS that any remaining confirmation history permits might qualify for, or carryover DAS (as discussed for Multispecies DAS), nor does it include effort in the open access General category sector of the fishery. Note that this does include DAS that are allocated to Monkfish Category C and D vessels. The relationship between Scallop and Monkfish DAS is discussed further in Section 4.16.1.6. Adoption of a TAC for General category permit holders will not be specifically included in the baseline at this time, but will be subject to a baseline review and considered in the future, should the Council adopt a TAC for this sector of the fishery.

The information provided above should be considered if limited access Scallop DAS adjustments or a General category TAC become subject to a baseline review as part of the process described in Section 4.16.2 of this document. A baseline review should occur if:

- The total limited access Scallop DAS **available for use** exceeds **34,000**.
- A TAC is allocated to the General category sector and increased in the future.

4.16.1.8 Summary of Baseline Measures

Table 10 summarizes the current baseline of management measures in other FMPs that will continue to offer additional protection to skates.

Table 10 Summary of Baseline Measures

BASELINE MEASURE	GENERAL DESCRIPTION	IMPORTANT FEATURES	SKATE SPECIES PROTECTED
MULTISPECIES YEAR-ROUND CLOSED AREAS	Five year-round closed areas; 2 closed in GOM, 3 closed on GB	• 8,282 total square miles closed	• Areas protect different species depending on location (see 4.16.1.1)
MULTISPECIES DAS	Effort reduction measure for multispecies fishing and majority of skate fishing in federal waters	• 62,000 DAS available for use • Includes DAS for Monkfish C and D permit holders • Does not include carryover DAS	• All species
GILLNET GEAR RESTRICTIONS	Effort reduction measure for gillnet gear; limits on the allowable number of flatfish and standup nets for day and trip gillnetters in different areas	• Net allowances differ for day and trip gillnetters by area (see Section 4.16.1.3)	• All species
LOBSTER RGAS	Time/area closures in offshore southern New England waters to minimize gear conflicts between mobile gear and lobster boats	• Four areas, each closed to mobile gear fishing during part of the year • Some areas closed for 6-9 months	• Little • Barndoor • Rosette
SMALL MESH GEAR RESTRICTIONS	Requirement to use Nordmore grate in Small Mesh Exemption Area and raised footrope trawl in Cape Cod Bay whiting fishery and SMAs 1 and 2	• Gears are known to eliminate virtually all skate bycatch • Small mesh fisheries are seasonal	• Little • Winter • Thorny • Smooth
MONKFISH DAS	Effort reduction measure for monkfish fishing	• 4,500 DAS available for use • Includes DAS for Monkfish-Only permit holders (Categories A and B) • Includes extra monkfish-only DAS allocated to groundfish vessels from the Interim Action	• All species
SCALLOP DAS	Effort reduction measure for scallop fishing	• 34,000 DAS available for use • Includes DAS for Monkfish C and D permit holders • Does not include carryover DAS • Future TAC for GC permit holders also subject to review	• All species

4.16.2 Review Process for Changes to the Baseline Measures

This FMP establishes a process for reviewing significant changes to the baseline measures identified in Section 4.16.1 of this document. This approach establishes a concrete link between skates and management measures in other fisheries that impact skates. As discussed in 4.16.1, significant changes are defined as those that make measures less restrictive and/or substantially change the nature and scope of the measures in question. Changes that make the baseline measures more restrictive without substantially changing the nature and scope of the measures will not be subject to the following review.

If the Council develops an action in another FMP that may significantly change or make less restrictive one or more of the baseline measures identified in Section 4.16.1 of this FMP, the Skate PDT will evaluate the potential impacts of the proposed changes on rebuilding skate populations and develop, if necessary, management measures (or modifications to the proposed action) to mitigate the impacts of the changes to the baseline measure(s) on rebuilding skates. After reviewing the proposed changes to the baseline measure(s), the Skate PDT also may recommend no action. If the Skate PDT recommends mitigating action, however, the Council will strive to adopt, within the timeline and context of the triggering action, measures to offset the changes to the baseline measure(s). The mitigating measures adopted by the Council may be one or more of the measures recommended by the Skate PDT, or other suitable measures developed by the Council or its Skate Oversight Committee. If the Council fails to act when the Skate PDT recommends action and cannot justify a lack of action, the Regional Administrator may implement one or more of the measures recommended by the Skate PDT through an agency framework adjustment to the relevant FMP.

The following outline summarizes the process described above.

I. Council initiates action in another FMP that significantly changes and/or makes less restrictive one or more baseline measures identified in Section 4.16.1 of this document;

V. Skate PDT reviews proposed changes to the baseline measures and assess potential impacts on the rebuilding of overfished skate species;

VI. If necessary, Skate PDT develops recommendations for Council consideration to address skate rebuilding concerns within the context of the triggering action (if time permits, the Skate PDT will forward its recommendations to the appropriate species committee for consideration prior to the full Council);

VII. Council finalizes action to change the baseline measure(s), including considerations for rebuilding skates, as necessary; the Council will not make any final decisions on the triggering action until the Skate PDT has completed its review of the potential impacts on rebuilding skates and forwarded its recommendations to the appropriate species committee and/or the full Council.

Important Considerations

- This review process only applies to those skate species that are subject to formal rebuilding programs in the FMP and only applies until these species are "rebuilt." Currently, barndoor and thorny skates are considered to be in an overfished condition and will be subject to rebuilding programs when the Skate FMP is implemented. Upon implementation of the Skate FMP, therefore, this process will apply only to barndoor and thorny skates until they are "rebuilt" (unless another skate species becomes overfished and subject to a rebuilding program in the future).
- This review process only applies to changes in the baseline measures that would make the measure(s) less restrictive or would significantly alter the scope and nature of the measure(s). Adjustments that make the baseline measure(s) more restrictive without substantially changing the nature and scope of the measure(s) would not be subject to review.
- Because skate fishery information is severely lacking, it is likely that the assessments and analyses associated with this process will be qualitative in nature. As evidenced in Section 4.16.1 of this document, identification and characterization of the current baseline is entirely qualitative. Lack of data precludes a quantitative assessment of the impacts of current baseline measures on skates and is likely to preclude such an assessment of changes to these measures, at least in the near future. Over time, as data are collected through the Skate FMP permit and reporting requirements, increased observer coverage, study fleets, and efforts to collect better information in other fisheries, the Skate PDT's ability to quantify the impacts of management measures on skates should improve greatly. However, it must be acknowledged that qualitative assessments will suffice in the short-term, as quantitative assessments cannot be completed.

4.16.3 Other Management Measures that Benefit Skates

In addition to the measures that constitute the baseline identified in Section 4.16.1 of this document, there are many measures in other fisheries that further protect skates. While the skate-specific benefits of these measures are difficult to quantify, the Council acknowledges the additional protection that they afford to skates. As additional information becomes available, the Council may consider adding one or more of these measures to the baseline (Section 4.16.1**)**, especially if new information indicates that the measure(s) may have significant beneficial impacts on skates.

4.16.3.1 Other Measures in the Multispecies FMP

The Multispecies FMP uses a variety of gear restrictions. The primary gear measure is the specification of minimum mesh requirements for all gillnet and trawl gear. In the Gulf of Maine/Georges Bank and Mid-Atlantic Regulated Mesh Areas, the minimum mesh size is 6.5-inch diamond or square mesh throughout the codend of the net. In the Southern New England Regulated Mesh Area, the minimum mesh size is 7-inch diamond or 6.5-inch square throughout the codend of the net. Other gear restrictions include an area in the Gulf of Maine where otter trawl vessels may not use roller gear of more than 12 inches in diameter, and a limitation on the number of hooks used by hook gear vessels.

These gear restrictions likely impact skate fishing mortality. Mesh size restrictions help to select fish of a certain size, and are usually designed to insure a certain percentage of fish of spawning age survive. While there no known studies on the selectivity of mesh for skates, these restrictions are likely to have some impact on the size of skates caught. The roller gear restriction limits trawl vessels to certain bottom areas in the Gulf of Maine. The restriction is designed to make it difficult for trawl vessels to operate in areas with rocky or complex habitat. To the extent skates frequent those areas, this restriction may provide some protection to skate species distributed in the inshore Gulf of Maine (thorny and smooth skate).

In addition to gear restrictions for large-mesh groundfishing, limitations on allowable incidental catch species in exempted (small mesh) fisheries help to reduce skate bycatch and ensure that directed small mesh fisheries for skates do not develop in this area. This is particularly true for fisheries in the Southern New England Regulated Mesh Area (SNE RMA). The emergency action that modified Amendment 5 in December of 1994 implemented the small mesh fishery exemption in the SNE RMA based on a Council proposal that no fishery using small mesh nets "be allowed that has not been verified to have a catch of less than five percent by weight of regulated species." While skates were not included in the list of incidental catch species for this emergency action, they were included in the amendment (i.e., skates (species in the family Rajidae)) to the interim emergency rule (60 FR 3102, January 13, 1995) at §651.20(d)(5)(ii). This addition of skates to the list of Southern New England exempted (incidental catch) species was at the request of the Mid-Atlantic Fishery Management Council, who requested an amendment to the emergency rule to address discard and waste in the mixed trawl fisheries of the New York and Mid-Atlantic. The next regulatory action to implement an allowance for skate incidental catch in SNE RMA under the small mesh species exemption was Amendment 7, §651.20(c)(3)(ii): "skate and skate parts up to ten percent by weight of all other species on board."

The provision that allows for incidental catch of skate and skate parts up to ten percent by weight of all other species on board, as proposed for implementation on August 1, 2002, would apply to vessels using gears described under §648.80(b)(2) and (a)(4) (i.e., Georges Bank Regulated Mesh Area gear restrictions) that are fishing with mesh sizes less than the minimum mesh required when harvesting those small mesh species described at §648.80(b)(3)(i)(A), through April 30, 2003, and with mesh sizes greater than 3-inches, beginning May 1, 2003, unless exempted pursuant to §648.80(b)(4), while fishing for species listed at §648.80(b)(3)(i)(B) in the SNE RMA.

4.16.3.2 Monkfish Management Measures

Because monkfish is harvested with the same types of gears as skates and groundfish, there is an unknown degree of overlap between the skate fishery and the monkfish fishery. It is therefore important to consider existing management measures in the monkfish fishery that are designed to reduce fishing effort and the bycatch of both target and non-target species. To the extent that these management measures are effective in reducing overall effort and bycatch, skate bycatch in the monkfish fishery should be reduced similarly.

The monkfish fishery is predominately an incidental catch fishery. According to the EIS prepared for the fishery management plan in 1998, 70 percent of monkfish landings are on trips where monkfish contributes less than 50 percent of total trip revenues. For the remaining trips (where monkfish contributes more than 50 of trip revenues), skate bycatch amounted to 4.1 percent and 1.2 percent of total landings in the Northern Fishery Management Area (NFMA) and Southern Fishery Management Area (SFMA), respectively, during the 1991-1994 period, according to NMFS weighout data. In addition to a DAS effort reduction program (which is included in the baseline for this FMP), the Monkfish FMP, which took effect in November 1999, implements a rebuilding program that consists of:

- a limited entry program
- trip limits (including on directed trips in the SFMA)
- minimum mesh sizes (10 inch diamond and 12 inch square on trawls, 10 inch gillnets)
- limits on the number of gillnets, and
- default measures in Year 4 (2003) calling for zero monkfish DAS, currently being modified by framework action.

While current estimates of skate bycatch on monkfish trips are not available, the overall impact of the management program under the Monkfish FMP should reduce the amount of skates caught.

4.16.3.3 Scallop Management Measures

The bycatch of skates in the sea scallop fishery may be a concern, especially for larger-sized species occurring in offshore regions (winter, barndoor, and thorny skates). In this context, it is important to consider existing scallop management measures that reduce the amount of bycatch in the sea scallop fishery. These measures are not directed at reducing skate bycatch specifically, but to the extent that overall bycatch in the scallop fishery is reduced, skate bycatch is likely to be reduced similarly. In addition to the Scallop DAS effort reduction program (which is included in the baseline for this FMP), the following list describes existing management measures in the Sea Scallop FMP that are designed to further reduce bycatch:

- Mesh in twine tops (one of the primary modes of finfish escapement) has increased from 5-inches in 1991 to the current 8-inch regulation. In December 1999, the minimum twine top mesh increased from 5½-inches to 8-inches in all areas, specifically to reduce bycatch and partly compensate for the expected bycatch increase in the Georges Bank closed groundfish areas. From a limited study on bycatch reduction, Henriksen et al. (1997) estimated a 34-41 percent reduction in yellowtail flounder bycatch, with little reduction in scallop catch. Other reductions in finfish bycatch, especially other flatfish, were noted but not estimated. The larger minimum mesh remains in effect in all areas. In the Georges Bank groundfish closed areas, the minimum twine top mesh increased to 10-inches, an increase made possible because large scallops in the closed areas are less likely to escape the dredge like the smaller scallops in open areas would do. DuPaul (1999) studied the effects of using 12-inch twine tops, but not 10-inch twine tops. Bycatch reduction was significant, but there were considerable reductions in scallop catches as well. Henrickson et al. (1997) estimated a reduction of 30 to 63 percent in yellowtail flounder bycatch, but also a considerable reduction in scallop catch. This research was conducted where scallops were smaller than those expected by Framework Adjustment 11 in Closed Area II, however.

- Amendment 4 (1994) also reduced the use of chafing gear (cookies, donuts, etc.) in the dredge and increased ring size from 3-inches to 3½-inches. Both changes make the dredge lighter and offer more opportunity for escapement by finfish and small scallops.

Although bycatch and bycatch mortality reduction are difficult to quantify, the effects of the above management measures should not be underestimated. Since sea sampling on scallop fishing vessels is rare, it has been impossible to monitor and estimate the cumulative effect of these changes on bycatch and bycatch mortality reduction. However, these changes are likely to have had significant effects that should be recognized for their value in reducing bycatch and bycatch mortality not only for target species, but also for incidental species like skates.

In addition to existing management measures, the Council is considering an area rotation strategy for future sea scallop management. This strategy could be incorporated into Amendment 10 to the Sea Scallop FMP. An area rotation approach to managing sea scallops, by itself, could have a conservative effect and reduce total bycatch in the scallop fishery. In addition to increasing yield-per-recruit, area rotation is expected to increase the density of scallops in areas where fishing occurs. This, in turn, would reduce the amount of fishing effort associated with the target fishing mortality rates in the FMP. As a result, the amount of time actually fished under an area rotation strategy could be less than that conducted without area management.

4.16.3.4 Lobster Management Measures

Activity in the directed skate fishery is linked to activity in the lobster fishery in that skates are a primary lobster bait, especially in offshore and Southern New England regions. The industry has indicated that the demand for skates as lobster bait has increased over time and that the market could absorb additional landings of skates, as demand for skates as lobster bait is never fully satisfied. However, increasing restrictions in the lobster fishery could indirectly affect the skate fishery to the extent that the need for skate bait decreases. It is still too early to quantify the true impacts of recent lobster restrictions (discussed below) on the skate fishery, but it is important to consider these restrictions and their potential impacts on the demand for skate bait.

Current regulations for the lobster fishery include limited access permits, a minimum lobster carapace size, prohibition of the possession of certain lobsters (such as V-notched, berried or scrubbed lobsters) or parts (detached tails, etc.), trap specifications (size, escape vents, marking, and tags), and landing limits for non-trap harvests. Of particular relevance to the skate fishery are some of the lobster management measures which were implemented in 2000, including the establishment of six lobster management areas and their associated restrictions. There is a maximum carapace size of five inches for lobsters harvested from Management Area 1, which is the inshore area from approximately Provincetown, MA north. In contrast, there is no maximum carapace size limit associated with the other management areas such as the large offshore area (Area 3), or other relatively nearshore areas. Vessels which indicate to NMFS that they intend to use traps to fish for lobsters must designate one or more EEZ management areas in which they intend to fish traps. The various management areas have different trap limits (maximum number of traps allowable) associated with them. The nearshore management areas have relatively low trap limits associated with them (800 traps in Area 1 versus 1,800 traps in Area 3). A vessel owner may designate several management areas in which to fish, but must then abide by the most restrictive trap limit of the areas designated (regardless of where the fishing occurs).

The most likely means by which lobster regulations may have an indirect effect on the skate fishery is that a change in fishing patterns in the lobster fishery caused by lobster regulations could cause a change in the patterns of use of skate as a bait for lobster traps. If recent restrictions in the number of lobster traps cause a reduction in the total number of lobster traps fished, then it is possible that such a reduction could result in a decreased demand for skate used for bait in the lobster fishery. This potential effect on the skate fishery is indirect and dependent upon a reduction in numbers of lobster traps which are baited with skate.

4.16.3.5 Marine Mammal Regulations

The skate fishery is prosecuted in an area that also is subject to several levels of regulations that protect a number of endangered and other species of marine mammals. These regulations apply to the sink gillnet fisheries that operate under the auspices of the Northeast Multispecies, Monkfish and Spiny Dogfish FMPs. Areas in which acoustic deterrents or gear modifications are required are not included in the section, given that the intent is to allow fishing to continue, albeit under specific constraints. Other areas are subject to seasonal closures in which the use of sink gillnets is prohibited. In the Harbor Porpoise Take Reduction Plan (HPTRP), these are:

Northeast Area: August 15 - September 13
Massachusetts Bay Area: March 1 - March 31
Cape Cod South Area: March 1 - March 31
Cashes Ledge Area: February 1 - February 28/29
New Jersey waters (as defined in the HPTRP): April 1 - April 20
New Jersey Mudhole: February 15 - March 15
Southern Mid-Atlantic waters (as defined in the HPTRP): February 15 - March 15

While in some cases these relatively short-term closures may result in a true reduction in skate fishing effort, thereby affording some conservation benefits to skate species, in others, effort simply may be displaced to adjacent open areas.

The benefits to skate conservation are clearer in cases where areas are closed for lengthy periods of time. These are the Cape Cod Bay right whale critical habitat area, closed to sink gillnet gear from January 1 through May 15, and the Great South Channel right whale critical habitat area, closed to gillnets from April 1 through June 30. Both closures are implemented under the Atlantic Large Whale Take Reduction Plan. The Great South Channel area probably affects skate resources most significantly because of its large size and offshore location, although there is a great deal of overlap with Closed Area I, which is already closed to all gear capable of catching groundfish, including sink gillnets.

The use of a Dynamic Area Management (DAM) System by NMFS to protect aggregations of right whales outside of critical habitat may benefit skate species when and if closures are implemented. The DAM system was, however, developed as short-term protective measure to be implemented for 15 days, although a DAM may be extended. Also, relatively small areas are most likely to be affected, up to approximately 24 square nautical miles for a group of three whales. If numbers overlapping of DAMs are implemented, the benefits to skates could be more obvious and significant.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

During the development of this FMP, the Council considered a wide range of alternatives to manage the skate complex and its associated fisheries. Some of these alternatives were suggested by the public during the scoping process, some were developed by the Skate Committee and Advisory Panel, and some were developed and analyzed by the Skate PDT. Development of the management measures included in this FMP was an iterative process during which several alternatives were eliminated from further consideration for various reasons.

The alternatives to the proposed action can be divided into three categories: (1) the no action alternative; (2) non-preferred alternatives that were fully analyzed in the DEIS but were not selected by the Council for the Final FMP; and (3) alternatives that were rejected from consideration after scoping because they are not reasonable to consider at this time. The management alternatives in each of these three categories are discussed below, along with the Council's rationale for not selecting them. Although these measures were not selected at this time, the Council may reconsider any of them in a future action for skates, especially as better fishery information becomes available.

5.1 THE NO ACTION ALTERNATIVE

Since this is a new FMP, the true no action alternative represents the regulatory environment that would exist if the Council did not initiate management of the Northeast skate complex and develop this FMP. Skate fishing would occur as it has in the past, that is, indirectly regulated through management measures in groundfish, monkfish, scallop, and other fisheries, and largely under-documented. The lack of species-specific fishery information would continue to hamper efforts to monitor the fisheries and evaluate the status of the skate resources.

The Council rejected the no action alternative because it is not consistent with the requirements of the Magnuson-Stevens Act. Section 304(e)(3) of the M-S Act requires the Council to prepare a fishery management plan (or amendment) for the fishery that has been identified as overfished or approaching an overfished condition within one year of notification regarding the status of the fishery. The fishery management plan must be prepared to end overfishing in the fishery and rebuild the affected stocks of fish. Because skates are not yet managed under a federal FMP, the M-S Act mandates the development of this fishery management plan to address the notification by the Secretary of Commerce that some skate species are considered to be in an overfished condition.

It is difficult to conclude that taking no action would result in a collapse of the skate resources, however, because skate fishing is significantly affected by management measures in other fisheries (see Section 4.16). It is more likely that without a Skate FMP, continued effort reduction in the Multispecies, Monkfish, and Scallop FMPs would provide adequate conservation to prevent a collapse of species in the skate complex. Closed areas implemented through the Groundfish FMP would likely continue to provide a great deal of protection to some or all of the skate species in the region. Still, it is unlikely that without an FMP for skates, the Council and NMFS could effectively manage skates through other plans so that all species in the complex rebuild to target biomass levels that can produce maximum sustainable yield (MSY) over the long-term.

Similarly, without a mechanism to implement species-specific measures for skates, it is likely that some species in the complex would continue to decline (for example, thorny skate), creating the need for more stringent measures that could have severe impacts not only on skate vessels, but also on vessels in other fisheries that catch skates incidentally. Moreover, if this is the long-term outcome of not establishing an FMP for skates, the Council could be faced with implementing more stringent measures without the important fishery information that this FMP has been created to collect.

In addition to the overall no action alternative (i.e., not developing a Skate FMP), options for no action were included in the Draft FMP for each proposed management measure. The no action options that were considered are described below. The Council rejected these options because they are not consistent with developing a comprehensive fishery management program for skates that addresses the overfished condition of barndoor and thorny skates and the need to rebuild all of the skate species to their target biomass levels.

Management Unit, Fishing Year, MSY/OY, Framework Adjustment Process, FMP Monitoring Process: The no action options for these items fall within the scope of the overall no action alternative (i.e., not developing a Skate FMP).

Overfishing Definitions: The no action option for the skate overfishing definitions was Overfishing Definition Option 4 in the Draft FMP/EIS. This option is inconsistent with the Magnuson-Stevens Act and NMFS' National Standard Guidelines.

Rebuilding Program for Overfished Species: The no action option for the rebuilding programs was Rebuilding Option 5 in the Draft FMP/EIS. This is inconsistent with the Magnuson-Stevens Act and NMFS' National Standard Guidelines.

Essential Fish Habitat: In the Draft FMP/EIS, the no action option for essential fish habitat included not developing text descriptions of EFH and EFH Alternative 1 for the EFH designation methodology. Under Alternative 1, the Council would not designate any areas for skate EFH.

Federal Permit Program: The no action option for the federal permit program was Permit Option 4 in the Draft FMP/EIS. Under this option, the Council would not establish federal permits for skate fishing. There would be no mechanism to identify skate vessels that are currently not permitted in any federal fishery and incorporate them into a permit program. This is inconsistent with all other FMPs in this region.

Catch Reporting Requirements: The no action option for the catch reporting requirements was Reporting Option 1 in the Draft FMP/EIS. Under this option, reporting requirements for skates would remain as they currently are. Vessels would continue to report skate landings and discards as "unclassified skates." No species-specific fishery information would be collected.

Letter of Authorization (LOA) for Direct Sales of Skate Bait: The no action option for the letter of authorization was Option 2 in the Draft FMP/EIS. Under this option, the Council would not require a letter of authorization for vessels engaged in direct vessel-to-vessel sales of skates for bait.

Measures to Protect Barndoor Skates: The no action option for barndoor skates was Option 4 in the Draft FMP/EIS. Under this option, the Council would not implement any kind of prohibition on fishing for barndoor skates. Vessels would be allowed to target and land barndoor skates in the wing fishery as they have in the past. This option would not discourage further development of an export market for barndoor skate wings.

Measures to Protect Thorny Skates: The no action option for thorny skates was Option 4 in the Draft FMP/EIS. Under this option, the Council would not implement any kind of prohibition on fishing for thorny skates. Vessels would be allowed to target and land thorny skates in the wing fishery. This option does not prevent the future expansion of any fisheries for thorny skates.

Measures to Protect Smooth Skates: The no action option for smooth skates was Option 4 in the Draft FMP/EIS. Under this option, the Council would not implement any kind of prohibition on fishing for smooth skates. This option does not prevent future development or expansion of fisheries for smooth skates.

Possession Limits for the Skate Wing Fishery: The no action option for the proposed wing possession limits was Option 4 in the Draft FMP/EIS. Under this option, the Council would not implement a possession limit for the skate wing fishery.

5.2 NON-PREFERRED ALTERNATIVES

The following subsections describe alternatives that were considered by the Council during the development of the Draft Skate FMP/EIS, but were rejected for various reasons. These alternatives were fully analyzed in the Draft Skate FMP/EIS and were presented to the public for comments during the Skate FMP public hearings and the NEPA 45-day comment period on the Draft FMP/EIS. The rationale for not selecting these alternatives also is briefly summarized below.

5.2.1 Skate Overfishing Definitions – Non-Preferred

Four options, including the no action alternative, were considered for skate overfishing definitions. The Council selected Overfishing Definition Option 2 for the Final FMP (described in Section 4.4.3). Options 1 and 3 are summarized below. Additional information about these options is presented in the Draft Skate FMP/EIS. Discussion of Option 4 (no action) can be found in Section 5.1.

Overfishing Definition Option 1 adopts the biomass and fishing mortality reference points developed at SAW 30 as the skate overfishing definitions. The reference points for this option are summarized in Table 11.

Table 11 Overfishing Definition Option 1 Reference Points (Non-Preferred)

SKATE SPECIES	TARGET BIOMASS, B_{target} (kg/tow)	THRESHOLD BIOMASS, $B_{threshold}$ (kg/tow)	TARGET FISHING MORTALITY F_{target}	THRESHOLD FISHING MORTALITY $F_{threshold}$
Winter	6.46	3.23	0.10	0.10
Little	6.54	3.27	0.40	0.40
Barndoor	1.62	0.81	N/A	N/A
Thorny	4.41	2.20	N/A	N/A
Smooth	0.31	0.16	N/A	N/A
Clearnose	0.56	0.28	N/A	N/A
Rosette	0.03	0.01	N/A	N/A

At its September 7, 2001 meeting, the Council's Scientific and Statistical Committee (SSC) reviewed available information about skates and the overfishing definition reference points developed at SAW 30. The SSC concluded that fishing mortality-based reference points currently could not be adequately estimated in a way that can inform management because although it might be possible to calculate F_{MAX}, there is not a reliable time series of fishing mortality estimates to compare with F_{MAX}. The SSC considered but did not recommend that Hoenig-based Fs be used (for winter and little skate) because equilibrium assumptions might not be valid. For this reason, the Council rejected this option. The proposed action (Section 4.4.3) incorporates the Council's SSC's recommendation to not use the fishing mortality reference points proposed in SAW 30, but it does utilize the SAW 30 biomass reference points (targets and thresholds).

Overfishing Definition Option 3 represents a modified version of Options 1 and 2. Instead of using the biomass and fishing mortality thresholds from SAW 30 (Option 1), Option 3 establishes both biomass and fishing mortality thresholds for all seven species based on a percentage decline in the NEFSC trawl survey. This is similar to Option 2 except both the biomass and fishing mortality thresholds (instead of just the fishing mortality thresholds) utilize the survey-based approach. The reference points for Option 3 are summarized in Table 12.

Table 12 Overfishing Definition Option 3 Reference Points (Non-Preferred)

SKATE SPECIES	TARGET BIOMASS, B_{target} (kg/tow)	THRESHOLD BIOMASS, $B_{threshold}$	TARGET FISHING MORTALITY F_{target}	THRESHOLD FISHING MORTALITY $F_{threshold}$
Winter	6.46	A decline of **20% or more** in the three-year moving average of the autumn trawl survey	N/S	A decline of **20% or more** in the three-year moving average of the autumn trawl survey
Little	6.54	A decline of **20% or more** in the three-year moving average of the spring trawl survey	N/S	A decline of **20% or more** in the three-year moving average of the spring trawl survey
Barndoor	1.62	A decline of **30% or more** in the three-year moving average of the autumn trawl survey	N/S	A decline of **30% or more** in the three-year moving average of the autumn trawl survey
Thorny	4.41	A decline of **20% or more** in the three-year moving average of the autumn trawl survey	N/S	A decline of **20% or more** in the three-year moving average of the autumn trawl survey
Smooth	0.31	A decline of **30% or more** in the three-year moving average of the autumn trawl survey	N/S	A decline of **30% or more** in the three-year moving average of the autumn trawl survey
Clearnose	0.56	A decline of **30% or more** in the three-year moving average of the autumn trawl survey	N/S	A decline of **30% or more** in the three-year moving average of the autumn trawl survey
Rosette	0.03	A decline of **60% or more** in the three-year moving average of the autumn trawl survey	N/S	A decline of **60% or more** in the three-year moving average of the autumn trawl survey

The Council does not prefer this option because of technical guidance from the Skate PDT. The Skate PDT noted that while percent declines in the survey may be appropriate as fishing mortality rate reference points, they may not be appropriate as biomass reference points. The shortcomings of this approach can be illustrated through a relatively simple example. Consider a skate species that is "rebuilt" with survey averages that are twice its target biomass level. If the three-year average of the survey declines by more than the specified percentage, applying this option leads to both determinations that overfishing is occurring and the stock is overfished. While it may be appropriate to conclude that fishing mortality is too high in this scenario, it is not appropriate to conclude that the stock is overfished. Even with a decline in the three-year moving average greater than the specified percentage, the mean weight per tow from the survey could still be above the target level (i.e., the stock could still be considered "rebuilt"), but this approach would lead to the determination that the stock is overfished and requires rebuilding to its target levels. This is an inconsistent and illogical determination. For a stock that is twice its B_{MSY} level, the error embedded in using this approach for the biomass threshold could be as much as 400% (the biomass threshold is a proxy for ½ B_{MSY}).

5.2.2 Rebuilding Programs for Overfished Species – Non-Preferred

Five options, including the no action alternative, were considered to establish rebuilding programs for overfished species in accordance with the M-S Act. The Council selected Rebuilding Option 2, with a slightly modified method for calculating the three-year averages to measure progress towards rebuilding. For this reason, Rebuilding Option 2 is not discussed below. Rebuilding Options 1, 3, and 4 are summarized below. More information about these options is presented in the Draft Skate FMP/EIS. Additionally, analysis of Options 1 and 4 can be found in Section 6.1.2 of this document, as well as Option 2 and the proposed action. Discussion of Rebuilding Option 5 (no action) can be found in Section 5.1.

Rebuilding Option 1 establishes a rebuilding program for overfished species that requires Council action if the three-year moving average of the appropriate survey mean weight per tow declines by a percentage that is outside of its historical variability and is therefore considered to reflect a "real" decline in stock abundance. The Skate PDT would be charged with annually updating NEFSC trawl survey data and stock status determinations for the seven species in the skate complex. The Skate PDT would report any changes in stock status to the Council on an annual basis and will include recommendations for action if necessary. Similarly, and to eliminate the potential to maintain status quo conditions for species in need of rebuilding, the Skate PDT would be charged with informing the Council if it appears that any of the overfished species are not increasing, but instead are maintaining the status quo in terms of survey abundance. As appropriate, the PDT may also recommend management action in these circumstances. The Council may initiate a framework adjustment at any time to address these issues as they arise (see Section 4.8). The proposed language for the rebuilding programs under Option 1 is provided below:

*For overfished skate species, the Skate PDT and the Council will monitor the trawl survey index as a proxy for stock biomass. The Skate PDT will report any changes in stock status to the Council on an annual basis, and this report will include recommendations for action if necessary. As long as the three-year moving average of the appropriate survey weight per tow does not decline by more than the historical variability in the trawl survey (as determined for each species individually), it is assumed that the biomass of the overfished species is not continuing to decline. The intent of this rebuilding program is not to maintain the status quo, however, but instead to ensure rebuilding. If the three-year moving average of the appropriate survey mean weight per tow declines by at least a **specified percentage**, the Council would be required to take management action to ensure that stock rebuilding will continue to target levels.*

The percentage specified for each species reflects its natural, historical variability within the NEFSC trawl survey. The Skate PDT will also inform the Council if it appears that any of the overfished species are maintaining the status quo and not rebuilding. This report also may include PDT recommendations for management action.

Table 13 Percent Declines that Trigger Additional Management Action Under Rebuilding Option 1 (Non-Preferred)

SKATE SPECIES	THRESHOLD FOR ADDITIONAL MANAGEMENT ACTION UNDER REBUILDING PROGRAM
Winter	20% or more in the three-year moving average of the autumn trawl survey
Little	20% or more in the three-year moving average of the spring trawl survey
Barndoor	30% or more in the three-year moving average of the autumn trawl survey
Thorny	20% or more in the three-year moving average of the autumn trawl survey
Smooth	30% or more in the three-year moving average of the autumn trawl survey
Clearnose	30% or more in the three-year moving average of the autumn trawl survey
Rosette	60% or more in the three-year moving average of the autumn trawl survey

This option is not preferred because the Council does not agree that it is precautionary enough, even given the limited information available. This option could essentially maintain the status quo during a rebuilding program, or even worse, allow progressive stock declines to occur during the rebuilding program without triggering additional Council action. For example, consider a situation in which the three-year moving average of survey biomass for barndoor skate declines by 25% annually for five years. In this situation, Council action to promote rebuilding would never be triggered because the annual decline never exceeded 30%, yet the stock decreased more than 75% over the five-year time period.

Rebuilding Option 3 establishes a process for monitoring the rebuilding of overfished species and taking additional Council action as recommended by the Skate PDT. Unlike the other rebuilding options under consideration, this option does not specify any “triggers” or criteria for additional Council action, but instead establishes a monitoring process through the Skate PDT and gives the Skate PDT flexibility to recommend additional Council action as it deems appropriate. The Skate PDT would be charged with annually updating NEFSC trawl survey data and stock status determinations for the seven species in the skate complex. The Skate PDT would report any changes in stock status to the Council on an annual basis, and this report would include PDT recommendations if action is necessary to ensure that the rebuilding of overfished species continues towards target levels. The Council may initiate a framework adjustment at any time to address these issues as they arise (see Section 4.8). The proposed language for the rebuilding programs under this option is provided on the following page:

For overfished skate species, the Skate PDT will be charged with monitoring progress towards rebuilding using the trawl survey index as a proxy for stock biomass. The Skate PDT will annually update NEFSC trawl survey data and stock status determinations to ensure that progress is being made towards the biomass target for all overfished species. The Skate PDT will report any changes in stock status to the Council on an annual basis, and this report will include PDT recommendations if action is deemed necessary to ensure that the rebuilding of overfished species continues to target levels. Based on the annual PDT report and recommendations, the Council would be required to take management action to ensure that stock rebuilding will continue to target levels.

Rebuilding Option 3 was proposed to provide a wide range of options for the Council to consider when selecting the final rebuilding program. The Council does not prefer this option because it does not establish any triggers for additional management action and consequently relies on subjective interpretation to determine progress towards rebuilding. Under this option, the Skate PDT (or other group) would have to annually determine a metric or trigger to evaluate progress towards rebuilding; the *dynamic response problem* discussed in Section 4.5.5 could be exacerbated if the PDT selects a different metric every time an evaluation is completed. This is a possibility, especially if membership on the PDT changes during the rebuilding time period.

Rebuilding Option 4 establishes a rebuilding program for overfished species that requires the Council to take management action if the three-year moving average of the appropriate survey mean weight per tow does not increase annually by a percentage that is more than the species' historical survey variability (see Table 14). Similar to the other rebuilding options under consideration, the Skate PDT would be charged with annually updating NEFSC trawl survey data and stock status determinations for the seven species in the skate complex. The Skate PDT would report to the Council the difference between the most current three-year average and the previous three-year average, and Council action would be required any time that the current three-year average is not higher than the previous three-year average by the percentages specified in Table 14. The proposed language for the rebuilding programs under this option is provided below:

*For overfished skate species, the Skate PDT and the Council will monitor the trawl survey index as a proxy for stock biomass. As long as the three-year moving average of the appropriate survey weight per tow increases by at least a **specified percentage**, it is assumed that the stock is rebuilding to target levels. If the three-year moving average of the appropriate survey mean weight per tow does not increase by at least the specified percentage in any year, the Council would be required to take management action to ensure that stock rebuilding will continue to target levels.*

Table 14 Survey Percent Increases Required Annually Under Rebuilding Option 4 (Non-Preferred)

SKATE SPECIES	REQUIRED INCREASE UNDER REBUILDING PROGRAM
Winter	20% or more in the three-year moving average of the autumn trawl survey
Little	20% or more in the three-year moving average of the spring trawl survey
Barndoor	30% or more in the three-year moving average of the autumn trawl survey
Thorny	20% or more in the three-year moving average of the autumn trawl survey
Smooth	30% or more in the three-year moving average of the autumn trawl survey
Clearnose	30% or more in the three-year moving average of the autumn trawl survey
Rosette	60% or more in the three-year moving average of the autumn trawl survey

The Council does not prefer Rebuilding Option 4 because the lack of flexibility associated with this option could be problematic. The trigger in this option is very rigid; management action is required any time that progress towards rebuilding is not measured at levels above those that may represent survey variability. Consider a stock that rebuilds such that the three-year moving average of the survey increases by 10% every year until it reaches its target level. If the trigger under this option is 20%, then management action would be required during every year of the rebuilding time period even though the stock is rebuilding. These kinds of "false triggers" under the rebuilding program is something that the Council is trying to minimize (see additional discussion and analysis in Section 6.1.2).

5.2.3 Skate EFH – Non-Preferred

5.2.3.1 Non-Preferred Alternatives for EFH Designation

Six alternatives, including no action, were considered for designating EFH for each skate species. The proposed action represents Alternative 2 – NMFS Survey Data – and is described in Section 4.6 of this document.

Alternative 1 – No EFH Designation

Considered the "no action" alternative, this approach would result in there being no EFH designated for skates. According to the 1996 amendments to the Magnuson-Stevens Act, however, the Regional Fishery Management Councils are mandated to designate EFH for each species managed under an FMP. Thus, this alternative would not be in compliance with the Magnuson-Stevens Act. According to the National Environmental Policy Act (NEPA), the full range of alternatives considered in a proposed action should include the no action alternative. Consideration of this alternative fulfills the requirements and intentions of NEPA. Because selection of this alternative would result in the Skate FMP being out of compliance with the Magnuson-Stevens Act, this alternative is not suitable for selection. There would be no EFH Text Descriptions for this alternative.

Alternative 3 – High Percentage of NMFS Survey Data

This alternative uses basically the same approach described above for Alternative 2, but uses different categories of the survey CPUE index. These categories (10, 20, or 25%) would result in much smaller areas designated as EFH for Council-managed skate species. Information from the NOAA ELMR program on bays and estuaries would only be incorporated in the EFH designation when the skates are considered to be "highly abundant" in a particular estuary or embayment.

The resulting EFH designations would be very small, and not necessarily in discrete patches. This alternative, as do several others, relies primarily on the NMFS survey data. During the development of the Omnibus EFH Amendment, NMFS and the Council identified limitations associated with this data source. The bottom trawl survey was designed to monitor changes in stock size and to conduct stock assessments, not to identify essential fish habitat. The survey uses a single gear type (otter trawl) that is most efficient on certain habitat types (relatively flat sand) and less efficient on other habitat types (rough cobble and boulder). Very high catches in an area could mean that the fish are relatively more abundant in that area, but could just as easily mean that the survey gear is relatively more efficient in that area. For example, suppose that the gear is 80% efficient on flat sand (80% of the fish in the path of the survey trawl will be caught) and only 10% efficient on cobble bottom. Five tows in a sandy area result in an average catch per tow of 400 fish, while five tows in a cobble area result in an average catch per tow of 50 fish. Simply looking at the absolute numbers, it would appear that the fish are almost an order of magnitude more abundant in the first area. But, taking gear efficiency into account, it is more likely that the fish are actually present in equal numbers in both areas. While the NMFS survey data help identify areas of important concentrations and can be used as a proxy for EFH designations, there is concern that at very high percentages of abundance gear catchability differences may overwhelm habitat differences.

Using larger percentages of the CPUE index (50 - 100%), the Council is more likely to include all areas where the fish occur in relatively high abundance -- regardless of survey catch efficiency. If the Council used only the smaller percentages (10 - 25%), without adjusting for catch efficiency, the resulting data could be biased toward areas better sampled by the survey gear or could underestimate abundance in important habitats that are not sampled well. While this may not be particularly problematic for species that are associated primarily with habitats where the gear is more efficient, this would be a problem for species more abundant in areas where the gear is less efficient.

Also, as the amount of area designated as EFH decreases due to a more limited approach for EFH designation, there will be a concomitant reduction in EFH consultations. This would minimize the Council's and NMFS' ability to review and provide comments on many activities which may have adverse impacts on habitats important for Council-managed species. As the EFH consultation process is the primary regulatory vehicle for the Council and NMFS to have oversight into decision-making regarding non-fishing activities, a reduction in the extent of this process may be undesirable.

This approach itself is not inappropriate, but the current data do not support their application to such refinement of the EFH designations. The NMFS regulations and technical guidance for designating EFH suggest that when using Levels 1 and 2 data, as we are, the EFH designations should be fairly broad and encompass much of the range of each species. This ensures that important areas are not missed. Given the limitations of the survey data, the approach described in this alternative would be very likely to miss important areas for many resource species. As the level of information available improves and we are better able to identify specific habitat types and account for the differential efficiency of the survey gear, this approach could be utilized to refine the EFH designations. When stocks are at very high levels, it is believed that they will inhabit habitats of less value once space in the higher value habitats becomes the limiting resource. Using fish abundance as a proxy for important habitat could result in lower value habitats being identified simply because there appears to be lots of fish there.

Alternative 4 – Distribution of Physical Characteristics

This alternative will suggest designating EFH based on the *distribution of physical characteristics* rather than based on a survey data index. The previous alternatives all base the areal extent of the EFH designations on a CPUE index of fish abundance and some physical characteristics. An alternative approach could disregard fish abundance altogether and focus entirely on the physical characteristics that comprise the common habitat associations for each resource species. The two principle characteristics which could be used to delineate EFH are depth and benthic characteristics (sediment type, as well as SAV and other biogenic structure). Based on the information provided by NMFS, we have a fairly good understanding of the depth ranges in which species managed by the New England Council occur at their various life history stages. This same information also identified the primary sediment types associated with each species. Using a GIS and available sediment and bathymetric data, EFH could be designated based on these characteristics.

Although other parameters may also be important components of fish habitat (salinity, temperature, DO, etc.) they are too temporally variable to map. It must be understood that the actual habitat utilized by a species may vary within the depth range and benthic characteristics as these other parameters change. As better information becomes available either on the actual distribution of particular benthic characteristics or on the preferred associations of resource species, these EFH designations could be refined.

As evidenced by their use in the text descriptions of EFH for each species, physical characteristics such as depth and benthic characteristics are important components of the essential habitat for many species. Using these characteristics to map the EFH as well as describe the EFH for each species would focus attention on the particular components that appear important for a species -- whether it actually occurs there or not -- rather than simply on the place where the fish are. This would address at least one potential limitation of the fish abundance approach. When a fish stock is at low levels, it is believed to contract within its range to a core area that optimizes its survival, either through protection from predation, availability of food items, increased spawning opportunities, some other factor, or some combination. While the substance of the EFH text descriptions would not change with the selection of this alternative, the ELMR information would not be used under this approach because the ELMR information is based on species abundance rather than on physical characteristics.

By focusing not on where the fish are at any point in time, but on the physical components of habitat, theoretically both the core areas and the expansion areas would be identified. Thus, if some adverse impact to habitat is constraining or preventing the rebuilding and expansion of the species, action could be taken to protect these areas and promote the expansion of the species out of the core areas. Also, when stocks are at very high levels, it is believed that they will inhabit habitats of less value once space in the higher value habitats becomes the limiting resource. Using fish abundance as a proxy for important habitat could result in lower value habitats being identified simply because there appears to be lots of fish there. Delineating EFH solely on habitat characteristics could prevent the designation of less important habitat.

This may be a valid approach and a fine goal for the EFH program, but the data and information necessary to implement the method simply are not available at this time. At present, the distribution of sediment types is poorly known and is not adequate for designating EFH in many areas of the Gulf of Maine and southern New England shelf. EFH designated based on current knowledge of sediment distribution would be unreliable and subject to missing many important areas of habitat.

This approach assumes that we understand the particular associations that determine what habitat is essential to any particular species. While we can observe certain associations between a species and its habitat, our knowledge of the "key ingredient" may be lacking. For instance, what appears to be a depth limitation for a species may actually be an association with a persistent pressure gradient that affords the species with a good source of prey. Using an approach for designating EFH based on where the fish are keys in on the relative abundance of fish -- even if we do not know why an area is important to a fish, if there are a lot of fish there we can at least be assured that it is important for some reason. Designating solely on certain physical characteristics could completely miss the important habitat if the actual habitat associations are different from what we perceive them to be.

Alternative 5 – Combination of Survey Data and Physical Characteristics

This alternative will combine Alternatives 2 and 4, using the NMFS survey data to initially define the areas of EFH but then further refining the areas to be mapped based on physical characteristics such as depth and sediment type, rather than relying on the text to refine the designation based on physical characteristics. Combining the approaches described in Alternatives 2 and 4, the full range of EFH would first be identified using the CPUE index data to identify areas where the species occur in relatively high abundance. These areas would then be refined to eliminate those portions of the fish distribution that do not meet the identified depth range and sediment characteristics. The areas actually designated as EFH would be constrained to those areas with relatively high abundances of fish that meet the physical characteristics believed to be important. This approach combines the best features of Alternatives 2 and 4 -- utilizing known fish distributions with depth and sediment characteristics. The ELMR information would be incorporated as described in Alternative 2.

Unfortunately, this approach suffers from many of the same limitations as Alternative 4 -- our knowledge of the distribution of sediment types in the Gulf of Maine and the southern New England shelf are so limited as to make this approach subject to many errors and our perceptions of the important habitat features may be in error or incomplete. The approach also begs the question that if there are areas identified because of high levels of fish abundance that do not meet the physical parameters established, why are those fish there and are these areas not essential? Are these areas important but we do not yet understand why, or are they important but our information about them is incomplete? This may be an appropriate approach when Level 3 or 4 information becomes available, but until these levels of information on habitat characteristics and associations are available, using this approach may be premature.

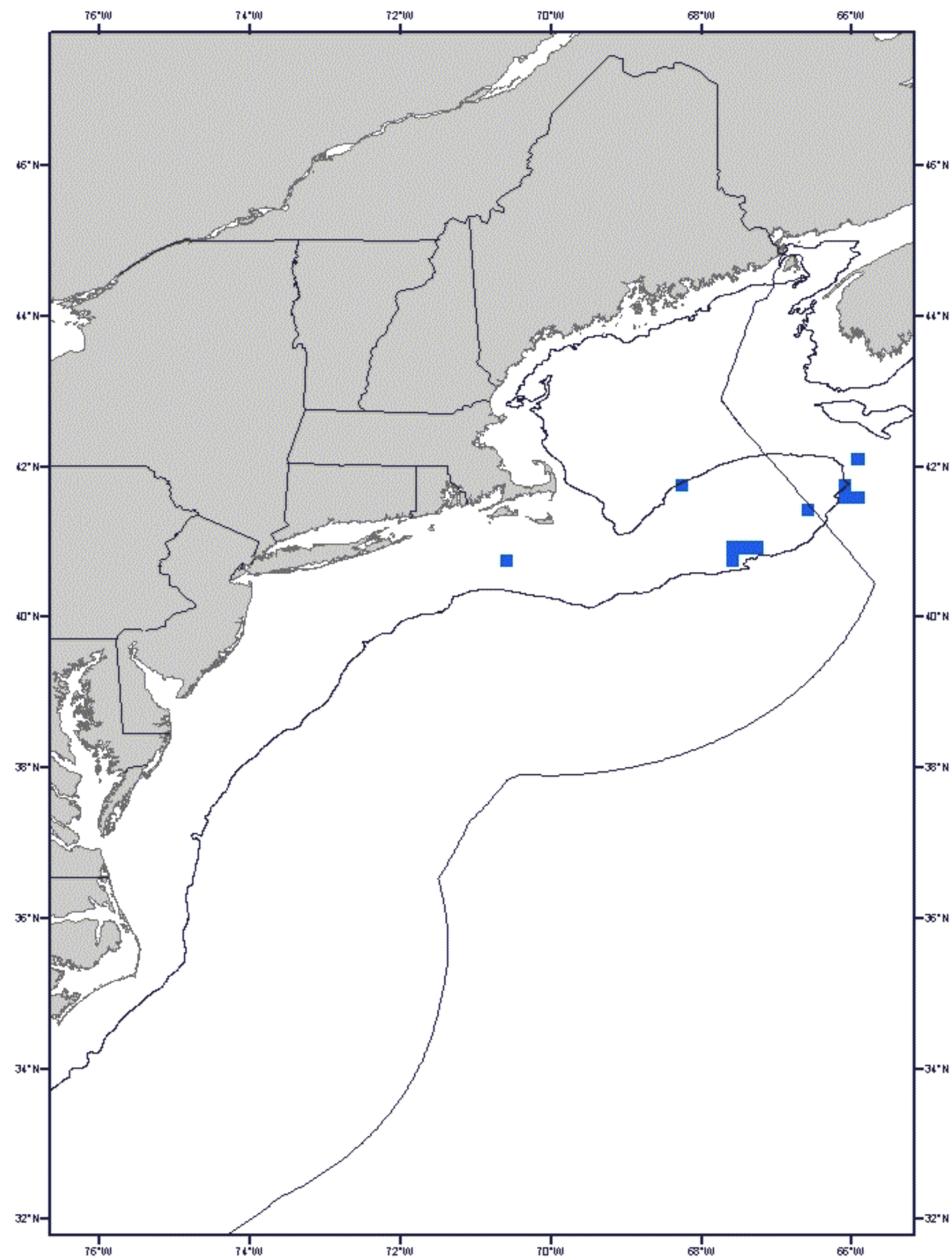
Alternative 6 – EFH is Everywhere

At the other end of the extreme from Alternative 1, this alternative would result in all waters from the shoreline to the EEZ designated as EFH for this species, whether skates occur in all areas or not. This alternative would indicate the most broad EFH designations possible. If all waters out to the EEZ are EFH for this species, then there is no possibility that the EFH designation would miss any important areas (within U.S. waters). However, this approach is not consistent with NMFS regulations and technical guidance, which specify that EFH should be designated within the full range of each species. This approach would actually go beyond this intention and include areas outside of the species' range as EFH.

5.2.3.2 Maps of Non-Preferred EFH Designation Options

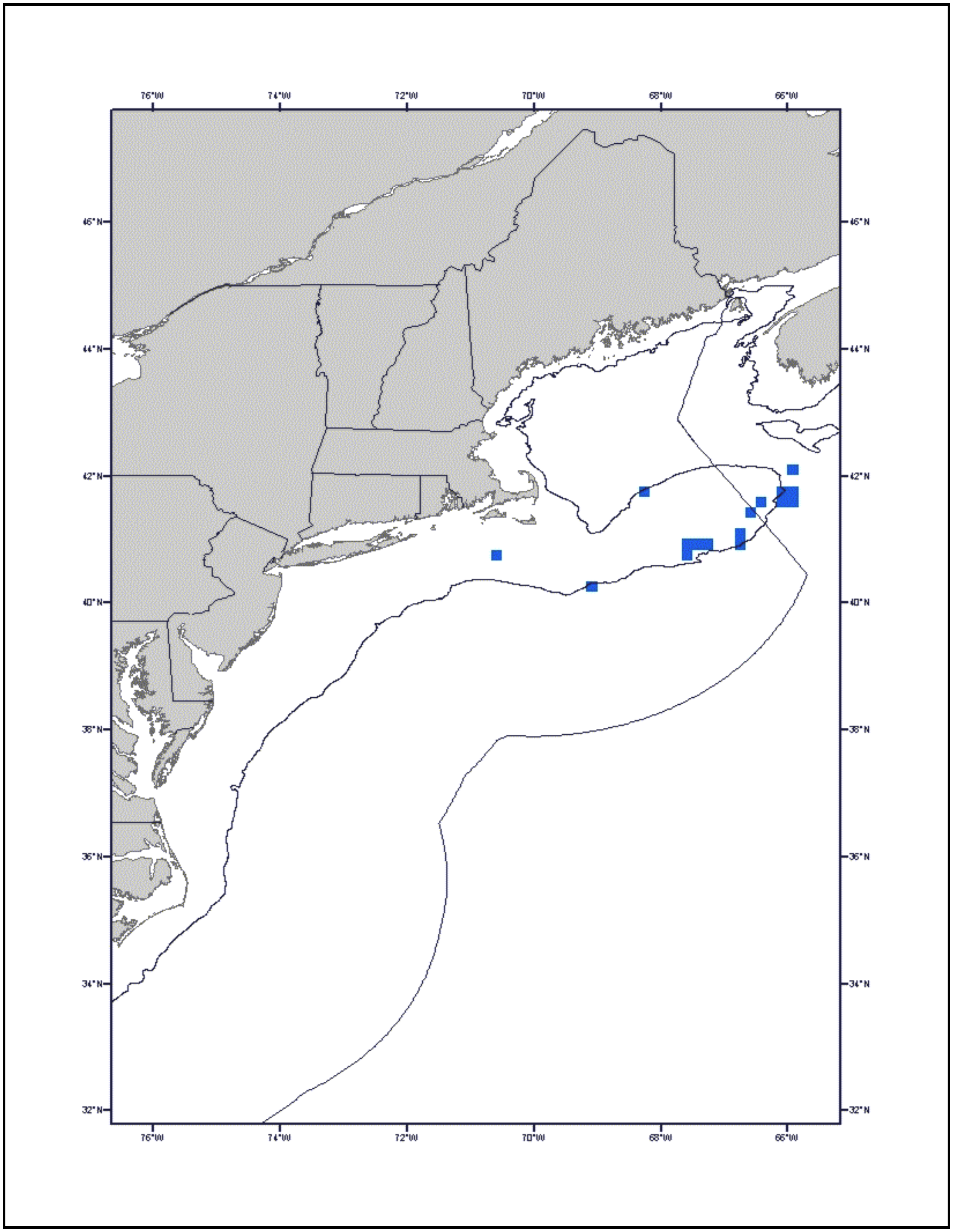
Within the preferred alternative to designate EFH for the skate species based on NMFS survey data, the Council considered four options for using the survey data: (1) 50%; (2) 75%; (3) 90%; and (4) 100%. The Council selected option 4 (100%) for barndoor skate and option 3 (90%) for all other skate species. The non-preferred EFH designation options are depicted in Figure 20 – Figure 61 on the following pages.

Figure 20 Barndoor Skate Juvenile EFH Option 1 – 50% (Non-Preferred)



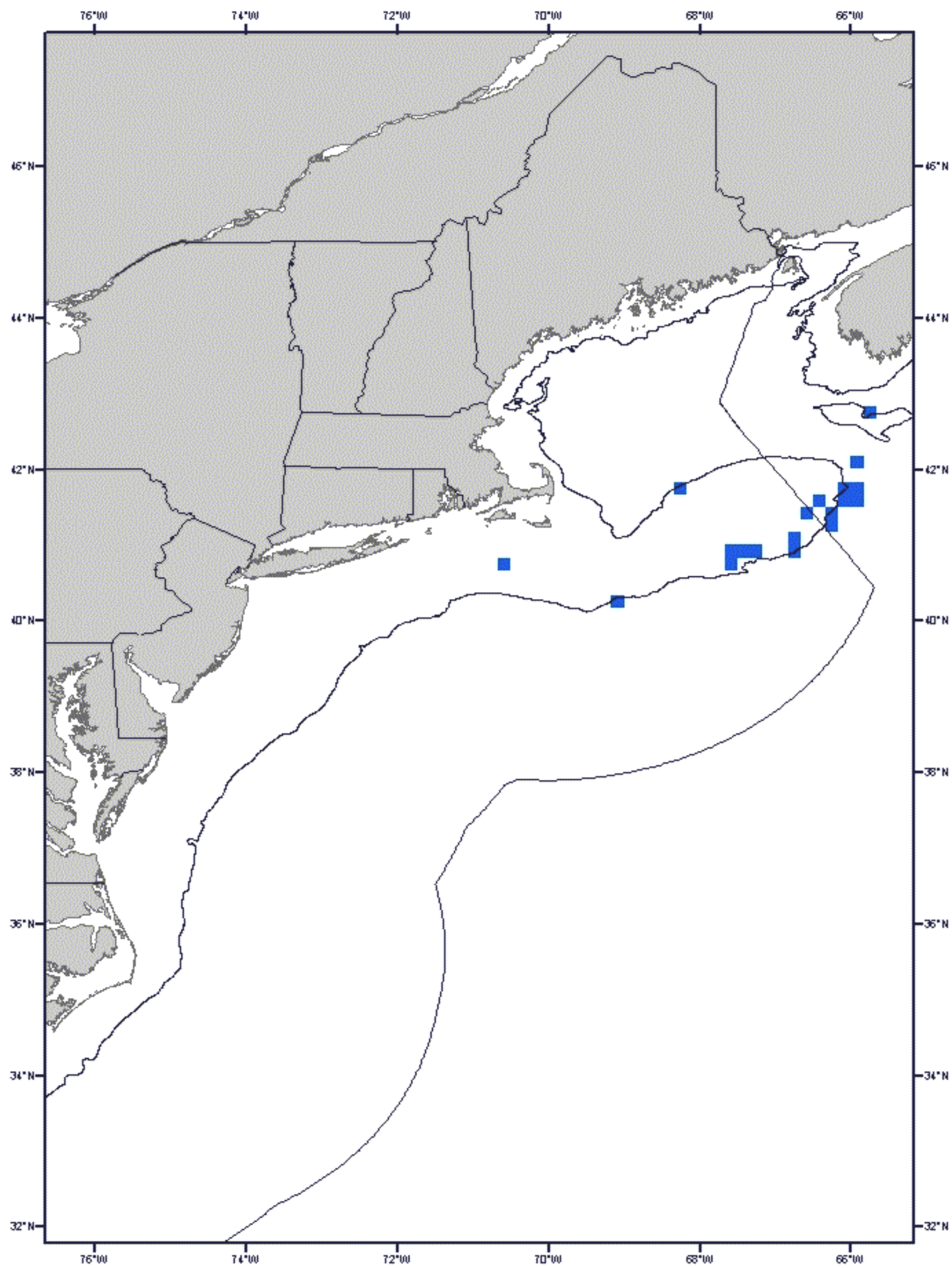
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 24% of the observed range of this life stage.

Figure 21 Barndoor Skate Juvenile EFH Option 2 – 75% (Non-Preferred)



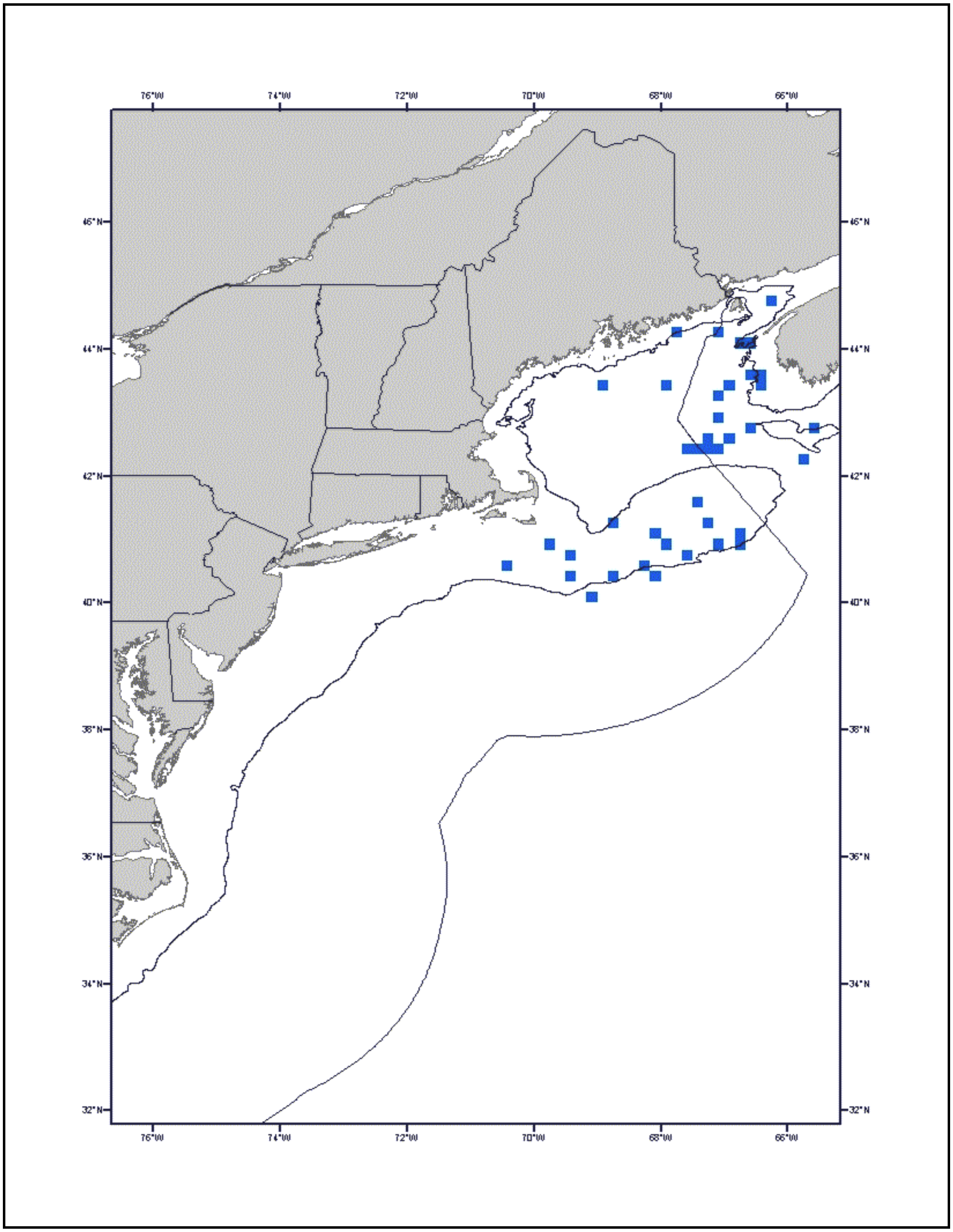
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 48% of the observed range of this life stage.

Figure 22 Barndoor Skate Juvenile EFH Option 3 – 90% (Non-Preferred)



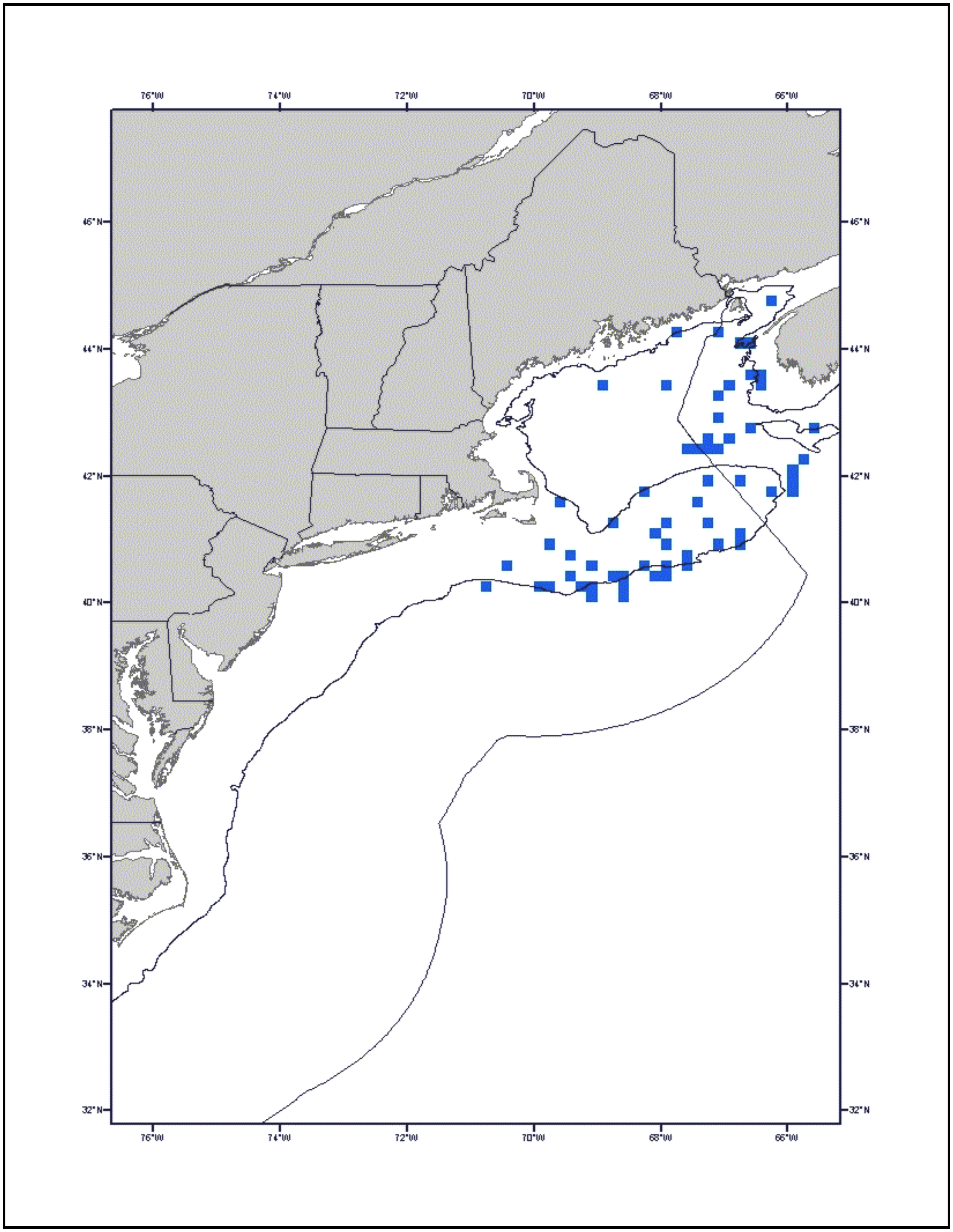
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 70% of the observed range of this life stage.

Figure 23 Barndoor Skate Adult EFH Option 1 – 50% (Non-Preferred)



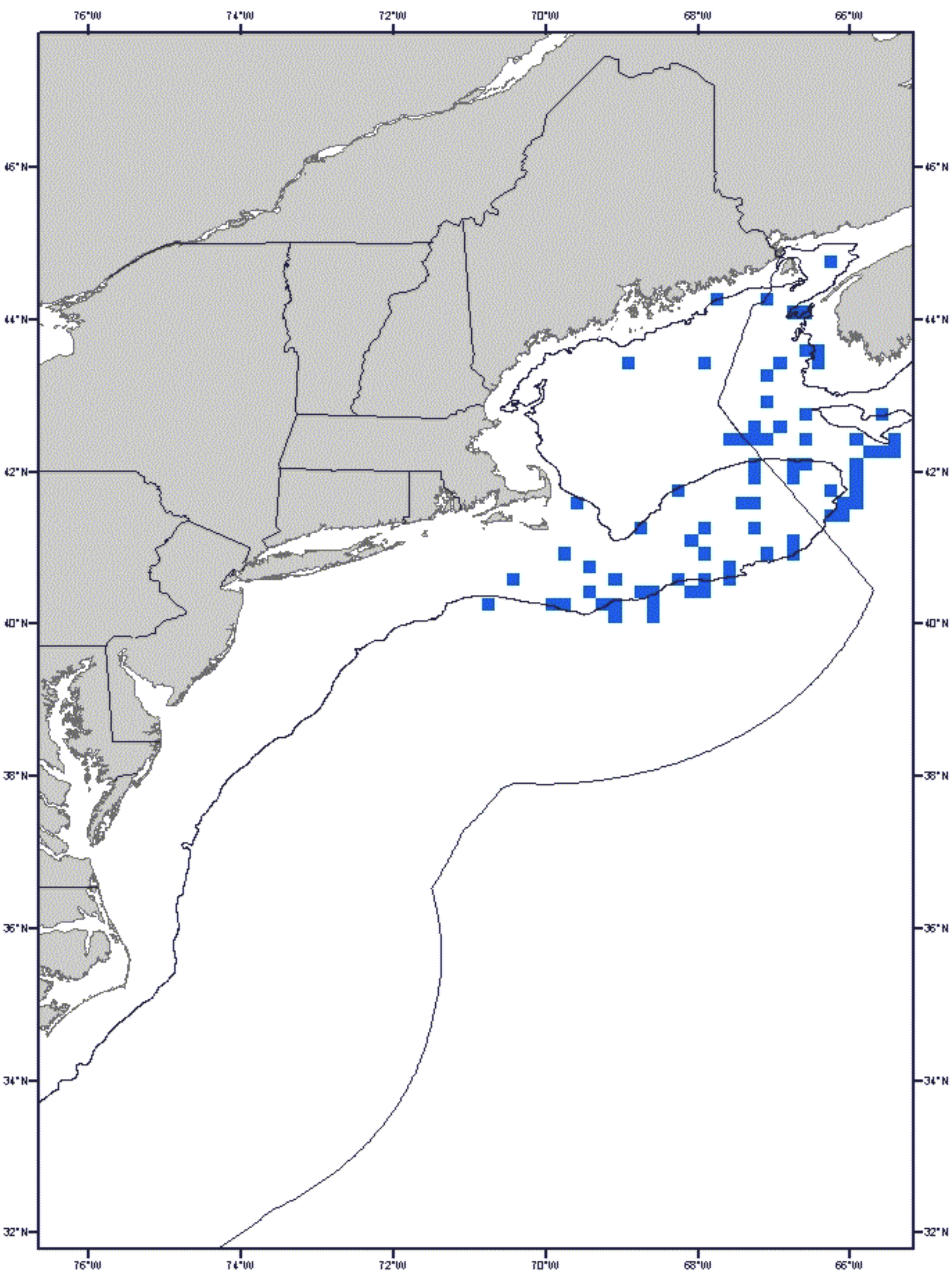
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 27% of the observed range of this life stage.

Figure 24 Barndoor Skate Adult EFH Option 2 – 75% (Non-Preferred)



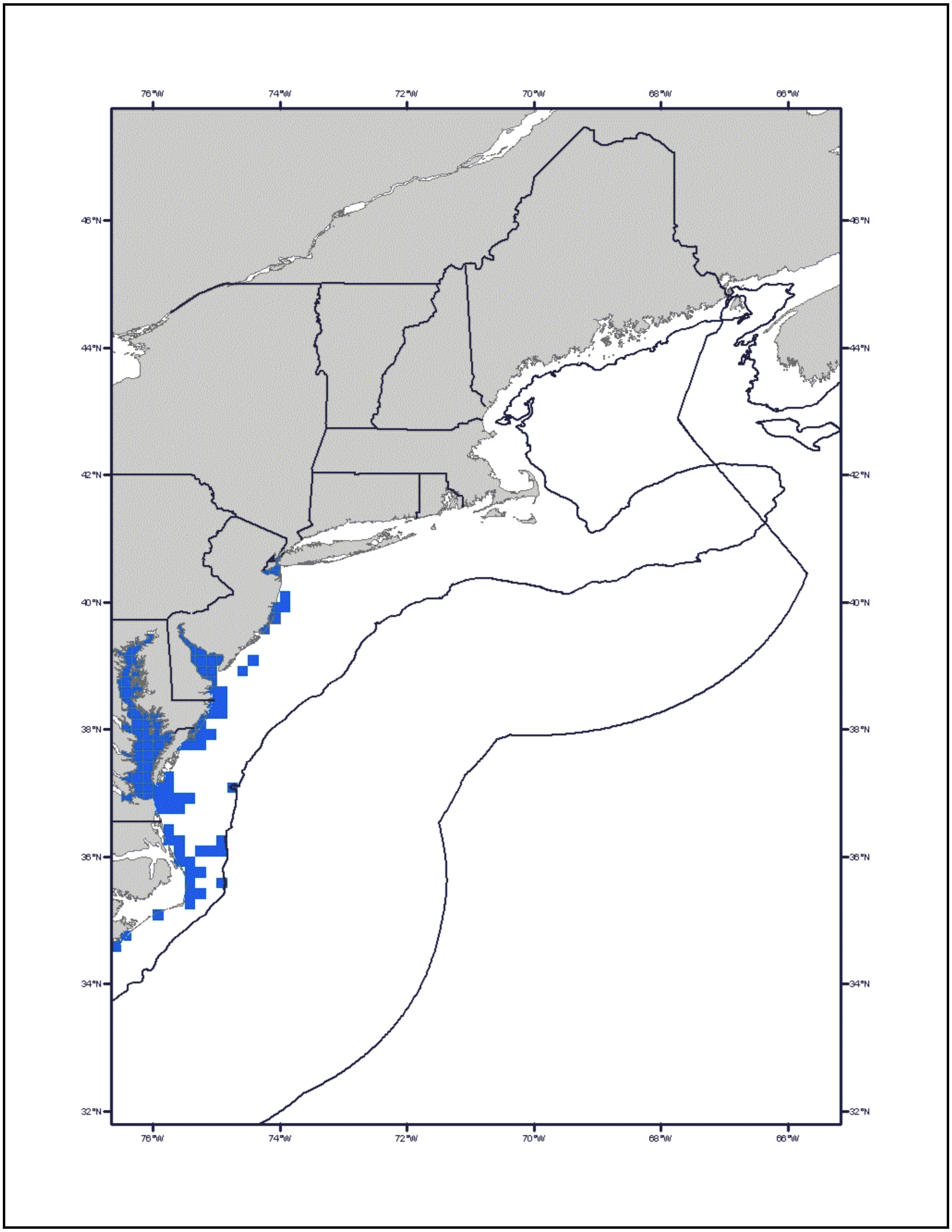
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 51% of the observed range of this life stage.

Figure 25 Barndoor Skate Adult EFH Option 3 – 90% (Non-Preferred)



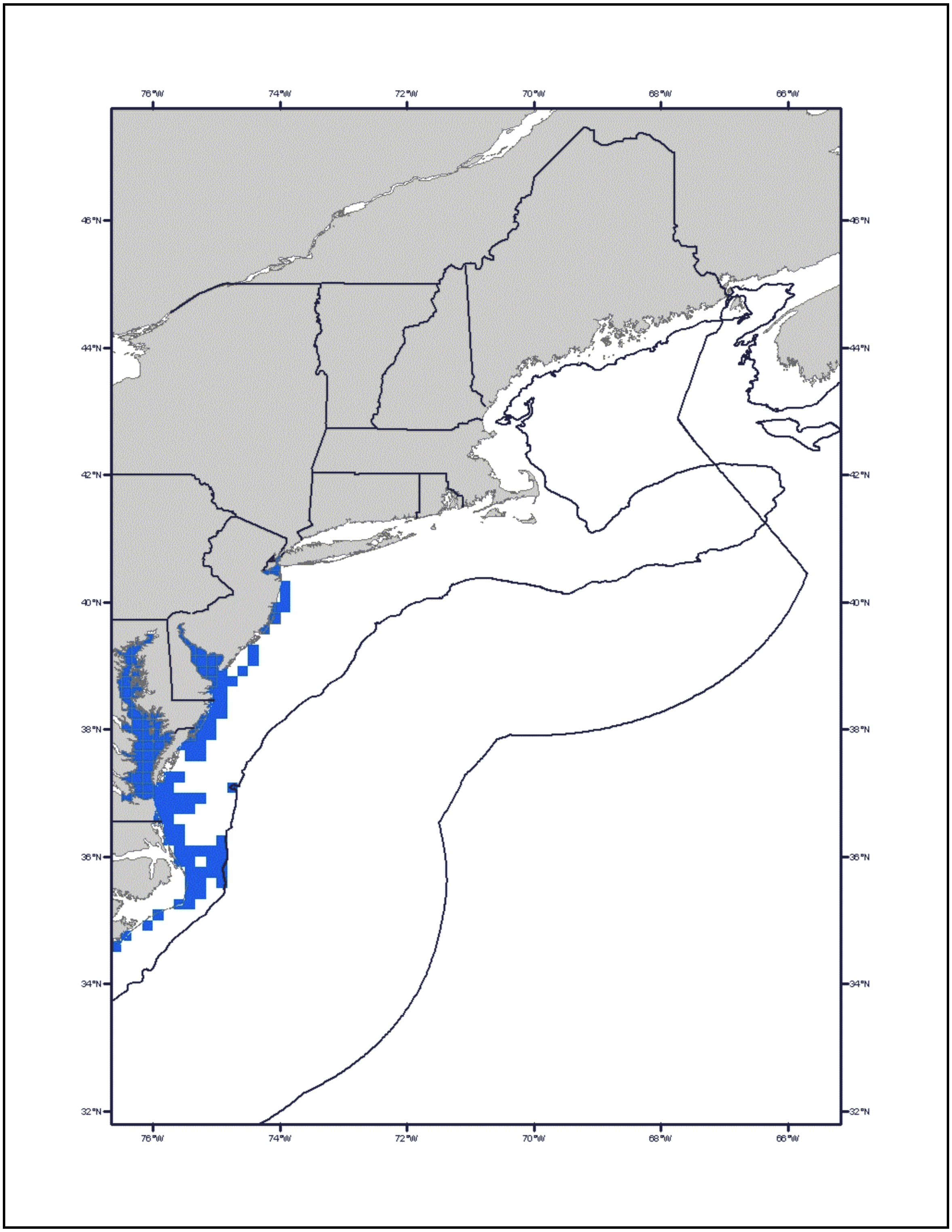
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only bottom habitats with mud, gravel, and sand substrates that occur within the shaded areas would be designated as EFH. This option represents 75% of the observed range of this life stage.

Figure 26 Clearnose Skate Juvenile EFH Option 1 – 50% (Non-Preferred)



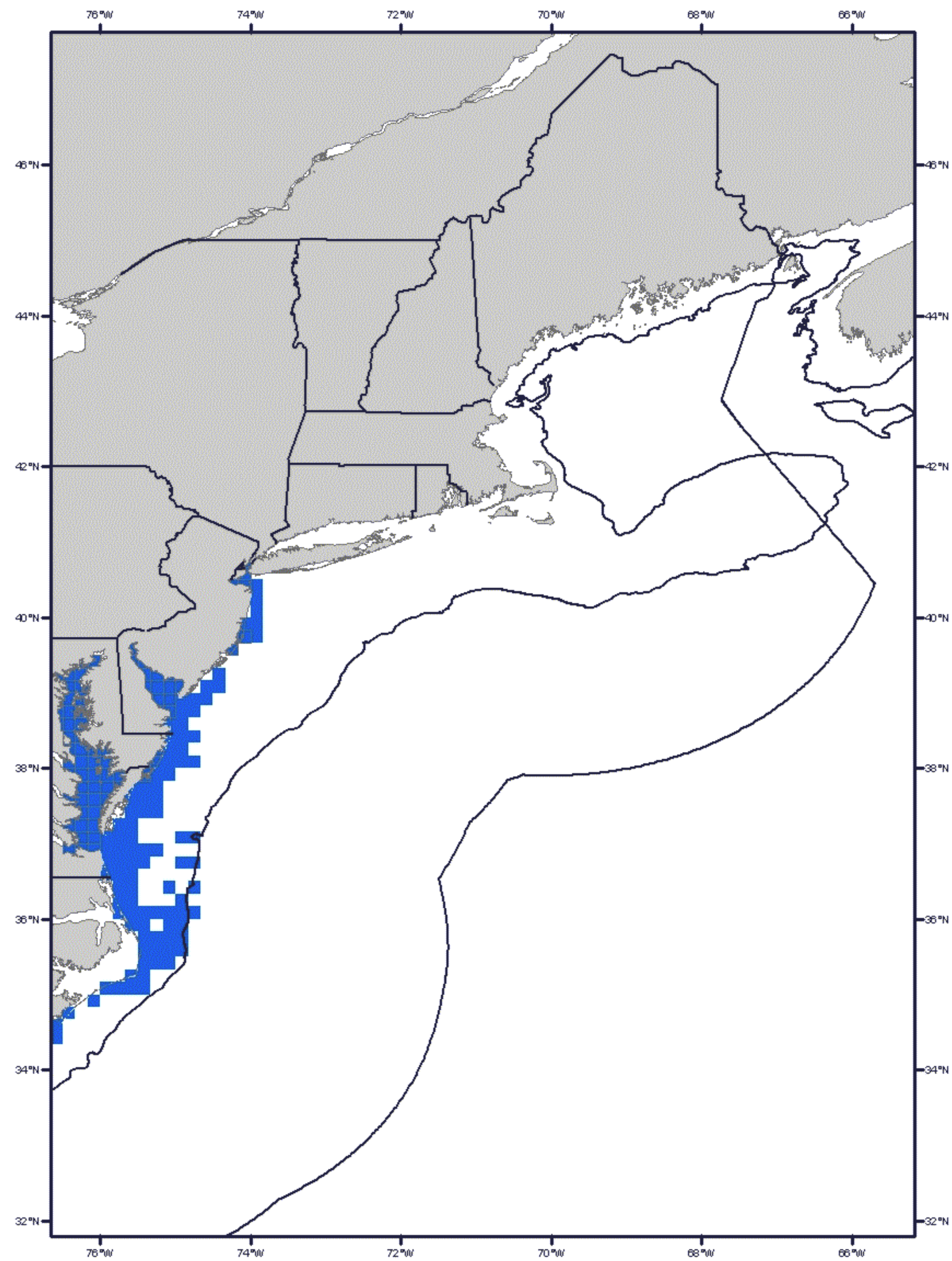
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 23% of the observed range of this life stage.

Figure 27 Clearnose Skate Juvenile EFH Option 2 – 75% (Non-Preferred)



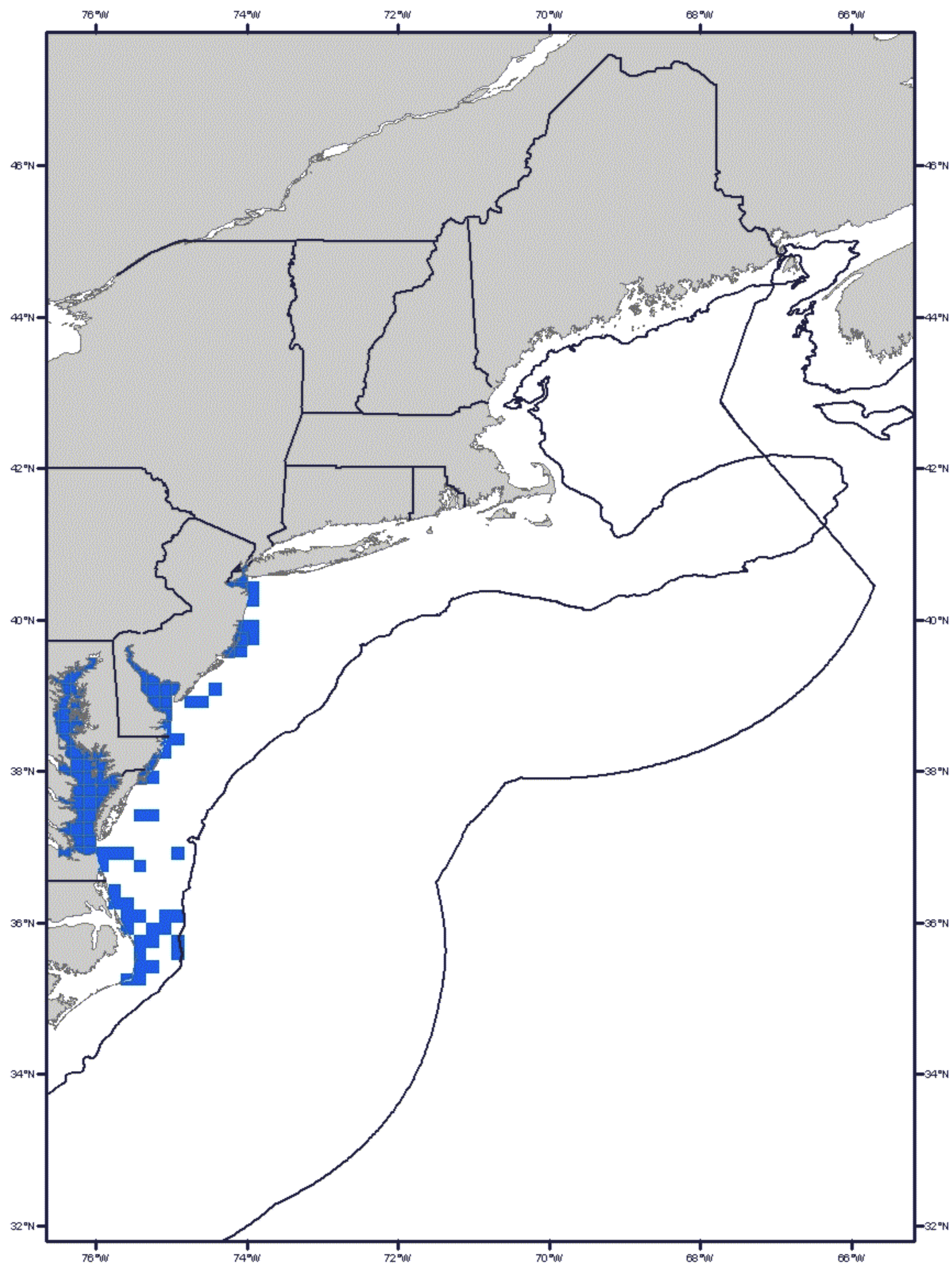
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 40% of the observed range of this life stage.

Figure 28 Clearnose Skate Juvenile EFH Option 4 – 100% (Non-Preferred)



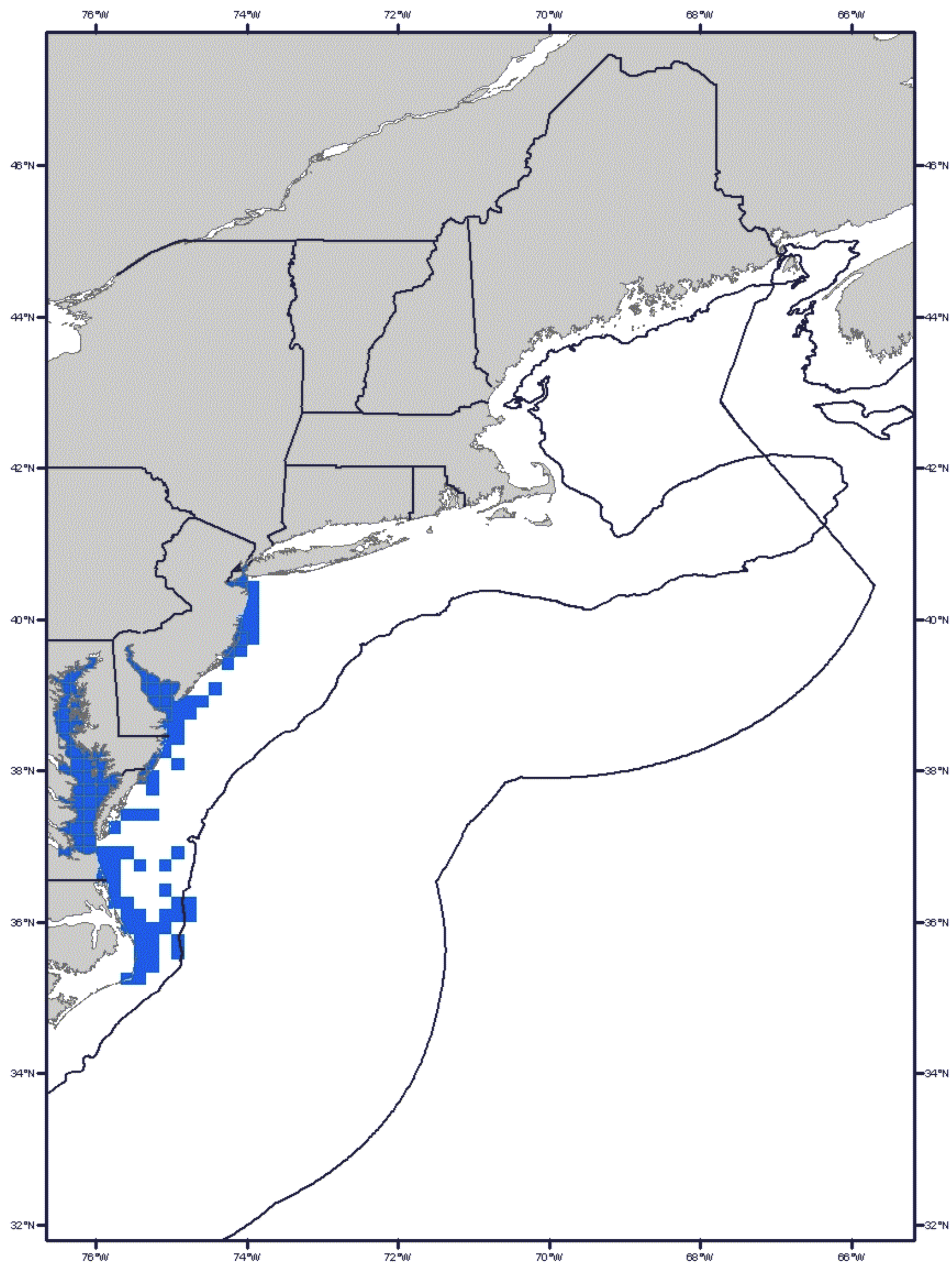
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 29 Clearnose Skate Adult EFH Option 1 – 50% (Non-Preferred)



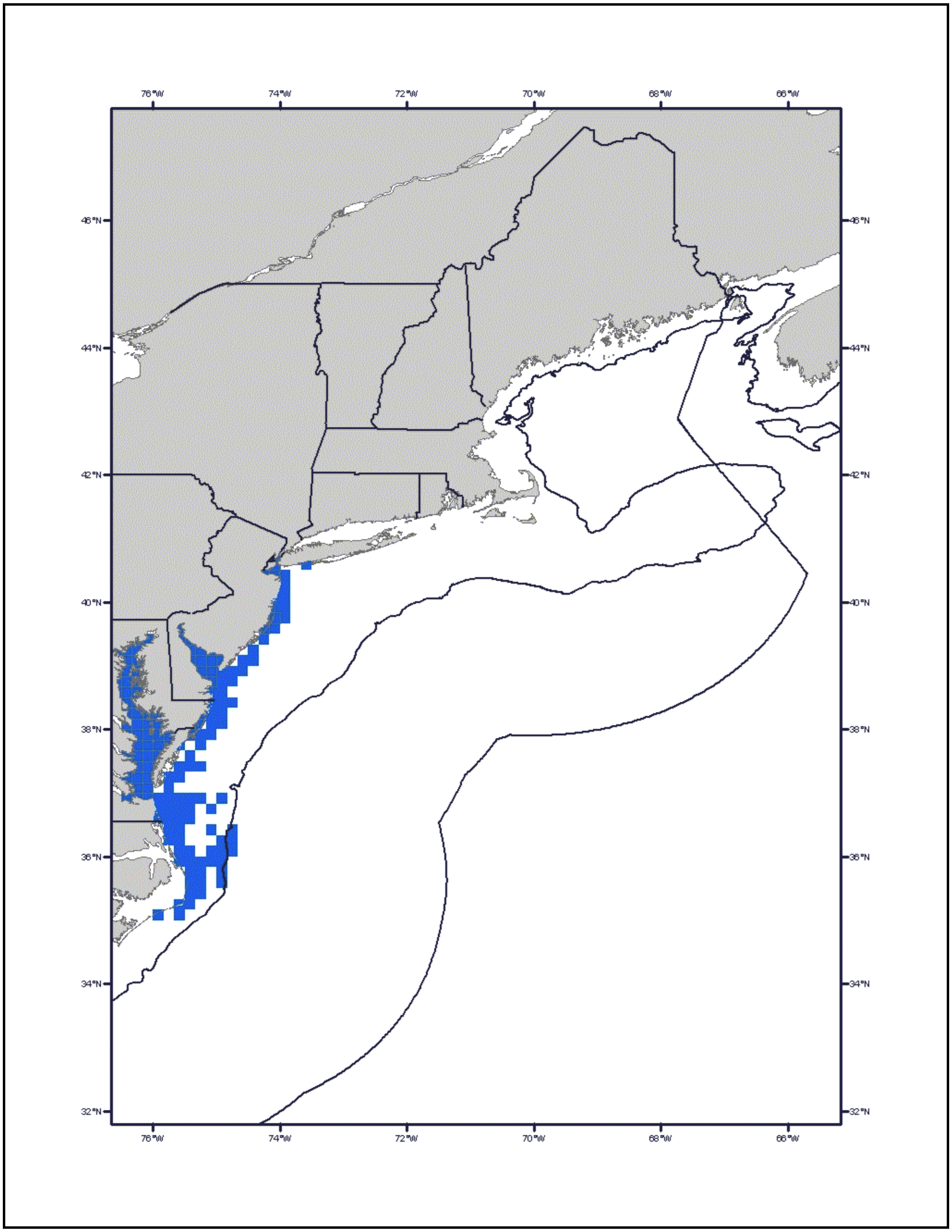
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 25% of the observed range of this life stage.

Figure 30 Clearnose Skate Adult EFH Option 2 – 75% (Non-Preferred)



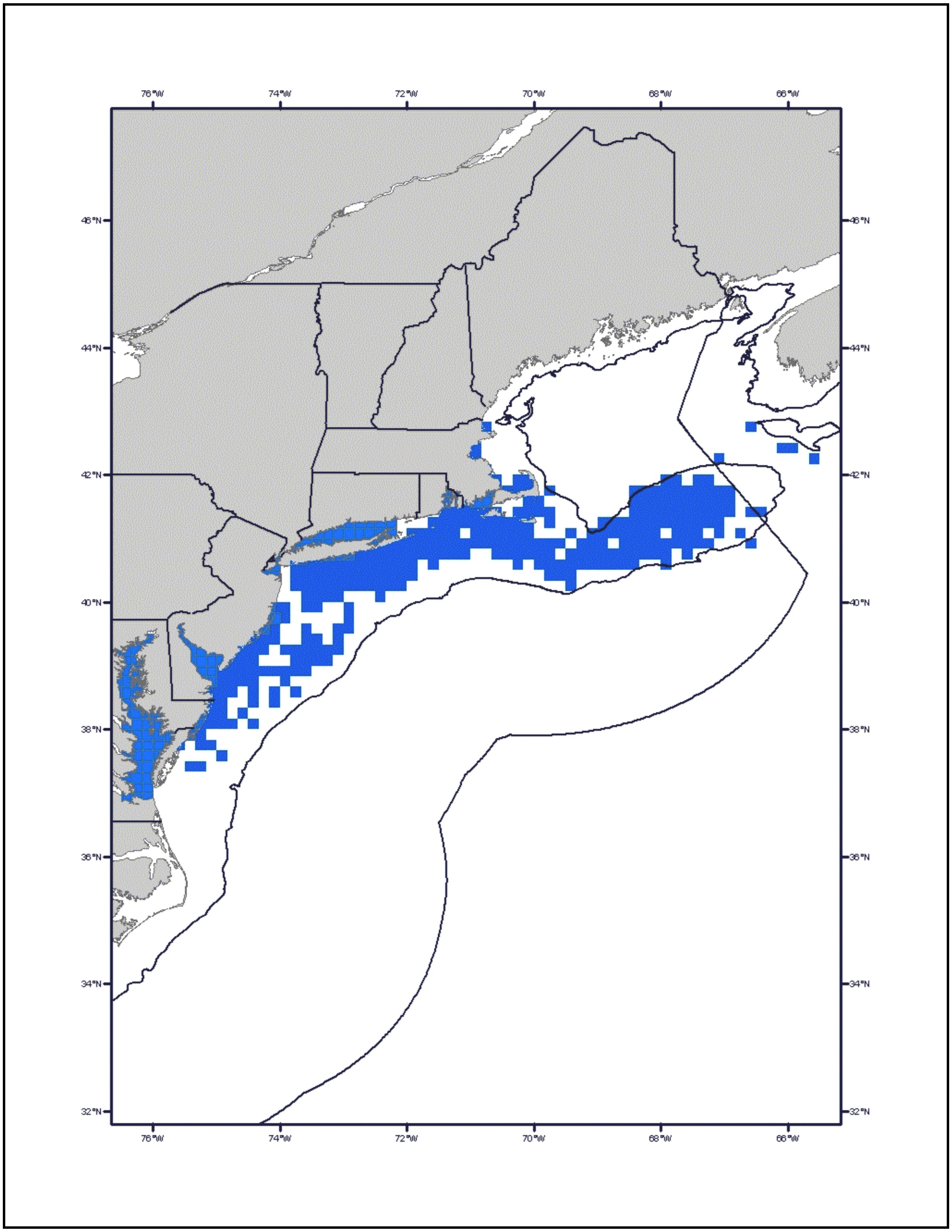
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 45% of the observed range of this life stage.

Figure 31 Clearnose Skate Adult EFH Option 4 – 100% (Non-Preferred)



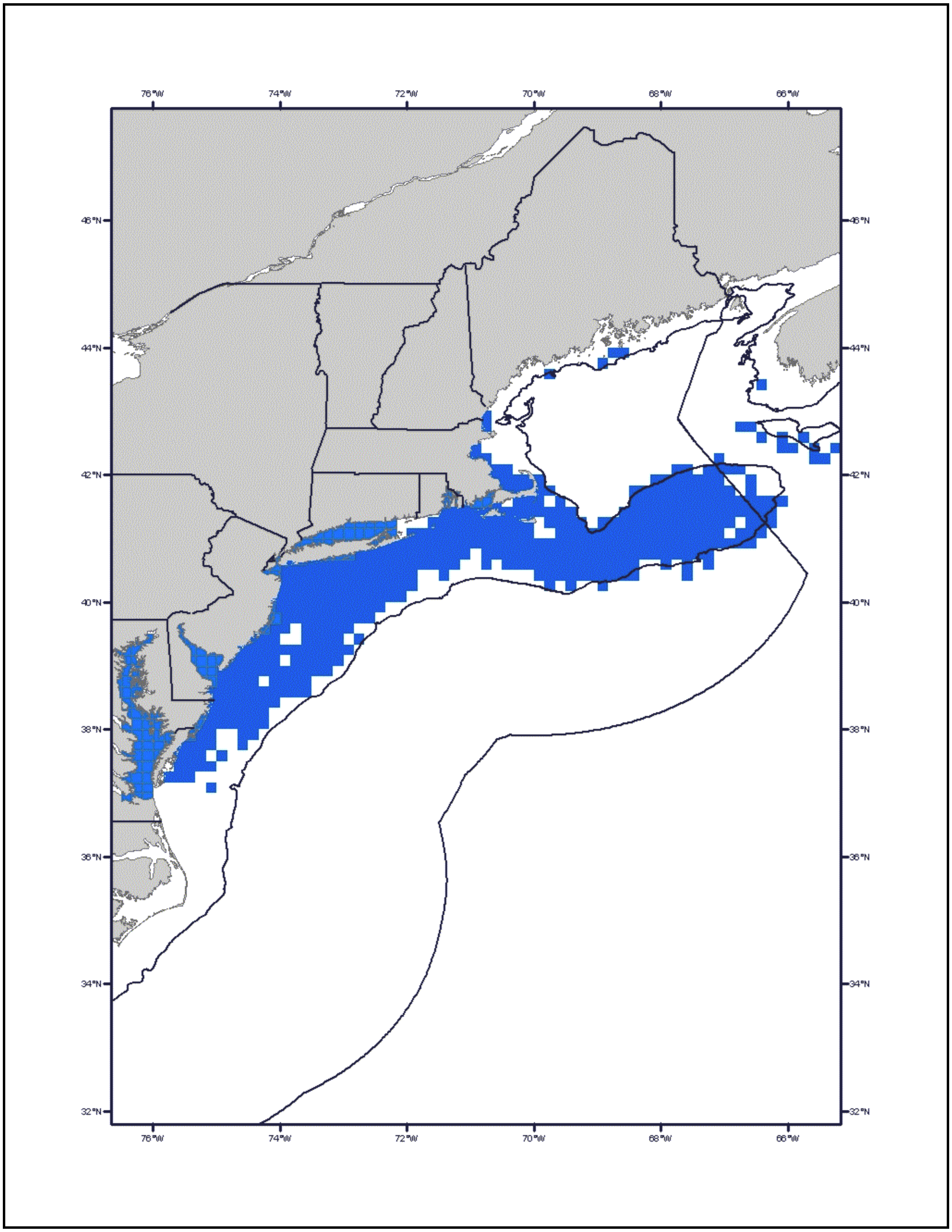
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with soft bottom, rocky or gravelly substrates that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 32 Little Skate Juvenile EFH Option 1 – 50% (Non-Preferred)



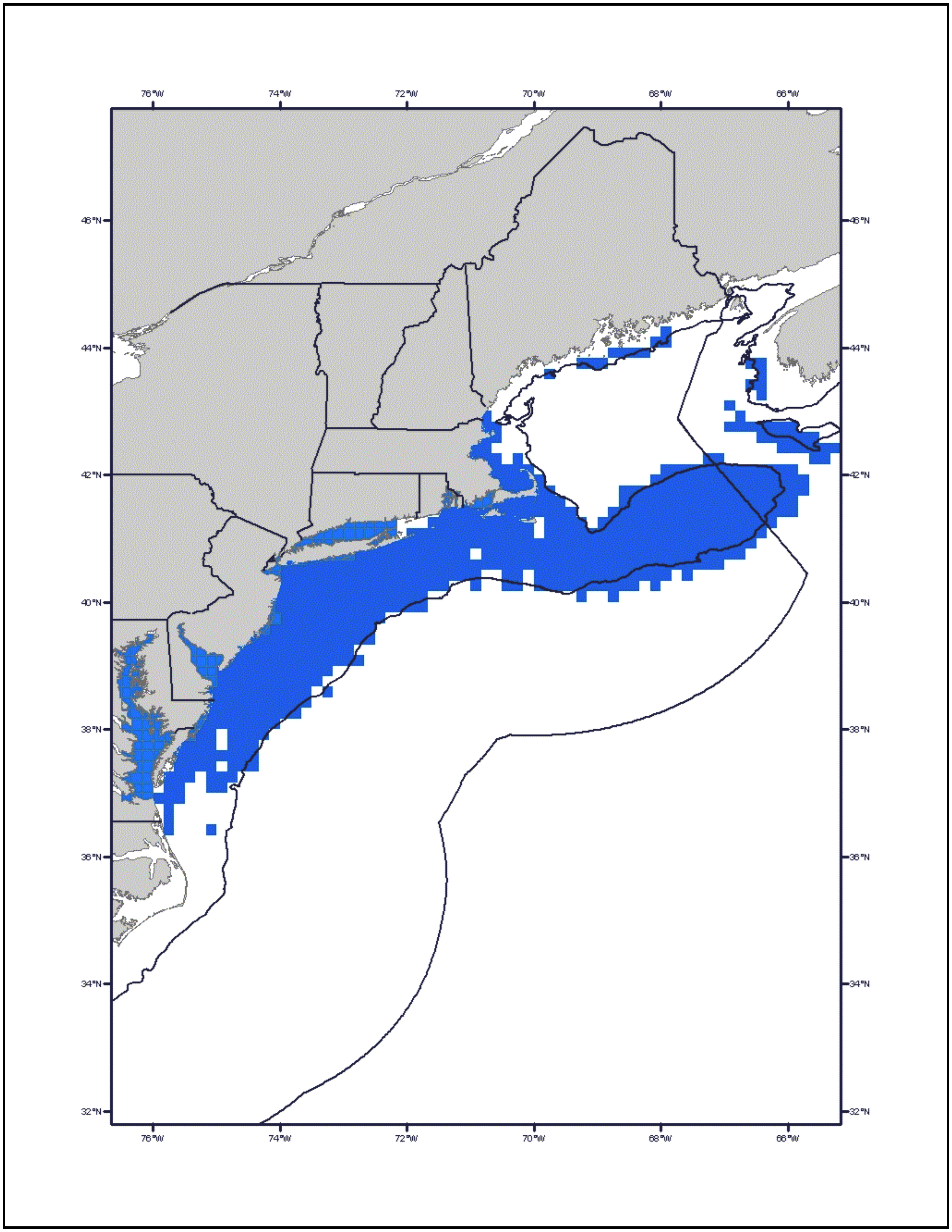
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 24% of the observed range of this life stage.

Figure 33 Little Skate Juvenile EFH Option 2 – 75% (Non-Preferred)



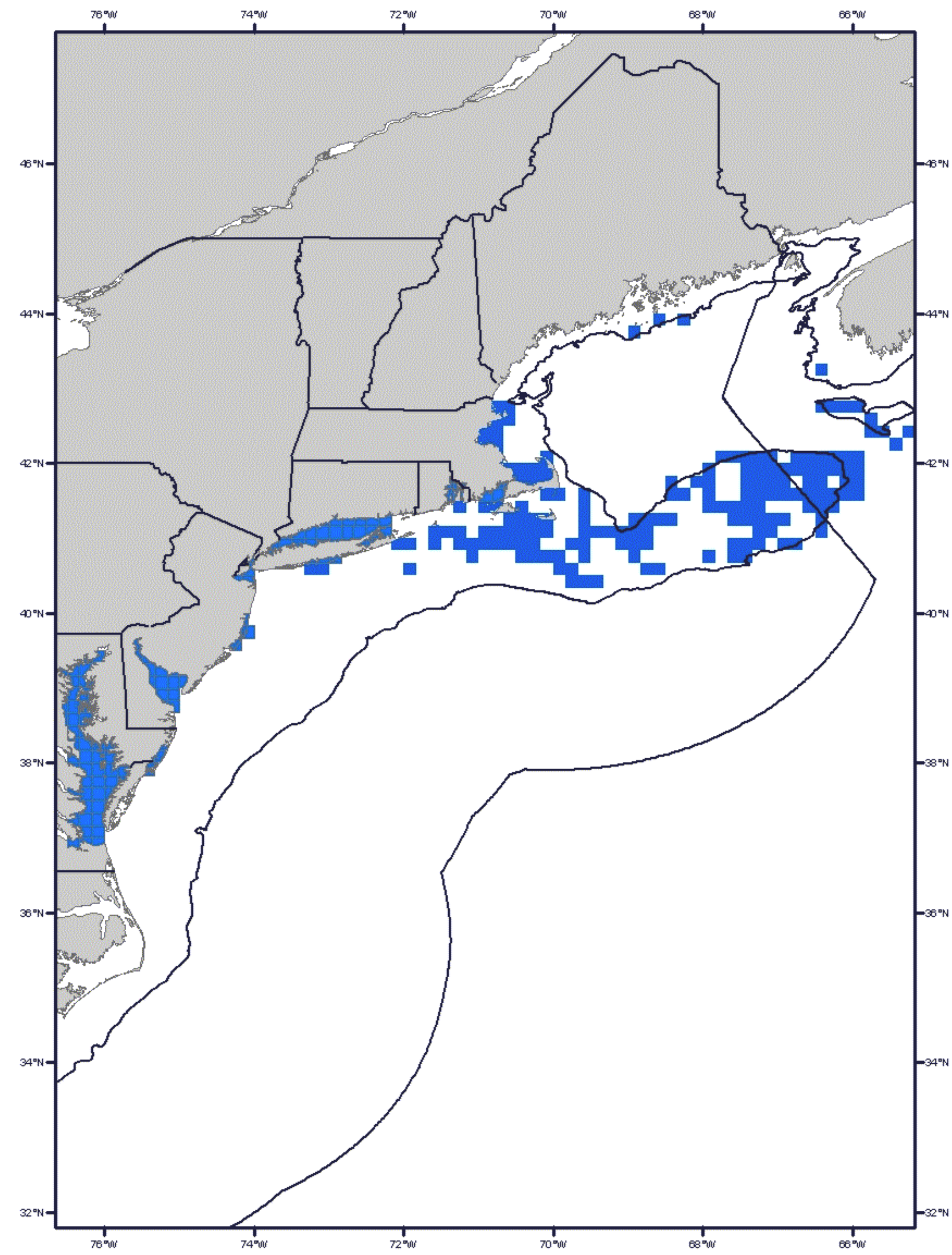
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 42% of the observed range of this life stage.

Figure 34 Little Skate Juvenile EFH Option 4 – 100% (Non-Preferred)



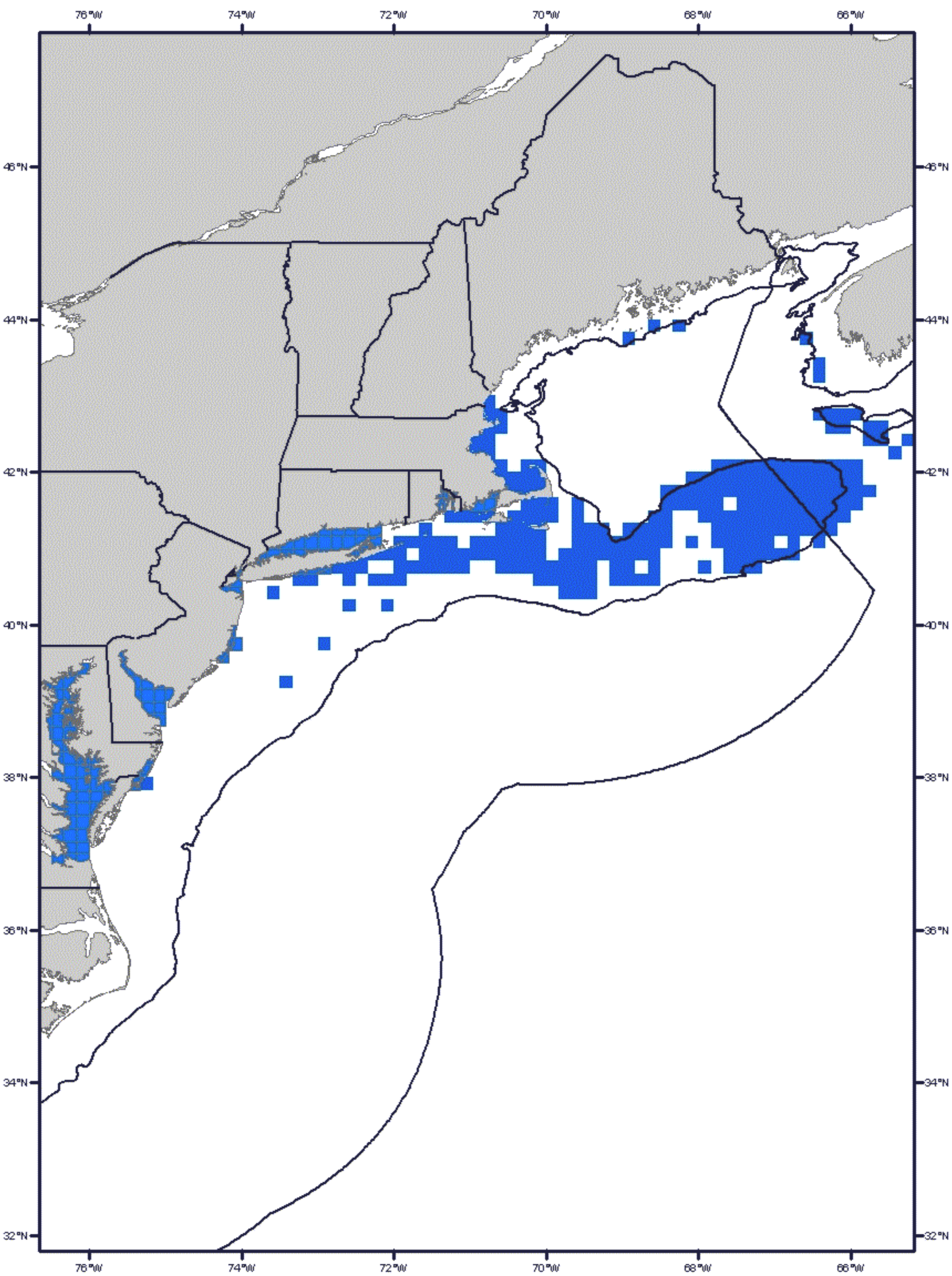
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 35 Little Skate Adult EFH Option 1 – 50% (Non-Preferred)



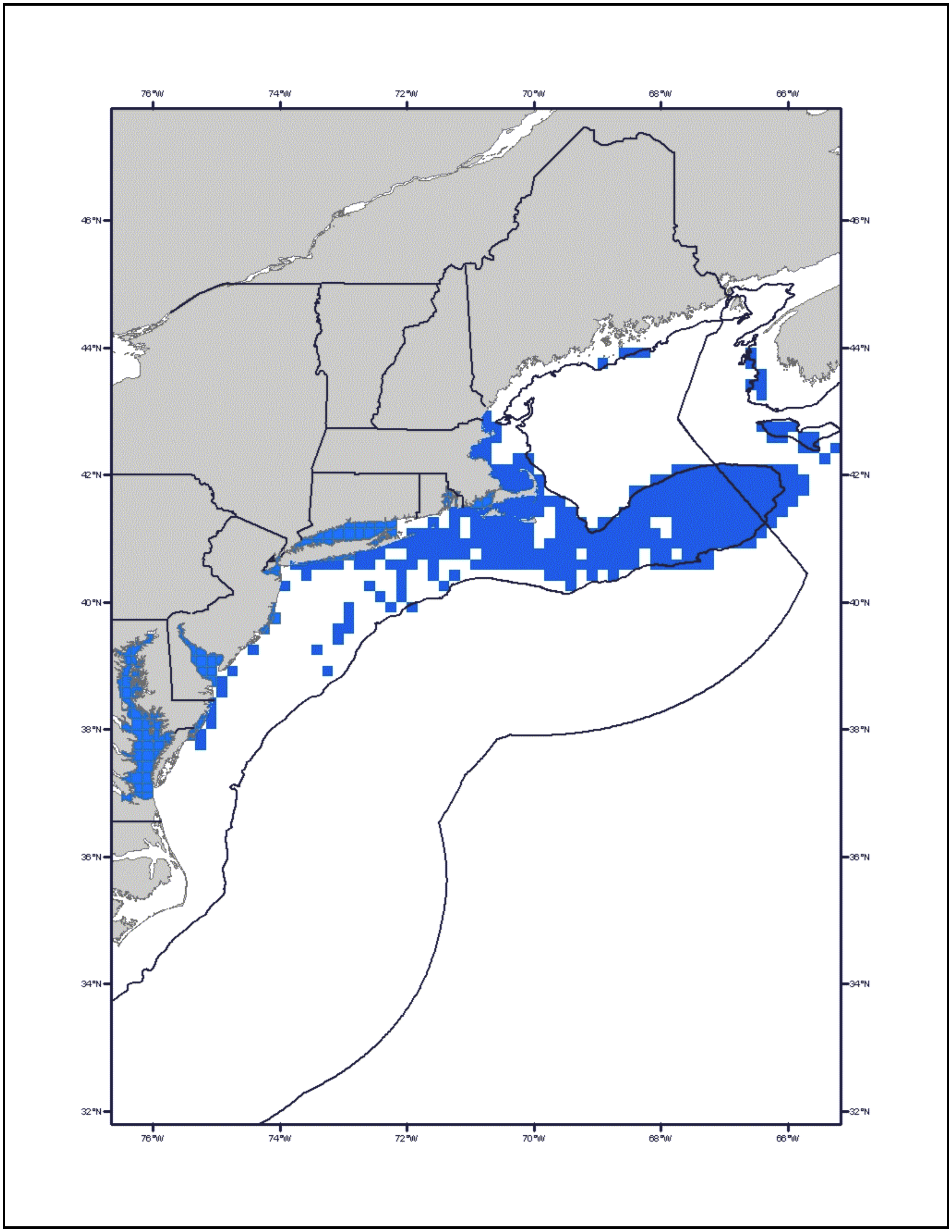
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 19% of the observed range of this life stage.

Figure 36 Little Skate Adult EFH Option 2 – 75% (Non-Preferred)



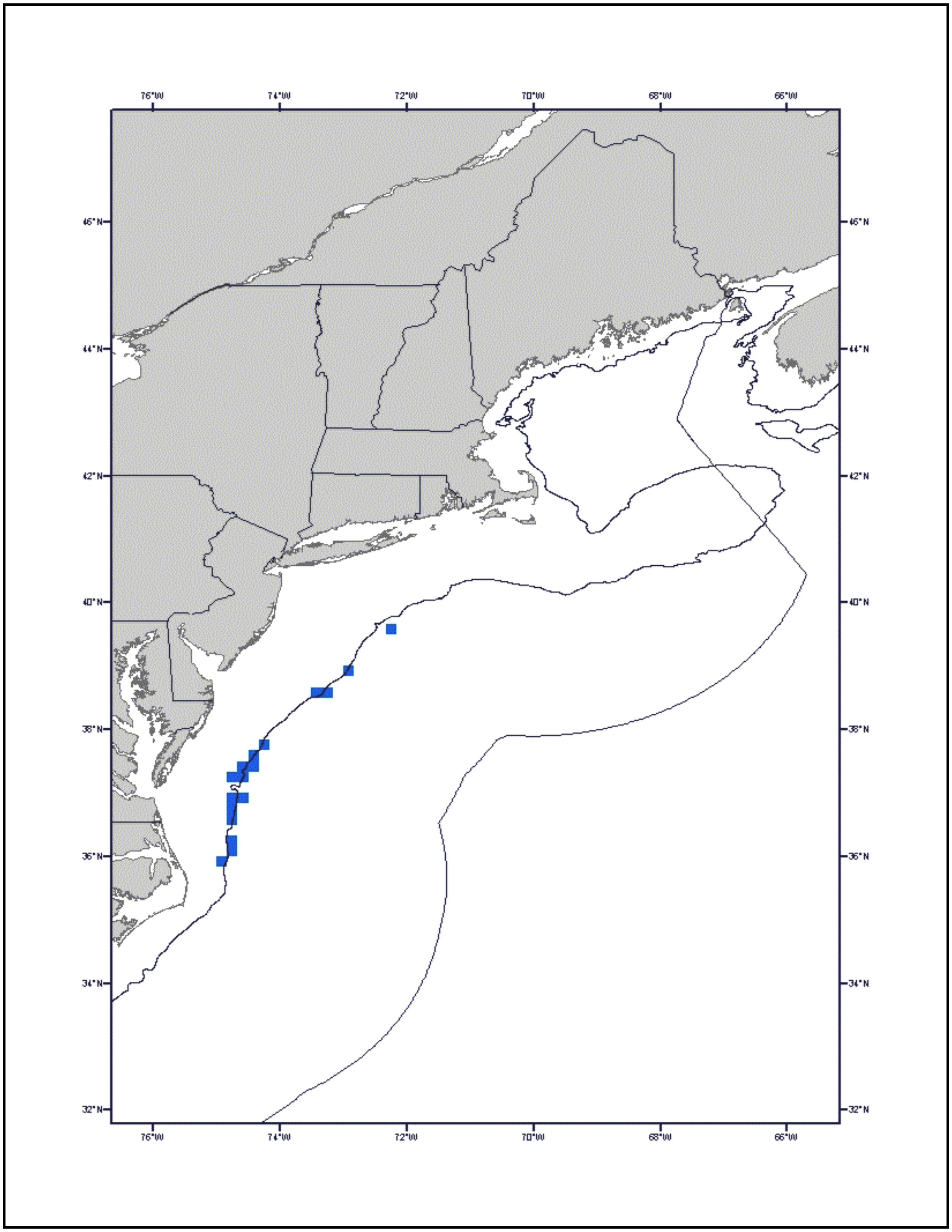
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 36% of the observed range of this life stage.

Figure 37 Little Skate Adult EFH Option 4 – 100% (Non-Preferred)



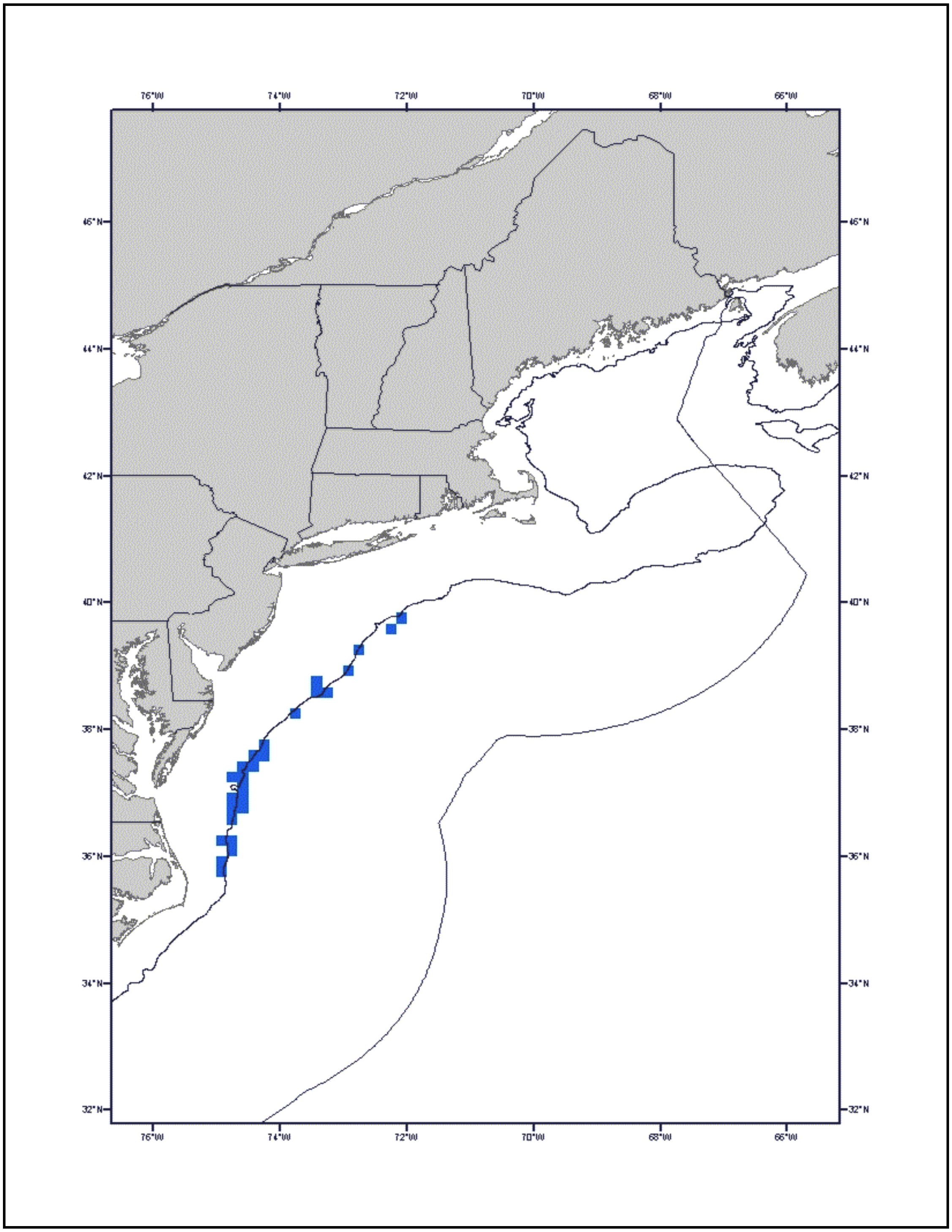
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with sandy, gravelly, or mud substrates that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 38 Rosette Skate Juvenile EFH Option 1 – 50% (Non-Preferred)



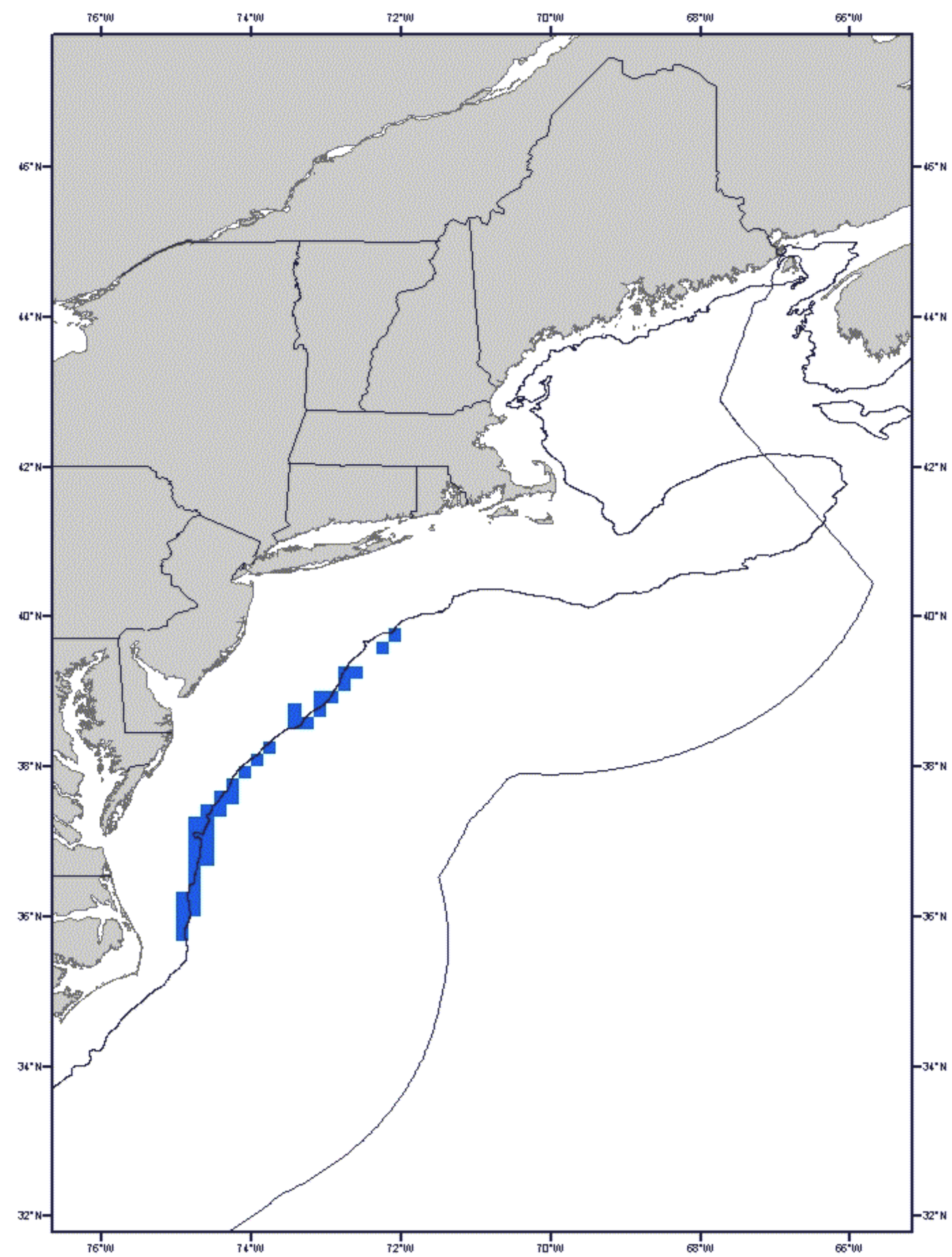
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 20% of the observed range of this life stage.

Figure 39 Rosette Skate Juvenile EFH Option 2 – 75% (Non-Preferred)



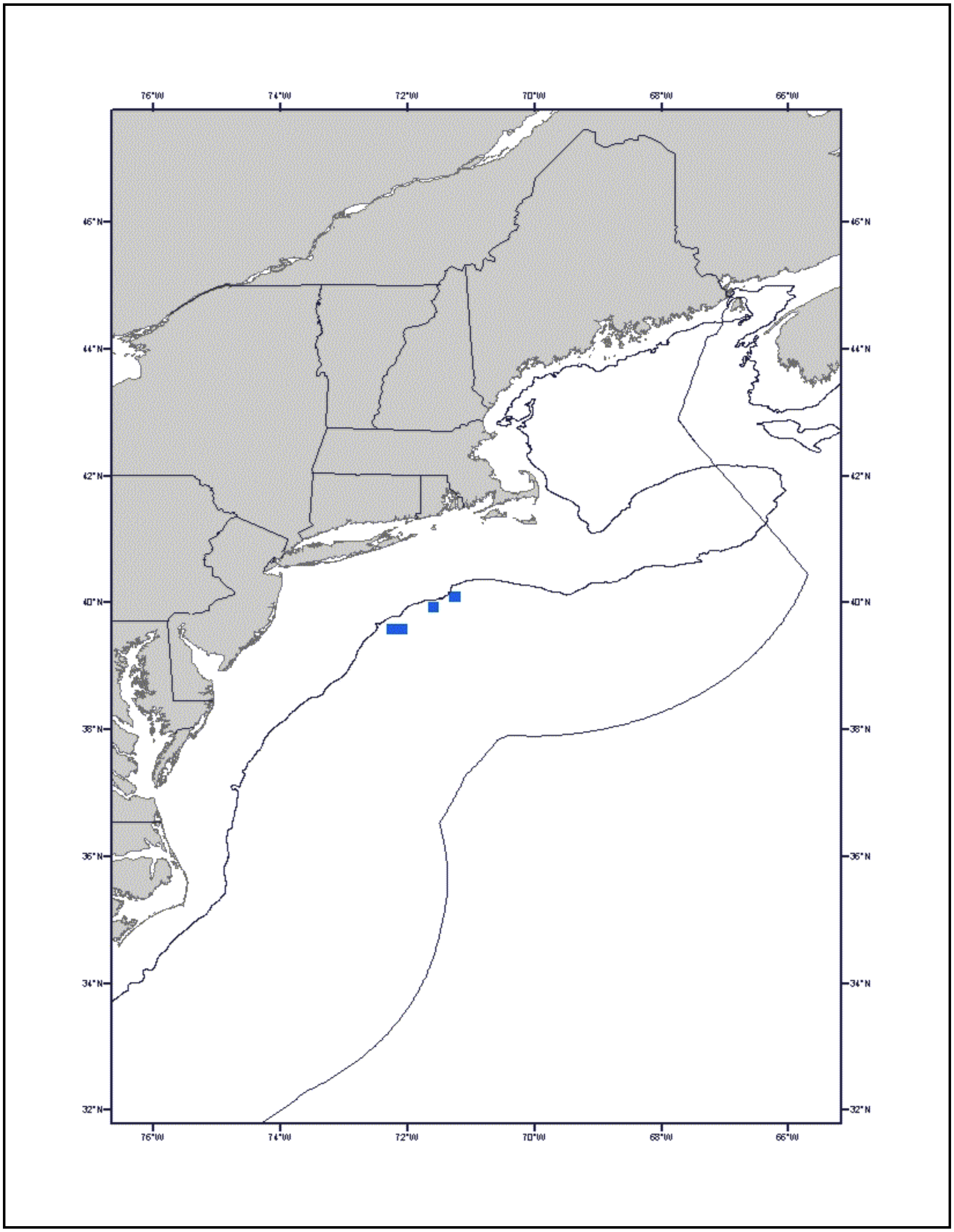
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophiuroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 41% of the observed range of this life stage.

Figure 40 Rosette Skate Juvenile EFH Option 4 – 100% (Non-Preferred)



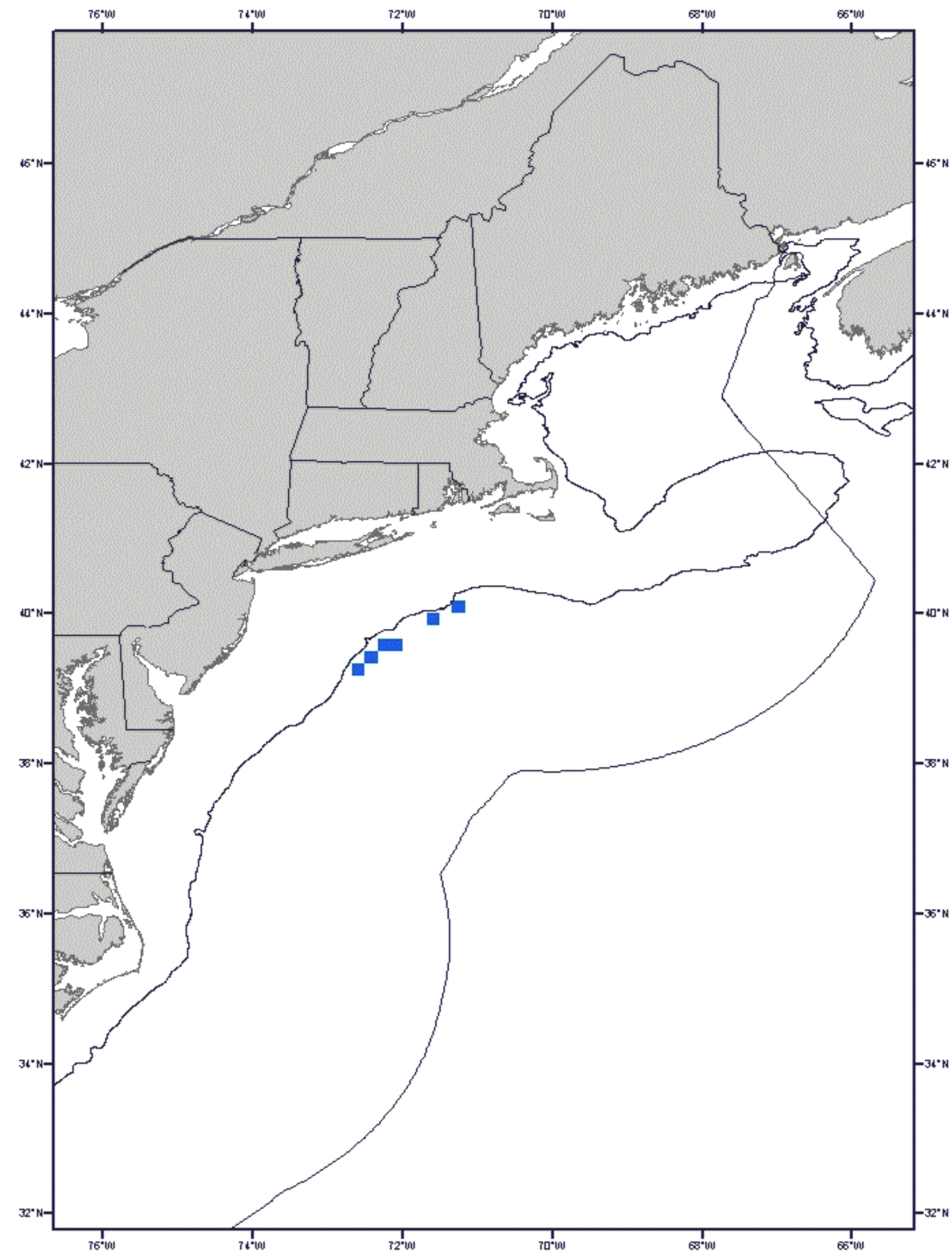
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 41 Rosette Skate Adult EFH Option 1 – 50% (Non-Preferred)



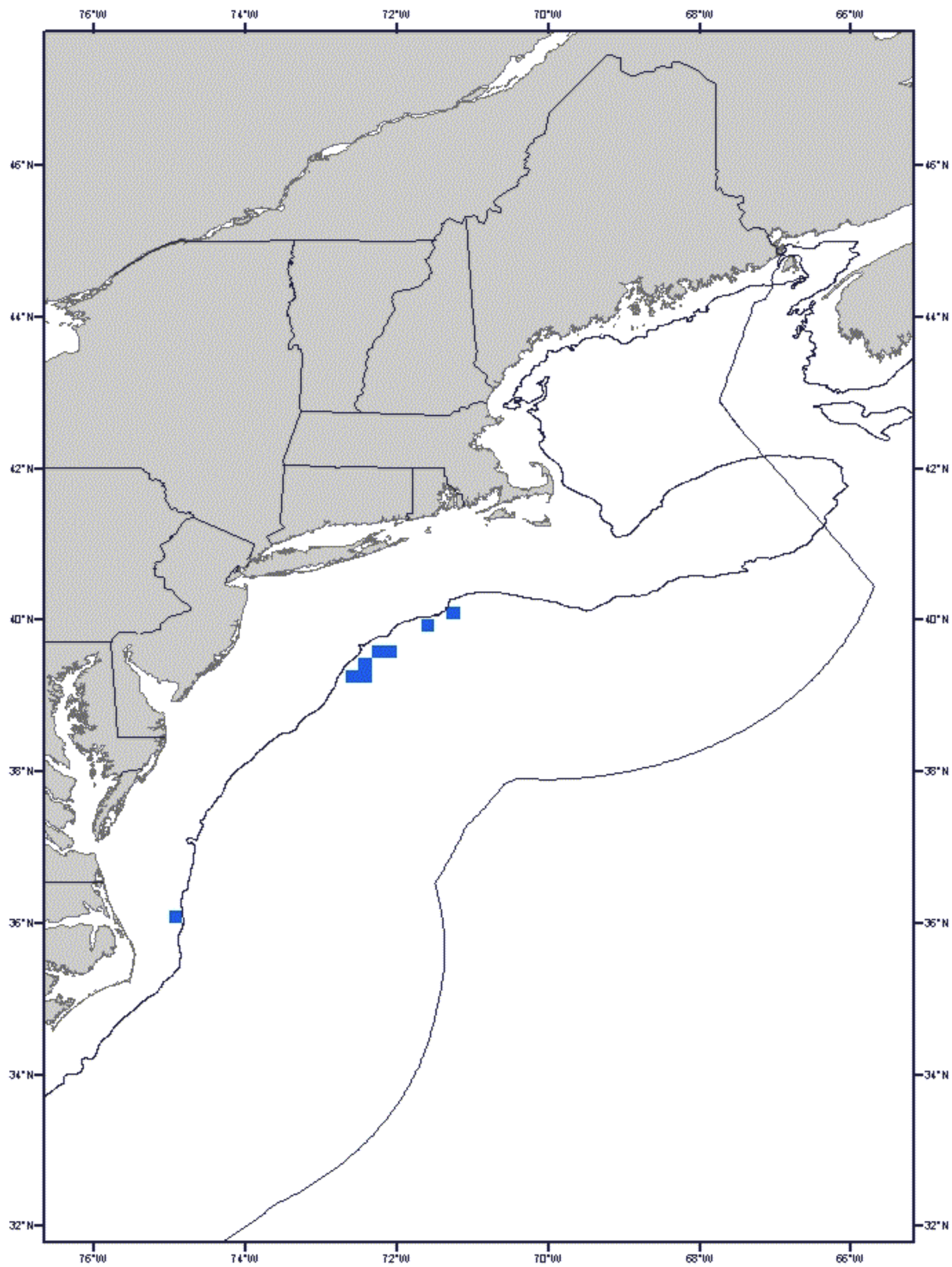
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 20% of the observed range of this life stage.

Figure 42 Rosette Skate Adult EFH Option 2 – 75% (Non-Preferred)



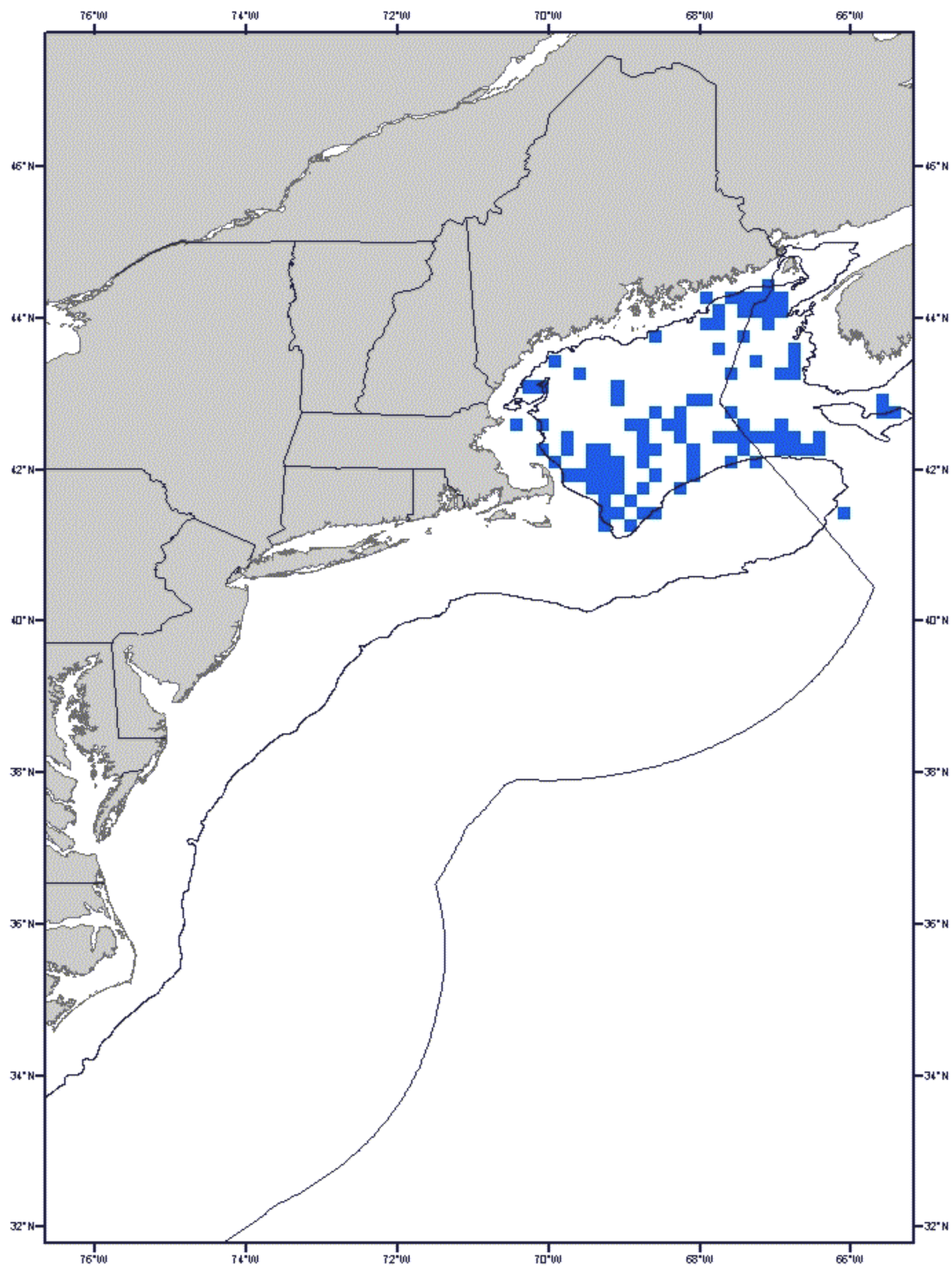
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 50% of the observed range of this life stage.

Figure 43 Rosette Skate Adult EFH Option 4 – 100% (Non-Preferred)



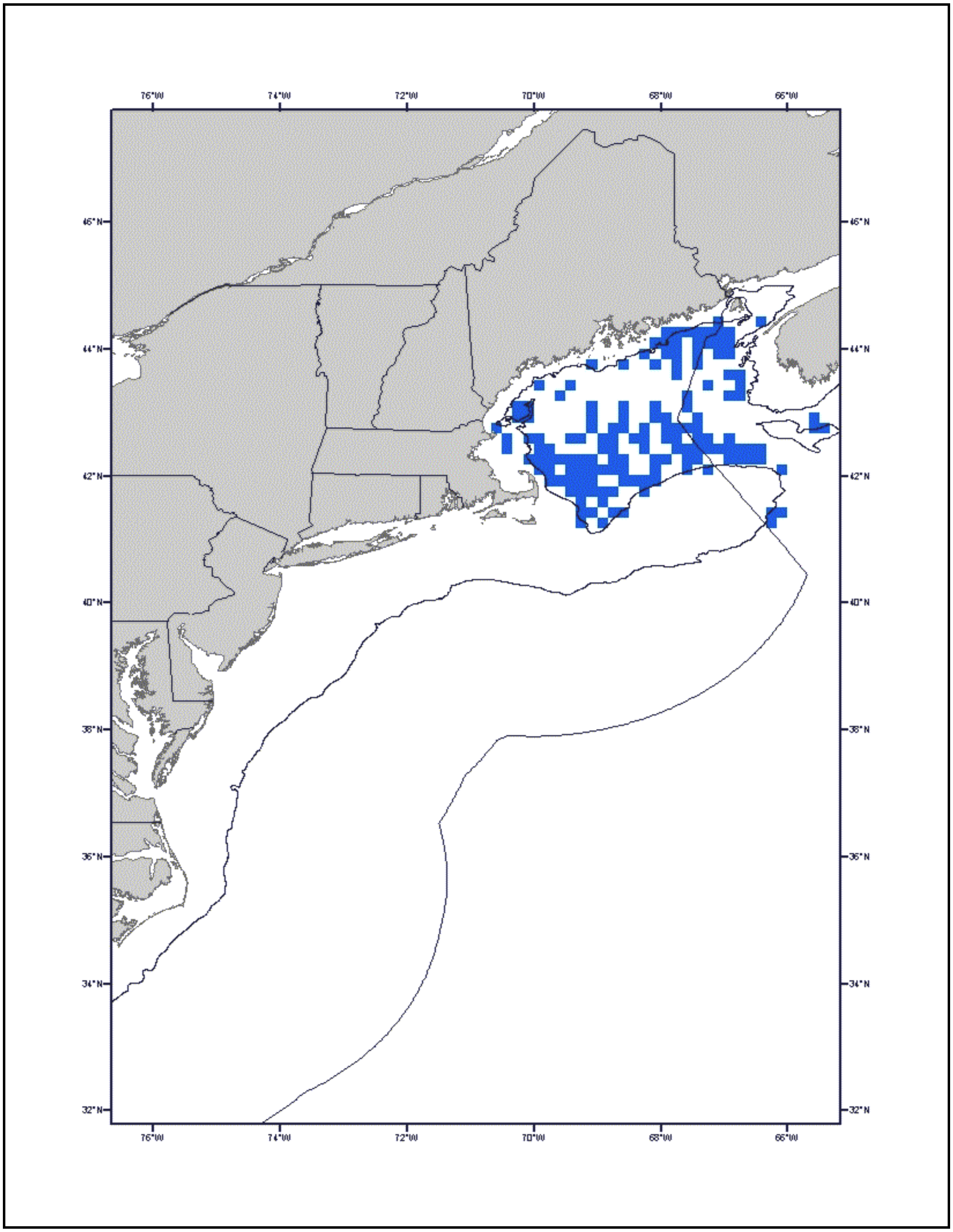
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 44 Smooth Skate Juvenile EFH Option 1 – 50% (Non-Preferred)



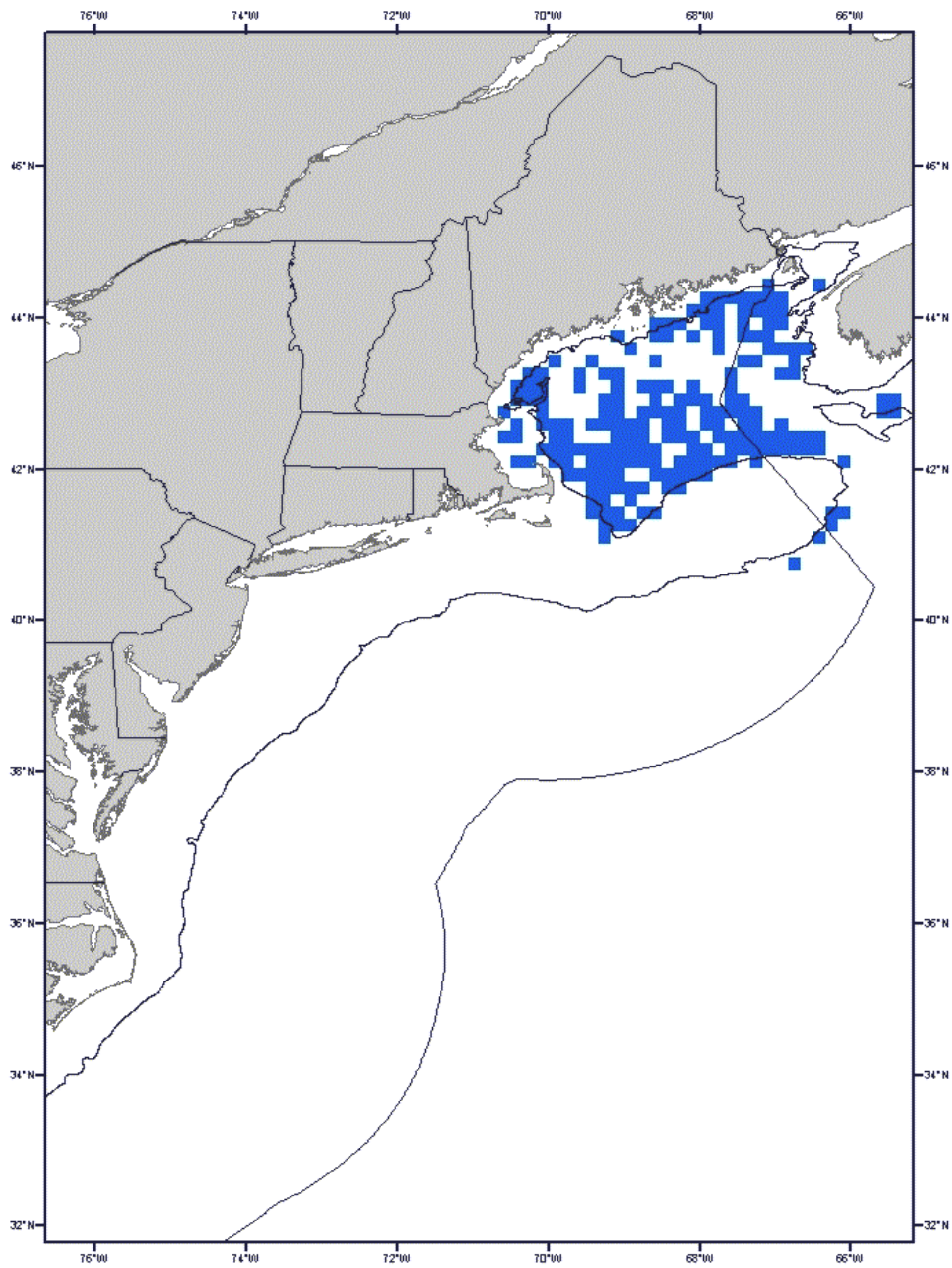
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 22% of the observed range of this life stage.

Figure 45 Smooth Skate Juvenile EFH Option 2 – 75% (Non-Preferred)



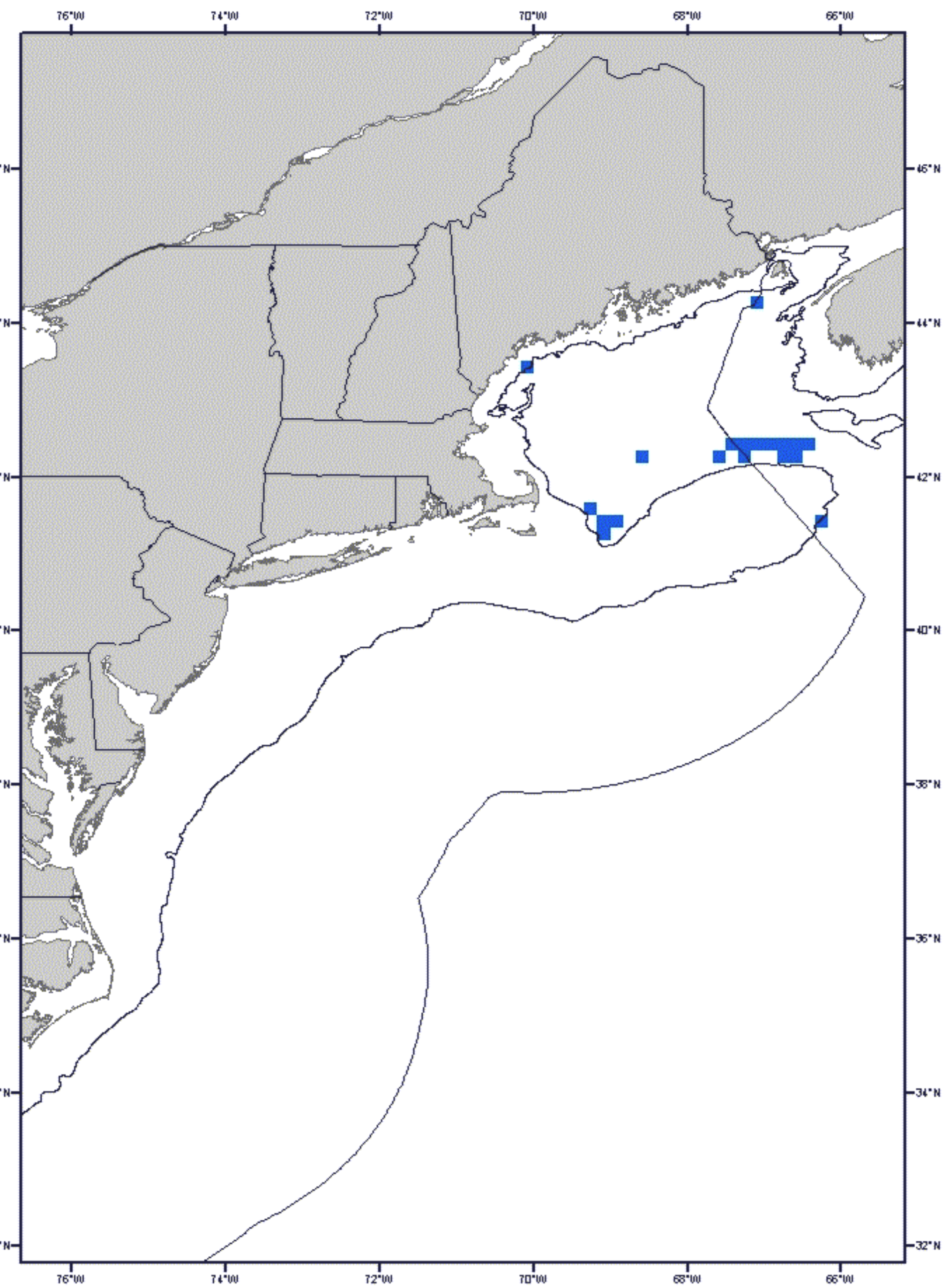
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 41% of the observed range of this life stage.

Figure 46 Smooth Skate Juvenile EFH Option 4 – 100% (Non-Preferred)



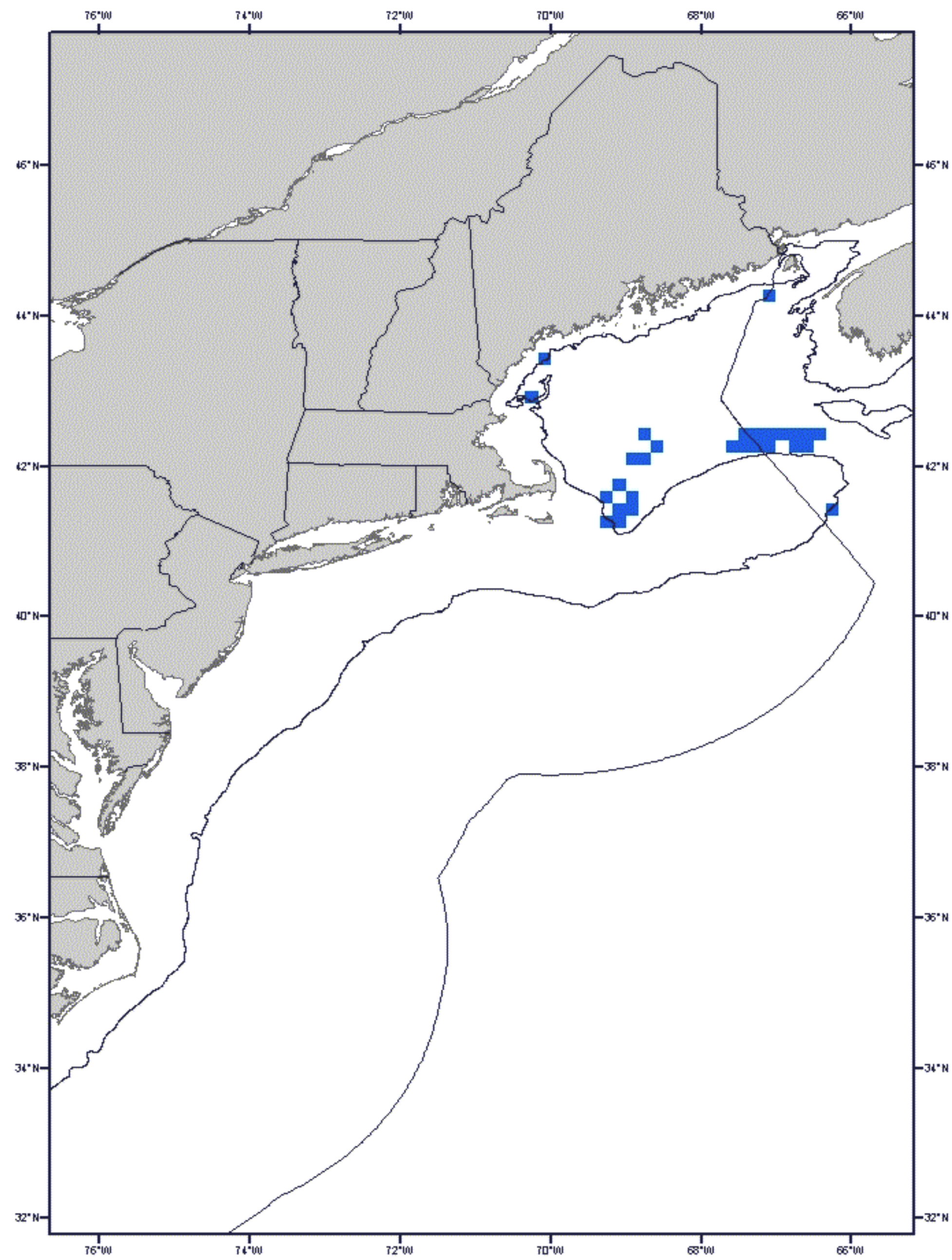
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 47 Smooth Skate Adult EFH Option 1 – 50% (Non-Preferred)



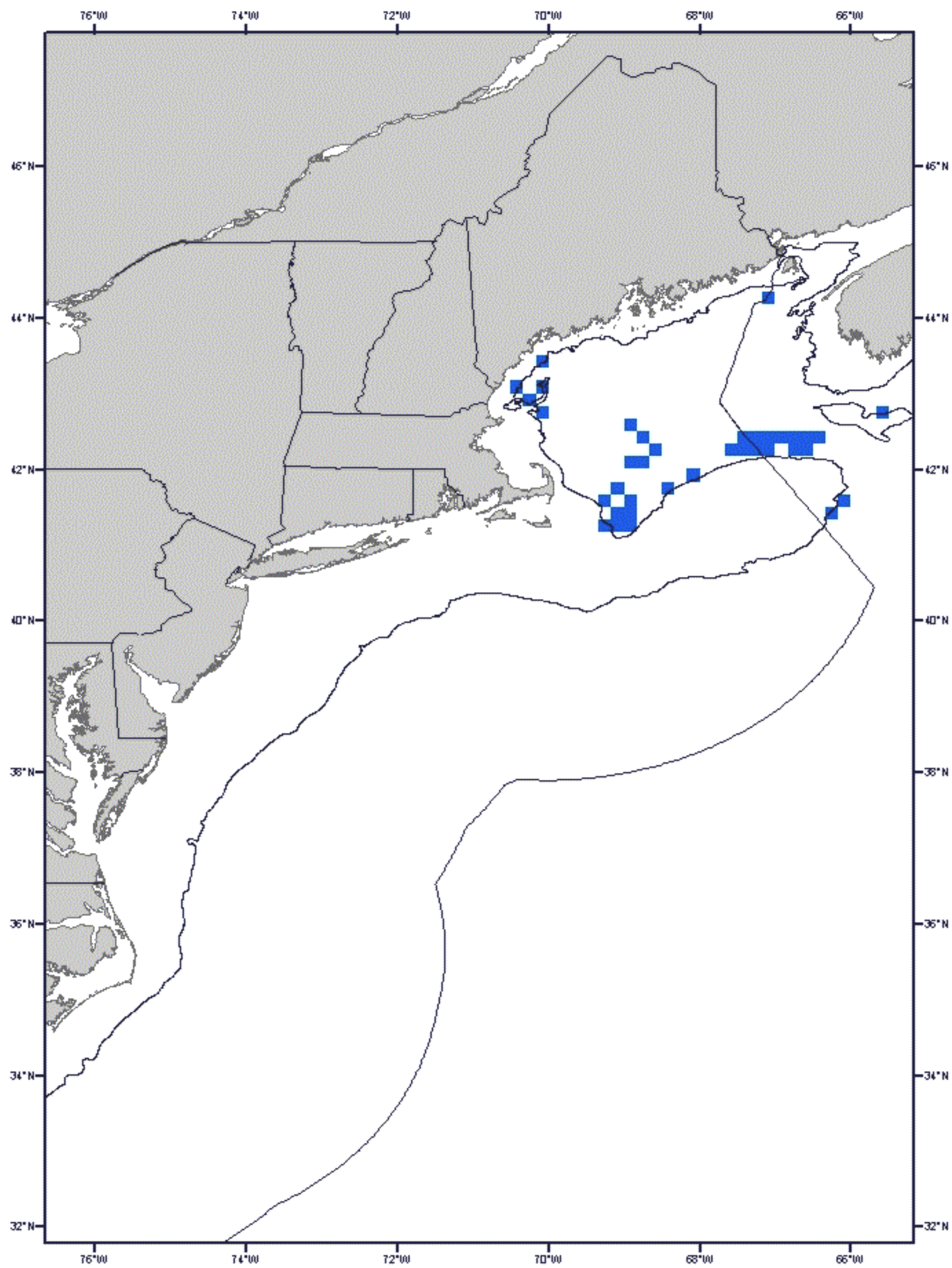
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 20% of the observed range of this life stage.

Figure 48 Smooth Skate Adult EFH Option 2 – 75% (Non-Preferred)



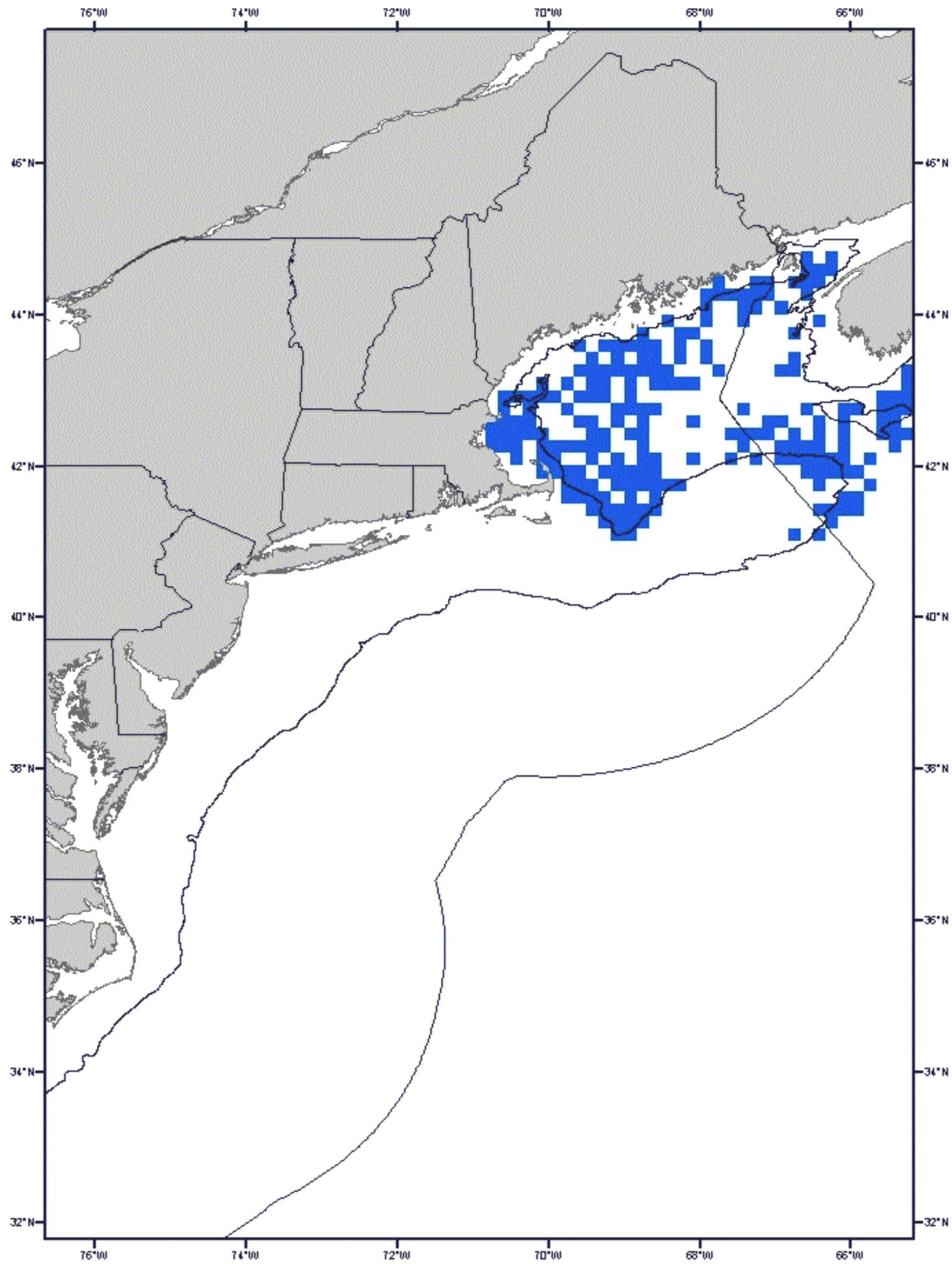
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 46% of the observed range of this life stage.

Figure 49 Smooth Skate Adult EFH Option 4 – 100% (Non-Preferred)



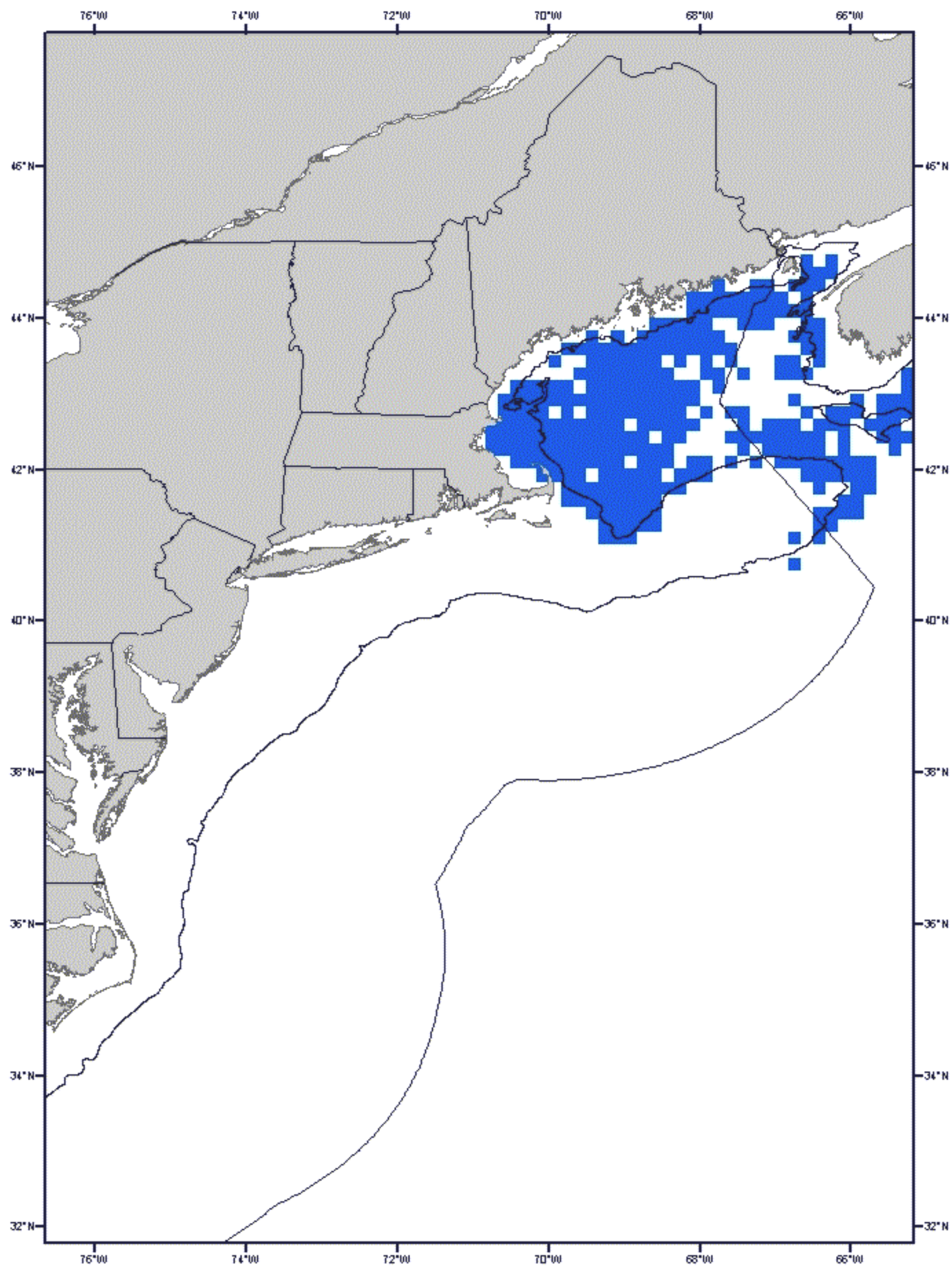
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of soft mud and also on sand, broken shells, gravel and pebbles that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 50 Thorny Skate Juvenile EFH Option 1 – 50% (Non-Preferred)



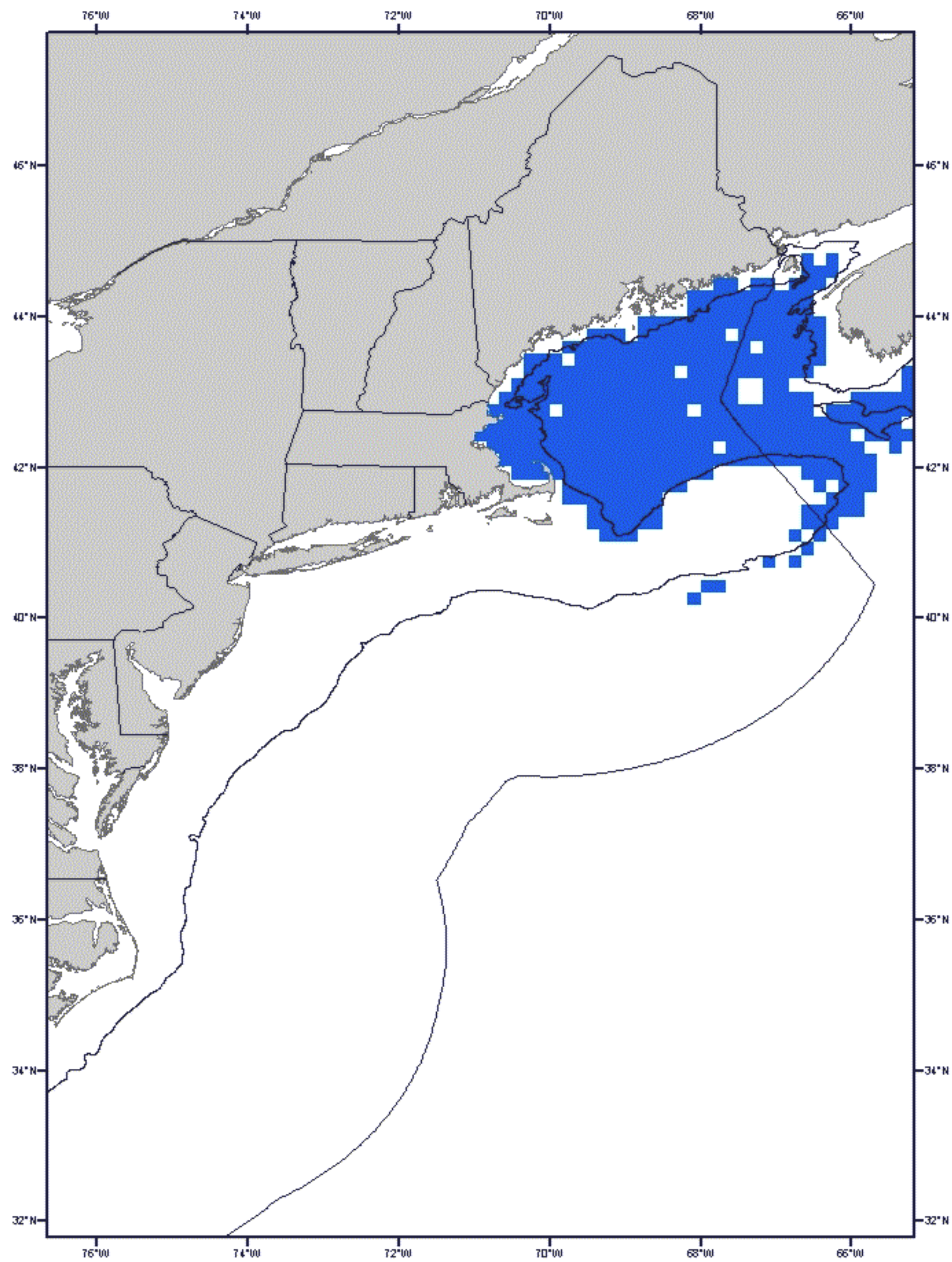
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 28% of the observed range of this life stage.

Figure 51 Thorny Skate Juvenile EFH Option 2 – 75% (Non-Preferred)



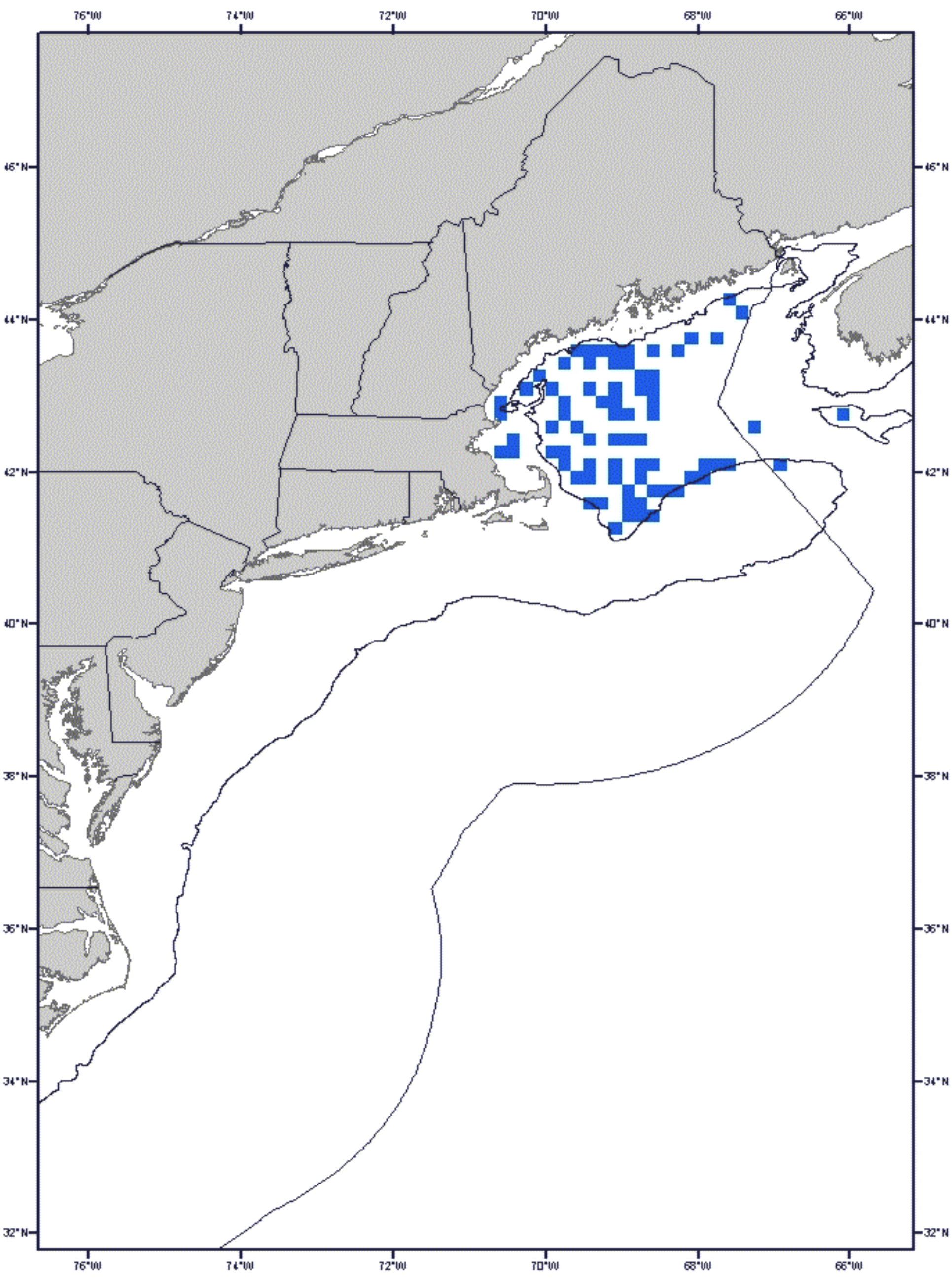
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 49% of the observed range of this life stage.

Figure 52 Thorny Skate Juvenile EFH Option 4 – 100% (Non-Preferred)



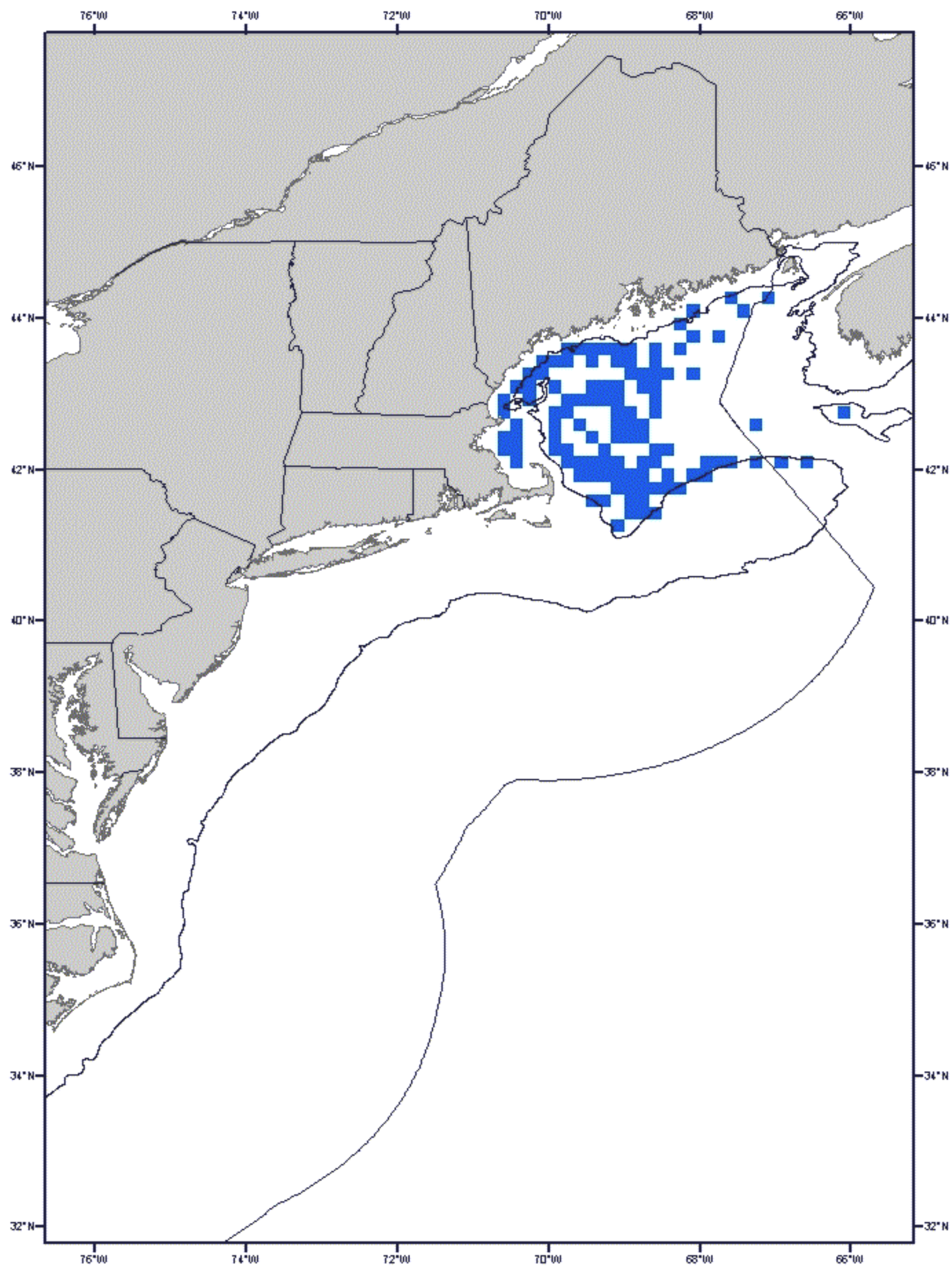
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 53 Thorny Skate Adult EFH Option 1 – 50% (Non-Preferred)



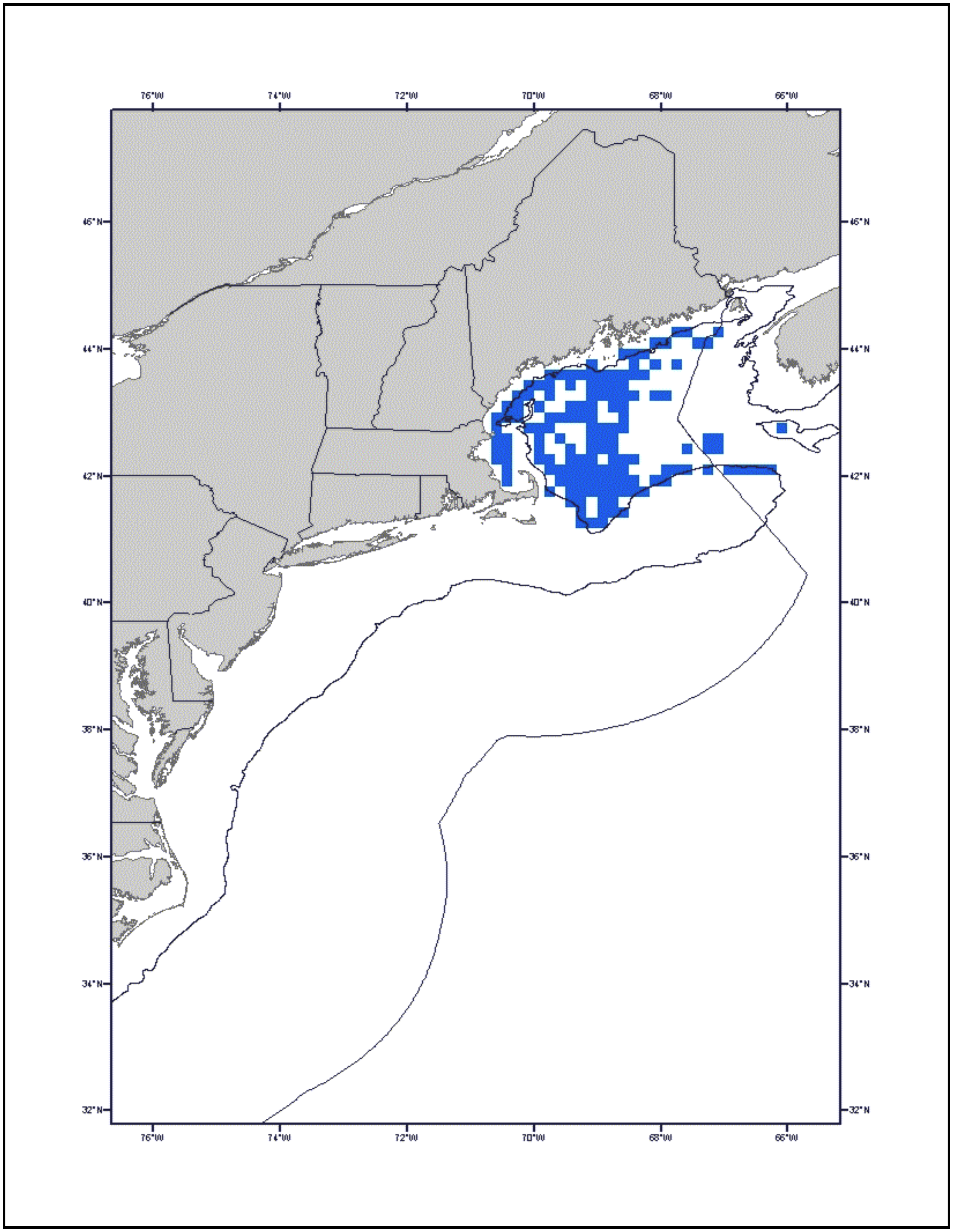
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 25% of the observed range of this life stage.

Figure 54 Thorny Skate Adult EFH Option 2 – 75% (Non-Preferred)



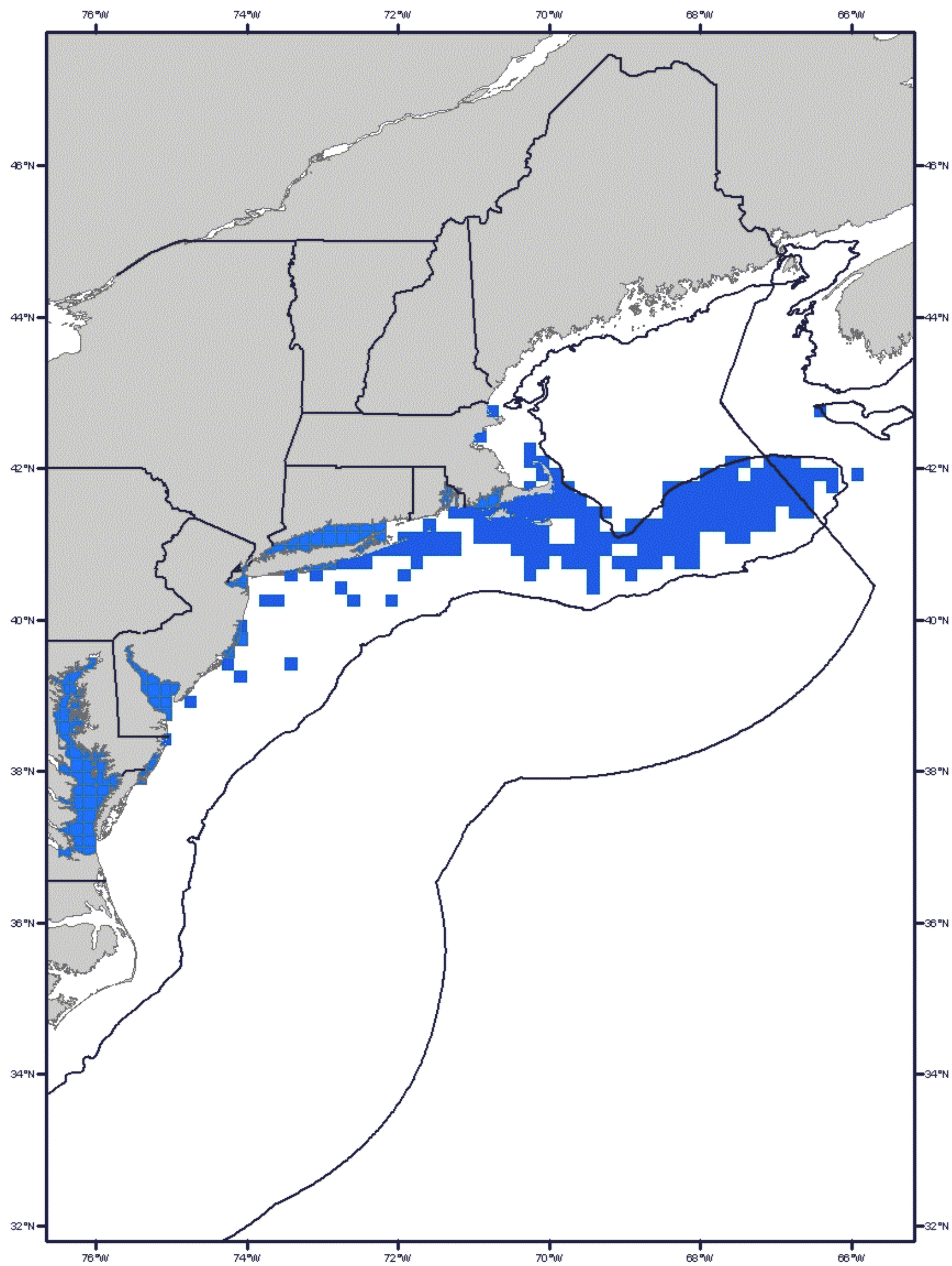
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 45% of the observed range of this life stage.

Figure 55 Thorny Skate Adult EFH Option 4 – 100% (Non-Preferred)



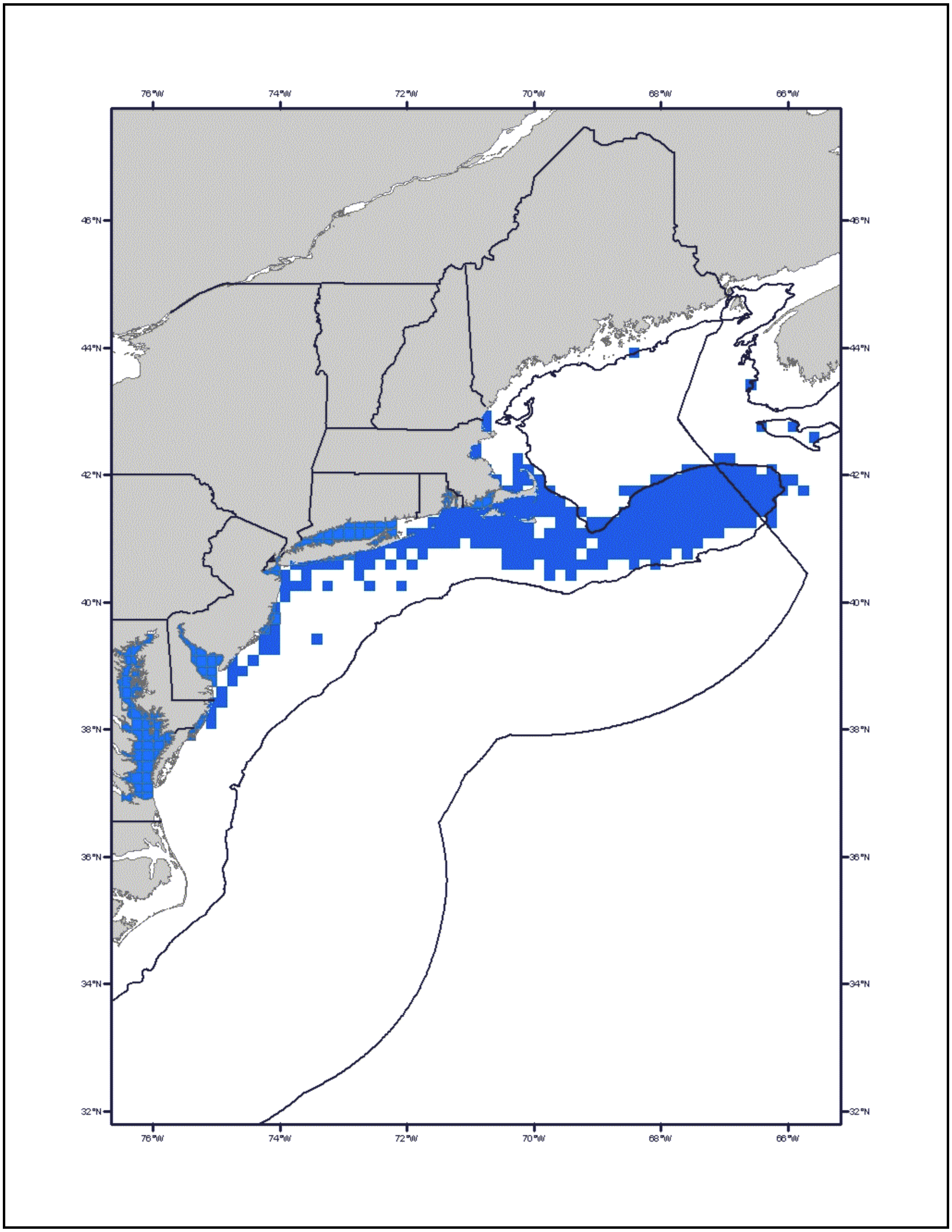
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999). Only habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 56 Winter Skate Juvenile EFH Option 1 – 50% (Non-Preferred)



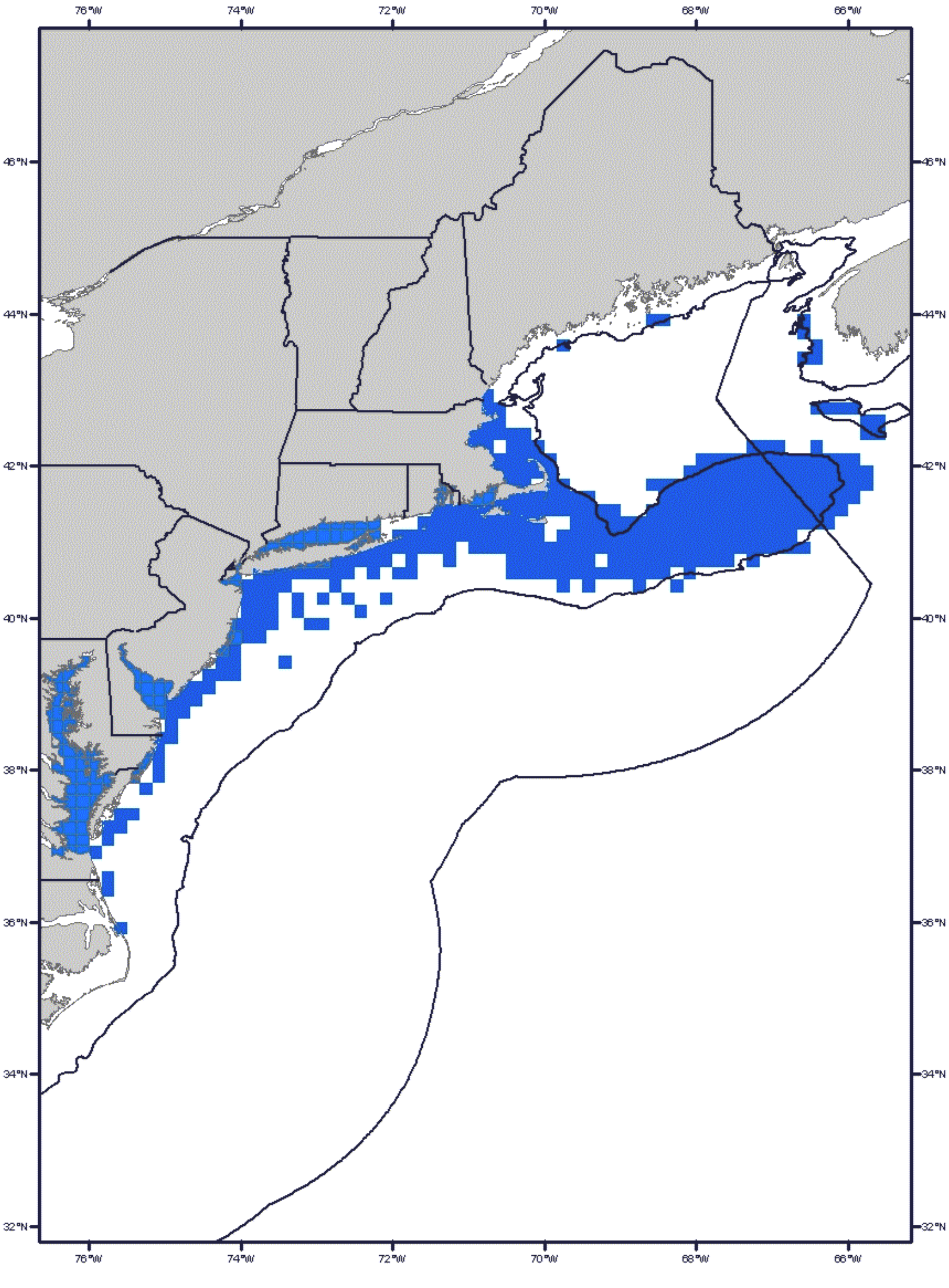
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 14% of the observed range of this life stage.

Figure 57 Winter Skate Juvenile EFH Option 2 – 75% (Non-Preferred)



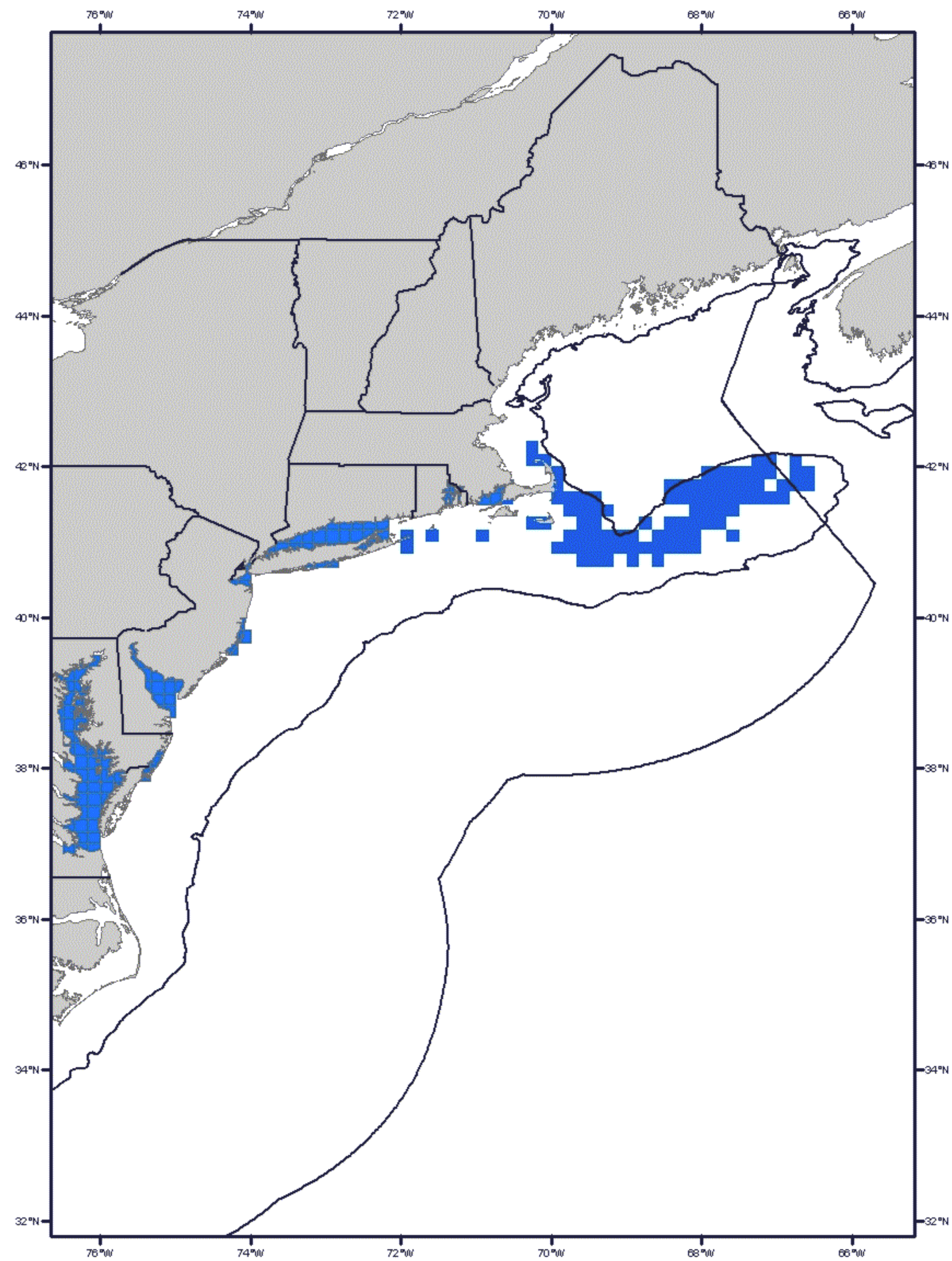
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 28% of the observed range of this life stage.

Figure 58 Winter Skate Juvenile EFH Option 4 – 100% (Non-Preferred)



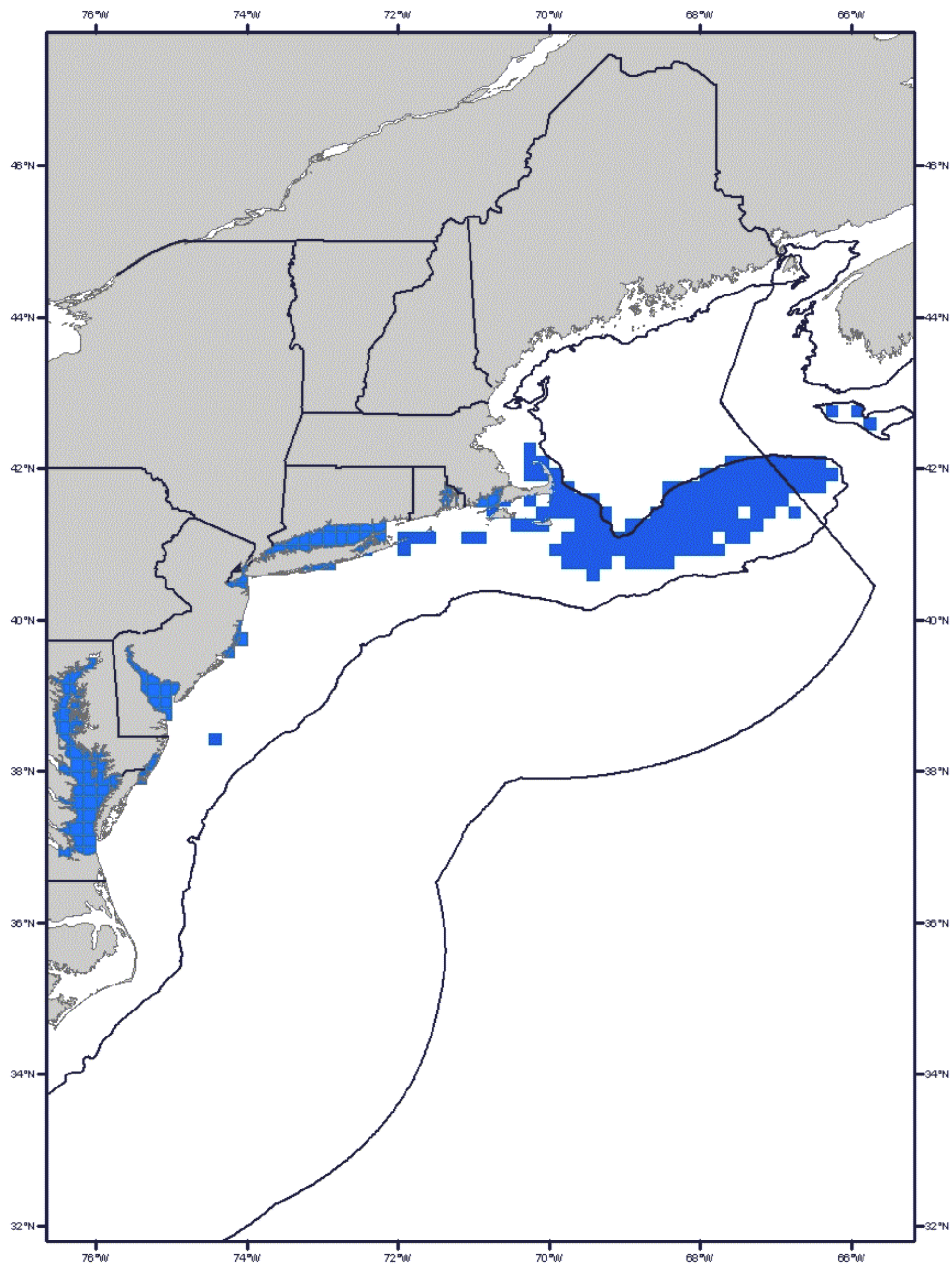
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

Figure 59 Winter Skate Adult EFH Option 1 – 50% (Non-Preferred)



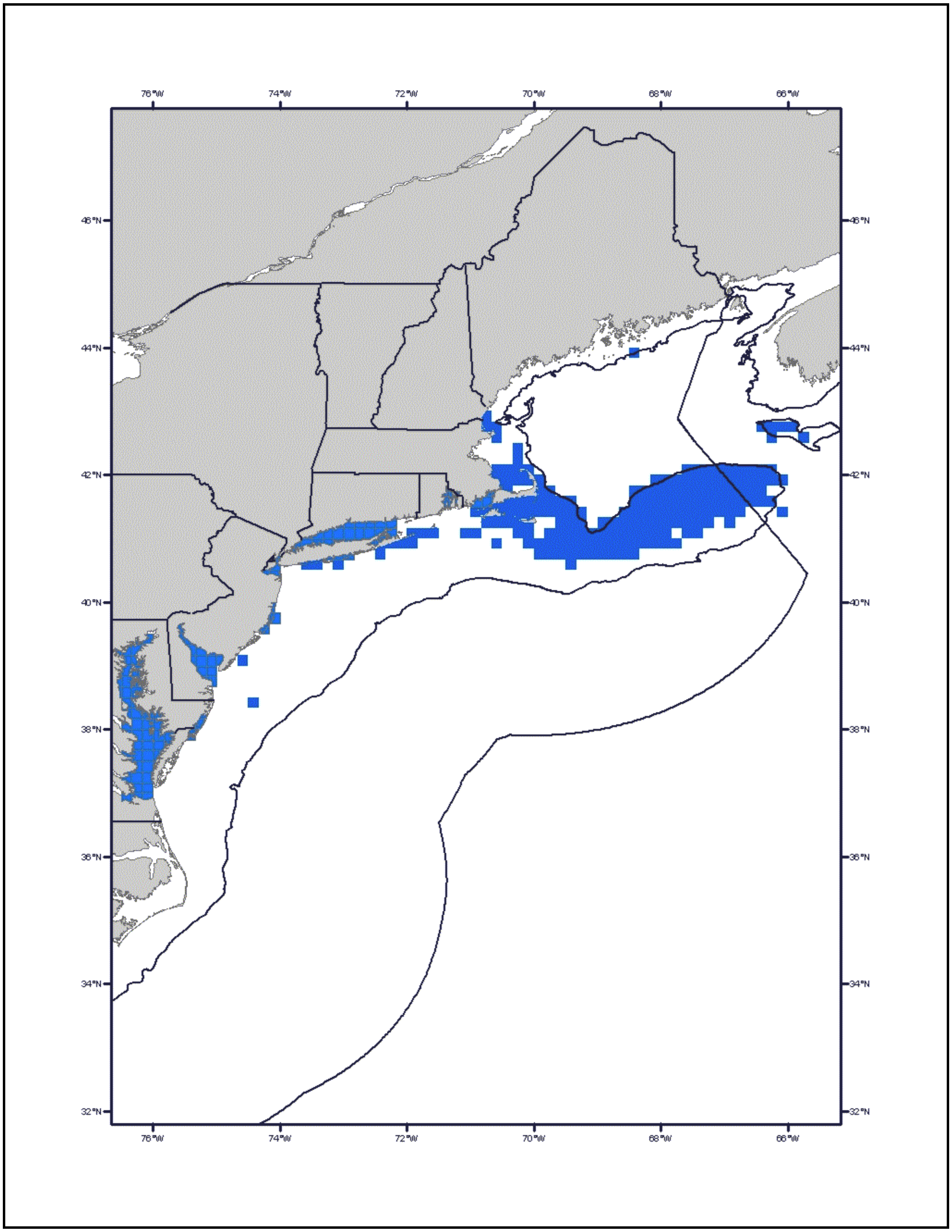
This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 12% of the observed range of this life stage.

Figure 60 Winter Skate Adult EFH Option 2 – 75% (Non-Preferred)



This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 26% of the observed range of this life stage.

Figure 61 Winter Skate Adult EFH Option 4 – 100% (Non-Preferred)



This map represents an option for the designation of EFH for this life history stage based on the areas of highest relative abundance of this species, based on the NMFS trawl survey (1963 - 1999) and ELMR data presented in Table 5. Only habitats with a substrate of sand and gravel or mud that occur within the shaded areas would be designated as EFH. This option represents 100% of the observed range of this life stage.

5.2.4 Federal Permit Program (Non-Preferred)

The Council considered four options, including the no action alternative, for establishing federal permits for vessels, operators, and dealers engaged in the skate fisheries. The Council selected Permit Option 1A as the proposed action (Section 4.9). Permit Options 1B, 2, and 3 are summarized below. The no action alternative is discussed in Section 5.1.

Permit Option 1B would require all vessels fishing for or landing skates in the EEZ to obtain a general skate fishery permit. Vessels that never possess more than 100 pounds of skates on board (bait and/or wings) would not be required to obtain a skate permit. The Council rejected this option because it does not incorporate all vessels that catch any amount of skates into the permit and catch reporting system. Although the extent to which catch reporting under Option 1B would be incomplete, it is inconsistent with the objectives of this FMP to not include all vessels and dealers in the permit and catch reporting systems.

Permit Option 2 would establish two permits for skates: (1) a Directed Skate Permit and (2) an Incidental Catch Skate Permit. (The terms "directed" and "incidental catch" are being applied loosely, recognizing that the vast majority of the skate wing fishery is an incidental catch fishery.) Vessels would be required to select either a directed or incidental catch skate permit on an annual basis.

- Vessels that obtain a **Directed Skate Permit** would be required to comply with ***all*** provisions of the Skate FMP, including any skate possession limits, gear restrictions, and other measures (seasons and closures) that may be implemented in the future.
- Vessels that obtain an **Incidental Catch Skate Permit** would be limited to a ***1,000 pound possession limit of skates (wings or bait)*** and would be required to comply with any species prohibitions in the Skate FMP.

The Council does not prefer Permit Option 2 because there are no incentives in the FMP at this time to encourage vessels to obtain an incidental skate permit rather than a directed permit. The PDT anticipated that without incentives, the vast majority of vessels would obtain directed permits, thereby defeating the objective of this option. If this is the case, the additional cost of administering a two-tier permit system would not be offset by any benefits related to better fishery information. The incidental catch limit may also create regulatory discards.

Permit Option 3 would allow vessels and dealers that possess any northeast federal fisheries permits that include logbook and dealer reporting requirements to use these other federal permits to land, sell, and purchase skates. Vessels and dealers that do not possess any northeast federal fisheries permits that include logbook and dealer reporting requirements would be required to obtain a general open access skate fishery permit. This ensures that all skate fishing activity will still be subject to reporting requirements even if some vessels do not possess a specific skate permit. The Council does not prefer Permit Option 3 because it is not consistent with permit programs in all other fisheries in the Northeast Region and could therefore complicate administration, monitoring, and enforcement.

5.2.5 Catch Reporting Requirements (Non-Preferred)

Table 15 summarizes the various options that the Council considered for modifying current reporting requirements for vessels and dealers to collect more specific skate fishery information. The options outlined in Table 15 were presented to the public to provide a general framework for various modifications to current reporting requirements that the Council may implement through the Skate FMP and did not represent an exhaustive list of possible options under consideration. It was noted in the Draft FMP/EIS and the public hearing document that the options in Table 15 could be “mixed and matched” in several other ways to construct various other options for catch reporting requirements. The Council ultimately selected Reporting Option 4 as the proposed action.

Table 15 Summary of Options to Modify Reporting Requirements

OPTION NUMBER	Report **LANDINGS** by Species	Report **LANDINGS** by Bait/Wing Category	Report **DISCARDS** by Species	Report **DISCARDS** by Large/Small Category	**DESCRIPTION**
#1					Status Quo reporting, most as “uncl. skates” and “uncl. wings”
#2		vessel		vessel	Mandatory reporting by general size and market categories
		dealer			
#3	vessel		vessel		Mandatory reporting by species
	dealer				
#4	vessel		Sea Sampling and study fleets	vessel	Relies on sea sampling and study fleets for species-specific discard data
	dealer				
#5	vessel		Volunteer program for vessels	Non-volunteer vessels	Relies on volunteer program for species-specific discard data
	dealer				
#6	Volunteer program for vessels	Non-volunteer vessels	Volunteer program for vessels	Non-volunteer vessels	Relies on volunteer program for species-specific landings and discard data
		dealer			
#7		vessel		vessel	Mandatory species-specific reporting for dealers
	dealer				

The Council felt that Reporting Option 4 was the most feasible and realistic option to collect much-needed fishery information without imposing an unreasonable burden on the industry. The no action alternative (Reporting Option 1) does not address the objectives of the Skate FMP because it does not provide a mechanism to collect detailed skate fishery data for monitoring the fishery and measuring the effectiveness of management. The Council does not prefer the options that required discards to be reported by individual species because this requirement could increase discard mortality if skates stay on deck longer for identification purposes. Also, difficulty in identification of species could affect the accuracy of the data. The Council does not prefer options that rely on a volunteer program for species-specific reporting because there currently are no incentives in the FMP to encourage vessels to participate in the voluntary data collection program. Therefore, volunteers would be hard to recruit into the reporting program and would require training to improve their ability to differentiate species.

5.2.6 Management Measures to Protect Barndoor, Thorny, and Smooth Skates (Non-Preferred)

In addition to the no action alternatives for barndoor, thorny, and smooth skates (Section 5.1), the Council considered prohibiting the possession (Option 1), landing (Option 2), and sale (Option 3) of each of these species. In general:

- A prohibition on the possession of a species means that ***no*** federally-permitted vessels or dealers will be allowed to possess the prohibited species. This includes all vessels and dealers with any federal permits, not just those permitted for the skate fishery. In the regulations, prohibitions on possession are comprehensive and refer to: fish for, harvest, possess, or land. Terms like catch, take, and retain may also be added to the regulatory language for a prohibition on possession. Similar to the prohibition on the possession of salmon, language may be added to the regulation that requires all of the prohibited species to be released in such a manner as to insure maximum probability of survival.
- A prohibition on the landing= of a species means that ***no*** federally-permitted vessels will be allowed to land the prohibited species, and ***no*** federally-permitted dealers will be allowed to purchase the prohibited species. "Land" is defined in the regulations as to begin offloading fish, to offload fish, or to enter port with fish. Dealer prohibitions usually refer to: purchase, possess or receive for a commercial purpose, or attempt to purchase possess or receive for a commercial purpose.
- A prohibition on the sale of a species means that ***no*** federally-permitted dealers will be allowed to purchase the prohibited species, and no federally-permitted vessels will be allowed to sell the prohibited species. In the regulations, prohibitions on sale usually refer to: sell, barter, trade, or otherwise transfer; or attempt to sell, barter, trade, or otherwise transfer for a commercial purpose.

The trade-offs associated with these options are discussed in Section 6.1.4 of this document. The Council selected prohibitions on possession for barndoor, thorny and smooth skates because these are the most proactive and precautionary measures that the Council can take at this time, and all three species are in need of protection to ensure that they rebuild to their long-term target levels. In addition, there are significant enforcement problems associated with prohibitions on landing and sale. The Council established a geographical limit on the prohibition on possession of smooth skate (GOM) to avoid overlap and potential species identification problems in the southern New England bait fishery. The majority of smooth skate is distributed in the GOM, so this geographical limitation should not compromise the biological benefits of the proposed action.

5.2.7 Possession Limits for the Skate Wing Fishery (Non-Preferred)

The Council considered four options for possession limits for the skate wing fishery, including the no action alternative. The no action alternative (Option 4) is discussed in Section 5.1 of this document. Options 1-3 are summarized below. The Council adopted a combination of Options 1 and 2 as the proposed action in this FMP.

Option 1. 10,000 pounds of skate wings (22,700 pounds whole weight)
Option 2. 20,000 pounds of skate wings (45,400 pounds whole weight)
Option 3. 30,000 pounds of skate wings (68,100 pounds whole weight)

Analyses of the impacts of all three of the above possession limit options is presented in Section 6.0 of this document. The Council does not prefer Option 3 because analysis showed that only a very small conservation benefit could be expected with such a high possession limit. Options 1 and 2, when combined, could produce a conservation benefit (i.e., reduction in landings) up to 14%. The benefits of a wing possession limit include not only fishing mortality reductions for winter skate, but also long-term benefits to the wing species if the possession limit can discourage expansion of the fishery and/or an influx of new entrants into the fishery. Also, it is very likely that management measures in other fisheries, especially additional effort reductions in the groundfish fishery, will continue to reduce effort in the skate wing fishery and allow winter skate to rebuild to its long-term target level.

5.3 REJECTED ALTERNATIVES

The following subsections describe alternatives that were rejected by the Council during the development of the Draft Skate FMP/EIS. These were identified in the Draft FMP as “rejected alternatives” and were not fully analyzed in the Draft EIS. The rationale for the Council’s rejection also is briefly summarized below.

5.3.1 Management Unit

As discussed in Section 4.1 of this document, the Council considered establishing a management unit based on the geographic extent of the ranges of all the species in the skate complex.

Two of the skate species in the northeast complex are distributed significantly farther south than the other species: clearnose and rosette skates. The ranges of these two species extend from the Southern New England area southward, well beyond the extent of the NEFSC trawl survey and into waters off the coast of Florida. For this reason, the Council discussed the possibility of managing these species throughout the extent of their ranges, that is, from Maine – Florida. However, it seems neither practical nor prudent for the New England Council to attempt to manage skate resources as far south as Florida. During the development of this FMP, the Council requested that the National Marine Fisheries Service remove clearnose and rosette skates from the northeast complex to diminish concerns about the possibility of the New England Council developing management measures for the southeast region. NMFS’ response suggested that this matter could be addressed through the specification of an appropriate management unit in the Skate FMP. Therefore, the management unit proposed in Section 4.1 is defined not as the area that incorporates the geographic range of all seven skate species, but as the area that incorporates the range of the New England Council's jurisdiction over management of the resource.

5.3.2 Skate-Specific Days-at-Sea (DAS)

The Council discussed the possibility of developing a separate DAS program for skates and controlling effort in the skate fishery through DAS management. This approach was rejected at this time for several reasons:

- Establishing another DAS program is administratively burdensome, and it does not appear that current administrative resources could absorb the increased burdens.
- The vast majority of skate fishing in federal waters is already managed through the Multispecies DAS program, since vessels must be using Multispecies DAS to catch skates unless they are fishing in an exempted fishery.
- Because most skate fishing occurs under Multispecies DAS and because of the lack of skate fishery information, it would be very difficult at this time to determine appropriate allocations of skate-specific DAS and appropriate reductions in DAS to achieve skate rebuilding objectives.

5.3.3 Requirement to Land All Skates Whole

Skates that are landed for the wing fishery are almost always landed only as wings and not whole skates. In some cases, this makes it difficult to attribute the wings to a particular skate species (although barndoor wings are easily identified). The Council considered requiring vessels to land all skates whole in order to improve species identification. This measure was rejected at this time for several reasons:

- It would create a significant amount of shoreside waste (skate carcasses) that would require disposal at an additional and potentially significant cost. If this cost were to be incurred by processors, it would likely result in a significant decrease in the ex-vessel price for skates. This measure could therefore impose significant economic burdens throughout the industry with no apparent or direct positive biological impact.
- Processors indicated that requiring wing skates to be landed whole could compromise the quality of the wing meat, especially on long/multi-day trips.

5.3.4 Limiting the Bait Fishery to Little Skate Only

The Council considered limiting the bait fishery to little skate only as a possible means of reducing fishing mortality on winter skate. Juvenile winter skates are thought to compose about 5-10% of landings in the skate bait fishery. This measure was rejected at this time for several reasons:

- Distinguishing little skates from juvenile winter skates is very difficult and requires examining each skate individually. The skate bait fishery is a high-volume fishery with some trips exceeding 50,000 pounds. It is not reasonable to expect bait catches to be sorted and examined to determine which skates are juvenile winter skates. In addition, the extra time required to sort the catch would likely increase the mortality of any juvenile skates that would be discarded.

- Species identification issues with little skates and juvenile winter skates would make this requirement very difficult to enforce.
- This measure is unlikely to significantly reduce fishing mortality on winter skate because of the small proportion of total bait catch that winter skate represents.

5.3.5 TACs

The Council considered implementing both "hard" (quota) and "soft" (target) Total Allowable Catches for the species in the skate complex as a general management approach for both directed and incidental skate fisheries. This measure was rejected at this time for several reasons:

- Lack of species-specific information hampers the ability to develop appropriate catch levels, even if these levels are just target levels. There is no information available to determine what amount of any species in the skate complex has historically been landed in any fishery.
- Absolute biomass for any of the skate species cannot be estimated at this time, so it is not possible to establish TACs at appropriate levels based on current biomass.
- The species composition of incidental catches in other fisheries (scallops, monkfish, etc.) is currently unknown, so it is not possible to establish appropriate bycatch TACs in other fisheries at this time.

5.3.6 Possession Limits for the Bait Fishery

The Council considered establishing possession limits in the bait fishery as a way to control effort in the bait fishery. This measure was rejected at this time for several reasons:

- The little skate resource, which constitutes the vast majority of the skate bait fishery, is abundant (above the biomass target) and increasing. It does not appear that there is a need to control effort in the skate fishery at this time.
- This measure would impact the vessels most economically dependent on skate bait fishing and would have significant negative impacts.
- This measure could affect the supply of bait for the lobster fishery, thereby producing additional negative impacts.

5.3.7 Skate-Specific Area Closures

Because skates are relatively sedentary and appear to benefit from closed area protection, the Council considered establishing skate-specific area closures to protect the species in need of management attention. This measure was rejected at this time for several reasons:

- Skates are already benefiting significantly from the numerous area closures implemented in other fisheries. For additional discussion, please see Section 6.1.6 of this document.
- Lack of information precludes an accurate analysis of the biological impacts of any skate-specific closures on the species in need of management attention.

- Lack of information precludes a comprehensive and accurate analysis of the impacts of any skate-specific area closures on skate vessels as well as vessels engaged in other fisheries in the areas proposed for closure.
- Some ports in the Northeast Region are already disproportionately impacted by the numerous groundfish area closures (year-round and seasonal), and the Council does not want to exacerbate difficulties these communities are experiencing as they try to maintain access to some fisheries for some part of the year.

5.3.8 Minimum Sizes

The Council considered establishing minimum sizes for skates as a general management approach for both the bait and wing fisheries. This measure was rejected at this time for several reasons:

- The lack of size selectivity information for skates precludes the development of appropriate minimum sizes.
- This approach may not be feasible in the high-volume bait fishery and could increase discard mortality if the time that skates remain on deck to be sorted increases.
- Processors indicated that they already self-regulate the size of skate wings based on a preferred wing weight. It would be difficult to translate the processors preferred wing weight into an appropriate minimum size for skates cut for wings.
- Skate wings are cut at sea and are cut differently depending on the vessel and the crew member. It would be difficult to establish an appropriate minimum size for skate wings that addresses individual cutting techniques.

5.3.9 Limited Access

The Council considered implementing a limited access permit program in this FMP as a mechanism to control effort and expansion in the skate fisheries. This measure was rejected at this time for several reasons:

- There is no complete, reliable database from which to develop limited access qualification criteria and/or analyze the impacts of any limited access program.
- The current composition of the fleet and capacity in the skate and wing fisheries is unknown, so it is difficult to determine whether or not a limited access program is warranted.
- A significant percentage of skate fisheries are already limited access in that they are indirectly managed through the multispecies effort reduction program. Skate fishing in federal waters must occur under Multispecies DAS (and therefore only by limited access multispecies permit holders) unless it occurs in an exempted fishery.

5.3.10 Gillnet Gear Requirements

The Council considered a requirement for heavier twine (0.90 mm) in sink gillnet fisheries to reduce the incidental catch of skates. This measure was rejected at this time for several reasons:

- No information is available to quantify the conservation benefits of this measure, and this measure would impose a significant cost for monkfish and groundfish gillnet vessels throughout the region.
- The impacts of this measure on other species caught in gillnet fisheries is unknown.
- Skate landings from gillnet vessels represent a relatively small proportion of total skate landings (less than 20%), so the costs of this measure may outweigh the benefits. In addition, similar measures for otter trawl vessels, which land more than 80% of all skates, are not being considered at this time.

6.0 ENVIRONMENTAL IMPACTS

6.1 BIOLOGICAL IMPACTS

6.1.1 Introduction

This section describes the biological impacts likely to result from the proposed action as well as the alternatives that the Council considered during the development of this FMP. This discussion focuses on the potential benefits of the proposed management measures on the species in the Northeast Region skate complex. The analyses below is severely limited by lack of information and is therefore primarily a qualitative assessment of the potential biological impacts of the measures proposed in this FMP.

As previously discussed, fishery information necessary to perform a quantitative biological analysis, including projections of future landings under a formal rebuilding program, is not available at this time. Moreover, it is currently not possible to estimate MSY for any of the species in the skate complex (see Section 4.3). There is no reliable time series of commercial fishery landings or discards for any of the individual species, and the time series for the complex as a whole is considered to be incomplete. In addition, very little reliable and current growth and maturity information is available for any of the species in the complex. Very little information is available on the length composition of the landings and discards. One of the primary objectives of this FMP is to collect information towards these ends so that the Council will be able to better monitor the effectiveness of skate management measures in the future.

6.1.2 Measures with No Direct Biological Impacts

As previously noted, not every measure proposed in this FMP is expected to have a direct biological impact on the skate resources. This is primarily because many measures proposed in this FMP are more administrative in nature and are designed to ensure effective implementation of the FMP, improve fishery information, and aid in the enforcement of the skate fishery regulations. To the extent that these measures achieve the above objectives, the indirect biological impacts on the skate resources will be positive, as the biological goals of this FMP are more likely to be achieved.

The measures proposed in this FMP that are not expected to have direct biological impacts are:

- Management Unit (Section 4.1);
- Fishing Year (Section 4.2);
- Identification of Essential Fish Habitat (Section 4.6);
- FMP Reviewing and Monitoring (Section 4.7);
- Framework Adjustment Process (Section 4.8);
- Federal Permit Program (Section 4.9);
- Catch Reporting Requirements (Section 4.10); and
- Letter of Authorization for Bait-Only Vessels (Section 4.15).

Because there are no direct biological impacts associated with the measures identified above, no specific biological analysis of these measures is provided in the following subsections of this document.

The biological impacts associated with MSY and OY specifications relate to the overfishing definitions proposed for the skate species. Biological considerations for MSY and OY are discussed in Section 4.3 of this document (p. 9). Biological considerations related to the proposed overfishing definitions are discussed in Section 4.4 (p. 19).

The long-term biological impacts of improved information and species-specific fishery data are significant and will ultimately improve the effectiveness of this FMP and the status of the skate resources. The measures proposed in this FMP to collect better species-specific and fishery information include the establishment of skate permits (Section 4.9) and proposed modifications to reporting requirements for skates (Section 4.10). Over the long-term, these measures may prove to be the most beneficial for the skate resources and their associated fisheries by providing more accurate information to monitor the FMP and make decisions about future management measures. While the long-term positive biological impacts of these measures cannot be quantified in this analysis, they must be acknowledged.

Positive impacts of management measures in other fisheries have already occurred (as evidenced by increasing trends in barndoor and other skate abundance) and will continue to occur in the future. The identification of baseline measures (Section 4.16.1) and the process to review changes to those measures (Section 4.16.2) that is proposed in this FMP establish a concrete link between management measures in other fisheries and the skate resources that they benefit. While the biological benefits of these baseline measures cannot be quantified, they are acknowledged. To provide some perspective on the biological impacts of the baseline measures, Section 6.1.6 of this document qualitatively illustrates the benefits of the groundfish year-round closed areas on the skate species.

In general, the measures proposed in this FMP that are likely to have the most direct biological impact on skates in the short-term are the proposed prohibitions for barndoor, thorny, and smooth skates (Sections 4.11-4.13) and the possession limit for the skate wing fishery (Section 4.14). The potential biological impacts of these measures as well as an assessment of the proposed rebuilding program are discussed in the subsections below.

6.1.3 Evaluation of Proposed Rebuilding Program for Overfished Species

6.1.3.1 Introduction

In the Draft Skate FMP/EIS, the Council considered four alternative rebuilding programs for overfished skate species (in addition to the no action alternative). The alternatives that the Council considered can be summarized as follows (see Section 5.2.2 of this document for a complete description of the rebuilding alternatives that the Council did not select):

1. **Rebuilding Option 1** – action triggered if the survey three-year average declines by more than a specified percentage in any given year
2. **Rebuilding Option 2** – action triggered if the survey three-year average does not increase annually
3. **Rebuilding Option 3** – action triggered based on Skate PDT recommendations
4. **Rebuilding Option 4** – action triggered if the survey three-year average does not increase by more than a specified percentage in any given year

Proposed Action (Rebuilding Option 2A)– Slightly modified version of Option 2; action triggered if survey three-year average does not increase in comparison to the most recent three-year average (see Section 4.5 for a complete description of the proposed rebuilding program).

Two issues are important to consider when determining the most appropriate rebuilding program for skates, given the limited information available:

1. survey variability and the *dynamic response problem* (see Section 4.5.5 for a discussion of the *dynamic response problem*); and
2. flexibility and discretion for reasonable and appropriate management responses during the rebuilding time period.

Related to the dynamic response problem is the potential to encounter false triggers. False triggers can occur when the rebuilding program triggers management action when the stock is actually increasing, or when the stock is not decreasing, but survey variability shows a short-term decline.

This section provides an assessment of the proposed rebuilding program for overfished species, including the rebuilding program options that the Council did not select. Two types of assessments are provided below: (1) a retrospective evaluation of the performance of the rebuilding options based on historical skate survey data – to consider how the rebuilding programs would have performed in the past; and (2) an evaluation of the performance of the rebuilding options using a hypothetical skate species in two scenarios – population declining at a rate of 5% per year, and population increasing at a rate of 5% per year – to consider the potential for false triggers during an assumed time of stock decline and an assumed time of stock rebuilding. **The proposed action is identified as Rebuilding Option 2A so as to differentiate it in the analysis from Rebuilding Option 2.**

6.1.3.2 Retrospective Performance Evaluation of Rebuilding Options

It is important to ensure that the selected rebuilding program performs well in that it triggers management action when management action may actually be required and not as a response to survey variability (i.e., a false trigger). To emphasize this important point, a retrospective evaluation was performed using historical time series for winter, little, barndoor, thorny, and smooth skates and the triggers for Rebuilding Options 1, 2, and 4. The proposed action represents a slightly modified version of Option 2, and results are expected to be similar for the proposed action as for Option 2. This evaluation provides some perspective on the practicality of the proposed rebuilding programs by illustrating how they would have performed in the past based on actual survey data for the skate species. Additional discussion is provided below.

Winter Skate

Winter skate is a species that exhibited low survey levels in the 1960s and 1970s (below the proposed biomass threshold), increased to record high levels in the 1980s (well above the proposed biomass target), decreased again to low levels in the 1990s (below the proposed biomass threshold), and recently increased to levels above the proposed threshold but below the target. It is useful to evaluate the performance of the proposed rebuilding programs based on the history of the winter skate trawl survey index, as this species essentially became overfished, completely rebuilt, became overfished again, and is now rebuilding again.

Table 16 and Figure 62 present a retrospective evaluation of how the rebuilding options that the Council considered during the development of this FMP would have performed in the past based on the winter skate autumn trawl survey index. From the time series shown in Table 16 and displayed in Figure 62, winter skate would have been considered overfished in 1975 and would have been considered rebuilt in 1982 (based on the proposed overfishing definition in Section 4.4). During this seven-year period, additional management action would have been required once under Rebuilding Option 1, twice under Rebuilding Option 2, and four times under Rebuilding Option 4. A strict interpretation of Rebuilding Option 4 means that management action would have been required in 1982, the year when the survey index actually increased to above the biomass target and the stock would have been considered rebuilt.

The early years of the time series (1975 and 1976) highlight problems with the time-lag that exists when using a three-year average of the survey index. From 1975 to 1976, the survey index increased more than 100%, but the three-year moving average actually decreased, necessitating management action under any of the rebuilding options under consideration. This contradictory pattern highlights the need for flexibility in interpreting the survey indices when making annual evaluations of management plans. The contradictions can work both ways (i.e., the survey can decrease before the three-year average decreases), so it is important that discretion be used when making determinations.

After 1982, the winter skate survey index increased considerably to almost twice the biomass target and then began to decline. In 1994, the index fell below the proposed biomass threshold, resulting in an overfished determination for winter skate. Since then, the stock has been rebuilding. The survey index increased above the threshold in 1999, but has not yet reached the target level. In the seven years since 1994, the three-year moving average from the survey has increased almost 75%; during this time, management action would have been required once under Rebuilding Options 1 and 2 and five times under Rebuilding Option 4. The survey three-year averages for 1998-2000 and 1999-2001 are the highest since the early 1990s, yet Option 4 would have triggered management action in both 2000 and 2001.

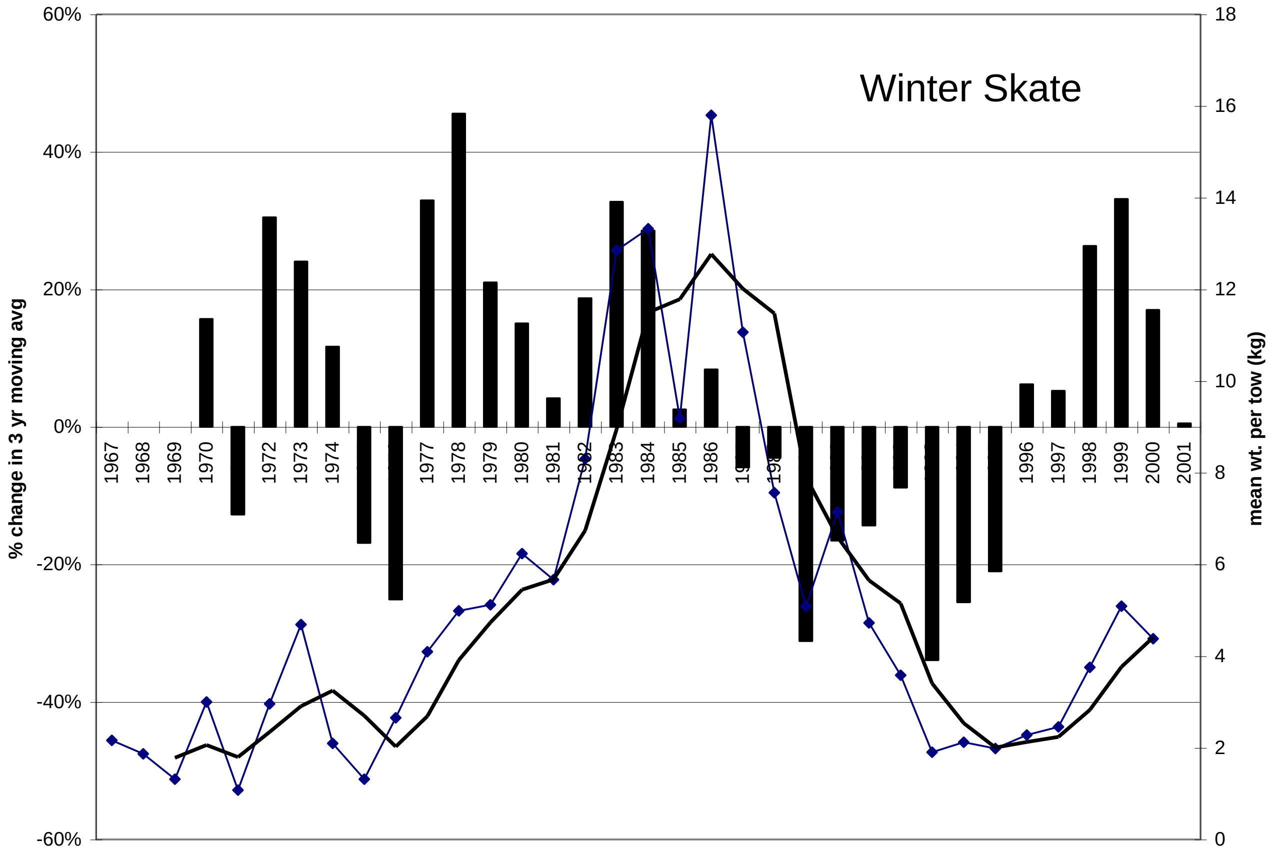
Table 16 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Winter Skate Autumn Survey Index

WINTER SKATE
Biomass threshold = 3.23 kg/tow; Biomass target = 6.46 kg/tow (3-yr. avg.)

YEAR	INDEX	3-YR. AVG.	3-YR. AVG. % CHANGE	RB Option 1 (20% decline)	RB Option 2 (no increase)	RB Option 4 (20% increase)
1972	2.958					
1973	4.686					
1974	2.097	3.247				
1975	1.315	2.699	-16.9		**ACTION**	**ACTION**
1976	2.655	2.022	-25.1	**ACTION**	**ACTION**	**ACTION**
1977	4.095	2.688	32.9			
1978	4.989	3.913	45.6			
1979	5.121	4.735	21.0			
1980	6.233	5.448	15.1			**ACTION**
1981	5.668	5.674	4.2			**ACTION**
1982	8.306	6.736	18.7			**ACTION**
1983	12.852	8.942	32.8			
1984	13.323	11.494	28.5			
1985	9.182	11.786	2.5			**ACTION**
1986	15.800	12.768	8.3			**ACTION**
1987	11.063	12.015	-5.9		**ACTION**	**ACTION**
1988	7.564	11.476	-4.5		**ACTION**	**ACTION**
1989	5.081	7.903	-31.1	**ACTION**	**ACTION**	**ACTION**
1990	7.145	6.597	-16.5		**ACTION**	**ACTION**
1991	4.724	5.650	-14.4		**ACTION**	**ACTION**
1992	3.582	5.150	-8.8		**ACTION**	**ACTION**
1993	1.905	3.404	-33.9	**ACTION**	**ACTION**	**ACTION**
1994	2.120	2.536	-25.5	**ACTION**	**ACTION**	**ACTION**
1995	1.985	2.004	-21.0	**ACTION**	**ACTION**	**ACTION**
1996	2.276	2.127	6.2			**ACTION**
1997	2.455	2.239	5.3			**ACTION**
1998	3.753	2.828	26.3			
1999	5.089	3.766	33.2			
2000	4.378	4.407	17.0			**ACTION**
2001	3.819	4.429	0.5			**ACTION**

**Indices and averages are in kg/tow.*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Figure 62 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Winter Skate Autumn Survey Index



**The bars represent the annual percent change in the three-year moving average of the trawl survey (left axis), while the lines represent the actual survey point estimates and the smoothed three-year moving average (right axis).*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Little Skate

Overall, the little skate resource is considered to be rebuilt and has remained above its biomass threshold and target for much of the survey time series (based on the proposed overfishing definition in Section 4.4).

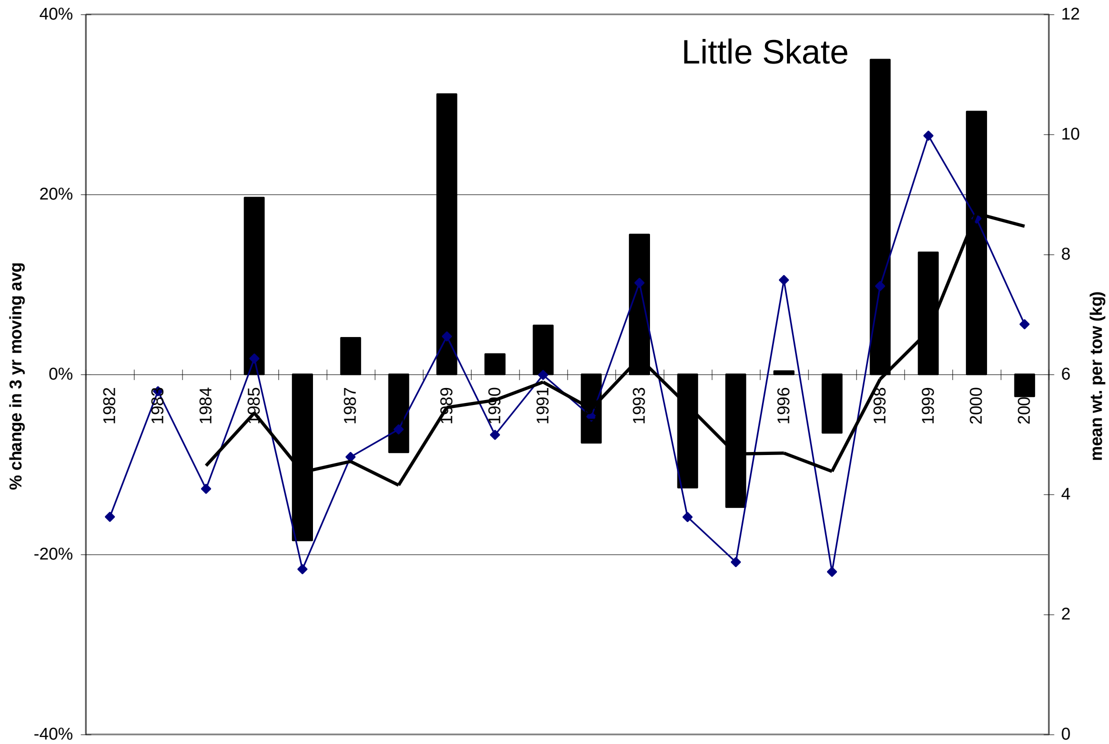
Table 17 and Figure 63 present a retrospective evaluation of how the rebuilding options that the Council considered during the development of this FMP would have performed in the past based on the little skate spring trawl survey index. Little skate is interesting to consider because over the time series presented in Table 17 and illustrated in Figure 63, the moving average of the survey index never fell below the proposed biomass threshold, so the little skate resource would never have been considered overfished. From 1985-2001, the survey index slowly increased to levels above the proposed biomass target and have remained well above the biomass target since 1999. Currently, the three-year moving average of the survey index for little skate is 89% higher than it was in 1984. Assuming that a rebuilding program had applied during this 17-year period (although it would never have been necessary), management action would never have been required under Rebuilding Option 1. In contrast, management action would have been required in seven years under Option 2 and in 14 of the 17 years under Option 4.

Table 17 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Little Skate Spring Survey Index

LITTLE SKATE Biomass threshold = 3.27 kg/tow; Biomass target = 6.54 kg/tow (3-yr. avg.)						
YEAR	**INDEX**	**3-YR. AVG.**	**3-YR. AVG. % CHANGE**	**RB Option 1 (20% decline)**	**RB Option 2 (no increase)**	**RB Option 4 (20% increase)**
1982	3.627					
1983	5.718					
1984	4.094	4.480				
1985	6.265	5.359	19.6			**ACTION**
1986	2.753	4.371	-18.4		**ACTION**	**ACTION**
1987	4.625	4.548	4.0			**ACTION**
1988	5.083	4.154	-8.7		**ACTION**	**ACTION**
1989	6.634	5.447	31.1			
1990	4.993	5.570	2.2			**ACTION**
1991	5.990	5.872	5.4			**ACTION**
1992	5.297	5.427	-7.6		**ACTION**	**ACTION**
1993	7.524	6.271	15.6			**ACTION**
1994	3.622	5.481	-12.6		**ACTION**	**ACTION**
1995	2.872	4.673	-14.8		**ACTION**	**ACTION**
1996	7.574	4.689	0.4			**ACTION**
1997	2.708	4.384	-6.5		**ACTION**	**ACTION**
1998	7.471	5.918	35.0			
1999	9.978	6.719	13.5			**ACTION**
2000	8.596	8.682	29.2			
2001	6.835	8.470	-2.4		**ACTION**	**ACTION**

**Indices and averages are in kg/tow.*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Figure 63 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Little Skate Spring Survey Index



**The bars represent the annual percent change in the three-year moving average of the trawl survey (left axis), while the lines represent the actual survey point estimates and the smoothed three-year moving average (right axis).*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Barndoor Skate

Barndoor skate is a species that has exhibited very low survey indices for many years. It is currently considered to be in an overfished condition (based on the proposed overfishing definition in Section 4.4) and subject to a rebuilding program once this FMP is implemented.

Table 18 and Figure 64 present a retrospective evaluation of how the rebuilding options that the Council considered during the development of this FMP would have performed in the past based on the barndoor skate autumn trawl survey index. The moving average of the trawl survey index fell below the proposed biomass threshold in 1968, and barndoor skate has remained in an overfished condition since that time. Over the 33-year time period since 1968, management action would have been required eight times under Option 1, 17 times under Option 2, and 22 times under Option 4.

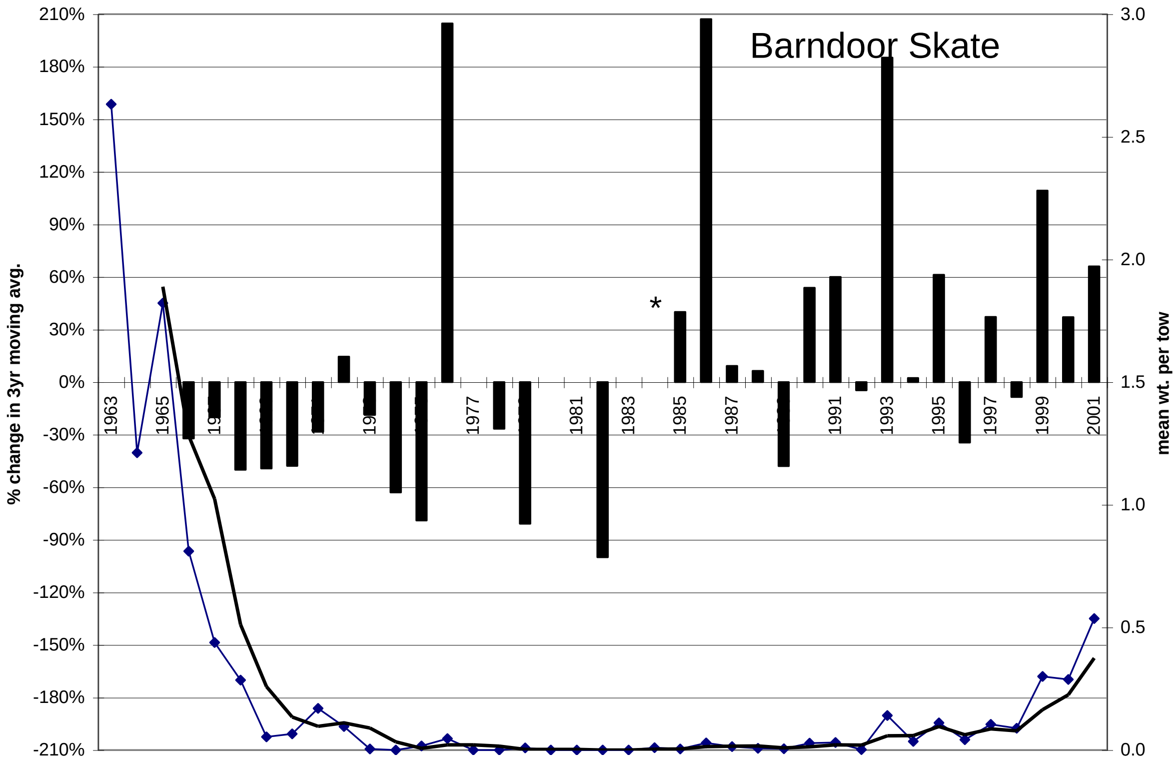
The survey time series for barndoor skate emphasizes problems with *dynamic response* associated with all of the rebuilding options under consideration. The survey index has been so close to zero for so long that annual variability becomes more extreme and problematic. Consider as an example the time period 1989-1999. Because the absolute values of the indices are so small, variability in the survey results in inconsistent advice about rebuilding in almost every year under Options 2 and 4. During this eleven-year time period, the three-year moving average of the trawl survey increased 1733%, indicating a significant increase. However, management action would have been triggered twice under Option 1, four times under Option 2, and five times under Option 4. Determinations and recommendations under Options 2 and 4 alternate on an almost annual basis, highlighting problems with inconsistency.

Table 18 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Barndoor Skate Autumn Survey Index

BARNDOOR SKATE Biomass threshold = 0.81 kg/tow; Biomass target = 1.62 kg/tow (3-yr. avg.)						
YEAR	**INDEX**	**3-YR. AVG.**	**3-YR. AVG. % CHANGE**	**RB Option 1 (30% decline)**	**RB Option 2 (no increase)**	**RB Option 4 (30% increase)**
1963	2.633					
1964	1.212					
1965	1.822	1.889				
1966	0.811	1.281	-32.2	**ACTION**	**ACTION**	**ACTION**
1967	0.438	1.023	-20.1		**ACTION**	**ACTION**
1968	0.285	0.511	-50.1	**ACTION**	**ACTION**	**ACTION**
1969	0.054	0.259	-49.4	**ACTION**	**ACTION**	**ACTION**
1970	0.066	0.135	-47.8	**ACTION**	**ACTION**	**ACTION**
1971	0.170	0.097	-28.3		**ACTION**	**ACTION**
1972	0.096	0.111	14.4			**ACTION**
1973	0.004	0.090	-18.8		**ACTION**	**ACTION**
1974	0.000	0.033	-63.1	**ACTION**	**ACTION**	**ACTION**
1975	0.017	0.007	-79.5	**ACTION**	**ACTION**	**ACTION**
1976	0.047	0.021	210.7			
1977	0.000	0.021	0.0		**ACTION**	**ACTION**
1978	0.000	0.016	-26.2		**ACTION**	**ACTION**
1979	0.009	0.003	-81.3	**ACTION**	**ACTION**	**ACTION**
1980	0.000	0.003	0.0		**ACTION**	**ACTION**
1981	0.000	0.003	0.0		**ACTION**	**ACTION**
1982	0.000	0.000	-100.0	**ACTION**	**ACTION**	**ACTION**
1983	0.000	0.000	N/A		**ACTION**	**ACTION**
1984	0.010	0.003	N/A			**ACTION**
1985	0.004	0.005	39.7			
1986	0.029	0.014	210.7			
1987	0.014	0.016	8.9			**ACTION**
1988	0.007	0.017	7.4			**ACTION**
1989	0.005	0.009	-48.4	**ACTION**	**ACTION**	**ACTION**
1990	0.028	0.014	55.0			
1991	0.031	0.022	58.5			
1992	0.002	0.021	-3.8		**ACTION**	**ACTION**
1993	0.141	0.058	180.7			
1994	0.035	0.059	2.0			**ACTION**
1995	0.111	0.096	61.3			
1996	0.042	0.063	-34.3	**ACTION**	**ACTION**	**ACTION**
1997	0.105	0.086	37.3			
1998	0.089	0.079	-8.6		**ACTION**	**ACTION**
1999	0.300	0.165	109.2			
2000	0.288	0.226	37.1			
2001	0.536	0.375	66.0			

**Indices and averages are in kg/tow.*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Figure 64 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Barndoor Skate Autumn Survey Index



* 1984 % change can't be determined due to zero value in three pt. moving average(1981-1983).

**The bars represent the annual percent change in the three-year moving average of the trawl survey (left axis), while the lines represent the actual survey point estimates and the smoothed three-year moving average (right axis).*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Thorny Skate

Thorny skate is a species that has exhibited a relatively steady decline in the trawl survey index since about 1980. It is currently considered to be in an overfished condition (based on the overfishing definition proposed in Section 4.4) and subject to a rebuilding program once this FMP is implemented.

Table 19 and Figure 65 present a retrospective evaluation of how the rebuilding options that the Council considered during the development of this FMP would have performed in the past based on the thorny skate autumn trawl survey index. The thorny skate survey index was already above the biomass target in 1965 and increased another 30% from 1965 to 1971. Applying the rebuilding options to this six-year time period (although they would never have been necessary) triggers management action three times under Option 2 and four times under Option 4. There would not have been a trigger for management action under Rebuilding Option 1 during this time period.

From the time series of trawl survey data presented in Table 19 and illustrated in Figure 65, the thorny skate resource would have been considered to be in an overfished condition in 1983. In the 18 years since 1983, management action would have been triggered four times under Option 1, 14 times under Option 2, and 17 times under Option 4.

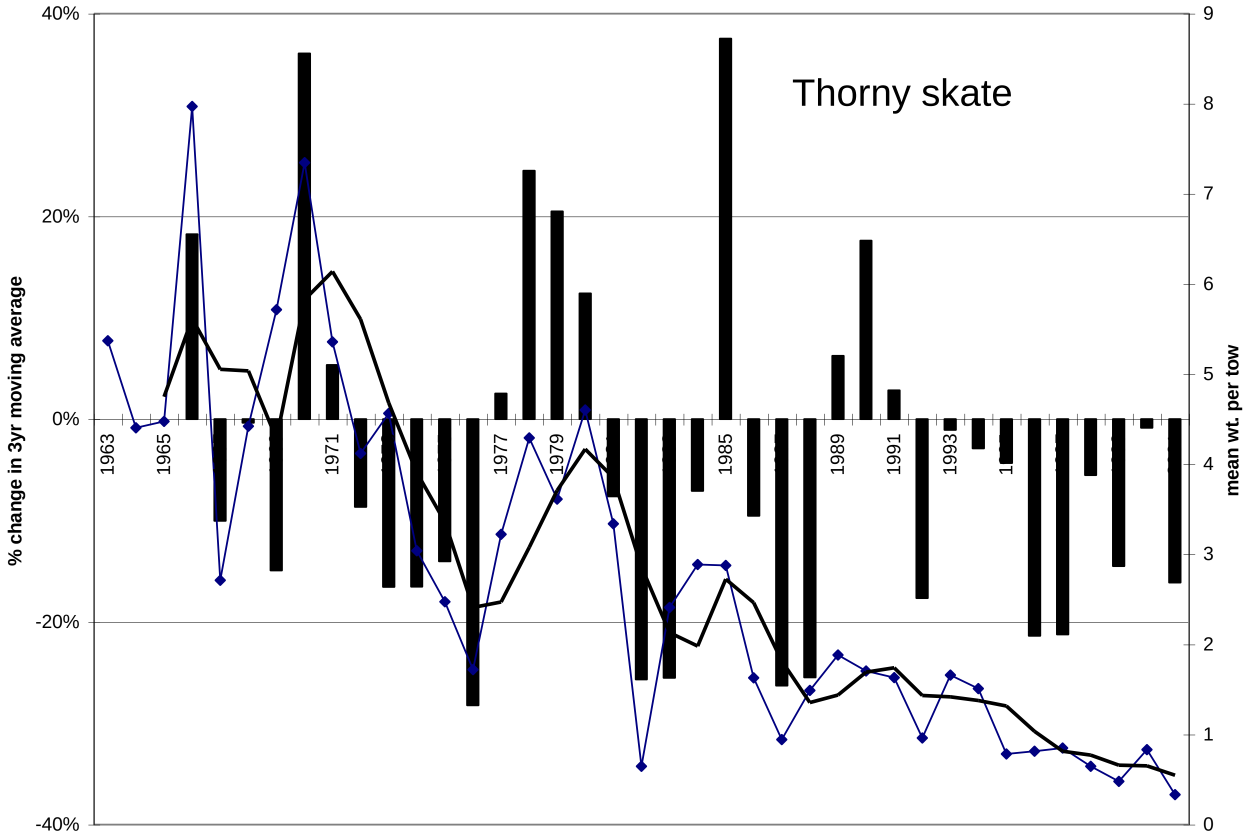
From 1987-1989, the survey index actually doubled, but the three-year moving average decreased, resulting in the need for action once under Options 1 and 2 and in both years under Option 4. This again underscores the importance of flexibility when evaluating the need for management action under any of these rebuilding options, as trends in the three-year moving average can contradict trends in the point estimates.

Table 19 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Thorny Skate Autumn Survey Index

THORNY SKATE Biomass threshold = 2.20 kg/tow; Biomass target = 4.41 kg/tow (3-yr. avg.)						
YEAR	**INDEX**	**3-YR. AVG.**	**3-YR. AVG. % CHANGE**	**RB Option 1 (20% decline)**	**RB Option 2 (no increase)**	**RB Option 4 (20% increase)**
1963	5.371					
1964	4.403					
1965	4.474	4.750				
1966	7.971	5.616	18.2			**ACTION**
1967	2.712	5.053	-10.0		**ACTION**	**ACTION**
1968	4.421	5.035	-0.4		**ACTION**	**ACTION**
1969	5.715	4.283	-14.9		**ACTION**	**ACTION**
1970	7.347	5.828	36.1			
1971	5.357	6.140	5.4			**ACTION**
1972	4.119	5.608	-8.7		**ACTION**	**ACTION**
1973	4.564	4.680	-16.5		**ACTION**	**ACTION**
1974	3.038	3.907	-16.5		**ACTION**	**ACTION**
1975	2.474	3.359	-14.0		**ACTION**	**ACTION**
1976	1.720	2.411	-28.2	**ACTION**	**ACTION**	**ACTION**
1977	3.221	2.471	2.5			**ACTION**
1978	4.291	3.077	24.5			
1979	3.612	3.708	20.5			
1980	4.601	4.168	12.4			**ACTION**
1981	3.339	3.851	-7.6		**ACTION**	**ACTION**
1982	0.646	2.862	-25.7	**ACTION**	**ACTION**	**ACTION**
1983	2.409	2.132	-25.5	**ACTION**	**ACTION**	**ACTION**
1984	2.887	1.981	-7.1		**ACTION**	**ACTION**
1985	2.877	2.724	37.5			
1986	1.629	2.464	-9.6		**ACTION**	**ACTION**
1987	0.944	1.816	-26.3	**ACTION**	**ACTION**	**ACTION**
1988	1.488	1.354	-25.5	**ACTION**	**ACTION**	**ACTION**
1989	1.883	1.438	6.3			**ACTION**
1990	1.704	1.692	17.6			**ACTION**
1991	1.632	1.740	2.8			**ACTION**
1992	0.962	1.433	-17.6		**ACTION**	**ACTION**
1993	1.658	1.417	-1.1		**ACTION**	**ACTION**
1994	1.509	1.376	-2.9		**ACTION**	**ACTION**
1995	0.783	1.317	-4.3		**ACTION**	**ACTION**
1996	0.814	1.035	-21.4	**ACTION**	**ACTION**	**ACTION**
1997	0.849	0.815	-21.2	**ACTION**	**ACTION**	**ACTION**
1998	0.648	0.770	-5.5		**ACTION**	**ACTION**
1999	0.479	0.659	-14.5		**ACTION**	**ACTION**
2000	0.832	0.653	-0.9		**ACTION**	**ACTION**
2001	0.332	0.548	-16.1		**ACTION**	**ACTION**

**Indices and averages are in kg/tow.*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Figure 65 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Thorny Skate Autumn Survey Index



**The bars represent the annual percent change in the three-year moving average of the trawl survey (left axis), while the lines represent the actual survey point estimates and the smoothed three-year moving average (right axis).*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Smooth Skate

The three-year moving average of the trawl survey index for smooth skate recently increased above the proposed biomass threshold, so smooth skate is no longer considered to be in an overfished condition. It has not yet rebuilt to its long-term target, however.

Table 20 and Figure 66 present a retrospective evaluation of how the rebuilding options that the Council considered during the development of this FMP would have performed in the past based on the smooth skate autumn trawl survey index. Over the time series shown in Table 20 and Figure 66, the smooth skate index has been somewhat variable, illustrating problems with *dynamic response* and underscoring the need for flexibility. For example, the three-year moving survey average fell below the proposed biomass threshold in 1976, suggesting that smooth skate was in an overfished condition. In 1979, just three years later, the average had increased above the proposed target, suggesting that the resource was rebuilt. Four years later, in 1983, the average fell below the threshold, and smooth skate was again considered to be in an overfished condition.

The trawl survey average for smooth skate has remained below the proposed biomass target since 1983, but has fluctuated around the proposed threshold considerably. After 1983, smooth skate also would have been designated overfished in 1984, 1994, 1996, 1998 – 2000. If smooth skate had been designated overfished in 1983, the Council would have initiated a management plan that included a rebuilding program for smooth skates. Hypothetically, in the 18 years since 1983, additional management action would have been triggered nine times under Rebuilding Option 2 and 16 times under Rebuilding Option 4. Management action would not have been triggered under Option 1 (except for the initial overfished determination).

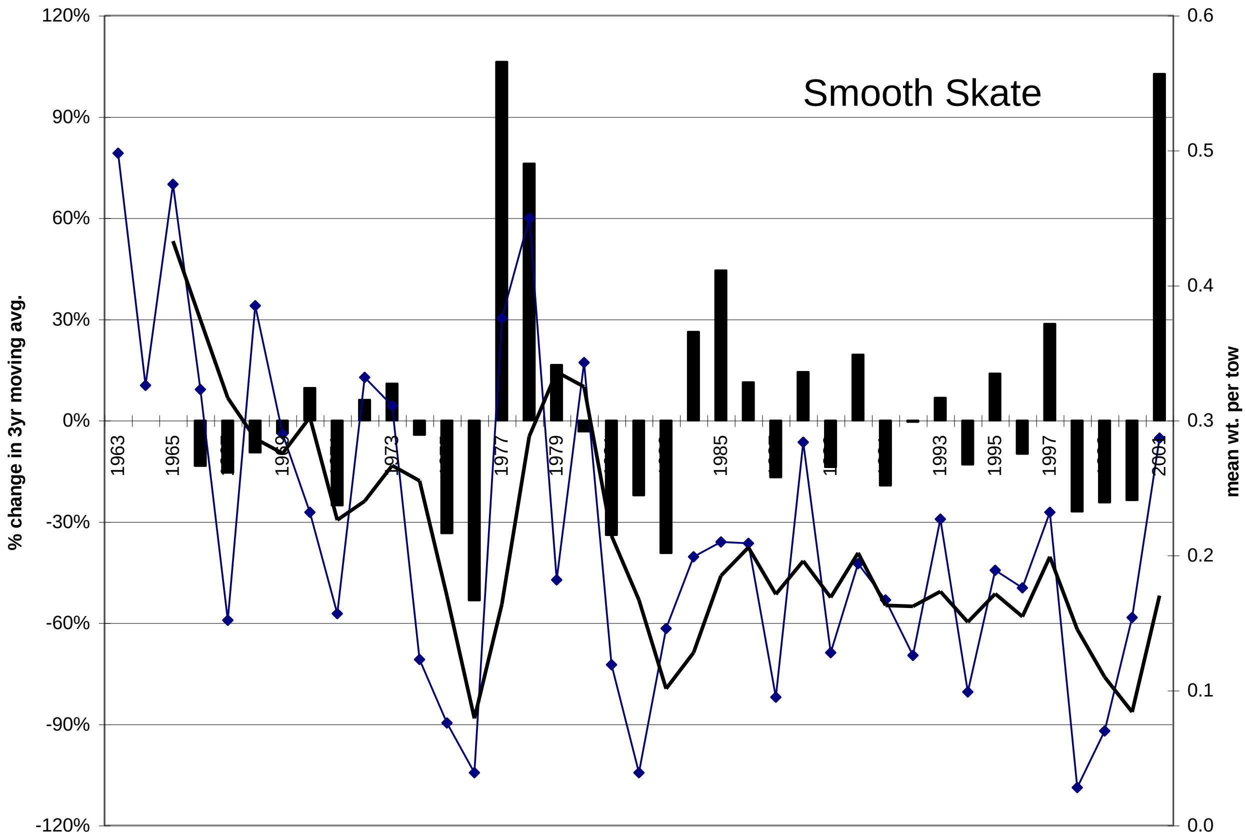
Another interesting time period to examine for smooth skate is 1998-2000. From 1998-2000, the survey point estimates increased 450% from 0.028 to 0.154, but the three-year moving average actually declined. Management action would have been triggered in all three years under Rebuilding Options 2 and 4. This again underscores the importance of flexibility when evaluating the need for management action under any of these rebuilding options, as trends in the three-year moving average can contradict trends in the point estimates.

Table 20 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Smooth Skate Autumn Survey Index

SMOOTH SKATE Biomass threshold = 0.16 kg/tow; Biomass target = 0.31 kg/tow (3-yr. avg.)						
YEAR	INDEX	3-YR. AVG.	3-YR. AVG. % CHANGE	RB Option 1 (30% decline)	RB Option 2 (no increase)	RB Option 4 (30% increase)
1963	0.498					
1964	0.326					
1965	0.475	0.433				
1966	0.323	0.375	-13.5		ACTION	ACTION
1967	0.152	0.317	-15.5		ACTION	ACTION
1968	0.385	0.287	-9.5		ACTION	ACTION
1969	0.290	0.276	-3.8		ACTION	ACTION
1970	0.232	0.302	9.6			ACTION
1971	0.157	0.227	-25.1		ACTION	ACTION
1972	0.332	0.240	6.1			ACTION
1973	0.311	0.267	10.9			ACTION
1974	0.123	0.255	-4.3		ACTION	ACTION
1975	0.076	0.170	-33.4	ACTION	ACTION	ACTION
1976	0.039	0.079	-53.3	ACTION	ACTION	ACTION
1977	0.376	0.163	106.1			
1978	0.450	0.288	76.4			
1979	0.182	0.336	16.5			ACTION
1980	0.343	0.325	-3.2		ACTION	ACTION
1981	0.119	0.215	-34.0	ACTION	ACTION	ACTION
1982	0.039	0.167	-22.2		ACTION	ACTION
1983	0.146	0.101	-39.3	ACTION	ACTION	ACTION
1984	0.199	0.128	26.2			ACTION
1985	0.210	0.185	44.6			
1986	0.209	0.206	11.3			ACTION
1987	0.095	0.172	-16.8		ACTION	ACTION
1988	0.284	0.196	14.5			ACTION
1989	0.128	0.169	-13.7		ACTION	ACTION
1990	0.194	0.202	19.4			ACTION
1991	0.167	0.163	-19.3		ACTION	ACTION
1992	0.126	0.162	-0.4		ACTION	ACTION
1993	0.227	0.173	6.7			ACTION
1994	0.099	0.151	-13.0		ACTION	ACTION
1995	0.189	0.172	13.8			ACTION
1996	0.176	0.155	-9.8		ACTION	ACTION
1997	0.232	0.199	28.6			ACTION
1998	0.028	0.146	-26.9		ACTION	ACTION
1999	0.070	0.110	-24.2		ACTION	ACTION
2000	0.154	0.084	-23.6		ACTION	ACTION
2001	0.287	0.170	102.3			

**Indices and averages are in kg/tow.*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

Figure 66 Retrospective Performance Evaluation of Rebuilding Options 1, 2, and 4 Based on Historical Smooth Skate Autumn Survey Index



**The bars represent the annual percent change in the three-year moving average of the trawl survey (left axis), while the lines represent the actual survey point estimates and the smoothed three-year moving average (right axis).*
***The proposed action represents a slightly modified version of Rebuilding Option 2 and is more thoroughly evaluated in Section 6.1.3.3.*

6.1.3.3 Evaluation of Rebuilding Options Using Hypothetical Skate Species

The retrospective evaluation presented in Section 6.1.3.2 of this document provides a clear indication of when Council action would have been required under each of the three criteria-based rebuilding options (Option 3 was not evaluated because it does not include any specific criteria or triggers). The drawback to this analysis is that it is not a simple matter to determine, from the actual survey data, how the various rebuilding options would perform in an assumed period of rebuilding compared to an assumed period of decline. This difficulty is due to the significant variability in the existing survey data for these species. In addition, management action that would have been required when the species would have been considered overfished did not occur, so it is difficult to determine whether or not additional action would have been triggered in following years.

The following assessment considers two very different scenarios. In the first scenario, the population of a hypothetical skate species is declining at a rate of 5% per year. In the second scenario, the population of a hypothetical skate species is increasing at the same rate of 5% per year. Similar to three of the seven species in the northeastern skate complex, the hypothetical survey index data for these skate species vary with a coefficient of variation (CV) equivalent to +/-20%.

Figure 67 provides a graphical representation of the hypothetical population declining at a rate of 5% per year, and Table 21 provides the data on which this graph is based. Figure 68 provides the graphical representation of the hypothetical skate population that is increasing at a rate of 5% annually, and Table 22 provides the data on which this graph is based. In both cases, the population change began with a baseline index value of 10.0 kg/tow in 1980. Also in both cases, the data for years 1981-2020 were generated by either decreasing (for Table 21) or increasing (for Table 22) the previous year's survey index value, offset by a randomly generated error factor of +/-20% of the previous year's index value to represent the survey variability. The time series for both examples arbitrarily runs through the year 2020 to provide for an extended time series against which to analyze the efficacy of the rebuilding options, and to reinforce the hypothetical nature of this exercise. The extended time series used in this analysis allows the population in example 1 to decline by more than 90% from the baseline, and the population in example 2 to increase by approximately 500%.

Figure 67 Representing a Hypothetical Skate Species with a Population Declining at an Annual Rate of 5% (on average), Subject to Survey Variability of +/- 20%

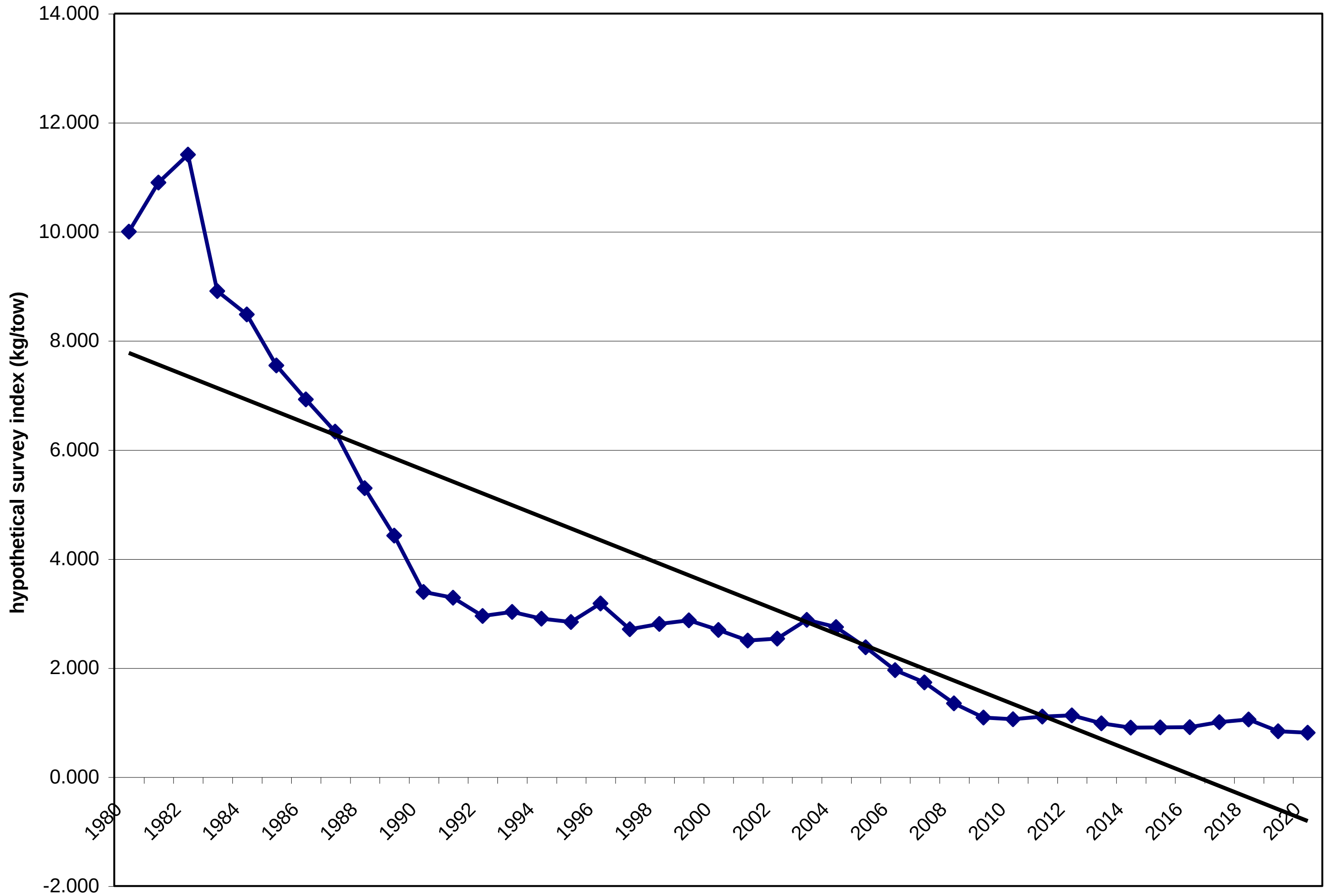


Figure 68 Representing a Hypothetical Skate Species with a Population Increasing at an Annual Rate of 5% (on average), Subject to Survey Variability of +/- 20%

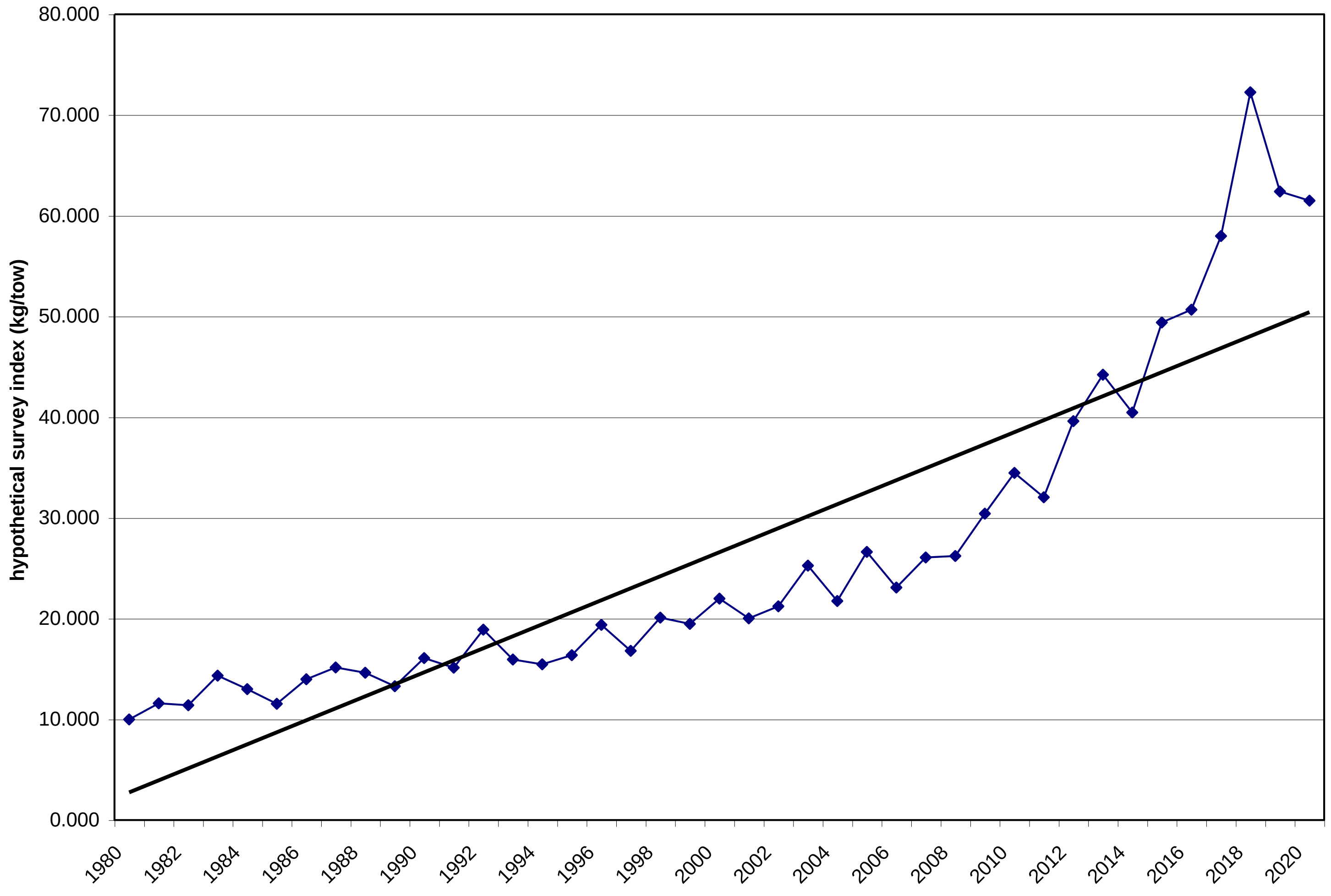


Table 21 Example of Effect of Rebuilding Program Options Using a Hypothetical Skate Species with a Population Declining at an Average Rate of 5% Per Year

	Survey Index**	Annual % Change	% Change from Baseline	3-Year Average	Annual % Change	% Change from Baseline	Option 1	Option 2	Option 2A-Proposed	Option 4
1980	10.000	--	--	--	--	--				
1981	10.902	9.0%	9.0%	--	--	--				
1982	11.414	4.7%	14.1%	10.77	--	--				
1983	8.910	-21.9%	-10.9%	10.41	-3.4%	-3.4%		**ACTION**		**ACTION**
1984	8.483	-4.8%	-15.2%	9.60	-7.7%	-10.9%		**ACTION**		**ACTION**
1985	7.548	-11.0%	-24.5%	8.31	-13.4%	-22.8%		**ACTION**	**ACTION**	**ACTION**
1986	6.926	-8.2%	-30.7%	7.65	-8.0%	-29.0%		**ACTION**	**ACTION**	**ACTION**
1987	6.333	-8.6%	-36.7%	6.94	-9.4%	-35.6%		**ACTION**	**ACTION**	**ACTION**
1988	5.294	-16.4%	-47.1%	6.18	-10.8%	-42.6%		**ACTION**	**ACTION**	**ACTION**
1989	4.428	-16.4%	-55.7%	5.35	-13.5%	-50.3%		**ACTION**	**ACTION**	**ACTION**
1990	3.394	-23.4%	-66.1%	4.37	-18.3%	-59.4%		**ACTION**	**ACTION**	**ACTION**
1991	3.287	-3.1%	-67.1%	3.70	-15.3%	-65.6%		**ACTION**	**ACTION**	**ACTION**
1992	2.951	-10.2%	-70.5%	3.21	-13.3%	-70.2%		**ACTION**	**ACTION**	**ACTION**
1993	3.025	2.5%	-69.7%	3.09	-3.8%	-71.3%		**ACTION**	**ACTION**	**ACTION**
1994	2.902	-4.1%	-71.0%	2.96	-4.2%	-72.5%		**ACTION**	**ACTION**	**ACTION**
1995	2.841	-2.1%	-71.6%	2.92	-1.2%	-72.9%		**ACTION**	**ACTION**	**ACTION**
1996	3.183	12.0%	-68.2%	2.98	1.8%	-72.4%			**ACTION**	**ACTION**
1997	2.708	-14.9%	-72.9%	2.91	-2.2%	-73.0%		**ACTION**	**ACTION**	**ACTION**
1998	2.806	3.6%	-71.9%	2.90	-0.4%	-73.1%		**ACTION**	**ACTION**	**ACTION**
1999	2.871	2.3%	-71.3%	2.79	-3.6%	-74.1%		**ACTION**	**ACTION**	**ACTION**
2000	2.697	-6.1%	-73.0%	2.79	-0.1%	-74.1%		**ACTION**	**ACTION**	**ACTION**
2001	2.500	-7.3%	-75.0%	2.69	-3.6%	-75.0%		**ACTION**	**ACTION**	**ACTION**
2002	2.536	1.4%	-74.6%	2.58	-4.1%	-76.1%		**ACTION**	**ACTION**	**ACTION**
2003	2.882	13.6%	-71.2%	2.64	2.4%	-75.5%			**ACTION**	**ACTION**
2004	2.749	-4.6%	-72.5%	2.72	3.1%	-74.7%				**ACTION**
2005	2.379	-13.5%	-76.2%	2.67	-1.9%	-75.2%		**ACTION**		**ACTION**
2006	1.959	-17.7%	-80.4%	2.36	-11.5%	-78.1%		**ACTION**	**ACTION**	**ACTION**
2007	1.733	-11.5%	-82.7%	2.02	-14.3%	-81.2%		**ACTION**	**ACTION**	**ACTION**
2008	1.352	-22.0%	-86.5%	1.68	-16.9%	-84.4%		**ACTION**	**ACTION**	**ACTION**
2009	1.091	-19.3%	-89.1%	1.39	-17.2%	-87.1%		**ACTION**	**ACTION**	**ACTION**
2010	1.057	-3.2%	-89.4%	1.17	-16.2%	-89.2%		**ACTION**	**ACTION**	**ACTION**
2011	1.109	5.0%	-88.9%	1.09	-6.9%	-89.9%		**ACTION**	**ACTION**	**ACTION**
2012	1.130	1.9%	-88.7%	1.10	1.2%	-89.8%			**ACTION**	**ACTION**
2013	0.986	-12.8%	-90.1%	1.07	-2.2%	-90.0%		**ACTION**	**ACTION**	**ACTION**
2014	0.903	-8.4%	-91.0%	1.01	-6.4%	-90.7%		**ACTION**	**ACTION**	**ACTION**
2015	0.910	0.8%	-90.9%	0.93	-7.3%	-91.3%		**ACTION**	**ACTION**	**ACTION**
2016	0.915	0.5%	-90.9%	0.91	-2.5%	-91.6%		**ACTION**	**ACTION**	**ACTION**
2017	1.006	10.0%	-89.9%	0.94	3.8%	-91.2%			**ACTION**	**ACTION**
2018	1.052	4.6%	-89.5%	0.99	5.0%	-90.8%				**ACTION**
2019	0.838	-20.3%	-91.6%	0.97	-2.6%	-91.0%		**ACTION**		**ACTION**
2020	0.814	-3.0%	-91.9%	0.90	-6.6%	-91.6%		**ACTION**	**ACTION**	**ACTION**

*** The survey index is randomly generated starting with a "baseline" of 10.0 kg/tow in year 1980, a forced 5% annual decline to establish a non-varying trend, and natural variability of +/- 20% to account for the CV of the survey index (assumed in the hypothetical case to be 20%).*

Table 22 Example of Effect of Rebuilding Program Options Using a Hypothetical Skate Species with a Population Increasing at an Average Rate of 5% Per Year

	Survey Index**	Annual % Change	% Change from Baseline	3-Year Average	Annual % Change	% Change from Baseline	Option 1	Option 2	Option 2A-Proposed	Option 4
1980	10.000	--	--	--	--	--				
1981	11.601	16.0%	16.0%	--	--	--				
1982	11.400	-1.7%	14.0%	11.00	--	--				
1983	14.332	25.7%	43.3%	12.44	13.1%	13.1%				ACTION
1984	13.010	-9.2%	30.1%	12.91	3.8%	17.4%				ACTION
1985	11.549	-11.2%	15.5%	12.96	0.4%	17.9%				ACTION
1986	13.989	21.1%	39.9%	12.85	-0.9%	16.8%		ACTION		ACTION
1987	15.160	8.4%	51.6%	13.57	5.6%	23.3%				ACTION
1988	14.639	-3.4%	46.4%	14.60	7.6%	32.7%				ACTION
1989	13.298	-9.2%	33.0%	14.37	-1.6%	30.6%		ACTION		ACTION
1990	16.075	20.9%	60.7%	14.67	2.1%	33.4%				ACTION
1991	15.135	-5.8%	51.4%	14.84	1.1%	34.9%				ACTION
1992	18.903	24.9%	89.0%	16.70	12.6%	51.9%				ACTION
1993	15.935	-15.7%	59.3%	16.66	-0.3%	51.4%		ACTION		ACTION
1994	15.461	-3.0%	54.6%	16.77	0.7%	52.4%				ACTION
1995	16.376	5.9%	63.8%	15.92	-5.0%	44.8%		ACTION	ACTION	ACTION
1996	19.386	18.4%	93.9%	17.07	7.2%	55.2%				ACTION
1997	16.812	-13.3%	68.1%	17.52	2.6%	59.3%				ACTION
1998	20.109	19.6%	101.1%	18.77	7.1%	70.6%				ACTION
1999	19.473	-3.2%	94.7%	18.80	0.2%	70.9%				ACTION
2000	21.990	12.9%	119.9%	20.52	9.2%	86.6%				ACTION
2001	20.021	-9.0%	100.2%	20.49	-0.1%	86.3%		ACTION		ACTION
2002	21.225	6.0%	112.2%	21.08	2.8%	91.6%				ACTION
2003	25.265	19.0%	152.6%	22.17	5.2%	101.5%				ACTION
2004	21.758	-13.9%	117.6%	22.75	2.6%	106.8%				ACTION
2005	26.618	22.3%	166.2%	24.55	7.9%	123.1%				ACTION
2006	23.095	-13.2%	131.0%	23.82	-2.9%	116.6%		ACTION		ACTION
2007	26.081	12.9%	160.8%	25.26	6.0%	129.7%				ACTION
2008	26.232	0.6%	162.3%	25.14	-0.5%	128.5%		ACTION		ACTION
2009	30.426	16.0%	204.3%	27.58	9.7%	150.7%				ACTION
2010	34.471	13.3%	244.7%	30.38	10.1%	176.1%				ACTION
2011	32.064	-7.0%	220.6%	32.32	6.4%	193.8%				ACTION
2012	39.602	23.5%	296.0%	35.38	9.5%	221.6%				ACTION
2013	44.225	11.7%	342.3%	38.63	9.2%	251.2%				ACTION
2014	40.459	-8.5%	304.6%	41.43	7.2%	276.6%				ACTION
2015	49.412	22.1%	394.1%	44.70	7.9%	306.3%				ACTION
2016	50.672	2.5%	406.7%	46.85	4.8%	325.9%				ACTION
2017	57.989	14.4%	479.9%	52.69	12.5%	379.0%				ACTION
2018	72.260	24.6%	622.6%	60.31	14.5%	448.2%				ACTION
2019	62.417	-13.6%	524.2%	64.22	6.5%	483.8%				ACTION
2020	61.506	-1.5%	515.1%	65.39	1.8%	494.5%				ACTION

*** The survey index is randomly generated starting with a "baseline" of 10.0 kg/tow in year 1980, a forced 5% annual increase to establish a non-varying trend, and natural variability of +/- 20% to account for the CV of the survey index (assumed in the hypothetical case to be 20%).*

Although the skate population in example 1 declines more than 90% over the course of the time series, because this decline is spread out over many years and the survey index never declines more than 23.4% in any one year, Council action would never be triggered under Rebuilding Option 1. On the other hand, because Option 4 requires such a significant increase in the survey index for action to not be required, additional Council action would be required every year in example 1. For example 1, Options 2 and 2A (the proposed action) appear very similar. Both would trigger Council action in most, but not all, years. Option 2A (the proposed action) would require Council action slightly more often than Option 2. It may not be evident in Table 21, but because the proposed action requires comparison of the current 3-year average with the 3-year average calculated for the fourth, fifth, and sixth years prior to the assessment year rather than the second, third, and fourth, there is a two-year delay to when this approach can be used compared with Option 2.

The analysis provides interesting results for example 2, in which the population increases consistently over the time series. Because this increase is small compared to the survey variability (even though a 5% annual population increase would actually be quite robust for a skate species), the effects of this increase are generally masked by the survey variability, and action would be required in every year under Rebuilding Option 4. Under Option 1, which only responds to significant decreases in the survey index, action would never be required. Rebuilding Options 2 and 2A are much less extreme, but there are some apparent differences. Under Option 2, action would be required seven times; but under Option 2A (the proposed action), action would only be required once.

This analysis illustrates an interesting outcome of Rebuilding Options 1 and 4: neither option is sufficiently sensitive to appropriately respond to small, but consistent changes in population size. Both options require significant short-term changes in population size to provide the Council with meaningful advice on when additional action should be taken. The lack of sufficient sensitivity of these two options to provide appropriate information for the Council is evident when comparing the results of the two examples: the results for both options are the same whether the population were to decrease more than 90% or increase 500% over the course of the time series. Although Option 1 would not be expected to trigger action in example 2, the limitations of Option 1 are evident in example 1. Similarly, although it could be argued that action should be required in every year for example 1, as it is under Option 4, it clearly should not be required in every year as it is under this option in example 2. Thus, neither of these options appear to have sufficient sensitivity to provide useful information to the Council that accurately reflects what is happening to the population.

Options 2 and 2A appear to provide much more useful information and to be much more sensitive to changes in population size. The results of this analysis are quite different for example 1 than they are for example 2, with action being required much more often for a declining population than for an increasing one. Of these two options, Option 2A (the proposed action) may be the more sensitive: Option 2A would trigger action more often than Option 2 when a population is in decline, and less often than Option 2 when a population is on the rise. In other words, Option 2A appears to be more effective at avoiding false triggers.

The results of this analysis suggest that, of the four criteria-based rebuilding options that the Council considered, Option 2A, the proposed action, would most accurately indicate when additional Council action should or should not be required to ensure the continued rebuilding of the species in the northeast skate complex.

6.1.4 Impacts of Proposed Prohibitions for Barndoor, Thorny, and Smooth Skates

During the development of this FMP, the Council considered various kinds of prohibitions for the skate species in need of specific management attention. For barndoor, thorny, and smooth skates, the Council considered prohibitions on: (1) possession; (2) landing; and (3) sale. Ultimately, the Council chose to prohibit the possession of all of these species. The following assessment addresses all three kinds of prohibitions that were considered in this FMP. General differences between these prohibitions as well as the trade-offs between restrictiveness and flexibility are discussed below.

In general:

- A prohibition on the possession of a species means that ***no*** federally-permitted vessels or dealers will be allowed to possess the prohibited species. This includes all vessels and dealers with any federal permits, not just those permitted for the skate fishery. In the regulations, prohibitions on possession are comprehensive and refer to: fish for, harvest, possess, or land. Terms like catch, take, and retain may also be added to the regulatory language for a prohibition on possession. Similar to the prohibition on the possession of salmon, language may be added to the regulation that requires all of the prohibited species to be released in such a manner as to insure maximum probability of survival.
- A prohibition on the landing of a species means that ***no*** federally-permitted vessels will be allowed to land the prohibited species, and ***no*** federally-permitted dealers will be allowed to purchase the prohibited species. "Land" is defined in the regulations as to begin offloading fish, to offload fish, or to enter port with fish. Dealer prohibitions usually refer to: purchase, possess or receive for a commercial purpose, or attempt to purchase possess or receive for a commercial purpose.
- A prohibition on the sale of a species means that ***no*** federally-permitted dealers will be allowed to purchase the prohibited species, and no federally-permitted vessels will be allowed to sell the prohibited species. In the regulations, prohibitions on sale usually refer to: sell, barter, trade, or otherwise transfer; or attempt to sell, barter, trade, or otherwise transfer for a commercial purpose.

Specific to skates is the problem with species identification. The effectiveness of more restrictive measures – for example, a prohibition on the possession of barndoor skate – will depend on the ability of fishermen to identify the prohibited species. To the extent that some of the skate species may be singled out for prohibitions, the ability of vessels, dealers, and enforcement agents to quickly and accurately distinguish the seven species in the skate complex becomes critical. Identification may be especially problematic on high volume trips and trips on vessels that only fish for or catch skates on a seasonal or part-time basis. The concern is that more restrictive prohibitions (those on possession, for example) could result in violations for many fishermen who make an honest mistake by missing a prohibited skate on a high volume trip or by mis-identifying a prohibited species. Similarly, enforcement agents could mis-identify a species and mistakenly issue a violation. For this reason, other kinds of prohibitions were considered that may provide more time/opportunity/flexibility for vessels to correctly identify the species and ensure that they are in compliance with the regulations. The Council selected prohibitions on possession because of the biological needs of the resources, so it will be important for enforcement personnel to establish mechanisms (for example, tolerances) to avoid problems associated with species mis-identification.

It is essential to recognize the trade-offs associated with different kinds of prohibitions. The trade-offs are related to the prohibition's potential impacts on fishing mortality and vessel flexibility. Vessel flexibility tends to decrease as the restrictiveness of the prohibition increases, while the potential to reduce fishing mortality tends to increase as the restrictiveness of the prohibition increases. Ranking the prohibitions that were considered for skates from most restrictive to least restrictive produces the following:

- Possession (most restrictive)
- Landing
- Sale
- No Action (least restrictive)

A prohibition on the possession of a species is the most restrictive form of prohibition and is most likely to reduce fishing mortality and therefore have positive biological impacts. This leaves the vessel with little flexibility, however, as the prohibited species must be returned to the water as quickly as possible. This is a measure that can be enforced both at-sea and dockside. To avoid problems with enforcement and compliance, a prohibition on possession includes a prohibition on both landing and sale as part of the regulatory language. If one objective of the management measure is to reduce fishing mortality and/or to promote rebuilding, then a prohibition on possession is the most likely kind of prohibition to achieve this objective. Note that while it does increase the probability of impacting fishing mortality, a prohibition on possession does not address any concerns related to species identification problems. As discussed above, if these problems prove to be significant, it may be necessary to consider tolerances to ensure that honest mistakes do not result in violations.

A prohibition on the landing of a species differs from a prohibition on possession in that a vessel may possess the species for some period of time, but cannot land it. Landing is defined as entering port, beginning to offload fish, or offloading fish. To avoid some problems with enforcement and compliance, a prohibition on landing usually includes a prohibition on sale. This kind of prohibition provides vessels with more flexibility and opportunity for compliance. If species identification is problematic, fishermen can take the time to sort their catch, identify the species, and discard the prohibited species. This may be a more feasible approach from a compliance perspective, but it has shortcomings from both the enforcement and fishing mortality perspectives. A prohibition on landing completely eliminates opportunity for at-sea enforcement and can complicate dockside enforcement. In addition, discard mortality is likely to increase with increased time that the prohibited species spends on deck. Under such a prohibition, vessels that catch skates incidentally may choose to set their skate catch aside until other species have been sorted since there is no legal requirement for them to return any skates to the water as quickly as possible. This is an important trade-off to understand in terms of the potential biological impacts of this measure.

A prohibition on the sale of a species differs from prohibitions on possession and landing in that it shifts much of the compliance burden to dealers (although it includes prohibitions for both sellers and buyers). This kind of prohibition has even more enforcement problems associated with it than a prohibition on landing. In addition to eliminating at-sea enforcement, dockside enforcement can become extremely difficult. For example, skate wings are most often cut at sea with only the wing returning to port for sale to a dealer. It may become very difficult for dealers, enforcement agents, and even the selling fishermen to distinguish all of the skate species by their wings only. As another example, a scenario that could result from this prohibition is if a vessel gives some of the prohibited species to a dealer to hold and then transfers the skates to another vessel for use as bait. This technically may not be a sale because no money was exchanged. This could be especially problematic with skates since one of the primary uses of skates is for lobster bait. During the scoping process for this FMP, some fishermen reported that significant amounts of skates are transferred between vessels (both at-sea and shoreside) for use as bait without any monetary exchange (because of the low commercial value of skates for bait). In addition to the enforcement problems, a prohibition on sale is not likely to reduce fishing mortality and may not result in any positive biological impacts.

As mentioned above, both prohibitions on landing and sale may be especially problematic for skates because of the nature of the skate fisheries. Both of these kinds of prohibitions introduce the potential to transfer the prohibited species at-sea for use as lobster bait. While adult barndoor and thorny skates are generally too large for use as bait, juvenile barndoor and thorny skates as well as smooth skates (adults) may be marketable as bait. Even though these are not the traditional species sought after for lobster bait, the potential for this activity to occur still exists. It is not possible to predict how much of this activity will occur, but to the extent that it does, the objective of the prohibition could be compromised. This is in addition to the potential to compromise the biological benefits of the prohibition because the prohibited species may remain on deck for a longer period of time.

Other problems could emerge if one kind of prohibition is adopted for one species, and another kind is adopted for another species. Inconsistent prohibitions between different skate species will compound enforcement and compliance difficulties. Consider a vessel trying to comply with a prohibition on the possession of barndoor skate, a prohibition on the landing of thorny skate, and a prohibition on the sale of smooth skate. This may ultimately confuse the situation to the extent that all of the prohibitions become ineffective. In this FMP, the Council resolved this issue by proposing the same kinds of prohibitions for all three skate species.

As discussed above, the potential to affect fishing mortality decreases with increasing flexibility/opportunity associated with the prohibition. Ranking the prohibitions considered in this FMP from most effective to least effective in terms of potential to reduce fishing mortality produces the following:

- Possession (most effective)
- Landing
- Sale
- No Action (least effective)

The discussion below focuses on the potential biological impacts of a prohibition on possession for barndoor, thorny, and smooth skates. It can be assumed that any benefits would be diminished by a prohibition on landings and diminished even more by a prohibition on sale. The diminishing of the benefits relates to the increased opportunity for the prohibited species to remain on-deck longer and not returned to the water in the most expeditious manner.

Landings of smooth skates are considered to be negligible. Smooth skates are relatively small-bodied skates and are considered too small for cutting skate wings. They are not known presently to be a component of any directed bait fishery (see Skate SAFE Report, Volume II). The effects of a prohibition on possession of smooth skates would likely be minor at present, but would discourage development of any markets for this species and prevent retention from any previously unreported fishery.

Both barndoor and thorny skates are large enough to be harvested for the skate wing fishery. However, the magnitude of landings for each species is unknown because most skate wings are landed as "unclassified." Information gathered for the Skate SAFE Report (Volume II) indicates that these species likely comprise a minor fraction of the skate wing landings, the majority being attributed to winter skate. The bait fishery reportedly favors small skates, and encounters with thorny or barndoor skates in the nearshore Southern New England waters where the bait fishery is most active are likely uncommon. The benefits of the prohibition can not be quantitatively analyzed because the magnitude of landings is not known. It is likely that neither species is currently targeted. Therefore, expected conservation benefits would be gained by the survival of discarded thorny and barndoor skates caught incidentally in mixed demersal or other targeted fisheries (which would have been opportunistically landed as skate wings).

In summary, the positive biological impacts resulting from the proposed prohibitions will be realized through discard survival and the preclusion of fishery and market expansion targeting these species. The short-term impacts are likely to be a product of discard survival, while the long-term impacts are likely to be a product of both discard survival and the preclusion of fishery and market expansion. The magnitude of the short-term positive impacts of any of these prohibitions will be directly related to the survival rates of discarded skates. While discard survival rates are not known for any of the skate species, they are generally thought to be higher than for finfish species. Therefore, it is assumed that at least some proportion of discarded skates will survive.

6.1.5 Impacts of Proposed Possession Limit for the Skate Wing Fishery

During the development of this FMP, the Council considered the following possession limits for the skate wing fishery (in addition to the no action alternative):

Option 1. 10,000 pounds of skate wings (22,700 pounds whole weight);

Option 2. 20,000 pounds of skate wings (45,400 pounds whole weight); and

Option 3. 30,000 pounds of skate wings (68,100 pounds whole weight).

The Council ultimately selected a combination of Options 1 and 2:

10,000 pounds per day (22,700 pounds whole weight) and 20,000 pounds per trip (45,400 pounds whole weight); a day is defined as any time period less than or equal to 24 hours, and a trip is defined as any time period greater than 24 hours.

The biological impacts of Options 1, 2, and 3 are discussed below. The impacts of the proposed action are assumed to fall within the range of expected impacts under Options 1 and 2.

The rationale supporting a possession limit on skate wings is to discourage a directed wing fishery at this time. The possession limit should reduce fishing mortality on winter skate, avoid an overfished situation for winter skate, and help improve the overfished status of thorny and barndoor skates. The conservation benefits discussed in this section and presented in Table 24 and Table 25 may be useful to roughly consider relative merits of the three possession limits considered during the development of this FMP.

Processors who contributed to the 2000 SAFE Report (Volume II) indicated that thorny and barndoor skates, as well as winter skates, are sufficiently large for the wing market. The relative contributions of these three species in the skate wing landings are unknown. The overfished status of thorny and barndoor skates and the geographic range of winter skate in relation to reported landings suggest that winter skate comprise the majority of skate wing landings at this time. The smaller species of skates (little skate, smooth skate, clearnose skate, and rosette skate) are not expected to be directly impacted by management strategies in the wing fishery.

Since it is not possible to separate out skate landings by species at this time, the following analysis is for aggregated "skate wings" only. Benefits to individual species cannot be analyzed. A retrospective analysis of potential conservation benefits from trip limits during the fishing years 1995-2000 is presented below, mirroring the trip limit analysis presented in the section describing the economic impacts of the possession limits (see Section 6.2). Trips landing skate wings were identified from dealer reports (see Section 6.5.4 for methodology). For this biological analysis, reported landings data have been converted from wing weight to live weight using a conversion factor of 2.27 (NEFSC).

In the 1995-2000 period, trips landing 10,000 pounds or more contributed nearly twice as much to total landings as did trips greater than 20,000 pounds and nearly four times the total contributions from trips greater than 30,000 pounds (Table 23). Trips landing 10,000 or more pounds of skate wings accounted for an average of 29% of total skate wing landings in the 1995-2000 period, with a maximum of 55% in 1996 and a minimum of 9% in 1995. The percentages for the same years that correspond to a 20,000-pound trip limit averaged 15% (range 3 - 39%).

Trips landing 30,000 pounds or more of skate wings contributed 8% of total wing landings on average (range 0 – 26%).

Table 23 Skate Landings and Estimated Conservation Gains in Skate Wing Fishery, 1995-2000 Calendar Years

Calendar Year	Total Reported Landings in Live Weight (lbs)	Landings from Trips Exceeding 10,000-lb Limit in Live Weight (lbs)	% of Reported Landings	Landings from Trips Exceeding 20,000-lb Limit in Live Weight (lbs)	% of Reported Landings	Landings from Trips Exceeding 30,000-lb Limit in Live Weight (lbs)	% of Reported Landings
1995	8,796,781	752,687	8.6%	258,428	2.9%	0	0.0%
1996	22,582,364	12,427,310	55.0%	8,697,519	38.5%	5,812,476	25.7%
1997	12,292,869	2,267,026	18.4%	863,031	7.0%	-	-
1998	18,606,389	4,867,913	26.2%	1,780,168	9.6%	560,088	3.0%
1999	14,671,773	2,758,899	18.8%	717,642	4.9%	-	-
2000	19,103,323	5,124,244	26.8%	2,046,757	10.7%	542,507	2.8%
Sum	96,053,500	28,198,078		14,363,545		7,284,684	
Average	16,008,917	4,699,680	29.4%	2,393,924	15.0%	*1,214,114	*7.6%

Data are from NMFS dealer reports converted to live weight. A dash indicates confidential information.
**1997 and 1999 values were included in calculation of series average.*

The economic analysis of trip limits (Section 6.5.4) describes how possession limits affect fishermen's decisions to continue or end a trip when a possession limit is reached. If the trip continues, any subsequent catches of wing skates would be discarded. If skate wings are necessary to cover trip costs, the trip is cut short. (See Table 26 in Section 6.2 for a breakdown of the number of vessels or number of trips that exceeded the proposed possession limits in 1995-2000. See Table 27 in the same section for a breakdown of how fishing trips were expected to respond to possession limits). In this analysis, the predicted response by fishermen to trip limits is used to estimate resulting conservation benefits.

The behaviors of fishermen in response to possession limits are simplified here and do not reflect other possible fishing strategies. For example, any trips that cease fishing operations when the skate trip limit is reached are credited with conservation benefits from reduced landings. An alternative change in fishing strategy such as more frequent but shorter trips could reduce those benefits assumed in this analysis.

The benefits accrued from trips that continue fishing and discarding skates once the trip limit is reached are analyzed under two assumptions of discard mortality: 100% mortality and 0% mortality of regulatory skate discards. Discard mortality rates are currently unknown for this complex of skate species.

In the most optimistic scenario (0% discard mortality), the assumptions are: (1) all discards survive (and therefore do not count as catch) on trips that continue fishing after reaching the possession limit, and (2) landings are reduced by shortened trips (those which end when the possession limit is reached). In this case, reductions in annual skate catches (based on reported catches from 1995-2000) between 276,000 and 7.2 million pounds of skates are projected by a 10,000-pound trip limit (Table 24). The average annual reduction is 2.2 million pounds or 14% of total observed landings. Under a 20,000-pound limit, catch reductions ranged from 31,000 to 3.6 million pounds annually, with an average reduction of 831,000 pounds or 5.2% of total landings. Expected reductions from a 30,000-pound possession limit ranged from 0 to 1.7 million pounds annually, with an average reduction of 329,000 pounds or 2.1% of total landings. The reduction from the proposed action can be expected to fall within the range of reductions under Options 1 and 2.

Table 24 Retrospective Estimates of Skate Conservation Gains from Shortened Trips and Assuming 100% Discard Survival on Continued Trips

Calendar Year	Total Reported Landings in Live Weight (lbs)	Gains from Trips Exceeding 10,000-lb Limit in Live Weight (lbs)	% of Reported Landings	Gains from Trips Exceeding 20,000-lb Limit in Live Weight (lbs)	% of Reported Landings	Gains from Trips Exceeding 30,000-lb Limit in Live Weight (lbs)	% of Reported Landings
1995	8,796,781	276,014	3.1%	31,390	0.4%	0	0.0%
1996	22,582,364	7,206,312	31.9%	3,612,714	16.0%	1,658,396	7.3%
1997	12,292,869	927,749	7.5%	227,418	1.8%	86,791	0.7%
1998	18,606,389	1,916,965	10.3%	418,207	2.2%	83,382	0.4%
1999	14,671,773	932,087	6.4%	127,440	0.9%	10,408	0.1%
2000	19,103,323	2,202,570	11.5%	566,313	3.0%	133,912	0.7%
Sum	96,053,500	13,461,697		4,983,481		1,972,889	
Average	16,008,917	2,243,616	14.0%	830,580	5.2%	328,815	2.1%

Alternatively, reductions are considered if the skates discarded by vessels continuing to fish after reaching the trip limit suffer 100% mortality; in this scenario, the only reductions that result are from shortened trips. Reductions in annual skate landings (based on reported catches from 1995-2000) between 188,000 and 4.8 million pounds are projected under a 10,000-pound trip limit (Table 25). The average annual reductions approach 1.4 million pounds live weight or nearly 9% of total landings. Analysis of the 20,000-pound possession limit projects an average annual reduction of 560,000 pounds of skates on shortened trips (3.5% of total landings), and 227,000 pounds are reduced under the 30,000-pound limit (1.4% of total landings). The reduction from the proposed action can be expected to fall within the range of reductions under Options 1 and 2.

Table 25 Retrospective Estimates of Skate Conservation Gains from Shortened Trips and Assuming 0% Discard Survival on Continued Trips

Calendar Year	Total Reported Landings in Live Weight (lbs)	Gains from Trips Exceeding 10,000-lb Limit in Live Weight (lbs)	% of Reported Landings	Gains from Trips Exceeding 20,000-lb Limit in Live Weight (lbs)	% of Reported Landings	Gains from Trips Exceeding 30,000-lb Limit in Live Weight (lbs)	% of Reported Landings
1995	8,796,781	188,435	2.1%	29,126	0.3%	0	0.0%
1996	22,582,364	4,831,139	21.4%	2,566,383	11.4%	1,228,672	5.4%
1997	12,292,869	267,510	2.2%	25,299	0.2%	0	0.0%
1998	18,606,389	1,430,888	7.7%	359,868	1.9%	83,382	0.4%
1999	14,671,773	569,765	3.9%	100,053	0.7%	10,408	0.1%
2000	19,103,323	1,088,408	5.7%	277,828	1.5%	39,257	0.2%
Sum	96,053,500	8,376,146		3,358,556		1,361,719	
Average	16,008,917	1,396,024	8.7%	559,759	3.5%	226,953	1.4%

6.1.6 Qualitative Assessment of Impacts of Year-Round Closed Areas

As discussed in Section 4.16 of this document, the Council will rely, in part, on management measures in other fisheries to continue to protect and help rebuild skates. In fact, one of the primary objectives of this FMP is to protect the overfished species of skates and rebuild their biomass to target levels through management measures in other FMPs (groundfish, monkfish, scallops, etc.), skate-specific management measures, or a combination of both as necessary.

While the impacts of the baseline management measures (Section 4.16.1) on the skate species cannot be specifically quantified at this time, it is acknowledged that these measures provide protection to skates and are likely to contribute to the rebuilding of the species in the skate complex. One of the baseline management measures identified in this FMP is the groundfish year-round closed areas (Section 4.16.1.1). The following assessment qualitatively characterizes the biological benefits of the year-round closed areas to provide some perspective on the benefits of the baseline measures identified in this FMP.

Because skates are relatively sedentary species, year-round closed areas in the Northeast Region are thought to be particularly beneficial for the skate resources. The Council acknowledges the protection already afforded to the skate complex by various year-round closed areas established through other FMPs, namely multispecies and scallops. Multispecies year-round closed areas were identified as an important baseline measure in Section 4.16 of this document.

The scallop closed areas are not included in the baseline in Section 4.16 because they are no longer closed year-round. They are currently “restricted access areas” with limitations and restrictions on the amount of scallop fishing allowed in the areas. The Council acknowledges the protection they provided for some skate species while they were closed as well as the benefits that restricted access may have for some skates in these areas. Qualitative discussion of the benefits of these areas (while they were closed) is included in the analysis below.

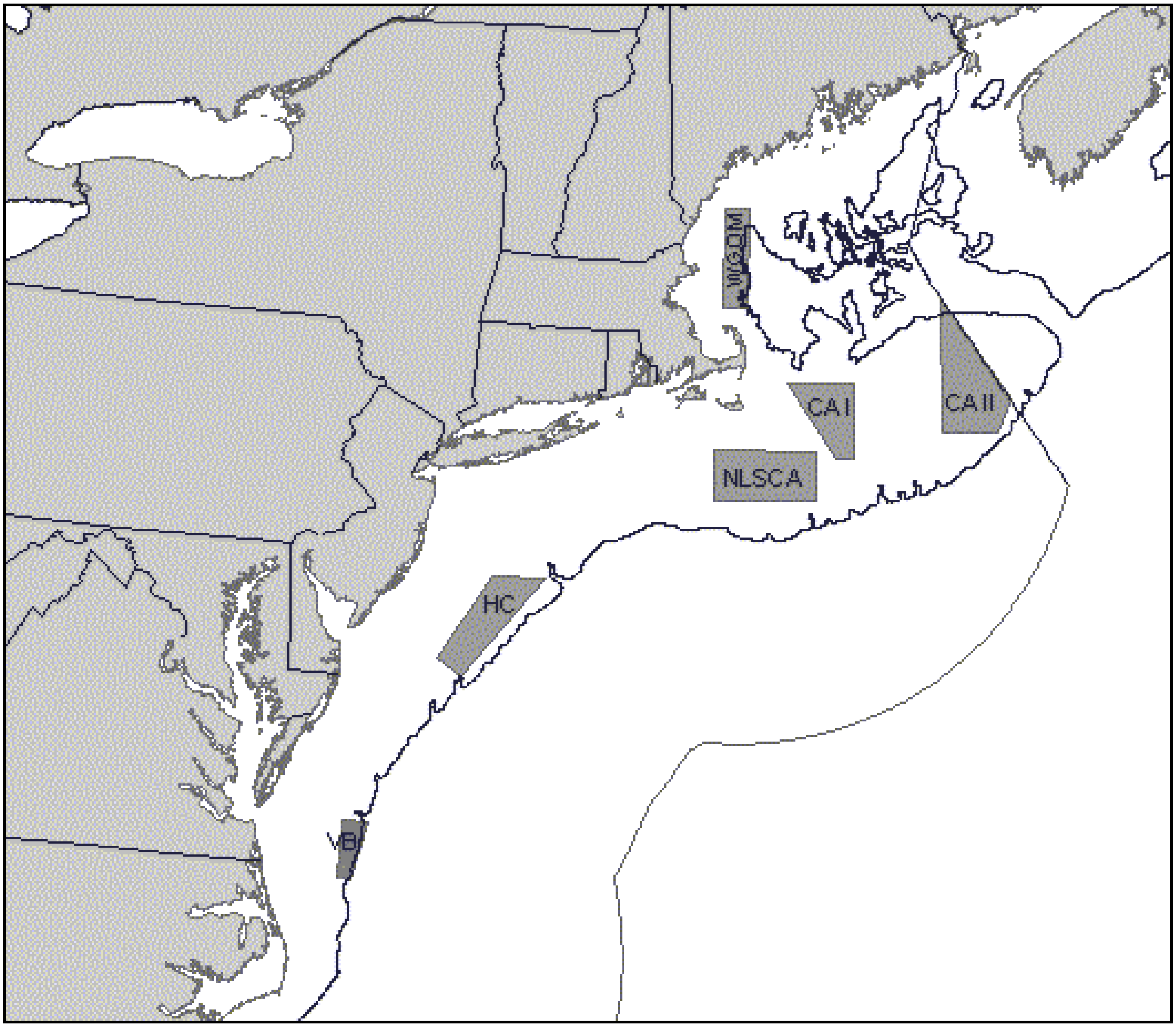
This assessment illustrates the benefits of the existing groundfish year-round closed areas and previous scallop closed areas on the species in the northeast skate complex through a series of figures. These benefits are in addition to any direct benefits resulting from the management measures proposed in this FMP. While this section focuses only on the year-round closed areas, it is important to recognize that additional benefits are likely to accrue from the numerous seasonal closures for groundfish, especially in the Gulf of Maine and on Georges Bank.

This section provides supplementary information relative to the year-round multispecies closed areas that were identified as baseline measures in Section 4.16 of this FMP. The Cashes Ledge year-round closure is not included in the following discussion because until very recently, it was only closed seasonally. However, the Cashes closure is identified and characterized as a baseline measure in Section 4.16.

As previously mentioned, the scallop year-round closed areas have recently re-opened under the area access program in Framework 14 to the Sea Scallop FMP. Both the Hudson Canyon (HC) and Virginia Beach (VB) closed areas opened on May 1, 2001. Although these areas are now open, they still provided protection during the time when overall fishing effort on scallops, skates, and other species was higher. Furthermore, there are additional restrictions placed on scallop vessels such as possession limits and an automatic charge of ten days-at-sea to enter these areas, which have reduced the incentive to make trips there.

Figure 69 below depicts four of the five year-round groundfish closures as well as the two recently-opened scallop closed areas. The combined total area within these year-round closures (not including Cashes Ledge) is approximately 10,263 square miles.

Figure 69 Year-Round Groundfish Closed Areas (not including Cashes Ledge) and Recently-Opened Scallop Closed Areas

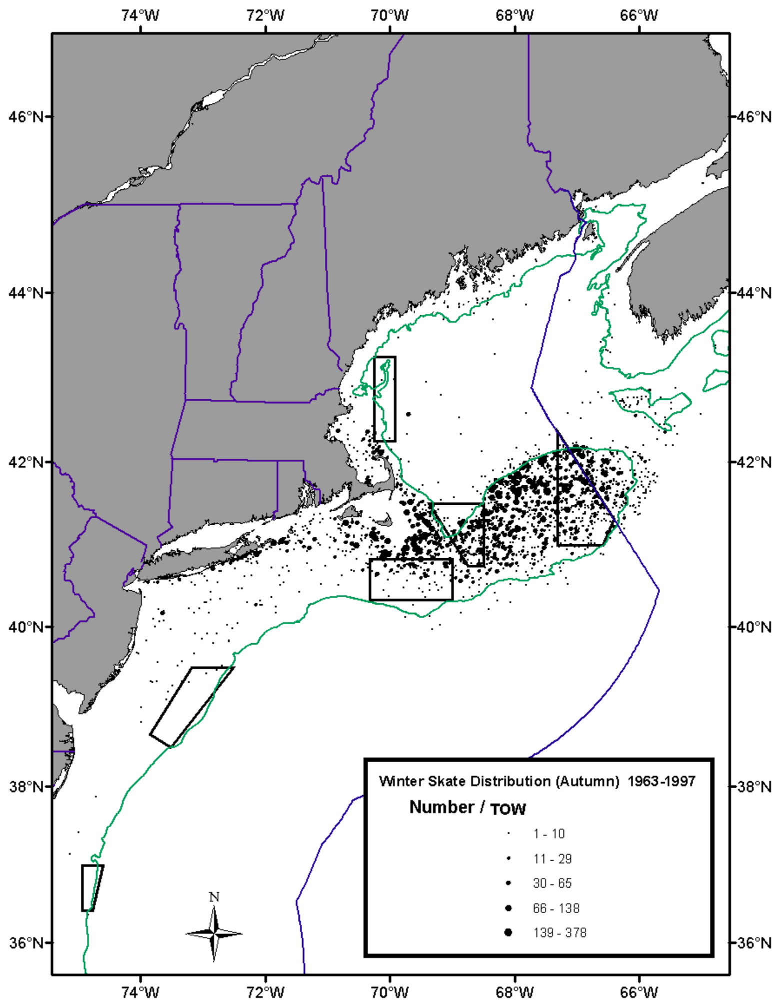


**WGOM represents the Western Gulf of Maine closed area; CAI represents Closed Area I; CAII represents Closed Area II; NLSCA represents the Nantucket Lightship Closed Area; HC represents the (now open) Hudson Canyon Closed Area for scallops; VB represents the (now open) Virginia Beach Closed Area for scallops.*

6.1.6.1 Winter Skate

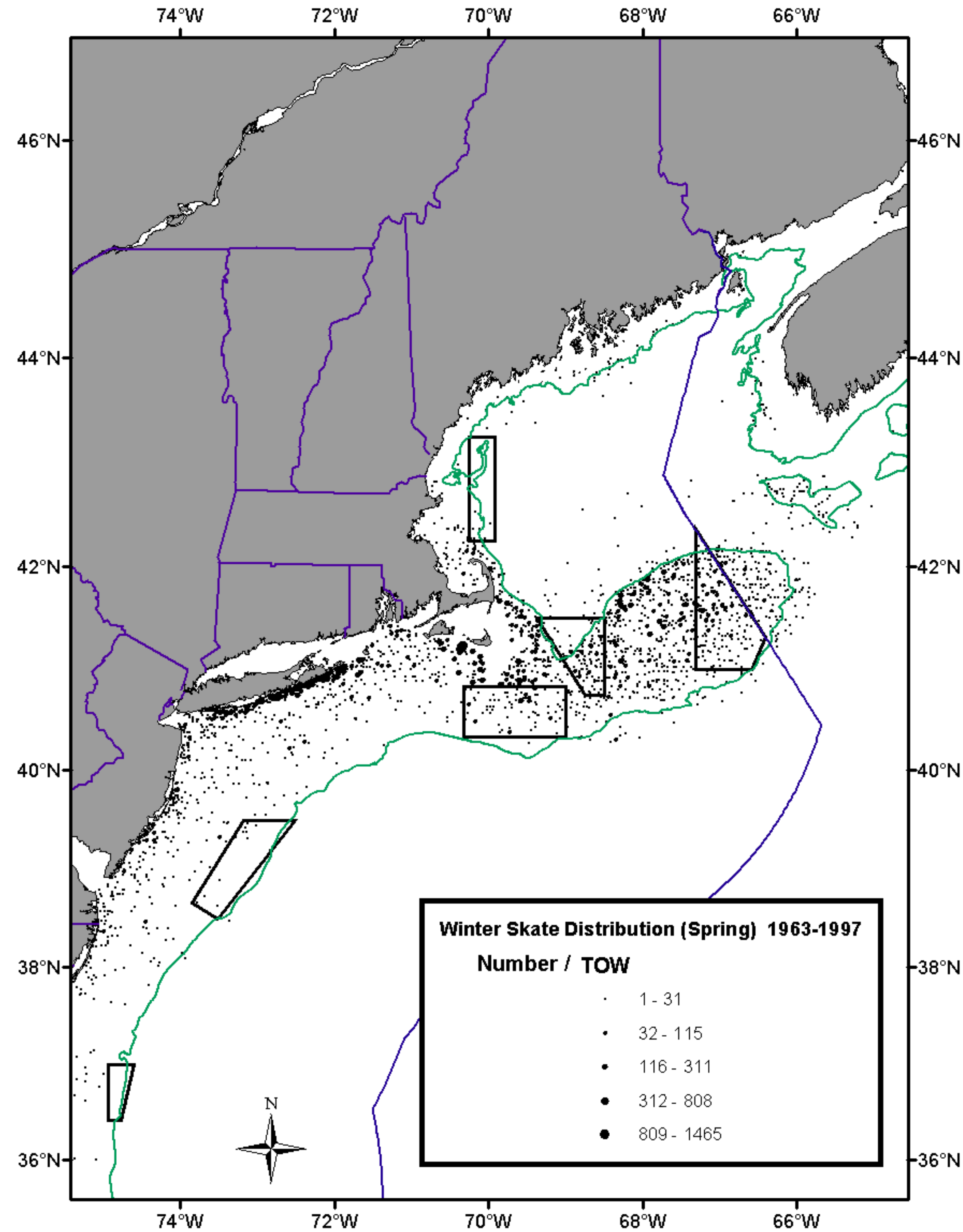
Figure 70 and Figure 71 indicate that the southern portion of Closed Area I and Closed Area II as well as the Nantucket Lightship Closed Area are located in regions of abundance of winter skates, while the Hudson Canyon Closed Area and Western Gulf of Maine Closed Area cover regions of relative scarcity of winter skates. Abundances of winter skate are sampled in the Georges Bank closed areas during both surveys, although there appears to be larger concentrations of winter skates in the closed areas during the autumn survey. Reduction of fishing effort in closed areas can be expected to provide a reduction in fishing mortality to the winter skate population within their bounds. In fact, it was noted at SAW 30 that the closed areas provide protection for winter skate that should reduce fishing mortality and help rebuild the resource. Because of its location relative to the survey distribution of winter skate, the Cashes Ledge closed area (not depicted in the figures) is not likely to provide additional protection for winter skate.

Figure 70 NEFSC Autumn Survey Distribution of Winter Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

Figure 71 NEFSC Spring Survey Distribution of Winter Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas

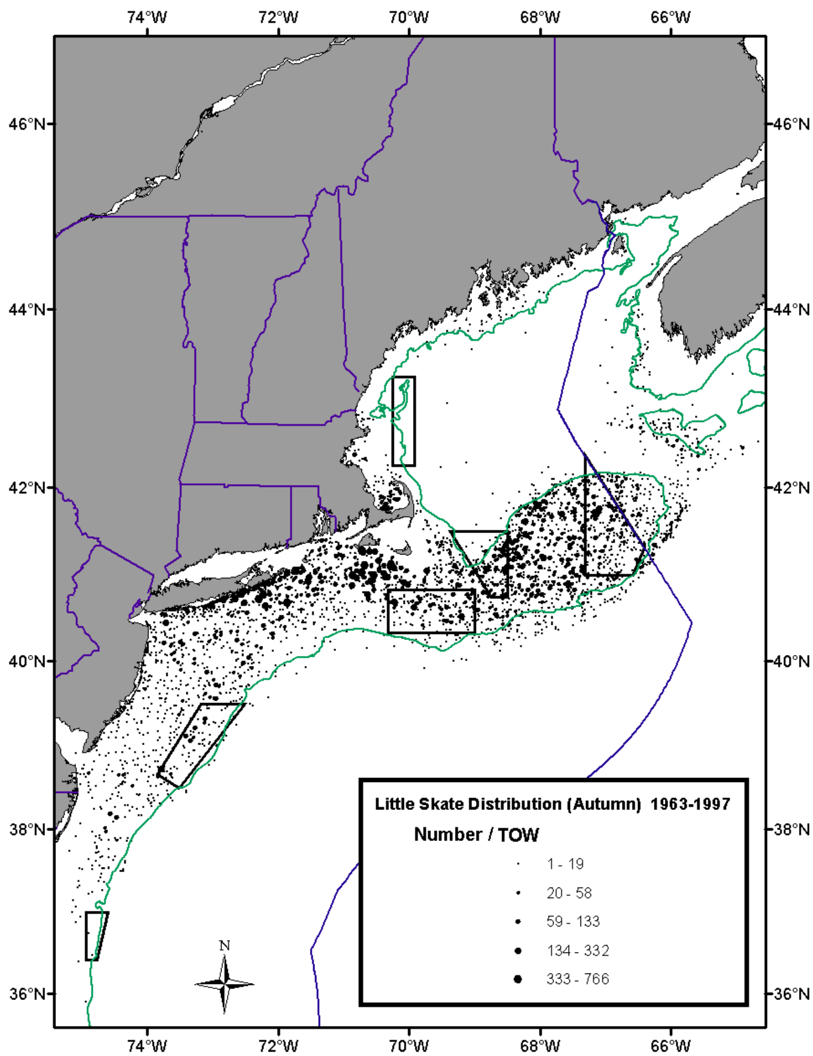


**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

6.1.6.2 Little Skate

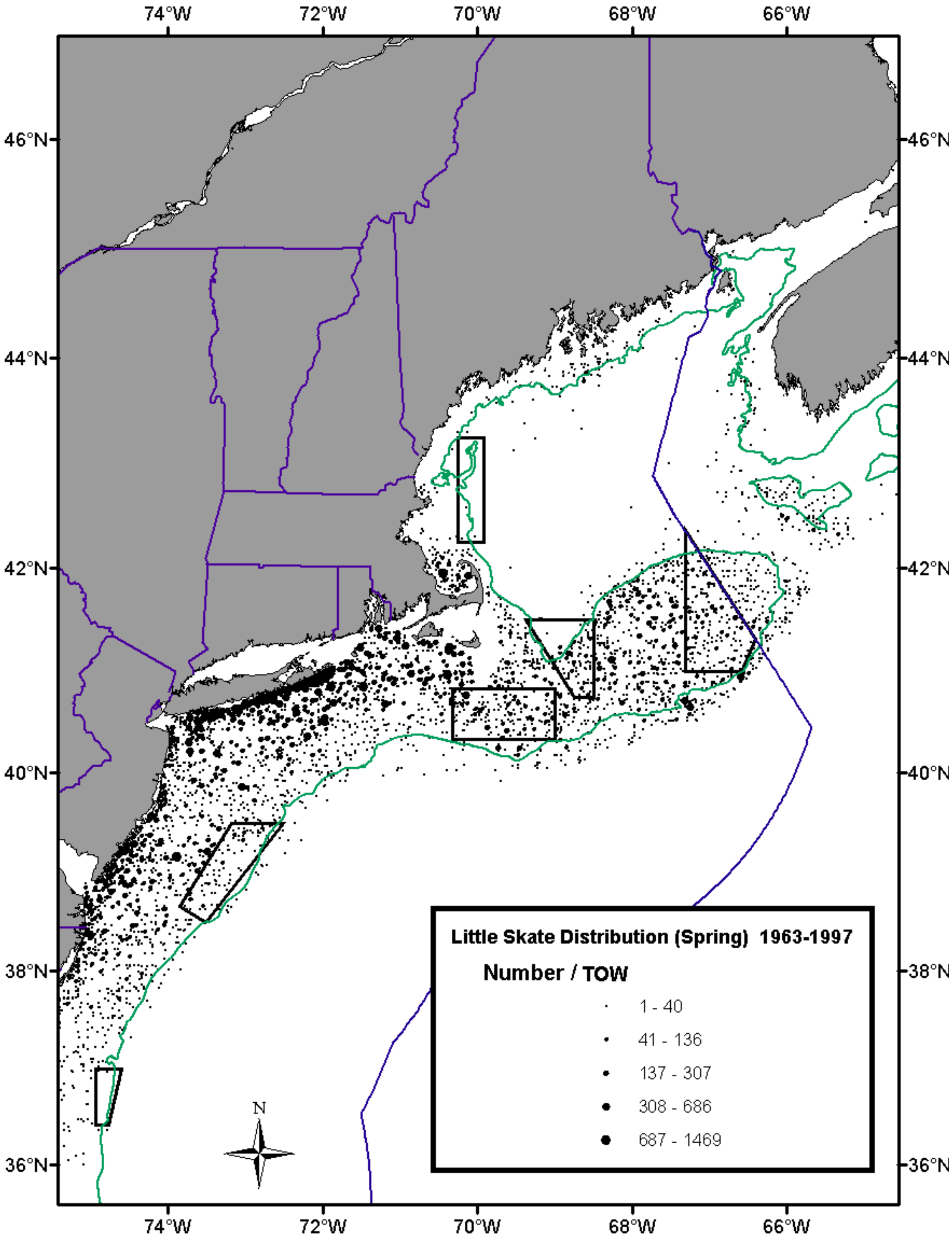
According to the NEFSC survey data, the majority of little skates are distributed within the 50-fathom line in the Gulf of Maine and along the Mid-Atlantic coast (Figure 72). Figure 72 and Figure 73 indicate that the southern portion of Closed Areas I as well as Closed Area II, the Nantucket Lightship Closed Area, and recently-opened Hudson Canyon Closed Area are located in regions of abundance of little skates, while the Western Gulf of Maine and Virginia Beach Closed Areas cover regions of relative scarcity of little skates. Reduction of fishing effort in can be expected to provide a reduction in fishing mortality to the little skate population within their bounds. Because of its location relative to the survey distribution of little skate, the Cashes Ledge closed area (not depicted in the figures) is not likely to provide additional protection for little skate.

Figure 72 NEFSC Autumn Survey Distribution of Little Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

Figure 73 NEFSC Spring Survey Distribution of Little Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas

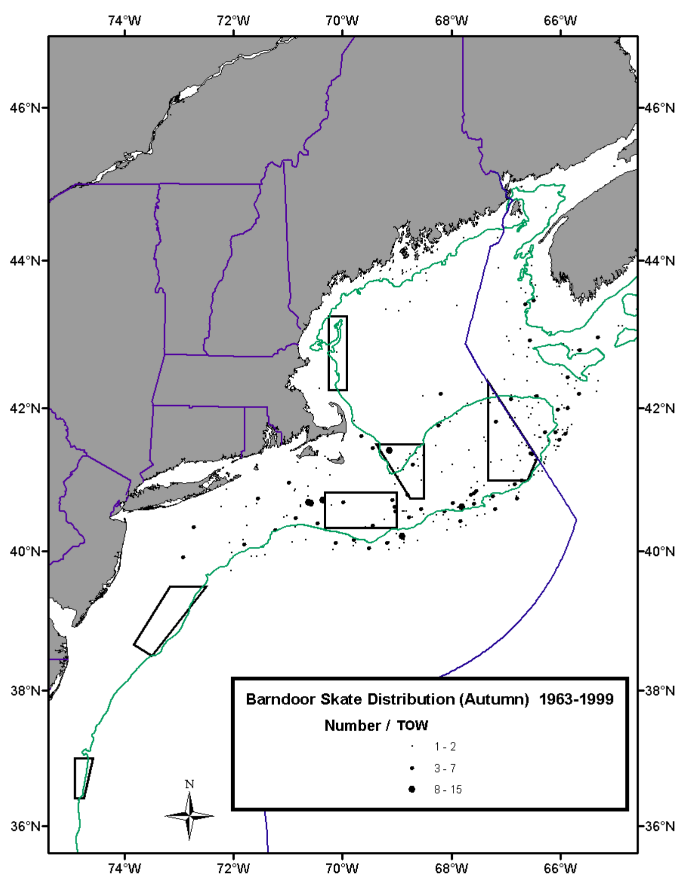


**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

6.1.6.3 Barndoor Skate

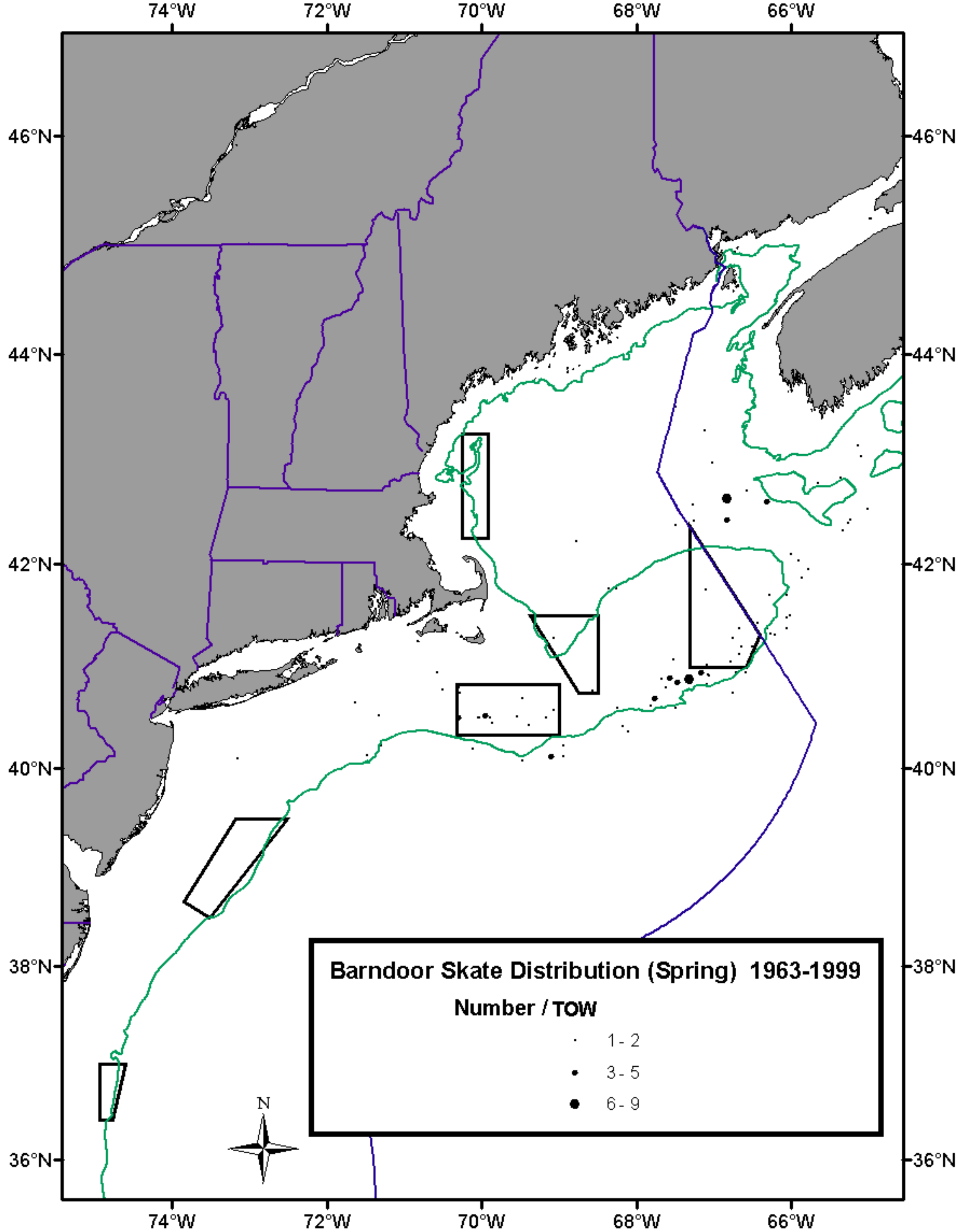
More barndoor skates were sampled in the autumn survey and seem to be most abundant around the 50-fathom line along Georges Bank. Figure 74 and Figure 75 indicate that Closed Areas I and II as well as the Nantucket Lightship Closed Area are located in regions of relative abundance of barndoor skates, while the Western Gulf of Maine Closed Area covers a region of relative scarcity of barndoor skates. Barndoor skates do not inhabit either of the recently-opened scallop closed areas in the Mid-Atlantic region. Reductions in fishing effort from the closed areas can be expected to provide a reduction in fishing mortality to the barndoor skate population within their bounds. In fact, it was noted at SAW 30 that protection by the year-round closed areas are one reason why recent abundance indices for barndoor skates have increased considerably. Because of its location relative to the survey distribution of barndoor skate, the Cashes Ledge closed area (not depicted in the figures) is not likely to provide additional protection for barndoor skate.

Figure 74 NEFSC Autumn Survey Distribution of Barndoor Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

Figure 75 NEFSC Spring Survey Distribution of Barndoor Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas

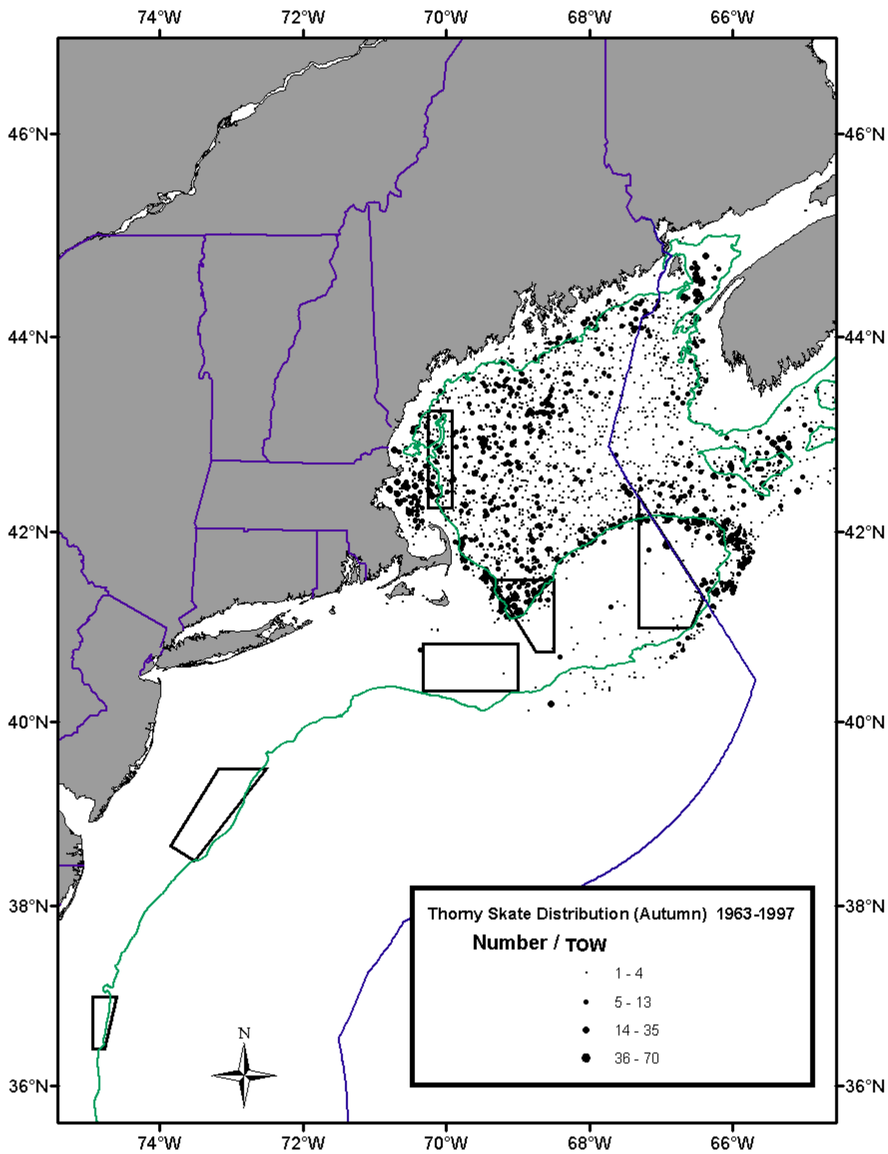


**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

6.1.6.4 Thorny Skate

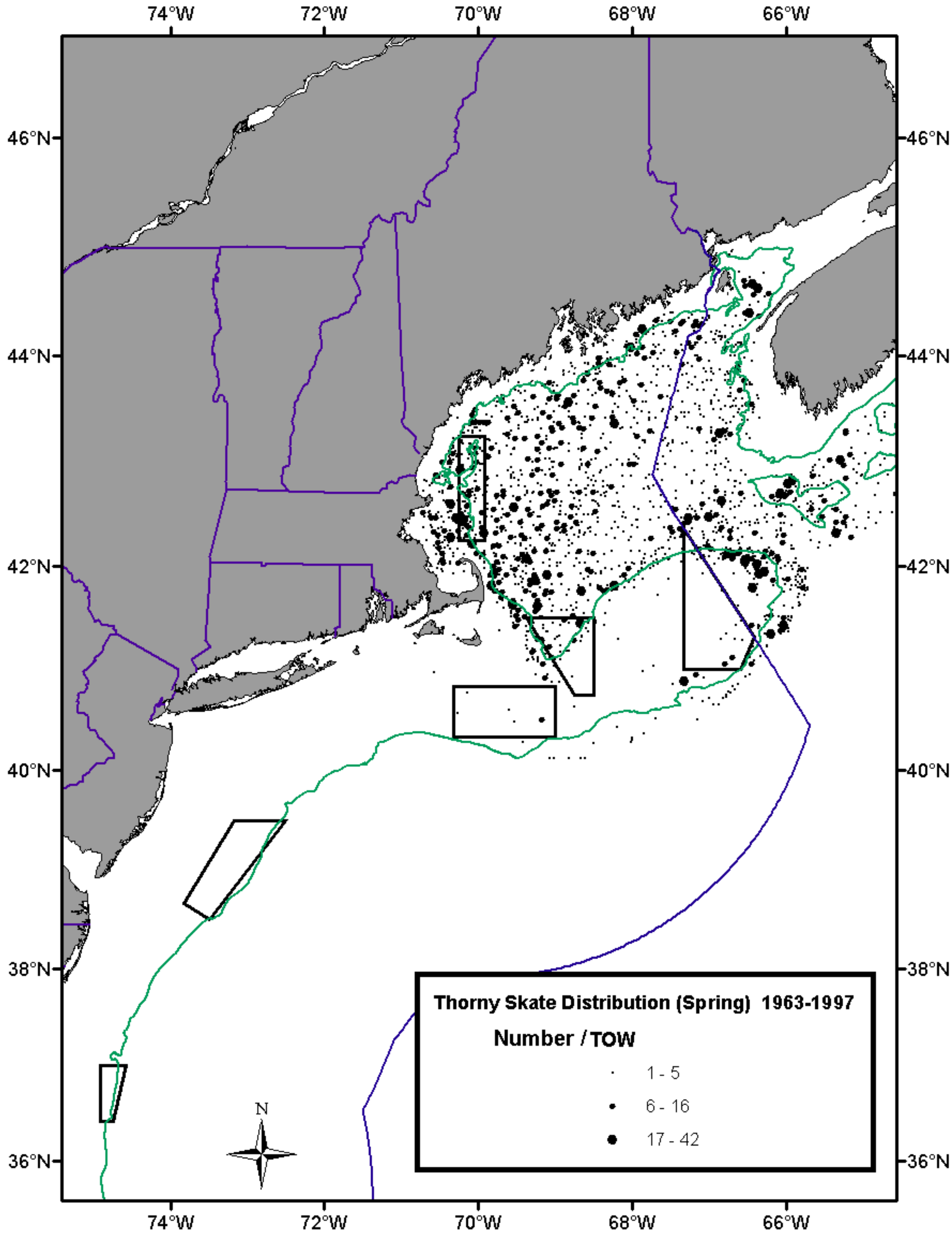
Figure 76 and Figure 77 indicate that the northern portion of Closed Area I as well as the Western Gulf of Maine Closed Area are located in regions of abundance of thorny skates, while Closed Area II and the Nantucket Lightship Closed Area cover regions of relative scarcity of thorny skates. Thorny skates do not inhabit either of the recently-opened scallop closed areas in the Mid-Atlantic region. Reduction of fishing effort in can be expected to provide a reduction in fishing mortality to the thorny skate population within their bounds. Because of its location relative to the survey distribution of thorny skate, the Cashes Ledge closed area (not depicted in the figures) is likely to provide additional protection for thorny skate.

Figure 76 NEFSC Autumn Survey Distribution of Thorny Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

Figure 77 NEFSC Spring Survey Distribution of Thorny Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas

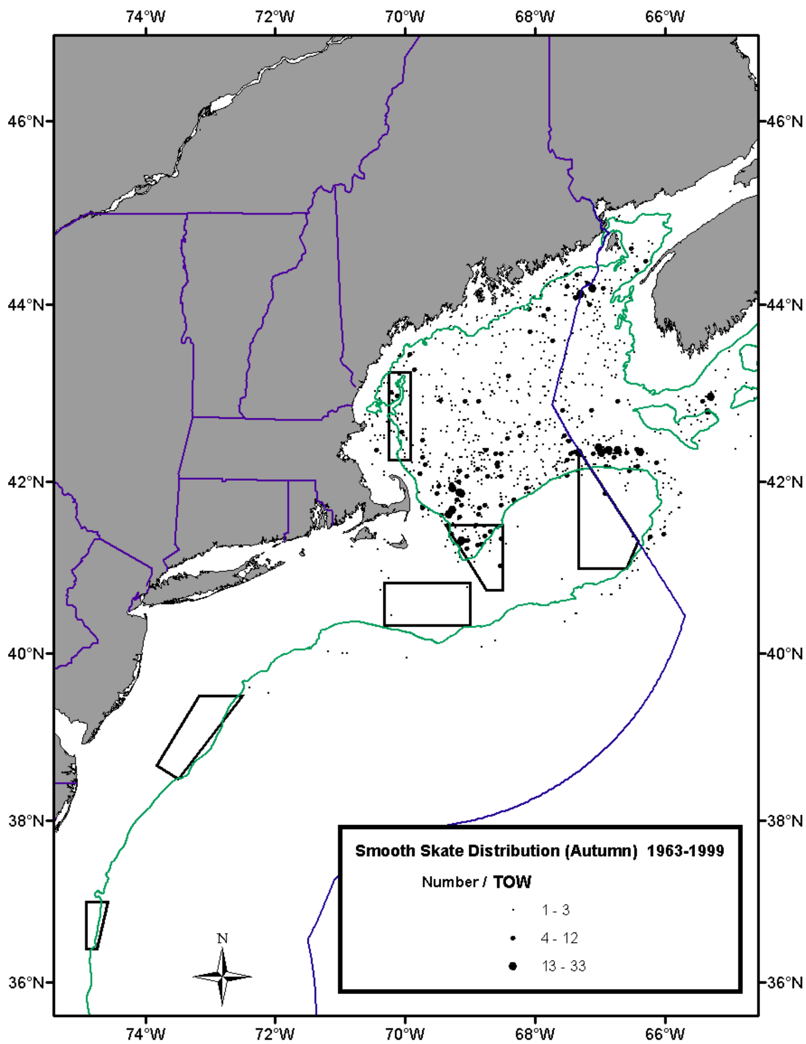


**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

6.1.6.5 Smooth Skate

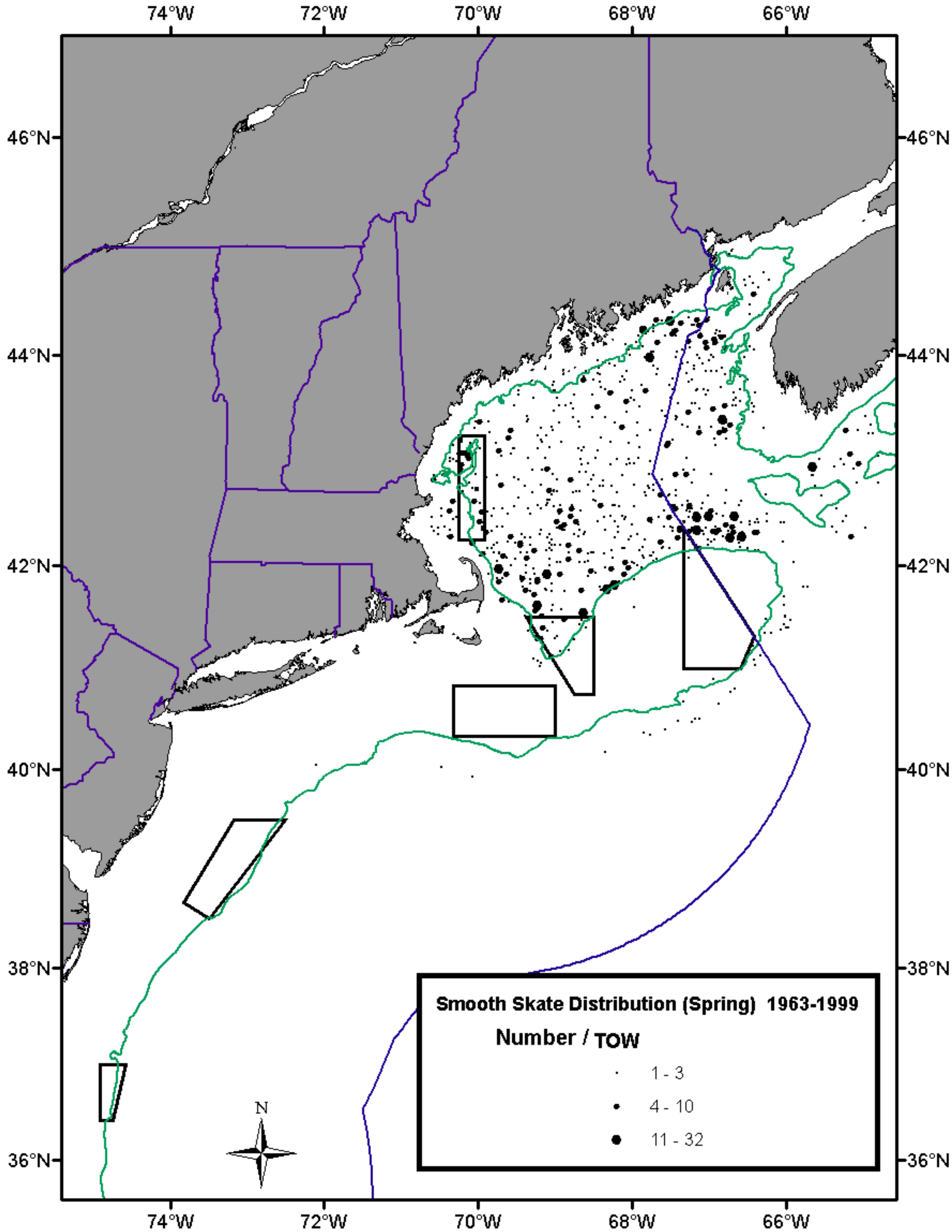
Figure 78 and Figure 79 indicate that the northern portion of Closed Area I as well as the Western Gulf of Maine Closed Area are located in regions of abundance of smooth skates, while Closed Area II and the Nantucket Lightship Closed Area cover regions of relative scarcity of smooth skates. Smooth skates do not inhabit either of the recently-opened scallop closed areas in the Mid-Atlantic region. Reductions in fishing effort from the closed areas can be expected to provide a reduction in fishing mortality to the smooth skate population within their bounds. Because of its location relative to the survey distribution of smooth skate, the Cashes Ledge closed area (not depicted in the figures) is likely to provide additional protection for smooth skate.

Figure 78 NEFSC Autumn Survey Distribution of Smooth Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

Figure 79 NEFSC Spring Survey Distribution of Smooth Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas

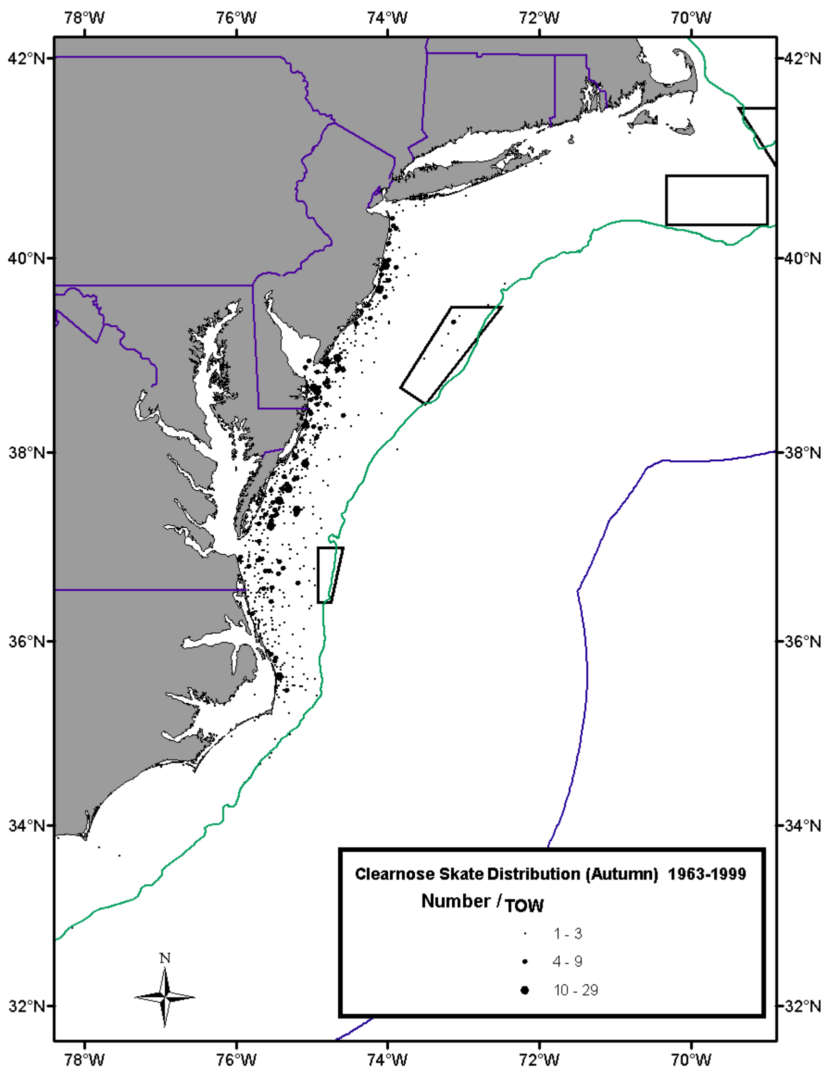


**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

6.1.6.6 Clearnose Skate

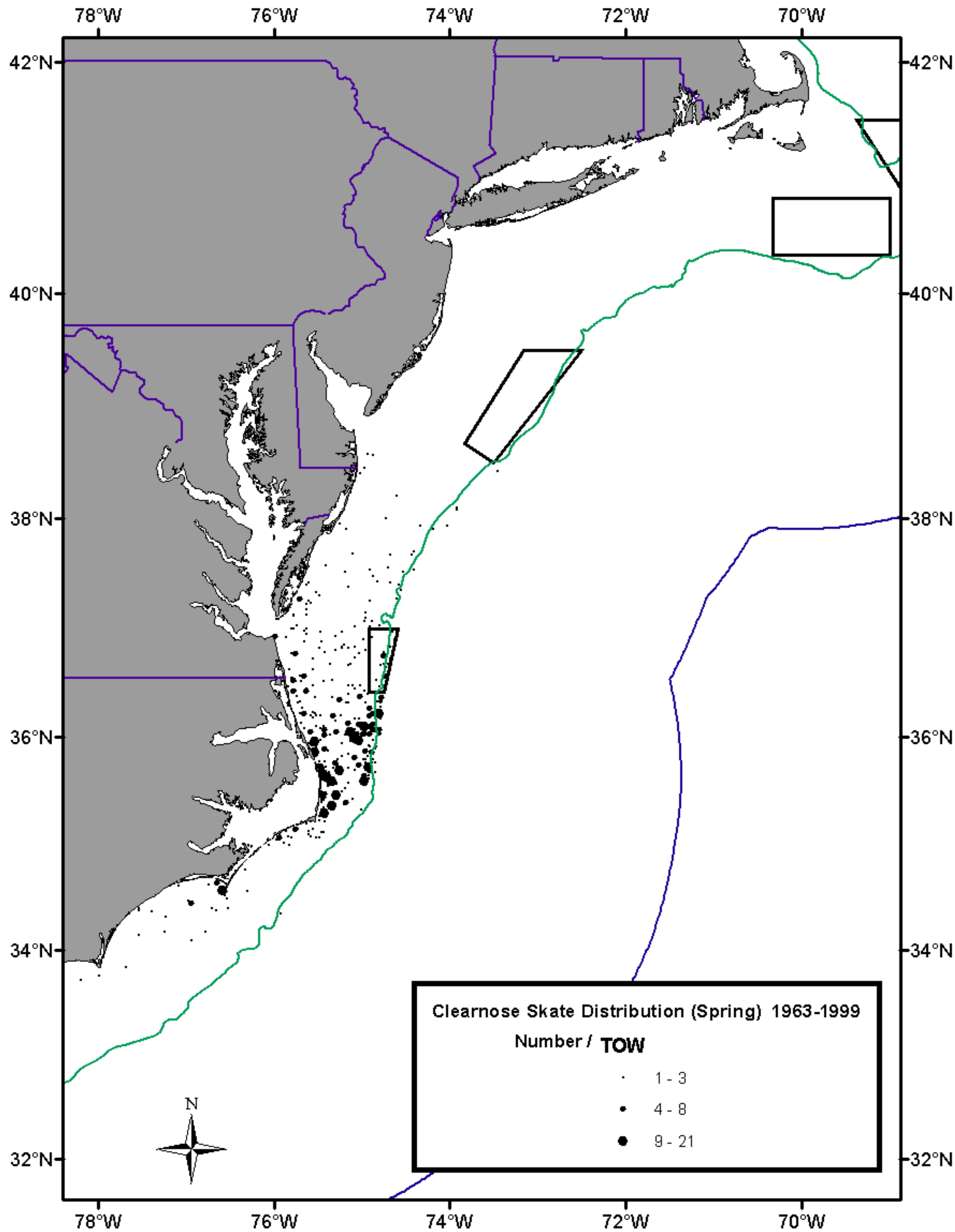
Figure 80 and Figure 81 indicate that clearnose skates do not inhabit any of the four year-round groundfish closures. Both of the recently-opened Mid-Atlantic scallop closures are located in regions of relative scarcity of clearnose skates. The distribution patterns of clearnose skate in relation to year-round closed areas would indicate that current closures could be expected to provide a minimal reduction in fishing mortality to clearnose skates. Because of its location relative to the survey distribution of clearnose skate, the Cashes Ledge closed area (not depicted in the figures) is not likely to provide additional protection for clearnose skate. Note that clearnose skate is not considered to be in an overfished condition and is, in fact, considered to be rebuilt.

Figure 80 NEFSC Autumn Survey Distribution of Clearnose Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

Figure 81 NEFSC Spring Survey Distribution of Clearnose Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas

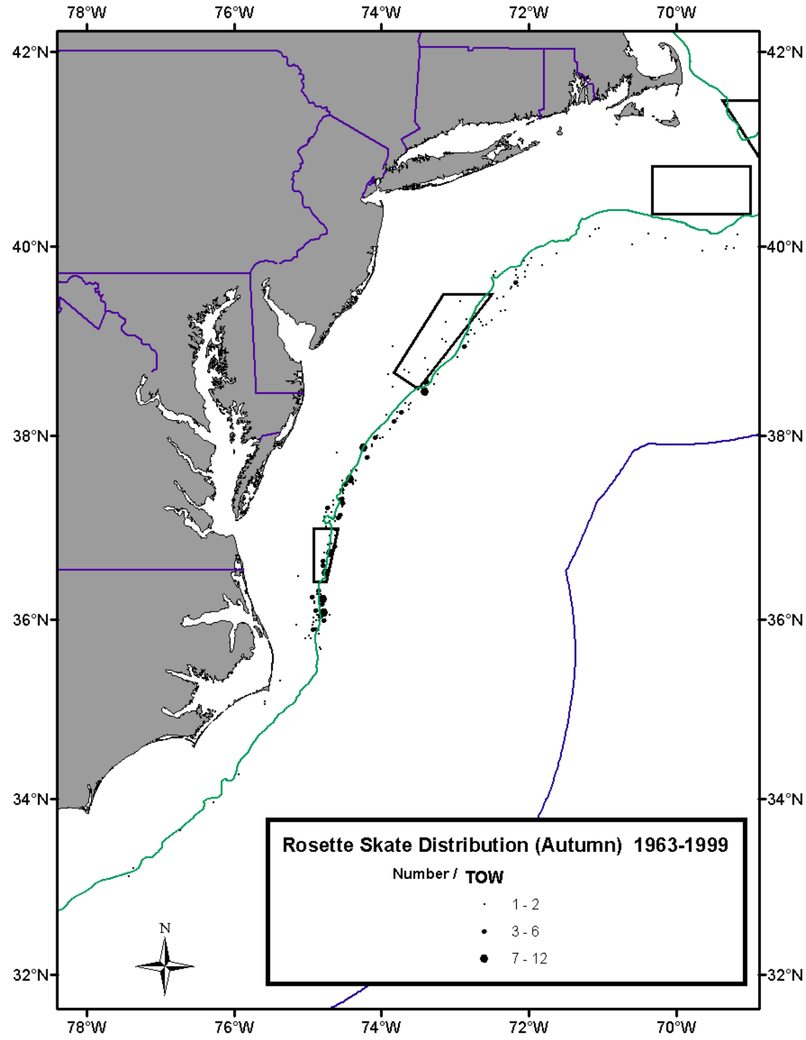


**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

6.1.6.7 Rosette Skate

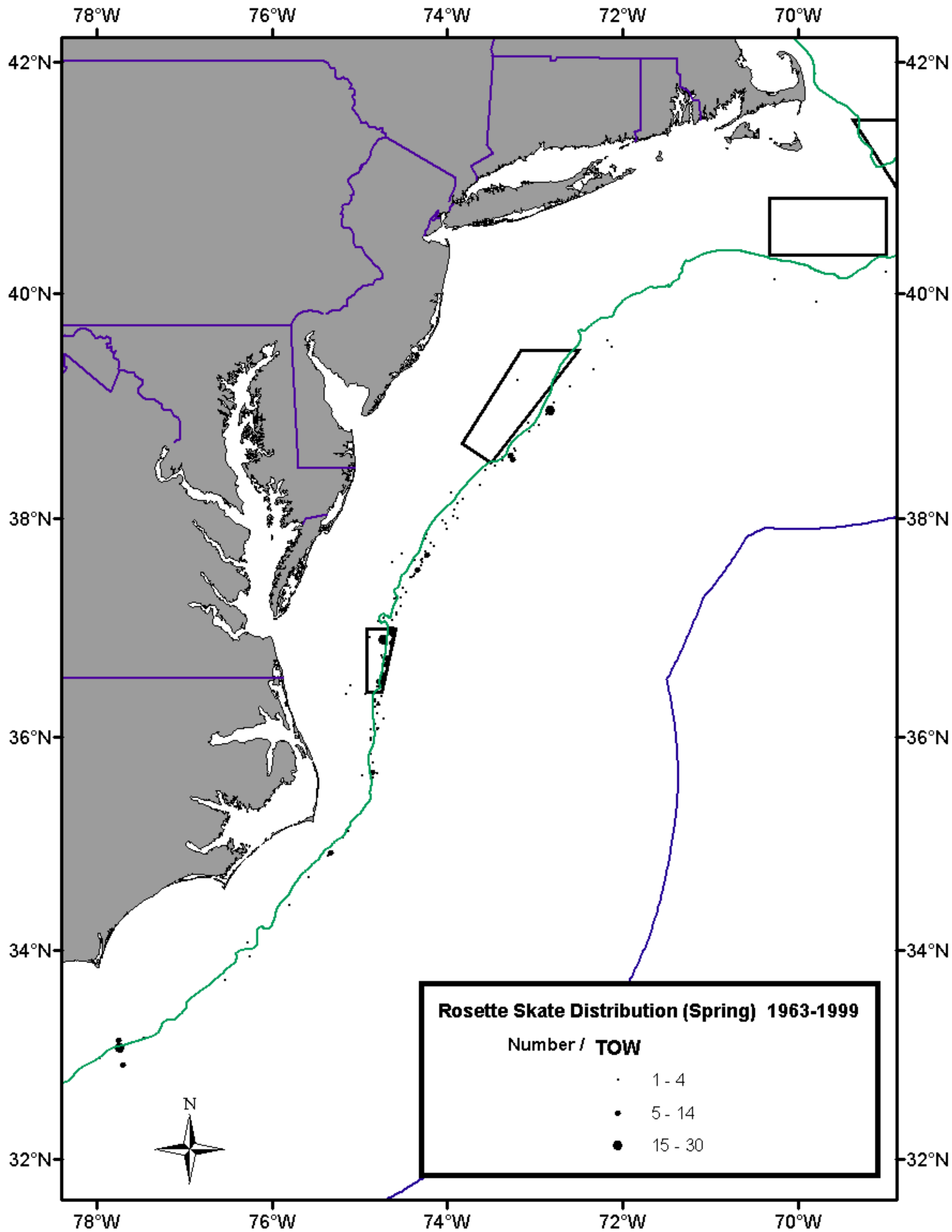
Figure 82 and Figure 83 indicate that rosette skates do not inhabit any of the four year round groundfish closures. The recently-opened Hudson Canyon scallop closure is located in a region of relative scarcity of rosette skates, but the Virginia Beach area is located in an area that includes some abundance of rosettes. The distribution patterns of rosette skate in relation to the scallop restricted access areas would indicate that when closed, these areas could be expected to provide a little reduction in fishing mortality on rosette skates. Because of its location relative to the survey distribution of rosette skate, the Cashes Ledge closed area (not depicted in the figures) is not likely to provide additional protection for rosette skate. Note that rosette skate is not considered to be in an overfished condition and is, in fact, considered to be rebuilt.

Figure 82 NEFSC Autumn Survey Distribution of Rosette Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

Figure 83 NEFSC Spring Survey Distribution of Rosette Skates and Overlap with Groundfish and Scallop Year-Round Closed Areas



**Note that the scallop areas recently re-opened to limited fishing under Framework 14 to the Scallop FMP.*

6.1.7 Impacts of Other Groundfish Management Measures

Although it is not possible to predict at this time what management measures will be implemented in the groundfish fishery within the next few months and years, it is likely that these measures will target significant effort and possibly capacity reductions. It is important to remember that any reductions in multispecies fishing effort should directly reduce effort on skates.

Because the majority of skate fishing occurs on Multispecies DAS, reductions in Multispecies DAS should proportionately reduce opportunities for skate fishing. Moreover, significant reductions in Multispecies DAS could reduce skate effort more than expected. If significant reductions are taken, vessels will likely try to maximize their remaining opportunities in the multispecies fishery and may decide not to target skates at all since skates are low-value species compared to groundfish. This could impact the skate bait fishery more than the wing fishery because the bait fishery is a directed skate fishery that occurs under Multispecies DAS and because bait is even lower in value than wings. Anecdotal information suggests that this is already occurring as a result of the Interim Action implemented by NMFS to respond to the Court Order in the Framework 33 lawsuit (CLF et al. v. Daley).

6.2 IMPACTS ON HABITAT – EFH ASSESSMENT

A description of the physical environment in which skates live and an assessment of the impacts to this habitat from fishing practices is provided in Section 7.2 of this document (p. 296), the description of the resource and affected environment. All the alternatives and actions proposed in this FMP are intended to control and, in some cases, reduce the amount of fishing effort for skates. Except for the directed bait fishery off Rhode Island, most skate landings come from bycatch and incidental catch in the groundfish fishery managed under the Northeast Multispecies FMP. The actions proposed in this FMP, therefore, are unlikely to increase any adverse impacts to the EFH of any managed species that may be associated with the skate fishery.

6.2.1 Federal Permit Program

This measure requires vessels that land skates to obtain a federal permit. This measure is purely administrative; therefore, implementation of this measure is not be expected to have any effect on the habitat of the region.

6.2.2 Catch Reporting Requirements

This measure requires vessels that land skates to report their landings via a formal reporting system. This measure is purely administrative; therefore, implementation of this measure is not be expected to have any effect on the habitat of the region.

6.2.3 LOA for Bait-Only Vessels

This measure requires vessels that fish for skates for bait and do not want to be subject to the possession limits proposed in this FMP to obtain a letter of authorization (LOA). This measure is purely administrative; therefore, implementation of this measure is not be expected to have any effect on the habitat of the region.

6.2.4 Prohibition on the Possession of Barndoor Skates

This measure prohibits the possession of barndoor skates to protect the barndoor skate resource. Industry reports suggest that barndoor skates comprise only 1% - 5% of skate wing landings (which themselves are only 60% of the total skate landings). It is unlikely that any changes in fishing effort would result from this measure, as fishermen will simply discard any barndoor skates that they catch. Also, because this measure is only relevant to the incidental catch skate wing fishery, whose overall fishing effort is controlled under the Northeast Multispecies FMP, the overall amount of fishing effort in the region is unlikely to change as a result of this proposed measure. Thus, the implementation of this measure is not expected to have any effect on the habitat of the region.

6.2.5 Prohibition on the Possession of Thorny Skates

This measure prohibits the possession of thorny skates to protect the thorny skate resource. There is no information available on the percentage of the current skate wing landings that come from thorny skates, but even so, it is unlikely that any changes in fishing effort would result from this measure, as fishermen will simply discard any thorny skates that they catch. Also, because this measure is only relevant to the incidental catch skate wing fishery, whose overall fishing effort is controlled under the Northeast Multispecies FMP, the overall amount of fishing effort in the region is unlikely to change as a result of this proposed measure. Thus, the implementation of this measure is not expected to have any effect on the habitat of the region.

6.2.6 Prohibition on the Possession of Smooth Skates in the GOM

This measure prohibits the possession of smooth skates in the GOM to protect the smooth skate resource. There is no information available on the percentage of the current skate bait or wing landings that come from smooth skates, but even so, it is unlikely that any changes in fishing effort would result from this measure, as fishermen will simply discard any smooth skates that they catch. Also, because this measure is most relevant to the incidental catch skate wing fishery, whose overall fishing effort is controlled under the Northeast Multispecies FMP, the overall amount of fishing effort in the region is unlikely to change as a result of this proposed measure. Thus, the implementation of this measure is not expected to have any effect on the habitat of the region.

6.2.7 Possession Limit for the Skate Wing Fishery

This measure implements an overall possession limit for the skate wing fishery. This measure could discourage large-scale directed fishing for skates, in order to reduce fishing mortality on winter skates. Implementation of a possession limit of this sort is not be expected to have a direct effect on the habitat of the region. The possession limit could have an indirect effect on the habitat of the region by reducing the amount of effort directing on skates, assuming that fishing effort ceases as soon as the trip limit is reached and does not continue with the intent of "highgrading," but the overall amount of fishing effort is unlikely to be reduced as vessels will simply target other species managed under the Northeast Multispecies FMP.

6.2.8 Management Measures in Other Fisheries

In addition to the measures described above, the Council will rely on management measures in place in several other fisheries to help control skate fishing effort and rebuild the skate resources. In addition to assisting to control skate fishing effort, measures for other fisheries may also have an effect on EFH. In most cases, management measures implemented under other Council FMPs provide significantly more habitat protection than could be expected under the Skate FMP, due to the nature of the skate fishery.

6.2.8.1 Multispecies FMP

In addition to the following measures identified below, the Council is in the process of developing a major amendment to the Northeast Multispecies FMP. Amendment 13 will consider a range of alternatives to improve habitat protection and these alternatives may modify the measures described below.

Multispecies DAS

The multispecies DAS program directly restricts the time available for vessels to fish for skates in the Gulf of Maine, Georges Bank, or Southern New England. The effort reduction program initiated in Amendment 5 and expanded in Amendment 7 directly reduced the amount of fishing effort in the groundfish fishery. Effort reductions in the Northeast Multispecies FMP translate directly into reductions in habitat impacts due to a reduction in the frequency and intensity of gear use.

Multispecies Closed Areas

The Northeast Multispecies FMP uses seasonal and year-round closure areas to reduce fishing mortality and protect spawning stocks of several important groundfish stocks. These closures also serve to protect the habitat contained within them by prohibiting all types of fishing gear capable of catching groundfish. This includes all types of bottom-tending mobile gear, the types of fishing gear most often associated with adverse impacts to fish habitat. The closed areas remain closed to all vessels fishing for skates, as well, so they serve as de facto skate habitat protection areas. Although the benefits to skates may be incidental to the purpose of the closed areas, the degree of protection these areas provide to skates should not be overlooked. Based on the historical distribution patterns observed by the NMFS trawl survey for the species in the skate complex, over 10% of all observations were in the areas now closed year-round (this includes the observations of the two southern species).

Other Measures in Multispecies FMP
Other measures in the Northeast Multispecies FMP, such as gear restrictions and trip limits, may either directly or indirectly affect skate fishing mortality. However, these types of measures are not expected to directly affect the habitat of the region.

6.2.8.2 Monkfish FMP

Because the monkfish fishery is primarily an incidental catch fishery (similar to the skate wing fishery), the management measures in the Monkfish FMP (limited entry, DAS, trip limits, mesh size restrictions, etc.) are unlikely to significantly affect the habitat of the region.

6.2.8.3 Sea Scallop FMP

There may be concern about the bycatch of skates in the sea scallop fishery, and several management measures in the Scallop FMP may serve to indirectly reduce bycatch of skates. Measures that reduce skate bycatch in the scallop fishery may also reduce the impacts of the scallop fishery on skate habitats by reducing the interactions between the scallop dredges used in the fishery and the habitats where skates occur. The Scallop FMP has reduced overall fishing effort in the scallop fishery by more than half (from 51,000 DAS in 1991 to 27,000 DAS in 1998 and then down to 19,600 DAS in 1999 with the closed area access program). This effort reduction is expected to have reduced adverse impacts to habitat that may be associated with the use of scallop dredge gear. Changes to the chafing gear and ring size used on the dredges may have reduced some of the adverse effects on habitat by making the dredge lighter on the bottom.

In addition to the measures identified above, the Council is in the process of developing a major amendment to the Sea Scallop FMP. Amendment 10 will consider a range of alternatives to improve habitat protection and these alternatives may modify the measures described above.

6.2.8.4 Lobster FMP

Fishing activities managed under the Lobster FMP involve only trap gear and are therefore not of significant concern relative to the habitat impacts associated with other fishing gears, such as otter trawls and scallop dredges. The management measures in the Lobster FMP are unlikely to significantly affect the habitat of the region.

6.2.9 EFH Assessment

This essential fish habitat (EFH) assessment is provided pursuant to 50 CFR 600.920 of the EFH Final Rule to initiate EFH consultation with the National Marine Fisheries Service.

6.2.9.1 Description of the Proposed Action

See Section 4.0 of this document for a description of the action proposed in this FMP (p. 8). The activity described by this proposed action, the regulated fishery for skates, occurs across designated EFH for all Council-managed species (see Amendments 11 and 12 to the Northeast Multispecies FMP). The range of this activity also occurs across the designated EFH of all species managed by the Mid-Atlantic Fishery Management Council and species managed under the NMFS Highly Pelagic Species FMP.

6.2.9.2 Analysis of the Effects of the Proposed Action

This action proposes to regulate the skate fishery. Several of the proposed actions are administrative in nature and have no impact whatsoever on EFH in the region. Measures to protect barndoor, thorny and smooth skate are relevant only to the incidental catch skate wing fishery, whose overall fishing effort is controlled under the Northeast Multispecies FMP. Consequently, the overall amount of fishing effort in the region is unlikely to change as a result of these proposed measures. The possession limit for the skate wing fishery could have an indirect effect on the habitat of the region by reducing the amount of effort directing on skates, assuming that fishing effort ceases as soon as the trip limit is reached and does not continue with the intent of "highgrading," but the overall amount of fishing effort is unlikely to be reduced as vessels will simply target other species managed under the Northeast Multispecies FMP.

This FMP does not propose to increase current levels of fishing activity in the U.S. EEZ. None of the proposed actions will cause additional adverse impacts on the EFH of any managed species relative to the baseline conditions established under Amendments 11 and 12.

6.2.9.3 Conclusions

In that fishing takes place as a result of this action, the action potentially has adverse effects on EFH that are less than substantial but does not increase any of the adverse effects as established in the baseline condition under Amendment 12. Since adverse effects are not increased, the Council has determined that the potentially adverse effects of fishing on EFH from this action have been minimized to the extent practicable; therefore, only an abbreviated EFH consultation is required.

6.2.9.4 Proposed Mitigation

None required.

6.3 IMPACTS ON OTHER SPECIES (FISHERY IMPACT STATEMENT)

No management measures proposed in this FMP are expected to have any direct or indirect impacts on other species within the management unit.

The Skate PDT considered the potential benefits of the proposed skate wing possession limits on other species that are caught in combination with skate wings, but the PDT concluded that these benefits are likely to be insignificant. Only to the extent that the proposed possession limit compromises trip profits and result in shorter trips could bycatch of other species be reduced. Given the low commercial value of skates, it is unlikely that the possession limit will produce this result often enough for benefits to other species to accrue. It is more likely that vessels will continue to fish for other species, move to an area with fewer skates, switch to another fishery, or take more trips if they reach the wing possession limit on a regular basis. The impacts of these alternative behaviors on other species cannot be accurately predicted or quantified.

It may be more important to consider the impacts of management measures in other fisheries on the skate complex, as skate fishing overlaps considerably with fishing for groundfish, monkfish, and to a lesser extent, scallops. This FMP considers the impacts of activities and management measures in other fisheries on skate fishing and the condition of the skate complex. Additional discussion of these measures and fisheries can be found in Sections 4.16 and 6.1.6 of this document.

6.4 IMPACTS ON PROTECTED SPECIES

6.4.1 Background

The seven species addressed by the Skate FMP are distributed along the coast of the northeast United States from near the tide line to depths exceeding 700 meters. Each displays a slightly different distribution pattern that is described generally in Table 1 and in more detail in the EFH Source Documents for these species (Volume III). A complete description of the available biological information about these species can be found in Section 6.1 of this document.

Skate inhabit the benthic regions of the inshore and continental shelf waters of the U.S. east coast. This habitat is shared by many of the groundfish species managed under the Multispecies FMP, as well as the spiny dogfish, monkfish, and scallop species that are managed under their own FMPs. In fact, one of the major concerns that has led to the implementation of a Skate FMP is the extensive bycatch and discard of skates in these similar fisheries. The gear types that are used to catch skates are also used to catch groundfish, dogfish, monkfish, and scallops. Therefore, the extensive overlap of skate habitat with these other more commercially valuable species, combined with the similar gear types used to catch these species, make it impossible for a fisherman to pursue one of these species without the probability of catching one of the other species. The Council, recognizing the extensive interrelationship of these fisheries, has evaluated the impact of management measures already in place in the Multispecies, Dogfish and Monkfish in terms of providing protection to skates. Their management strategy for skates first considers these existing measures before imposing further management restrictions to protect skates. In a similar fashion, the protective measures that have been implemented to reduce the impact of multispecies, dogfish and monkfish fisheries to key protected species such as large whales and harbor porpoise must be considered as effective for the skate fisheries as well.

Skates are harvested in two very different fisheries, one for lobster bait and one for the skate wing market. Both fisheries use bottom trawl and sink gillnet gear that is known to interact with various protected species. However, each fishery has slightly different characteristics that must be understood before undertaking an analysis of potential impacts to these species.

Bait Fishery Characteristics

The skate fishery for use as lobster bait is the only known directed skate fishery, and the demand for skate as lobster bait is directly controlled by the intensely managed lobster fishery. The skate bait fishery is further limited geographically to the Southern New England region. The geographical limitation of the skate bait fishery is due to the fact that skate have a longer "shelf life" than the other soft bait choices such as mackerel or herring. Most lobster fishermen would prefer to use mackerel or herring for bait, however, those species do not last very long in traps set in the warmer southern New England region. Indeed, vessels fishing in the Gulf of Maine consistently use mackerel and herring for lobster bait, as they are a preferred bait and will last longer in the colder waters found in that area. Therefore, the only known directed skate fishery is limited both by the limited entry and trap restrictions currently in place under the Lobster FMP and by the limited use of skate as lobster bait to the Southern New England region. The bait fishery appears to be dominated by otter trawl vessels (97% of landings) operating out of southeastern Massachusetts and Rhode Island. Sink gillnets usually make up less than 10% of skate bait landings. Therefore, for the reasons stated above, it is assumed that the only area where a directed skate fishery may exist separate from the Multispecies, Dogfish, and Monkfish FMPs, would be in the southern New England region.

Size is a major factor in the choice of skate species used for bait. A "dinner plate" skate brings the highest price in the bait fishery. Therefore, because of their smaller size, little skates make up 90% or more of the skate landings for bait, with a small number of juvenile winter skates providing the rest of the landings. The large skates (adult winter, barndoor, and thorny) are rarely used in the Southern New England bait fishery. A complete description of available information about this fishery can be found in Section 7.3.1.1 of this document.

Wing Fishery Characteristics

The wing fishery is generally an incidental catch fishery that involves a larger number of vessels located throughout the region. Skates intended for the overseas wing market are caught in the large mesh otter trawl and sink gillnet fisheries that are simultaneously targeting other demersal species such as groundfish and monkfish. Skates are rarely landed unless prices are high enough to ensure some level of profitability. Therefore, skates caught but not landed in these fisheries become discards.

Skate wing landings are also dominated by otter trawl vessels (83%) with the sink gillnet sector averaging around 15% of skate wing landings over the last seven years. A complete description of available information about this fishery can also be found in Section 7.3.1.2 of this document.

Fishery Summary

The directed Southern New England skate bait fishery is not likely to expand because demand is limited by the current trap limits and other restrictions controlling effort in the lobster fishery. Skates landed in the wing fishery are largely taken as incidental catch in other fisheries such as groundfish, monkfish, and dogfish as well as sea scallops. The FMPs that regulate these fisheries also contain controls on effort for each fishery. In addition, the low market value of skate makes it unlikely that a vessel could survive economically without landing other more valued species, in addition to skates. Therefore, given these various limiting factors, fishing operations occurring under the Skate FMP are not expected to increase the overall otter trawl or gillnet effort in the region.

Existing Protected Species Programs

Many of the factors that are likely to mitigate the impacts of the skate fishery on protected species exist in other FMPs currently implemented in the Northeast Region. The specific measures that are relevant to the skate fishery are described in Section 4.16 of this document (p. 79). In addition, as described below, the regulatory measures of the Atlantic Large Whale Take Reduction Plan (ALWTRP) and the Harbor Porpoise Take Reduction Plan (HPTRP) have been implemented in direct response to the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) concerns expressed regarding the fishing operations taking place under the other FMPs (specifically the Multispecies, Spiny Dogfish and Monkfish FMPs) and must be adhered to by any vessel fishing for skate. As explained below, these protective measures also apply to the small sink gillnet component of the directed skate bait fishery that may not fall under the other FMPs mentioned above.

It is understood that measures contained in any FMP (including the Skate FMP) could change at any time in the future, potentially changing the degree of protection afforded all marine mammals as well as species listed as threatened or endangered under the ESA. However, once an FMP is in place, most changes to its measures occur through further Council action, and would be reviewed by NMFS for possible reinitiation under the ESA.

Atlantic Large Whale Take Reduction Plan

The gear used to catch skates, including gear used in the bait fishery, is identical to that used in the fisheries managed under the Northeast Multispecies, Monkfish, and Spiny Dogfish FMPs. Since each of these FMPs require permits for any gear “capable of catching” their target species, it would be impossible for any vessel to target only skate and avoid the measures contained in these plans. These FMPs have all undergone consultation pursuant to Section 7 of the Endangered Species Act (ESA), with the most recent Biological Opinions (Opinions) for all three FMPs dated June 14, 2001. The conclusions in all three Opinions are identical and state that each fishery is likely to jeopardize the continued existence of the North Atlantic right whale. The Opinions require NMFS to implement a set of Reasonable and Prudent Alternatives (RPA) to remedy the jeopardy finding. The RPAs call for significant further action under the ALWTRP.

The ALWTRP contains a series of regulatory measures designed to reduce the likelihood of fishing gear entanglements of large whale species in the North Atlantic. The RPAs called for three key regulatory changes: 1) new gear modifications; 2) implementation of a Dynamic Area Management system (DAM) of short-term closures to protect unexpected concentrations of right whales; and 3) establishment of a Seasonal Area Management system (SAM) of additional gear modifications to protect known seasonal concentrations of right whales. All of the above changes have been implemented since the beginning of 2002.

Harbor Porpoise Take Reduction Plan

As described at the beginning of this section, the gear used to catch skates, including gear used in the bait fishery, is identical to that used in the fisheries managed under the Northeast Multispecies, Monkfish, and Spiny Dogfish FMPs. This gear includes sink gillnet gear that has been found to entangle and kill harbor porpoise as well as other small odontocetes and seals. The HPTRP was developed to reduce the impact of this gear type on harbor porpoise populations to acceptable levels as defined under the MMPA. The measures implemented under the HPTRP include time/area closures combined with the use of acoustical devices (pingers) on nets. These measures have been shown to be effective in reducing the serious injury and mortality of harbor porpoise in the sink gillnet fishery.

6.4.2 Impacts of the Skate FMP Options

The basic goals of the Skate FMP are to obtain better data to understand the levels of discards and bycatch in relation to landings that are sold for bait or wings, and to rebuild the two overfished skate species. The current options being considered under the Skate FMP, with the exception of the possession prohibitions for overfished skates, are largely administrative (permit system) and data gathering (catch reporting) in scope. However, the Skate FMP establishes a mechanism for addressing any future unknown pressure or threats to the seven skate species.

The management options selected by the Council for the Skate FMP are described in Section 4.0 (p. 8) of this document, and include a federal permit system, catch reporting requirements, letters of authorization (LOA) for the bait fishery, possession prohibitions for the overfished skate species, and possession limits for the wing fishery. These measures are designed to either establish better documentation of the skate fishery, which will have no direct impact on the actual fishing operations, or are directed at protecting certain skate species. Due to the administrative nature of these measures, none are expected to provide either a direct beneficial or adverse impact on protected large whales, small cetaceans or sea turtles.

Provided below are assessments of the relative impacts of the management options on the protected species described in Section 7.1.3 of this document (p. 267). Since the bulk of the protective measures for protected species in the skate fishery are tied to other FMPs, discussion of impacts to protected species provided below will focus on the limited directed fishery for skate that may not be included in the requirements imposed by the other FMPs mentioned above, and to potential impacts to barndoor skate, an ESA candidate species.

6.4.2.1 Permit Options

The Council proposed to require permits for vessels, dealers, and processors engaged in the skate fisheries occurring in the U.S. EEZ, as is required in FMPs for other closely related fisheries such as multispecies, monkfish and spiny dogfish. A skate permit system does not; by itself provide any direct protection to marine mammals (large whales, small odontocetes, or seals) or sea turtles.

Permit Option 1 – One General Skate Permit (Proposed Action)

The selected option establishes one general open access federal skate permit. A general open access permit provides the regulatory mechanism by which the true scope of the number of vessels that may target skate can be documented. It assures that development of any directed skate fishery will be easily defined so that any additional threats to protected species not currently known can be assessed. Incorporation of a skate permit will also facilitate implementation of any further measures that may be needed to rebuild skate stocks.

Permit Option 2 – "Directed" and "Incidental Catch" Skate Permits (Non-Preferred)

This option would have established two permits for skates: (1) a Directed Skate Permit that would require compliance with all provisions of the Skate FMP, and (2) an Incidental Catch Skate Permit that would have a 1,000 pound skate possession limit but would have required compliance with any species prohibitions in the Skate FMP. Most barndoor skate are caught incidental to other fisheries and are rarely landed in quantities that exceed 1,000 pounds. Therefore, this option would have provided no additional protection for barndoor skate not already provided by the selected possession prohibition.

Permit Option 3 – Other Federal Permits (Non-Preferred)

This option would have allowed vessels and dealers that possess any Northeast Region federal fisheries permit that require logbook and dealer reporting to use these other federal permits to land, sell, and purchase skates. This option recognized the overlap of the skate fishery with other permitted fisheries. However, it would have provided no additional protection to barndoor skate not already provided by the selected possession prohibition.

6.4.2.2 Catch Reporting Requirements

Reporting requirements for the skate fishery will be similar to those for other federal fisheries in the Northeast Region. The options considered by the Council were designed to obtain additional or more detailed information about skates. A skate catch reporting requirement does not; by itself, provide any direct protection to marine mammals (large whales, small odontocetes, or seals) or sea turtles.

Reporting Option 1 – Status Quo (Non-Preferred)

The "no action" alternative for reporting requirements would have meant that vessels would continue to report skate landings and discards on their logbooks under the general categories of "unclassified skates" and "unclassified wings." This option would have provided no additional protection to barndoor skate not already provided by the selected possession prohibition, given that no detailed data would be collected to better describe landings and discards of this overfished species.

Reporting Option 2 – Mandatory Reporting by General Categories (Non-Preferred)

This option would have required landings to be reported by "bait" and "wing" categories, and discards to be reported by "small skate" (<23 inches) and "large skate" (>23 inches) categories. This option would have provided a minimum of additional data on barndoor skate landings and discards. Managers could assume that "bait" landings are not barndoor skate, but would have had to rely on observer and survey data to determine the percentage of "wing" landings (if applicable) and "large skate" discards that may be barndoor skate.

Reporting Option 3 – Mandatory Reporting of Landings and Discards by Species (Non-Preferred)

This option would have required vessels to report all skate landings and discards in logbooks by individual species. It would also have required dealers to report all skate purchases by individual species. This option might have provided the best, most detailed data on barndoor skate landings and discards. The question of species identification problems is not significant for barndoor skate, as they are the most easily identifiable of the large skate species.

Reporting Option 4 – Mandatory Reporting of Landings by Species and Sea Sampling and Study Fleets for Species-Specific Discard Data (Proposed Action)

The selected option requires vessels to report all skate landings and discards in logbooks by individual species, and discards by the "small skate" and "large skate" categories noted in Option 2 above. It also requires dealers to report all skate purchases by individual species. This measure provides the best quality data on barndoor skate landings, but data on discards will be minimal. Managers will have to rely on observer and survey data to determine the percentage of "large skate" discards that may be barndoor skate. As mentioned above, the issue of species identification problems is not significant for the easily identifiable barndoor skate.

Reporting Option 5 – Mandatory Reporting of Landings by Species and Volunteer Program for Species-Specific Discard Data (Non-Preferred)

This option would have imposed a mandatory requirement for vessels to report landings by species and would have created a voluntary program for reporting discards by species. Dealers would have been required to report purchases by species. This option might have provided the most comprehensive information on landings as well as accurate data on discards, depending on the success of a voluntary program. Dealer reporting by species would have provided a cross-reference for the landings data if skate dealers were skilled in species identification. However, at least for barndoor skate, species identification is not considered a problem.

Reporting Option 6 – Mandatory Reporting by General Categories and Volunteer Program for Species-Specific Landings and Discard Data (Non-Preferred)

This option would have required landings to be reported by "bait" and "wing" categories, and discards to be reported by "small skate" (<23 inches) and "large skate" (>23 inches) categories. Dealers would have been required to report purchases of skates by market category. A voluntary program would have been established for vessels to report landings and discards by species and would have provided the same minimal level of data collection on barndoor skate as Option 2. Collection of accurate data on barndoor skate would have been dependent on the success of the voluntary program and its ability to document all segments of the skate fishery. The lack of incentives for participation in a voluntary program would have been problematic.

Reporting Option 7 – Mandatory Vessel Reporting by General Categories and Mandatory Dealer Reporting by Species (Non-Preferred)

This option would have required vessels to report landings by "bait" and "wing" categories, and discards to be reported by "small skates" (<23 inches) and "large skates" (>23 inches) categories. Dealers would have been required to report purchases by species. This placed the onus of species identification on the dealers where it is possible that more accurate identification data could have been collected. However, managers would have had to rely on observer and survey data to determine the percentage of "large skate" discards that may be barndoor skate. Most managers consider the barndoor skate the easiest to identify.

6.4.2.3 Letter of Authorization for Bait-Only Vessels

The extent to which skate bait vessels sell their catch directly to lobster vessels is largely undocumented. This activity usually occurs in state waters between seasonal bait vessels and local inshore lobster vessels where no mechanism currently exists to document these transactions.

The selected option to require a letter of authorization is aimed at gaining an understanding of the amount of vessel-to-vessel transfer of skate for lobster bait as well as providing another tool to ensure the enforceability of the wing possession limits. Vessels will be required to record the sales of skate bait in their logbooks, and maintain receipts for these transactions. This is a portion of the directed skate fishery that needs to be quantified. However, if it is true that the direct sale of skate to lobster vessels is limited to inshore state waters, then the impact to marine mammals and sea turtles would be minimal. In addition, bait fisheries do not generally utilize barndoor skate. Not only is the species too large for lobster traps, but also lobster fishermen in Southern New England prefer 'dinner-plate'-size skates for bait purposes. Therefore, this option should have no adverse or beneficial effect on barndoor skate.

6.4.2.4 Measures to Protect Barndoor Skates

Options were considered in this FMP to prohibit the possession, landing, or sale of barndoor skate on all vessels fishing in federal waters. As noted in Section 7.1.3, barndoor skate are considered a candidate species under the ESA. Therefore, the species warrants significant management action to conserve the resource to the greatest extent possible. However, any restrictive measure applied to barndoor skate would not have a direct beneficial or adverse impact on marine mammals or sea turtles.

Option 1 –Prohibition on the Possession of Barndoor Skates (Proposed Action)

The selected option of a complete prohibition on possession of this species will provide the most complete protection available for barndoor skate. It will ensure that vessels at sea would be forced to comply with the restriction. Depending on the degree of at-sea enforcement applied to these fisheries, it may affect vessel fishing strategy to avoid catching skates.

Option 2 –Prohibition on the Landing of Barndoor Skates (Non-Preferred)
A prohibition on landing barndoor skate would also have provided adequate protection for this overfished ESA candidate species. It would have allowed vessels to possess the species at-sea, but prohibit landing the species at the dock. Given that dockside enforcement is the major tool for NMFS, it would have maintained the desired affect of restricting use of this species in the marketplace. However, there would have been little incentive for vessels to modify their at-sea fishing strategy to avoid catching skate.

Option 3 – Prohibition on the Sale of Barndoor Skates (Non-Preferred)
Prohibiting the sale of barndoor skate would not have been significantly different from the landing prohibition described above. It would have achieved the same desired protection for this overfished ESA candidate species by restricting the use of the species in the marketplace, and would have allowed the inadvertent landing of a barndoor skate at the dock, but not its sale. However, as above, there would have been little incentive for vessels to modify their at-sea fishing strategy to avoid catching skate.

Option 4 - No Action (Non-Preferred)
Failure to prohibit the possession, landing, or sale of barndoor skate would have provided no additional protection for this species, except as noted in the previous discussions. The barndoor skate is considered "overfished" and was the subject of a petition to list as endangered or threatened under the ESA. It is still considered a candidate species under that Act.

6.4.2.5 Measures to Protect Thorny Skates

The overfished status of thorny skate calls for action to be taken to conserve the species under the Skate FMP. Although the implementation of restrictive measures to thorny skates may have an effect on barndoor skate as mentioned below, it would not have a direct beneficial or adverse impact on marine mammals or sea turtles.

Option 1 – Prohibition on the Possession of Thorny Skates (Proposed Action)

The selected option of a prohibition on possession of thorny skate will not directly benefit barndoor skate. The only indirect benefit would be the synergistic effect of a possession prohibition on two of the three "big" skates, causing fewer vessels to participate in the skate wing fishery that target large skates. Discards in other fisheries would continue to occur at the same level.

Option 2 – Prohibition on Landing of Thorny Skates (Non-Preferred)
A prohibition on the landing of thorny skates would not have directly benefited barndoor skate. However, there would have been little incentive for vessels to modify their at-sea fishing strategy to avoid catching one of the three 'big' skates in the wing fishery.

Option 3 – Prohibition on the Sale of Thorny Skates (Non-Preferred)
A prohibition on the sale of thorny skates would not have directly benefited barndoor skate. However, there would have been little incentive for vessels to modify their at-sea fishing strategy to avoid catching or inadvertently landing one of the three 'big' skates in the wing fishery. Therefore, discards of large skate species would have continued to occur.

Option 4 – No Action (Non-Preferred)

This option represents the "no action" alternative for thorny skate and would have had no beneficial impact on barndoor skate.

6.4.2.6 Measures to Protect Smooth Skates

Although it is not considered an overfished species, the smooth skate resource was overfished at the time of SAW 30 and is still depleted. Although the implementation of restrictive measures to smooth skates may have an effect on barndoor skate as mentioned below, it would not have a direct beneficial or adverse impact on marine mammals or sea turtles.

Option 1 – Prohibition on the Possession of Smooth Skates (Proposed Action)

This selected option was modified by the Council to apply only within the Gulf of Maine as defined by the Multispecies FMP regulated mesh line. Such a prohibition will not directly benefit barndoor skate. However, as noted above in the thorny skate discussion, a potential indirect benefit will be the overall effect of a possession prohibition on three of the four skates that are caught in the Gulf of Maine. To avoid landing three of four species, vessels may choose not to land any skate species from the area. Discards in other fisheries will continue to occur.

Option 2 – Prohibition on the Landing of Smooth Skates (Non-Preferred)
A prohibition on the landing of smooth skate would not have directly benefited barndoor skate.

Option 3 – Prohibition on the Sale of Smooth Skates (Non-Preferred)
A prohibition on the sale of smooth skate would not have directly benefited barndoor skate.

Option 4 – No Action (Non-Preferred)

This option represents the "no action" alternative for smooth skate and would have had no beneficial impact on barndoor skate.

6.4.2.7 Possession Limits for the Skate Wing Fishery

The Council considered three options for possession limits in the skate wing fishery at 10,000, 20,000, and 30,000 pounds. The skate wing fishery is currently characterized as an incidental catch in fisheries for other demersal species; especially groundfish and monkfish, taken by large mesh otter trawl and sink gillnet gear. However, as regulations potentially become more restrictive for these fisheries, vessels may target the skate species preferred in the wing fishery. Possession limits are intended to discourage expansion and any influx of new entrants into the fishery. Such limits do not by themselves protect barndoor skate, although discouraging expansion will be a benefit for all skate species that are taken in the wing fishery. In addition, a restrictive possession limit measure applied to skates may have a beneficial impact on marine mammals and sea turtles if overall fishing effort is not allowed to increase.

Option 1 – 10,000 Pound Wing Possession Limit

A possession limit of 10,000 pounds would have provided the most protection for skates. Between 23 and 47 of the more than 800 vessels that landed skate in the wing fishery between 1997 and 2000 landed over 10,000 pounds in a trip. This indicated that an actual reduction in effort might have resulted with this option.

Option 2 – 20,000 Pound Wing Possession Limit (Proposed Action)

The selected option of a possession limit of 20,000 pounds per trip was further modified by the Council to restrict vessels to a daily possession limit of 10,000 pounds. This will provide an adequate hedge against expansion in the skate wing fishery. However, landings data from 1997 and 2000 indicate that only between 8 and 18 of the more than 800 vessels that landed skate in the wing fishery, landed over 20,000 pounds in a trip. This likely means that little, if any reduction in effort is likely to be seen with this option.

Option 3 – 30,000 Pound Wing Possession Limit (Non-Preferred)

It is unclear if a possession limit of 30,000 pounds would have provided an adequate hedge against expansion in the skate wing fishery. Only between one (1) and six (6) of the more than 800 vessels that landed skate in the wing fishery between 1997 and 2000 landed over 30,000 pounds in a trip. This suggests that, since very few vessels would have currently been affected by this limit, it would not have provided a disincentive for expansion.

Option 4 – No Wing Possession Limit ("No Action") (Non-Preferred)

The "no action" option would have provided no adequate control on expansion of the skate wing fishery that targets the large skate species, including the barndoor skate.

6.4.3 ESA Conclusions

Right Whale

Given the known anthropogenic sources of right whale mortality, their low population size, and their poor reproductive rate, the loss of even one northern right whale as a result of gear operating in the skate fishery may reduce appreciably the likelihood of both survival and recovery of this species. Although there are no documented takes of large whales in trawl gear, sink gillnet entanglements are common. Documented entanglements in any fishery are considered an underestimate of the extent of the entanglement problem since not all entanglements are likely to be observed. Consequently, the total level of interaction between fisheries and right whales is unknown. However, recent studies have estimated that over 60% of right whales exhibit scars consistent with fishery interactions.

New gear modifications required by the ALWTRP regulations are designed to further reduce the amount of serious injury and mortality from an encounter, but do not eliminate the threat of entanglement. The recent implementation of the DAM system and SAM program described above will further separate skate gear from most known or predicted right whale concentrations, but cannot be expected to be 100% effective. Therefore, fisheries that utilize sink gillnet gear (including the skate fishery) will continue to pose a risk of entanglement to right whales.

Virtually all vessels that catch and land skate also participate in one of the other permitted fisheries, as it is nearly impossible to target skate and not catch the other demersal species. Even a vessel operating solely in a directed skate fishery will be using gear (sink gillnet or trawl) that is capable of catching a species in the multispecies complex, requiring him to possess a multispecies permit and comply with the ALWTRP and HPTRP. Furthermore, the low market value of skate makes it difficult to survive economically without landing the higher value species. Therefore, both skate bait and wing fisheries are prosecuted by vessels already enrolled in one or more fisheries that are already managed by FMPs in the Northeast Region. The Council is confident that the impacts to right whales will continue to be assessed under the ALWTRP process, as well as the FMP process, and modifications required to further relieve those adverse effects will be applied to all four fisheries.

Humpback, Fin, and Minke Whales

Humpback, fin, and minke whales are taken in the sink gillnet fisheries that catch skates. As with the right whale, the impacts of these fisheries on the large whale species have been assessed in ESA consultations for the Multispecies, Monkfish and Spiny Dogfish FMPs. The Opinions for these species concluded that the fisheries would not jeopardize the endangered humpback and fin whale and not affect the ability of the minke whale populations to maintain optimum levels. In addition, the ALWTRP measures, recently revised to meet the RPA established to protect the right whale, are expected to further reduce the potential for mortality and serious injuries that are occurring in all large whale populations in the Northeast Region.

Blue, Sei, and Sperm Whales

The preferred foraging areas of blue and sei whales are unknown, although the extensive surveys conducted along the U.S. continental shelf (CeTAP surveys in 1979-81, and NMFS summer ship and aerial surveys conducted from 1990-98) did not record significant sightings of either species in shelf waters. The known feeding behavior of blue and sei whales suggest they focus on plankton/zooplankton resources that are found in the upper water column. Sperm whales are frequently found foraging along the shelf edge at the outer edge of the known skate fishing areas. Therefore, the threat of entanglement in skate gear for these species is limited to encounters with the buoy lines coming from the sink gillnets set on the seabed to the surface buoys. This will be addressed by new ALWTRP gear modifications that require weak links to be installed both at each sink gillnet buoy and along the float line of each net panel.

Although the sink gillnet gear operations that catch skates may affect the blue, sei, and sperm whales, there appears to be significant separation between the known feeding range of these species and the primary skate fishing areas. In addition, adequate mitigation should be provided by the ALWTRP that is anticipated to benefit all large whale species

Sea Turtles

Skate fishing effort is concentrated primarily in the Gulf of Maine and Georges Bank areas. Sea turtle distribution in the Northeast Region is focused along the Mid-Atlantic and Southern New England shelf region during the summer and early fall. Therefore, with the exception of leatherbacks that are able to forage into the middle of the Gulf of Maine, the overlap between the skate fishery and sea turtles is not significant.

The skate gears most likely to affect sea turtles are otter trawls and sink gillnets. NMFS assessed the potential impact of these gear types on all sea turtle species in the Biological Opinions issued for the Multispecies, Monkfish and Spiny Dogfish FMPs and concluded that the takes would not jeopardize the continued existence of the ridley, green, leatherback, or loggerhead sea turtles. The skate fishery is largely prosecuted by the same vessels participating in the multispecies, monkfish, and spiny dogfish fisheries. In addition, as explained in this section, the vessels participating in the small direct bait fishery operating in the Southern New England area are required to obtain permits for any gear "capable of catching" the target species of the other FMPs. Therefore, the fishing operations of these vessels were considered part of the ESA consultations conducted for those plans. Since the Skate FMP is not expected to increase the overall effort for trawl or gillnet gear, the potential impacts to sea turtles should not change with its implementation.

The Skate FMP, in combination with implementation of the RPAs contained in the recent Opinions for the Multispecies, Monkfish, and Spiny Dogfish FMPs, will affect the large whales (right, humpback, fin, blue, sei, and sperm whales), and sea turtles (green, Kemp's ridley, leatherback, and loggerhead)as described in this section and in Section 7.1.3. Furthermore, it has been determined that the skate fishery will not affect the endangered shortnose sturgeon, Atlantic salmon, hawksbill sea turtle, roseate tern, piping plover, or the two right whale critical habitat areas found in the Northeast Region for the reasons stated in Section 7.1.3. The barndoor skate is a candidate species under the ESA and is considered an overfished species under the MSFCMA. The final Skate FMP will prohibit possession of this species providing adequate protection to the barndoor skate.

6.4.4 MMPA Conclusions

It is recognized that the skate fishery will be prosecuted in the continental shelf waters frequented by several species of offshore odontocetes including pilot whales, Risso's dolphin, offshore and coastal bottlenose dolphin, harbor porpoise, white-sided, spotted and striped dolphins. It is unlikely that the bottom-tending trawl gear used by the skate fishery will affect these odontocetes. The levels of take of these species in the sink gillnet fisheries has been well documented by NMFS observer effort. The mortality and serious injury suffered by these species has been assessed relative to the PBR allowed under the MMPA for each species and have been found to be below those levels. However, harbor porpoise are still taken in numbers determined to be significant to the population (>10% of the species' PBR) requiring continued protection under the HPTRP.

Harbor porpoise are known to be taken in sink gillnet gear used to catch skate, and are found primarily in the Gulf of Maine in the summer months. However, they migrate seasonally through regions where skates are caught. For example, they move through the southern New England area where the skate bait fishery occurs in the spring (March and April). Harbor porpoise also move through the Massachusetts Bay and Jeffrey's Ledge region in the spring

(April and May) and the fall (October November). They are not known to frequent the Georges Bank region where skate are also found.

The skate wing fisheries that utilize sink gillnet gear land skate only as bycatch in other fisheries for demersal species (groundfish, monkfish and scallops). A small sink gillnet component of the directed skate bait fishery that takes place in Southern New England may not fall under the other FMPs mentioned above. The majority of these fisheries operate under FMPs that contain effort controls developed for each fishery. However, two factors serve to ensure that all vessels participating in the skate fishery must adhere to the protective measures of the other FMPs and the ALWRTP and HPTRP: (1) the low market value of skate makes it unlikely that a vessel could survive economically without landing other more valued species; and (2) each of these FMPs require permits for any gear "capable of catching" their target species, making it impossible for any vessel to target only skate and avoid the measures contained in these plans. For these reasons, the Skate FMP will not increase sink gillnet effort in the Northeast Region, and will not affect the ability of the HPTRP to maintain the serious injury and mortality levels below the PBR levels allowed for commercial fisheries under the MMPA. Thus, the Skate FMP will continue to allow harbor porpoise to achieve its optimum sustainable population level.

6.5 ECONOMIC IMPACTS

6.5.1 Introduction

In addition to the background information presented in Section 7.3 of this document, the Skate SAFE Report (Volume II) includes the following economic information that should be referenced for this assessment:

- Annual commercial landings and revenues of skates on a calendar-year basis and by state, market category, gear, and port;
- Dockside prices for bait and wings;
- Preliminary price models and supply/demand information;
- Vessel-level revenues from skates; and
- Skate dealer activity.

Of the management measures proposed in this FMP, only restrictions on the possession of skates could potentially have economic impacts on northeast fisheries and related businesses and consumers. These include the proposed prohibitions on possession of barndoor, thorny, and smooth skate, as well as the proposed possession limit for the wing fishery. A traditional benefit-cost analysis of these measures is not possible, however, due to missing information on landings and markets in three important areas:

- First, the biological assessments of resource status could not be used to generate species-specific landings projections because of unknown amounts of unreported landings and because virtually all of what is landed is reported in generic market categories for unclassified skates or wings.
- Second, landings explained less than 5% of the variation in dockside price regression models for bait and wings (see SAFE Report, Volume II). Under-reporting (particularly of bait) and

missing information on product quality and trade most likely contributed to these poor results, but the models need to be re-structured as inverse demands derived from the lobster fishery (bait) and international seafood markets.

- Finally, there is no directed skate wing fishery per se. Skates that are landed for the overseas wing markets are caught together with other demersal species, especially large mesh groundfish and monkfish species in trawl and sink gillnet fisheries. It is difficult to assess economic impacts on only a portion of an industry's regulated activities, particularly when new multispecies and sea scallop regulations (currently under development) are likely to spillover onto this plan.

Given the above limitations, the analysis of economic impacts is a qualitative analysis of the no-possession measures for overfished species, and a semi-quantitative analysis of proposed possession limits for the skate wing fishery.

6.5.2 Measures with No Direct Economic Impacts

As previously noted, not every measure proposed in this FMP is expected to have a direct economic impact on participants in the skate fishery. This is primarily because many measures proposed in this FMP are more administrative in nature and are designed to ensure effective implementation of the FMP, improve fishery information, and aid in the enforcement of the skate fishery regulations.

The measures proposed in this FMP that are not expected to have direct economic impacts are:

- Management Unit (Section 4.1);
- Fishing Year (Section 4.2);
- Skate Overfishing Definitions (Section 4.4);
- Rebuilding Programs for Overfished Species (Section 4.5);
- Identification of Essential Fish Habitat (Section 4.6);
- FMP Reviewing and Monitoring (Section 4.7);
- Framework Adjustment Process (Section 4.8);
- Federal Permit Program (Section 4.9);
- Catch Reporting Requirements (Section 4.10);
- Letter of Authorization for Bait-Only Vessels (Section 4.15);
- Identification of Baseline Management Measures in Other Fisheries (Section 4.16.1); and
- Review Process for Changes to the Baseline Measures in Other Fisheries (Section 4.16.2).

While the measures listed above are not expected to produce any direct economic impacts, some may be associated with indirect economic impacts. For example, the selection of a rebuilding program for overfished species, by itself, has no economic effects; however, the measures that result from applying the rebuilding program and triggering additional management action by the Council may have economic impacts. Similarly, the skate overfishing definitions do not have direct economic impacts associated with them, but the management action resulting from an "overfished" determination may produce economic effects. The Council also recognizes that the economic impacts of management measures in other fisheries (including the baseline measures identified in this FMP) affect participants in the skate fishery. Increasing the restrictiveness of the baseline measures in other fisheries would not trigger a review and possible additional action under this FMP, but could affect revenues for skate fishery participants.

6.5.3 Proposed Prohibitions for Barndoor, Thorny, and Smooth Skates

During the development of this FMP, alternatives were considered to prohibit the possession, landing, and/or sale of barndoor, thorny, and smooth skates. As previously noted, the Council chose to prohibit the possession of all three species (with a geographical constraint on the prohibition for smooth skate).

Similar to the discussion of biological impacts (Section 6.1), the following discussion focuses on prohibitions on possession. It is assumed that prohibitions on landing and sale would produce economic impacts similar to those under a prohibition on possession. Of the species proposed for prohibitions in this FMP, only barndoor skates appear as a market category in the dealer database; however, virtually no landings have been reported in this category (e.g., 13 pounds in the year 2000). Thus, there are no landings data on which to base a quantitative economic analysis of proposed prohibitions on possession.

It is also not possible to draw absolute qualitative conclusions about the economic impacts of no-possession restrictions, although the information provided by fishermen and processors and incorporated into the 2000 Skate SAFE Report (Volume II) suggests that these prohibitions would produce only a small negative impact (also see Section 7.3.1 of this document for additional discussion). Inshore lobstermen south of Cape Cod and offshore lobstermen reportedly use little skates and some small winter skates caught in Southern New England waters as bait. In contrast, the inshore Gulf of Maine lobster fishery prefers soft-bodied fish such as herring and mackerel.

The scenario in the skate wing fishery appears to be less clear. Processors who contributed to the information presented in the 2000 Skate SAFE Report stated that thorny and barndoor skates, as well as winter skates, are sufficiently large for the wing market. Thorny skates in the Gulf of Maine are likely mixed with winter skates from the Great South Channel on the same trips. Winter skates probably dominate wing landings from Georges Bank and south based on species geographic distributions, possibly with some barndoor skate in the mix. The relative amounts of these three species in the wing landings are currently unknown. The overfished status of thorny and barndoor skates and the geographic range of winter skates suggests that winter skates likely compose the bulk of wings landings at this time.

6.5.4 Proposed Possession Limit for the Skate Wing Fishery

The rationale supporting a possession limit on wings is to preclude the development of a directed wing fishery at this time and thereby reduce fishing mortality on winter skate, avoid an overfished situation for winter skate, and help improve the overfished status of thorny and barndoor skates. Recent experience with spiny dogfish and monkfish shows that fishermen participating in the groundfish fishery, where there is considerable excess capacity and tight regulations, can relatively quickly deplete alternative fishery resources depending on market demand. Assuming that there is merit to the fisheries management paradigm, the short-run status quo gains during an overfishing period would most likely be outweighed by gains from moderate and steady exploitation.

The Council considered three options for a wing possession limit in addition to the no action alternative: 10,000 pounds, 20,000 pounds, and 30,000 pounds. All three options are evaluated below. Whether to continue fishing or end the trip once the possession limit is reached is an economic decision that vessels will have to make. The economic impacts of the proposed action (10,000 pounds per day/20,000-pounds per trip) are likely to closely resemble those expected under a 20,000-pound possession limit. This is further discussed in Section 6.5.5 (p. 244).

Existing dealer reports were used to identify trips for the possession limit analysis. Logbook data have been used recently to analyze spiny dogfish and silver hake possession limits, but the skate wing species category is not used consistently by fishermen when filling out vessel trip reports. For example, skate wing landings from the dealer reports (market categories 3651, 3661, 3671, and 3681) totaled 8.4 million pounds in 2000, compared to only 1.2 million pounds according to the vessel logbooks (SKATW species code). Fishing effort by trip was accessed from the logbook data, however.

The analysis was restricted to the calendar years 1995-2000. Landings data from the first year of mandatory reporting (i.e., 1994) are often considered to be incomplete, and the year 2001 data were not available in time for this analysis.

Not having biological projections, the 1995-2000 landings data were inspected visually for trends that could be used to project the no action and, therefore, alternative scenarios into the near future. The information summarized in Table 26 does not suggest any useful trends in vessel activity and wings landings. The number of vessels reported to have sold skate wings to dealers declined steadily from 933 in 1995 to 771 in 2000, but trip counts vacillated between about 13.6 thousand in 2000 and 15.2 thousand in 1998. Skate wing landings more than doubled between 1995 and 1996, but then averaged about 7.1 million pounds thereafter. (Roughly 75% of total skate wing landings have been made by vessels using otter trawl gear, and 20% by sink gillnet vessels.) Likewise, dockside revenues averaged $2.7 million during 1997-2000 after peaking at $4.9 million in 1996.

The usual inverse relationship between dockside prices and landings found for most species is not apparent for skate wings. Prices were highest at $0.50/pound during 1995 and 1996, the very years when skate wing landings were lowest and highest, respectively, in the series. Thereafter, prices were relatively constant, just shy of $0.40.

No temporal trends which are useful for projections are apparent at the possession limit levels either (Table 26). The number of vessels with landings of 10,000 pounds or more tripled between 1995 and 1996, but then fluctuated, returning to 47 in 2000 (Figure 84). The corresponding number of trips followed a similar ranking (Figure 85). The 20,000 and 30,000 pound cutoffs followed suit with 1996 activity standing out, followed by the year 2000 (Figure 84 and Figure 85). Landings and revenues follow trip levels (Table 26).

Although, on average, less than 1% of total trips landed 10,000 or more pounds of skate wings, these trips comprised a large share of the wings revenues: 56% in 1996 and 31% overall (use information in Table 26). The percentages for the same years that correspond to a 20,000 pound trip limit drop to 37% and 17%, respectively. Trips landing 30,000 pounds of skate wings or more contributed 26% to total wing revenues in 1996 and 9% overall.

Having no basis to empirically project future landings for each scenario, the range of values during 1995-2000 will serve as a rudimentary risk analysis.

Table 26 Skate Wing Landings, Calendar Years 1995-2000

Data are from NMFS dealer reports. A dash indicates confidential information. Revenues at risk include mixed species catches on trips that end early once the possession limit is reached (see text for explanation).

Category	Factor	1995	1996	1997	1998	1999	2000
Total	# vessels	933	851	860	809	779	771
	# trips	14,624	13,843	13,680	15,152	13,986	13,589
	Wing landings (lbs)	3,875,234	9,948,178	5,415,361	8,196,647	6,463,336	8,415,561
	Wing revenues	$1,952,501	$4,938,104	$2,123,312	$3,218,713	$2,456,230	$3,060,228
	Wing price ($/lb)	$0.50	$0.50	$0.39	$0.39	$0.38	$0.36
10,000 pound possession limit	# vessels	15	47	23	40	38	47
	# trips	21	230	59	130	82	134
	Wing landings (lbs)	331,580	5,474,586	998,690	2,144,455	1,215,374	2,257,376
	Wing revenues	$181,383	$2,747,722	$434,781	$886,889	$478,019	$852,348
	Trip revenues at risk	$76,855	$1,717,328	$184,458	$394,921	$193,490	$399,945
20,000 pound possession limit	# vessels	4	32	8	15	9	18
	# trips	5	112	14	30	13	34
	Wing landings (lbs)	113,845	3,831,506	380,190	784,215	316,142	901,655
	Wing revenues	$62,812	$1,936,523	$164,272	$322,720	$128,169	$328,178
	Trip revenues at risk	$9173	$848,732	$44,130	$83,945	$27,544	$90,474
30,000 pound possession limit	# vessels	0	21	3	6	1	5
	# trips	0	61	3	7	1	6
	Wing landings (lbs)	0	2,560,562	-	246,735	-	238,990
	Wing revenues	0	$1,277,317	-	$103,077	-	$65,648
	Trip revenues at risk	0	$385,000	-	$16,876	-	$15,344

Figure 84 Number of Vessels that Would Have Caught the Stated Wing Trip Limit on at Least One Trip

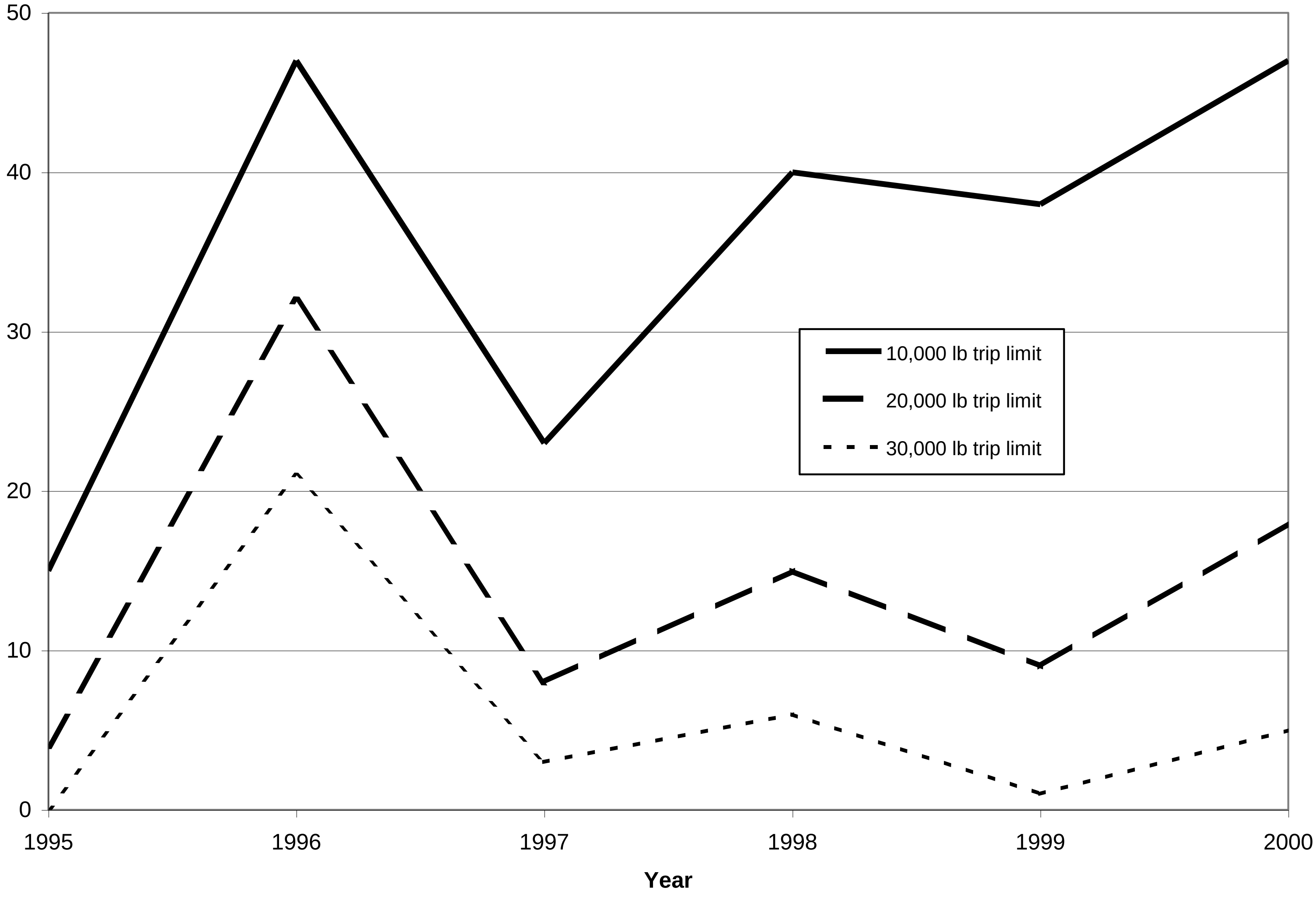
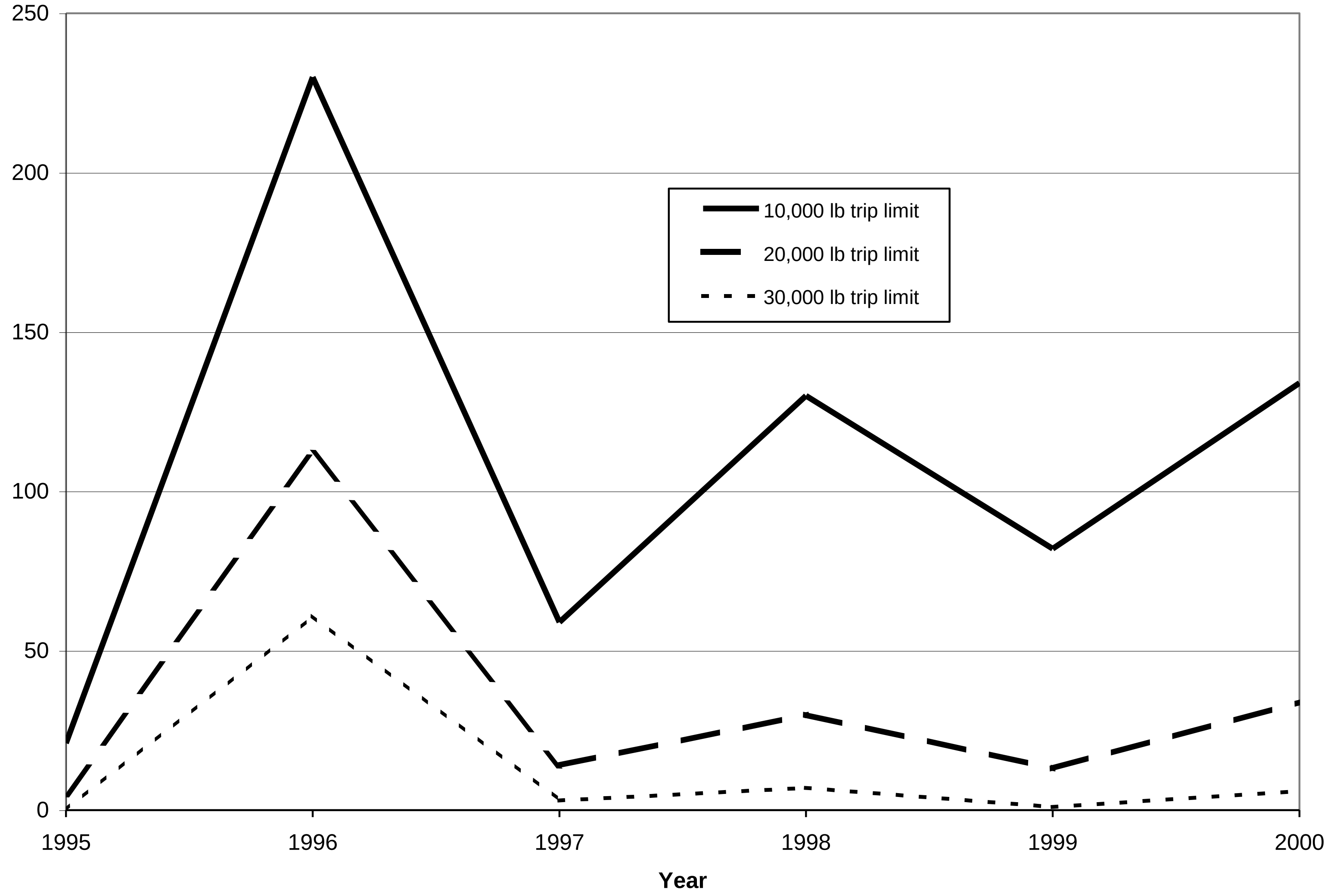


Figure 85 Number of Trips that Landed the Stated Amount of Skate Wings



6.5.4.1 Trip Limit Analysis

Steinback and Thunberg (2000) describe a straight-forward method to analyze the economic impacts of trip, or possession, limits in fisheries. Trip revenues are averaged per day-at-sea and then compared to daily operating costs. The captain decides whether to continue a trip once the limit is reached depending on whether he expects to cover normal daily operating expenses for inputs such as fuel, ice, food, and oil. If the trip continues, the regulated species is discarded and operating income to the vessel owner, captain, and crew (i.e., revenue minus operating costs) is reduced by the foregone revenues from discards. If the regulated species is needed to cover trip costs, the trip is cut short and operating income is reduced by the foregone average income-per-day on the shortened trip.

Several assumptions are implicit in the method as applied to skate wing management. The first assumption is that dockside wing prices will remain relatively constant despite reduced landings. This assumption seems valid based on recent experience (discussed above with reference to Table 26) and knowing that domestic wing prices are strongly determined by global supplies. Impacts on the fishing industry are therefore measured in terms of changes in landings alone.

The second assumption is that virtually all skate wings are exported, making it unnecessary to assess impacts on net benefits for U.S. consumers (i.e., consumer surplus). This assumption is consistent with information from industry advisors, although there are small domestic ethnic markets for skate wings. Skate wings are not reported separately in trade data; therefore, domestic landings can not be compared to exports.

The third assumption simplifies the behavior of fishermen in response to possession limits to either continue the trip or end it early after the limit is reached. It is conceivable that the possession limits cause fishermen to take more but shorter trips, depending in part on associated effort and other controls in the multispecies and monkfish plans. The economic impacts of this response is the cumulative loss of operating income due to more time steaming to and from fishing grounds on extra trips. Other possible responses include changing fishing locations where skate catch rates are lower, or changing fisheries (e.g., sea scallop fishery on general category permit). Given these possibilities, the estimates of economic losses which are reported below should be considered upper bounds. The resources required to estimate more complicated choice and production models are unwarranted given the small estimates of potential.

Fourth, changes in *operating income* are used to measure changes in *producer surplus*. This assumption will overstate losses, however, if repair and maintenance costs are reduced by shortened trips (again assuming no additional short trips).

Fifth, the opportunity costs of fishing were not addressed. It is arguable whether production elsewhere in the economy is affected by possession limits that shorten trip lengths.

Finally, the potential loss in operating profit and producer surplus by dealers, processors, and exporters resulting from reduced landings could not be assessed without cost data from these businesses.

Trip revenues (including by species) are from dealer reports. "Date-sold" was used to match dealer and logbook records in order to obtain days-at-sea effort data per trip. NMFS does not census operating costs; therefore, average daily operating costs (1996$) by gear type and vessel length were taken from independent sources reported in Steinback and Thunberg (2000): $270/day for trawl vessels <50 feet; $500/day for trawl vessels >=50 feet and <70 feet; $875/day for trawl vessels >=70 feet; $250/day for gillnet vessels <35 feet; and $315/day for gillnet vessels >=35 feet. In the few cases when the assigned costs exceeded actual trip revenues, operating income was set equal to zero. Virtually all trips landing at least 10,000 pounds of skate wings were made by trawl vessels.

Estimates of losses in operating income during 1995-2000, had the possession limits under consideration been in place, are reported in Table 27. Losses are broken down by trips that would have continued once the possession limit was reached and those that would have ended early. The number of trips in each group are also reported. Some cells in the table are empty to protect confidentiality.

The results in Table 27 suggest that a high percentage of trips would have continued during 1995-2000 under the possession limits considered in this FMP. For example, 46% of all trips affected by a 10,000 pound possession limit during these years are predicted to continue fishing.

The average annual loss in operating income corresponding to a 10,000 pound trip limit is $350,000/year, but year-to-year losses varied by an order of magnitude (Table 27). On a trip basis, the overall average loss throughout 1995-2000 is about $534/trip. Average annual losses corresponding to 20,000 and 30,000 pound trip limits are $144,000 and $61,000 respectively, and average losses per trip under these limits were $694 and $787 respectively.

As explained above, the estimates of losses in operating income during 1995-2000 are being used to measure the potential loss in producer surplus in the near future if the possession limits under consideration are implemented. The estimates in Table 27 were adjusted to 1996$ (OMB requirement) and are reported in Table 28 as the mean and range of potential annual losses in producer surplus. The range serves as a rudimentary risk analysis in the absence of a bioeconomic projection model.

Table 27 Retrospective Estimates of Losses in Operating Income from Skate Wing Landings Had the Possession Limits Been in Effect

Losses are not reported where information is confidential.

Year	Factor	10,000 Pound Trip Limit			20,000 Pound Trip Limit			30,000 Pound Trip Limit		
		Continue Trip	End Trip	Total	Continue Trip	End Trip	Total	Continue Trip	End Trip	Total
1995	# Trips	8	13	21	2	3	5	0	0	0
	Loss	$18,181	$33,788	$51,969	-	-	$6,499	0	0	0
1996	# Trips	97	133	230	37	75	112	18	43	61
	Loss	$522,745	$819,025	$1,341,770	$227,731	$470,114	$697,845	$90,962	$236,828	$327,790
1997	# Trips	40	19	59	9	5	14	3	0	3
	Loss	$125,070	$29,137	$154,207	$38,484	$4,066	$42,550	$16,737	0	$16,737
1998	# Trips	45	85	130	7	23	30	0	7	7
	Loss	$86,699	$98,540	$185,239	$9,742	$37,256	$46,998	0	$10,694	$10,694
1999	# Trips	39	43	82	4	9	13	0	1	1
	Loss	$62,286	$62,428	$124,714	$3,974	$14,205	$18,179	0	-	-
2000	# Trips	71	63	134	15	19	34	4	2	6
	Loss	$174,192	$69,057	$243,249	$37,311	$17,166	$54,477	$9,599	-	-

Under a 10,000 pound trip limit, losses in producer surplus could average $345,000/year and range from $53,000/year to $1.3 million/year (Table 28). Average annual losses are $143,000 and $61,000 under 20,000 and 30,000 pound possession limits, respectively, both with wide ranges.

Table 28 also reports the equivalent present value of these producer surplus losses over a short-term, 5-year period using a 7% discount rate (OMB requirement). For example, the present value of average annual losses under a 10,000 pound trip limit is $1.5 million.

In addition to measuring the opportunity costs of possession limits, the possible losses in the fishing industry's producer surplus can be used to help judge the conservation benefits of possession limits. Another assumption is that skates which are discarded on trips that continue after the possession limit is reached are either dead or moribund. In contrast, skate catches are reduced on trips that end early. If additional trips are not taken to compensate for shortened trips, the amount of skates saved in this way can be divided into foregone producer surplus to obtain an opportunity cost per pound of skate conservation.

Analysis of the 1995-2000 data shows that between 83,000 and 2.1 million pounds of skate wings could be saved from harvest annually by a 10,000 pound trip limit. The average annual savings is 615,000 pounds (1.4 million pounds live weight), or nearly 9% of total landings during these years. The corresponding average loss in producer surplus is $0.56/pound (i.e., $345 thousand from Table 28 divided by 615,000 pounds). (The opportunity costs should *not* be compared to skate wing dockside prices which are in terms of gross revenues per pound.) If all discards survived on trips that continued despite the possession limit (average of 375 thousand pounds/year), the average opportunity cost is reduced to $0.35.

Analysis of the other possession limits under consideration shows an average annual savings of 247,000 pounds of skate wings on shortened trips (i.e., not counting discards on continued trips) at the 20,000 pound cutoff (3.5% of total landings), and 100,000 pounds at the 30,000 pound cutoff (1.4% of total landings). These correspond to opportunity costs of $0.58/pound and $0.61/pound, respectively. Including discards reduces the loss to about $0.40/pound.

Table 28 Short-Term Potential Losses in Producer Surplus Under the Proposed Possession Limits

Present values (PV) were calculated using a 7% discount rate and 5-year time horizon. All values are in thousands of 1996 dollars.

Measure	10,000 Pound Trip Limit		20,000 Pound Trip Limit		30,000 Pound Trip Limit	
	Annual	PV	Annual	PV	Annual	PV
Average	$345	$1515	$143	$629	$61	$268
Minimum	$53	-	$7	-	$0	-
Maximum	$1342	-	$698	-	$328	-

6.5.4.2 Distribution of Impacts

Benefit-cost analysis compares the net economic impacts of alternative fishery management regulations on the overall economy of fishermen, seafood businesses, and consumers. Although the annual loss in producer surplus potentially caused by the proposed possession limits is small compared to other actions taken by the Council and by economic standards set by E.O. 12866, it is still important to investigate whether the impacts are concentrated on particular ports, gear types, or small businesses.

6.5.4.2.1 Port and Gear Impacts

More than 95% of the trips that landed at least 10,000 pounds of skate wings during 1995-2000 were made by trawl vessels that landed in New Bedford, Massachusetts. Trawlers landing in Provincetown, Massachusetts were a distant second at 3.5% of the total trips landing more than 10,000 pounds of skate wings. Only one gillnet trip exceeded 10,000 pounds of wings during this period.

Although concentrated, skate wings from large trips contributed relatively little to the total dockside revenues of New Bedford and Provincetown, let alone the potential losses resulting from possession limits. For example, in the year 2000, total fishery revenues in New Bedford and Provincetown were $148.806 million and $3.806 million, respectively. Total skate wing revenues on trips landing at least 10,000 pounds were $0.893 million (0.6%) in New Bedford, and $0.028 million (0.7%) in Provincetown. The possible reduction in skate revenues due to the possession limits under consideration would be an even smaller percentage of port total revenues.

6.5.4.2.2 Small Businesses – Vessel Impacts

Although several hundred vessels landed skate wings each year during 1995-2000, relatively few of them landed 10,000 pounds or more on any trip (Table 26). Specifically, fewer than 50 vessels per year, or less than 6%, landed at least 10,000 pounds of skate wings on any trip. Fewer than 4% of the vessels landed 20,000 pounds or more, and fewer than 3% landed at least 30,000 pounds.

A repeated incidence of large skate wing landings by individual vessels is one guide to dependence on skate wing landings. Throughout 1995-2000, 82 different vessels landed 10,000 pounds or more of skate wings on at least one trip. Thirteen of these vessels landed at least one trip at this level during each of the past five or six years. In contrast, 27 of these vessels did not land this quantity of skate wings on any trip during 1999 or 2000. The 20,000 pound threshold showed similar results, with two (2) out of 42 vessels landing this amount of skate wings during the last 5 or 6 years, and 22 vessels not reaching this limit on any trip during 1999 or 2000. Finally, 22 out of 27 vessels that landed at least one trip with 30,000 pounds of skate wings or more during 1995-2000 did not do so in 1999 or 2000.

Another measure of dependence is provided by the distribution of vessels and number of trips that landed the possession limits under consideration. Using the cumulative record during 1995-2000 once again, 82 vessels landed 10,000 pounds or more of skate wings on 674 trips, or 0.8%

of the 84,874 individual trips summarized in Table 26. One half of these vessels landed 1-4 large wing trips during this six-year period (Figure 86). In contrast, 17 vessels landed 10,000 or more pounds of skate wings on more than 10 trips each. These 17 vessels accounted for nearly 60% of the large skate wing trips.

The results for the higher possession limits are skewed towards few trips. Thirty of the 42 vessels which landed 20,000 pounds of skate wings or more during 1995-2000 did so on 1-4 trips. At the 30,000 pound threshold, 23 out of 27 vessels landed 1-4 large trips.

The final indication of vessel dependence on skate wing landings concerns revenues potentially at risk from the possession limits under consideration. During the year 2000, for example, skate wings contributed between 11% and 100% of total revenues on the 134 trips that landed at least 10,000 pounds of wings in 2000. (Other species landed on the mixed trips were primarily large mesh groundfish, monkfish, and lobster.)

Not all of these revenues would be impacted by the possession limit, however. Trips that can cover operating costs would only lose skate wing revenues in excess of the 10,000 pound limit, while trips that end because they are uneconomic would lose revenues from all species that would have been caught. The combination of these two potential impacts amounts to $400,000 using the year 2000 as a baseline (Table 26).

Figure 87 summarizes the potential impacts of a possession limit on the 47 vessels that landed more than 10,000 pounds of skate wings during the 2000 calendar year. The solid bars in Figure 87 pertain to only those trips which landed at least 10,000 pounds of wings, while the hashed bars pertain to the same vessels' total annual fishing activity. As shown in Figure 87, skate wing landings in excess of 10,000 pounds amounted to more than 5% of the trip revenues for 35 vessels (add the solid bars at 6-10%, 11-20%, 21-30%, and >30%). In contrast, the annual revenues of only three of these vessels would have been impacted by more than 5% if all fishing activity during the year is considered. For perspective, this is three vessels out of the population of 771 vessels that landed any amount of skate wings in 2000 (Table 26). Also, this potential loss of revenue would be mitigated (to an unpredictable degree) by changing fishing behavior. The 47 vessels that landed 10,000 or more pounds of skate wings on at least one trip in 2000 held permits in several fisheries, including summer flounder, sea scallop (general category), and squid/mackerel/butterfish as well as multispecies and monkfish (Figure 88).

The year 2000 results for vessels that landed above the 20,000 and 30,000-pound thresholds are similar. The potential revenue loss for the 18 vessels that landed at least 20,000 pounds of skate wings was less than 5% of total annual revenues in each case (14 were less than 1%). The five vessels meeting the 30,000 pound threshold were exposed by 1% or less based on annual revenues.

The vessel-level impacts for most of the other years were similar to the year 2000 results. In particular, the total annual revenues of six or fewer vessels that landed at least 10,000 pounds of skate wings would potentially be impacted by more than 5% except in 1996 when 21 out of a total of 851 vessels were exposed to a 5% or larger revenue loss.

Figure 86 Number of Vessels That Landed 10,000 or More Pounds of Skate Wings on at Least One Trip During 1995-2000 (N=82 vessels)

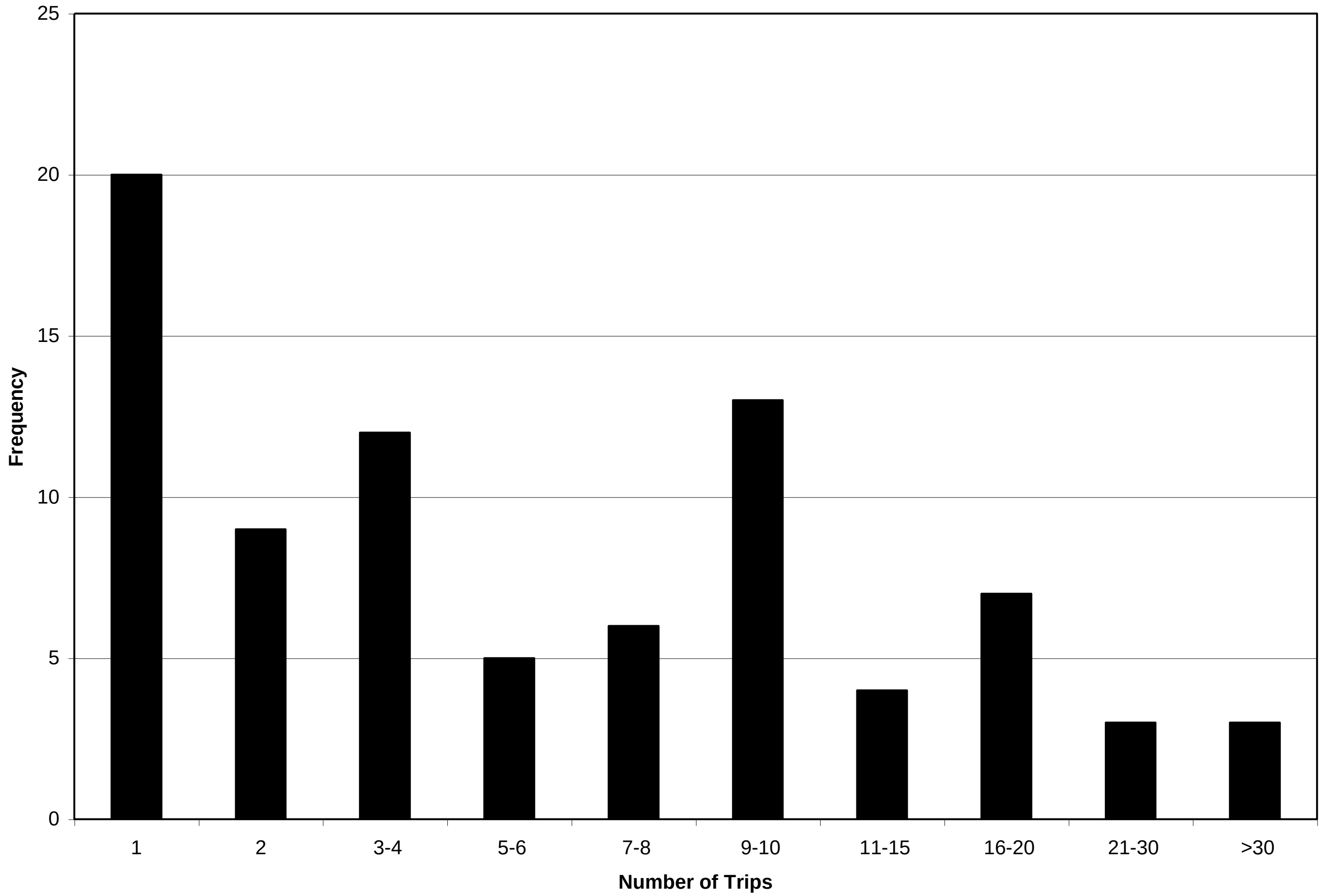


Figure 87 Revenues of Vessels Potentially Impacted by a 10,000 Pound Skate Wing Possession Limit (Based on Year 2000 Fishing Activity)

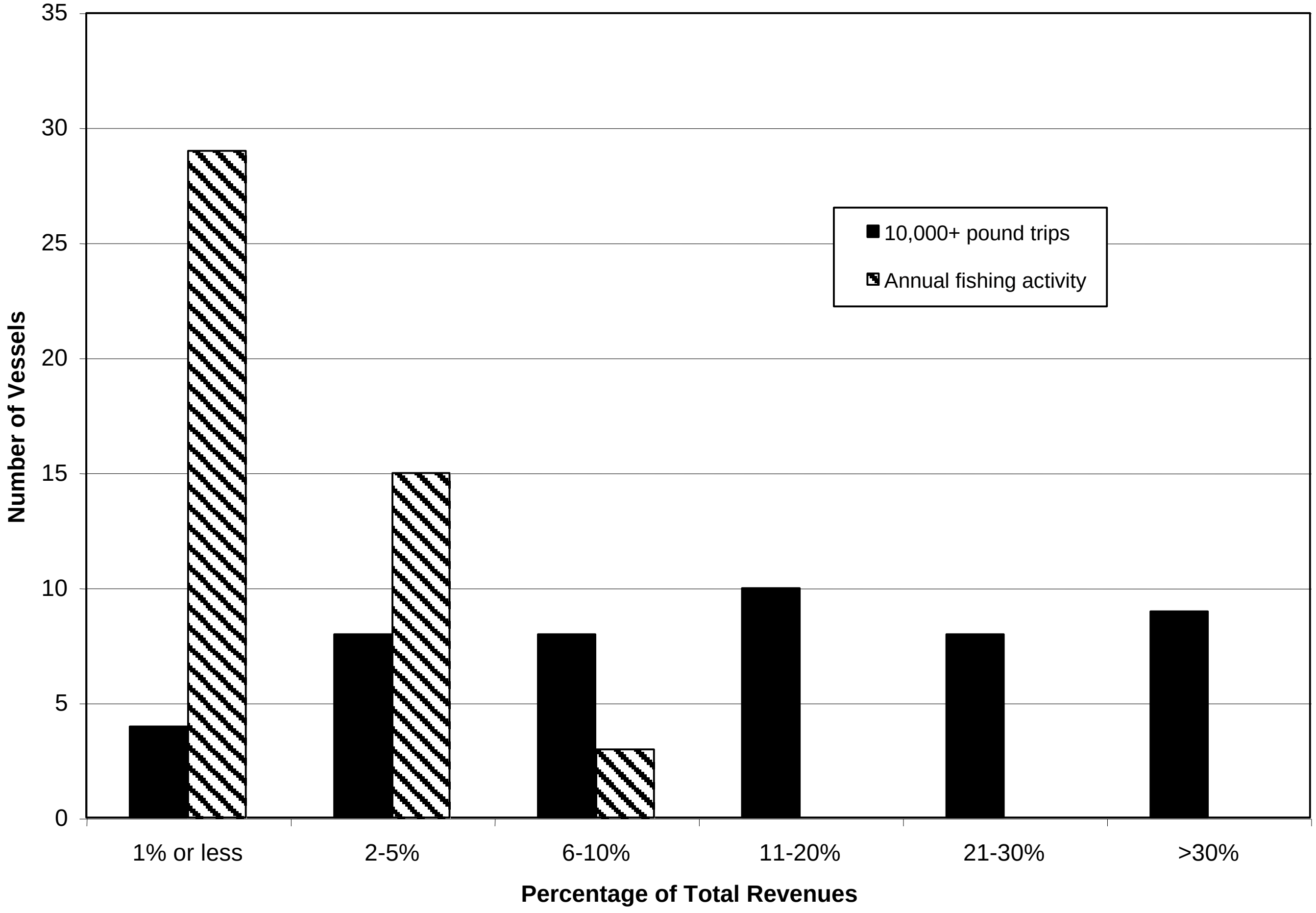
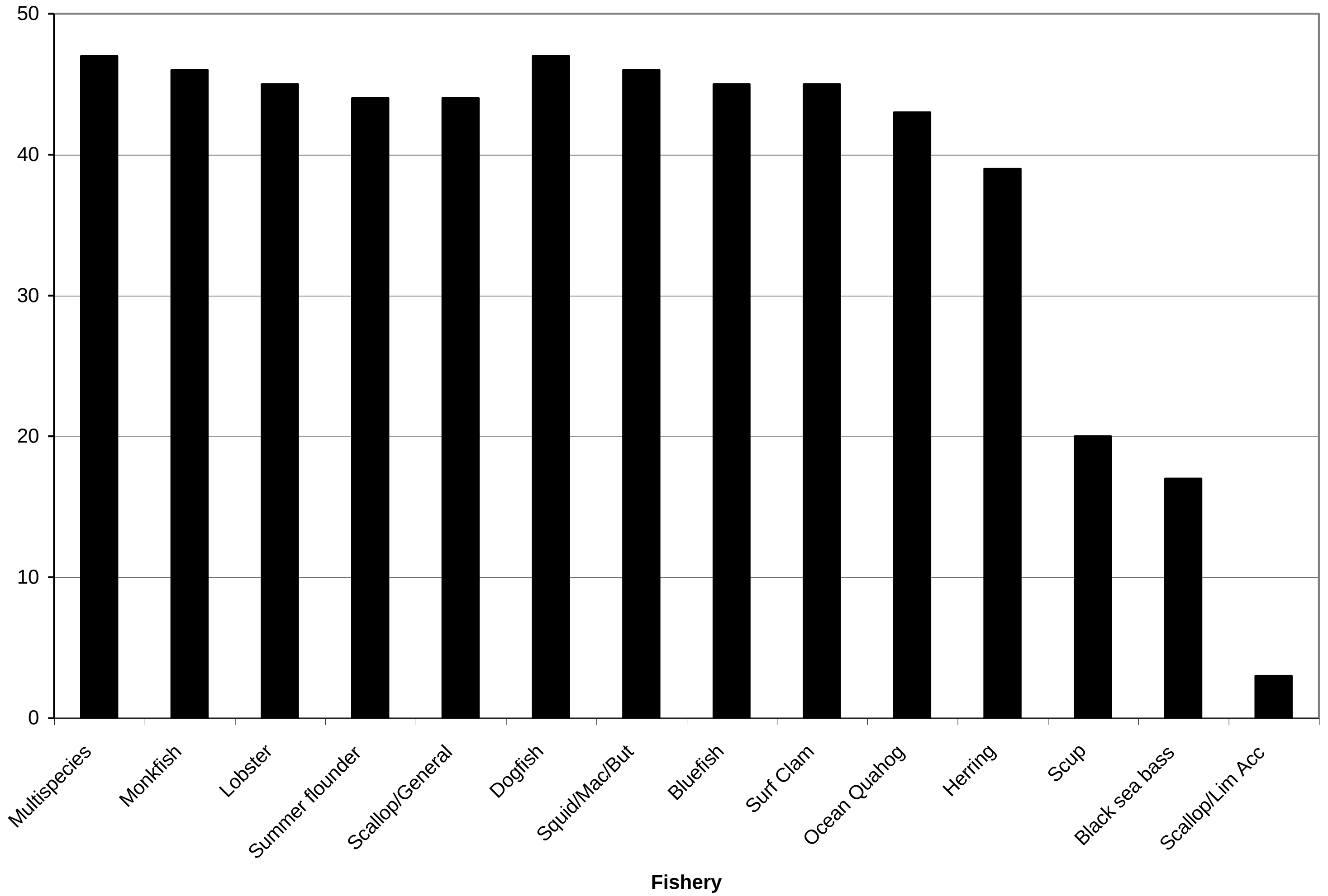


Figure 88 Count of Fishery Permits Held by the 47 Vessels That Landed at Least One Trip With 10,000 Pounds of Skate Wings During 2000



6.5.4.2.3 Small Businesses – Dealer Impacts

About 130 dealers reported skate wing purchases each year during 1995-2000. Although market shares and some companies have changed, only a small fraction of these dealers bought wings from vessels that landed at least 10,000 pounds per trip. In the year 2000, for example, 15 out of 124 dealers, primarily in New Bedford and Provincetown, Massachusetts, bought skate wings from trips that would have been affected by a 10,000 pound possession limit. The potential reductions in skate wing landings above 10,000 pounds per trip comprised 3% or less of total purchases of finfish and shellfish by these companies.

Continuing with the year 2000 baseline, eight (8) dealers would have been impacted by a 20,000 pound possession limit, although by 1% or less of total seafood purchases. Similarly, a 30,000 pound limit would have impacted five (5) dealers, although negligibly.

6.5.5 Postscript to Analysis of Economic Impacts

Data from the year 2001 became available after the DEIS and PREE were prepared for the Draft Skate FMP. Fishing activity associated with skate wing landings in 2001 was comparable to the range analyzed for the years 1995-2000 (Table 26, p. 232); therefore, a full analysis of the most recent year's data is unlikely to change conclusions concerning possible economic impacts of the proposed possession limit. Specifically, in 2001, 735 vessels landed 8.265 million pounds of skate wings on 12,040 trips (similar to 771 vessels landing 8.415 million pounds of wings on 13,589 trips in 2000 as Table 26 indicates). Also in 2001, 14 separate vessels landed wings in excess of the proposed 20,000-pound possession limit on 27 trips. The average annual price for wings was $0.30 per pound. If anything, these data show a reduction in skate wing activity when compared to the year 2000.

The proposed action also includes a 10,000-pound limit on skate wing landings for one-day trips. This measure will most likely have a negligible affect on the majority of participants in the fishery because one-day trips are a wasteful use of groundfish days-at-sea allocations. (The vast majority of skate wings are landed on groundfish trips.) For example, in 2000, only three vessels landed more than 10,000 pounds of skate wings on five trips that lasted less than one day (24 hours). The excess amounted to 10,520 pounds.

6.6 SOCIAL AND COMMUNITY IMPACTS

This assessment characterizes the magnitude and extent of the social and community impacts likely to result from the management measures proposed in the Skate FMP.

6.6.1 Background Information

A description of the affected environment (vessels that catch skates and fishing communities involved in the skate fisheries) is presented in Section 7.3 of this document. There is a great deal of overlap between the skate fishery and multispecies and monkfish fisheries. Therefore, information about vessels and fishing communities involved in the multispecies and monkfish fisheries supplements information about the affected environment presented in this document. In turn, the following may be referenced for additional social impact information that is not included in this document:

- Amendments 5 and 7 to the Northeast Multispecies FMP;
- Frameworks 25, 26, 27, 30, 31, 33, and especially Draft Framework 36 (which was never submitted); the Draft Framework 36 document has evolved into the Draft Amendment 13 DSEIS and includes even more social impact information;
- Report from the Groundfish Social Impact Informational Meetings;
- Monkfish Fishery Management Plan and the 2001 Monkfish SAFE Report; and
- Draft Amendment 10 to the Sea Scallop FMP

As mentioned in Section 7.3, the following documents also serve as important reference materials:

Aguirre International, October 1996. *An Appraisal of the Social and Cultural Aspects of the Multispecies Groundfish Fishery in New England and the Mid-Atlantic Regions.* Submitted to NOAA under Contract Number 50-DGNF-5-00008, 141 pp.

Hall-Arber, Madeleine, Christopher Dyer, John Poggie, James McNally and Renee Gagne, 2001. *Fishing Communities and Fishing Dependency in the Northeast Region of the United States.* MARFIN Project Final Report to National Marine Fisheries Service, 429 pp.

McCay, Bonnie and Marie Cieri, April 2000. *Fishing Ports of the Mid-Atlantic.* Report to the Mid-Atlantic Fishery Management Council, Dover, Delaware, 183 pp.

McCay, Bonnie, Blinkoff, Belinda, Blinkoff, Robbie, and Bart, David, December 1993. *Report, Part 2, Phase I, Fishery Impact Management Project, to the Mid-Atlantic Fishery Management Council.* Report to the Mid-Atlantic Fishery Management Council, Dover, Delaware, 179 pp.

6.6.2 Skate FMP Communities of Interest

Section 7.3 of this document characterizes skate fishing activity and dependence (defined as percentage of total fisheries revenues from skates) for most communities that are known to land skates in either the bait or wing fisheries. Details about the bait and wing fisheries are also provided in Section 7.3. In general, the only communities with substantial involvement in and/or dependence on skate fishing are: Point Judith, RI; New Bedford, MA; Provincetown, MA; and eastern Rhode Island (Newport, Tiverton, Portsmouth, Jamestown, Middletown, and Little Compton). The vast majority of skate fishing activity in RI ports, however, is in the skate bait fishery. Since none of the measures proposed in this FMP directly impact vessels participating in the skate bait fishery, this assessment will focus on impacts to the communities of **New Bedford and Provincetown**. Based on analysis presented in Section 6.2 of this document, New Bedford and Provincetown are the only two communities with skate wing landings high enough to be impacted by the proposed possession limit for the wing fishery.

While New Bedford and Provincetown have been identified as communities of particular interest in this FMP, it is still important to consider the general impacts of the measures proposed across all potentially affected participants in the fisheries. ***Social impacts*** can be defined as the changes that a fisheries management action may create in:

- people's way of life (how they live, work, play, and interact),
- people's cultural traditions (shared beliefs, customs, and values), and
- people's community (population structure, cohesion, stability, and character).

As such, social impacts may result from changes in flexibility, opportunity, stability, certainty, safety, and other factors that are not specific to any community, but oftentimes to any individual or entity experiencing changes resulting from a fishing regulation.

New Bedford, Massachusetts: New Bedford has emerged as the top port of landing for skate wings. In addition to landings, New Bedford processes the majority of skate wings landed throughout the region. Table 29 summarizes annual skate fishing activity in New Bedford (from the dealer weighout database) averaged across fishing years 1994-2000. From FY94-FY00, skate landings averaged almost 10% of total annual landings in New Bedford, but because of the higher value of other species, skate revenues only averaged 2.36% of total annual fisheries revenues there. In FY00, 385 multispecies-permitted vessels landed fish in New Bedford. It is likely that many of these vessels landed small amounts of skates that were caught incidentally in other fisheries, while only a few landed larger quantities of skates on "directed" trips.

Despite New Bedford's significant contribution to overall wing landings in the region (more than 61% of total wing landings came from New Bedford in FY00), dependency on the skate fishery in this community appears to be low. Completely eliminating the skate fishery in New Bedford would be expected to impact the community's fisheries revenues by less than 3%. However, it is important to remember that while the overall community's dependence on skates may be low, it is likely that there are individual vessels that will experience losses greater than those predicted for the community as a whole. In addition, skate processors in New Bedford obtain wings from ports other than New Bedford and could potentially experience losses greater than those predicted for New Bedford based on the dealer weighout database.

Table 29 Average Annual Skate Fishing Activity in New Bedford, FY94-FY00

Bait Landings (Pounds)	174,628 (0.35% of total landings)
Bait Revenues (1999 Dollars)	14,500 (0.015% of total revenues)
Wing Landings (Pounds)	4,676,700 (9.36% of total landings)
Wing Revenues (1999 Dollars)	2,277,470 (2.34% of total revenues)
Total Skate Landings (Pounds)	4,851,328 (9.71% of total landings)
Total Skate Revenues (1999 Dollars)	2,291,970 (2.36% of total revenues)
Total Landings (Pounds)	49,987,257
Total Revenues (1999 Dollars)	97,203,228

Source: NMFS Dealer Weighout Database

Provincetown, Massachusetts: Provincetown is another port of landing for the wing fishery, although the level of wing activity is a distant second to that in New Bedford. However, vessels landing in Provincetown have exhibited an overall higher level of dependence on skates than those in any other ports (see Skate SAFE Report, Volume II). Table 30 summarizes annual skate fishing activity in Provincetown (from the dealer weighout database) averaged across fishing years 1994-2000. From FY94-FY00, skate landings averaged 9.8% of total annual landings in Provincetown, and skate revenues averaged 4.8% of Provincetown's total annual fisheries revenues. In FY00, 44 multispecies-permitted vessels landed fish in Provincetown. It is likely that the majority of these vessels landed some quantity of skates.

It is important to note that skate fishing activity in Provincetown increased considerably after FY96, so the averages reported in Table 30 underestimate current activity (see Section 7.3.3.3.4 for annual estimates). In addition, the industry in Provincetown reported during scoping that the dealer weighout database appears to underestimate skate activity in the area. It is likely that some skate wings landed in Provincetown are being transported directly to places like New Bedford without being documented by a local dealer. If this is the case, then skate activity reported through the dealer database likely underestimates total skate activity in the port.

Like New Bedford, while the overall dependence on skates in Provincetown may be relatively low, it is likely that there are individual vessels that will experience losses greater than those predicted for the community as a whole. In addition, most wings that are landed in P-Town are transported to New Bedford for processing, so any losses in landings that Provincetown vessels experience could exacerbate any impacts on processors in New Bedford.

Because of Provincetown's geographic isolation and proximity to areas that are closed for groundfish protection (Blocks 124 and 125 are currently closed four months each year), participation in the skate fishery becomes an even more critical element of fishing activity in the community. Despite the overlap between groundfish and skate fishing, skates have come to represent an important, viable fishery for vessels in Provincetown, which have experienced significant reductions in fishing opportunities through multispecies regulations. If upcoming changes to the multispecies regulations further decrease opportunities, the ability to continue to land skates in Provincetown may become even more critical.

Table 30 Average Annual Skate Fishing Activity in Provincetown, FY94-FY00

Bait Landings (Pounds)	0 (0% of total landings)
Bait Revenues (1999 Dollars)	0 (0% of total revenues)
Wing Landings (Pounds)	315,200 (9.8% of total landings)
Wing Revenues (1999 Dollars)	108,314 (4.8% of total revenues)
Total Skate Landings (Pounds)	315,200 (9.8% of total landings)
Total Skate Revenues (1999 Dollars)	108,314 (4.8% of total revenues)
Total Landings (Pounds)	3,215,600
Total Revenues (1999 Dollars)	2,272,871

Source: NMFS Dealer Weighout Database

6.6.3 Skate FMP Social Impact Assessment Factors

Because detailed and skate-specific information is currently lacking and because the impacts of the measures proposed in this FMP are expected to be relatively minimal, the Social Impact Assessment (SIA) factors described below are evaluated in a qualitative sense. Each management measure proposed in this FMP is examined in the context of these factors to evaluate the magnitude and nature of the social impacts likely to result.

6.6.3.1 Changes in Occupational Opportunities

Definition: The degree to which the implementation of the management measures in this FMP could alter the employment and industrial profile of the affected fishing communities.

Description: Changes in occupational opportunities can lead to changes in household/family income, classes, and lifestyles. In assessing the extent of these changes, both the short-and long-term shifts in job opportunities should be considered. These include changes to year-round and seasonal fishing opportunities, short-term and long-term dislocation from the fishery, employment opportunities, and the ability to find and keep crew. Flexibility for the fishing fleet and the ability to plan business ventures over the short-term and long-term also are related factors.

Assessment of this variable should address the following questions:

- Could the proposed action change the structure and/or composition of New England's fishing fleets?
- Are the management measures proposed in this FMP likely to affect the supply and/or cost of fishing-related employees?
- Will affected fishermen have alternative fishing opportunities under the proposed action?

Generally, significant changes to occupational opportunities tend to be more cumulative and long-term in nature. Because the skate wing fishery is primarily an incidental catch fishery and no fishing communities significantly depend on skate fishing, it is very unlikely that any of the measures proposed in this FMP will cause notable changes in occupational opportunities. One important consideration related to this factor in this FMP is whether or not vessels affected by the proposed wing possession limit will be able to maintain sufficient opportunities to earn income from fishing on a year-round basis. This issue is discussed in the subsections below.

6.6.3.2 Disruption in Daily Living

Definition: Changes in the routine living and work activities of affected fishery participants, including the potential for alteration in their social and work patterns to adapt to new management measures.

Description: Measuring changes in established daily patterns – patterns that, in the case of fishing communities, are often internally generated and regulated and highly regimented – can provide a key component to social impact assessment. Although the existence, nature, and evolution of these patterns in fishing communities is well documented by marine anthropologists, the effects of changes to them have often been overlooked in conducting social impact assessments for fishery management. Ideally, measurement of disruption in daily living should include an assessment of the outcomes of any periods of inactivity, including changes in social stress and stress-related health problems, job satisfaction, crime rates, and family cohesion.

Assessment of this variable should address the following questions:

- How could the proposed action alter the daily living and work patterns of fishing families in the affected communities?
- Will fishermen need to travel to new fishing grounds or fishing grounds farther away from their homes as a result of the proposed action? Will fishermen be spending more time away from home as a result of the proposed action?
- Could the proposed action increase stress at the family level?

6.6.3.3 Regulatory Discarding

Definition: Forced discarding of oftentimes marketable and dead fish; usually a byproduct of trip limits, quotas, and minimum fish sizes.

Description: Regulatory discarding is an important social problem, just as it is an ecological problem. Low trip limits resulting in excessive discarding leave fishermen feeling embarrassed, demoralized, frustrated, and disgusted with their way of life. Fishermen recognize that discarding marketable and oftentimes dead fish does nothing to benefit them or their families, the health of the resource, their disappearing hold on local fresh fish markets, or seafood consumers. Fishing is usually a family business, so the impacts of this are felt throughout the entire family and fishing community.

Regulatory discarding is one factor that produces negative social impacts in the short-term, usually immediately after implementation of the measure that is creating the discard situation. It is an important factor to consider any time that possession or trip limits are proposed. For the Skate FMP, this factor will be considered in the context of both the possession limit proposed for the skate wing fishery and the proposed prohibitions on certain skate species.

Assessment of this variable should address the following questions:

- Is the proposed action likely to force fishermen to throw marketable fish overboard?
- Is the level of regulatory discarding under the proposed action likely to be high enough to generate significant negative social impacts?

6.6.3.4 Safety

Definition: The ability of fishermen to maintain safe operations at sea; can be compromised by various adaptations to increased regulations and decreased fishing opportunities.

Description: The safety of fishermen and fishing operations at sea is an extremely important social impact factor, as decreased safety often increases stress at the individual and family level, which can exacerbate many family and societal problems. In addition, the impacts of fishing-related casualties can be felt throughout fishing communities, where close-knit groups have longstanding family and social networks.

Assessment of this variable should address the following questions:

- Is the proposed action likely to compromise the safety of fishermen and/or fishing operations?
- Will fishermen need to travel to new fishing grounds or fishing grounds farther away from their homes as a result of the proposed action?
- Is it likely that fishermen will make adaptations to the proposed management measures that could compromise their safety (taking less crew, fishing during times of bad weather)?

6.6.4 Social Impacts of Proposed Management Measures

6.6.4.1 Social Impacts of Taking No Action

When management measures are considered in any FMP, amendment, or framework adjustment, their impacts are usually compared to a baseline scenario of "no action." For the Skate FMP, taking no action means that the Council would not develop an FMP for skates. No species-specific fishery data would be collected without a Skate FMP, and uncertainties about the skate resources and their associated fisheries would continue to constrain the Council's ability to ensure the long-term viability of the skate complex.

It is difficult to conclude that taking no action would result in a collapse of the skate resources, however, because skate fishing is affected by management measures in other fisheries. It is more likely that without a Skate FMP, continued effort reduction in the Multispecies, Monkfish, and

Scallop FMPs would provide adequate conservation to prevent a collapse of species in the skate complex. Still, it is unlikely that without an FMP for skates, the Council and NMFS could effectively manage skates through other plans so that all species in the complex rebuild to target biomass levels that can produce maximum sustainable yield (MSY) over the long-term. This FMP is essential to collecting species-specific fishery information to estimate MSY, which currently cannot be estimated.

Similarly, without a mechanism to implement species-specific measures for skates, it is likely that some species in the complex would continue to decline (i.e., thorny skate), creating the need for more stringent measures that could have severe impacts not only on skate vessels, but also on vessels in other fisheries that catch skates incidentally. Moreover, if this is the long-term outcome of not establishing an FMP for skates, the Council could be faced with implementing more stringent measures without the important fishery information that this FMP has been created to collect. The long-term social impacts of not collecting this information, therefore, could be significant.

Of the social impact factors identified in this assessment, the long-term negative impacts of not establishing a Skate FMP at this time could most significantly affect *changes in occupational opportunities* and *disruption in daily living*, especially if more draconian measures and/or if measures that impact other fisheries (groundfish, monkfish, scallops) would be required to address increasing concerns about the condition of the skate complex.

6.6.4.2 Measures with No Direct Social Impacts

Similar to the assessment of the biological and economic impacts of the proposed action, it is important to identify the actions proposed in this FMP that are not likely to result in any direct social impacts. This is primarily because many measures proposed in this FMP are more administrative in nature and are designed to ensure effective implementation of the FMP, improve fishery information, and aid in the enforcement of the skate fishery regulations.

The measures proposed in this FMP that are not expected to have direct social impacts are:

- Management Unit (Section 4.1);
- Fishing Year (Section 4.2);
- Skate Overfishing Definitions (Section 4.4);
- Rebuilding Programs for Overfished Species (Section 4.5);
- Identification of Essential Fish Habitat (Section 4.6);
- FMP Reviewing and Monitoring (Section 4.7);
- Framework Adjustment Process (Section 4.8);
- Identification of Baseline Management Measures in Other Fisheries (Section 4.16.1); and
- Review Process for Changes to the Baseline Measures in Other Fisheries (Section 4.16.2).

While the measures listed above are not expected to produce any direct social impacts, some may be associated with indirect social impacts. For example, the selection of a rebuilding program for overfished species, by itself, has no social or economic effects; however, the measures that result from applying the rebuilding program and triggering additional management action by the Council may have social impacts. Similarly, the skate overfishing definitions do not have direct social impacts associated with them, but the management action resulting from an "overfished" determination may produce social effects. In these instances, the social impacts of the resulting actions will be evaluated by the Council during their development (framework adjustment and/or amendment).

The Council also recognizes that the social impacts of management measures in other fisheries (including the baseline measures identified in this FMP) affect participants in the skate fishery. Increasing the restrictiveness of the baseline measures in other fisheries would not trigger a review and possible additional action under this FMP, but could affect skate fishery participants and their communities.

6.6.4.3 Social Impacts of Proposed Permitting and Reporting Requirements

This FMP proposes to establish federal permits for skate fishing and to modify reporting requirements for vessels and dealers in order to collect better skate fishery information. Three permit options and seven reporting options were considered by the Council during the development of this FMP. The Council ultimately chose to establish one open-access permit for skates and to require the reporting of skate landings and purchases by species and discards by general size categories (see Section 4.0 for a complete description of the proposed action).

In general, the requirement to obtain a permit to fish for, land, sell, purchase, or process skates is assumed to produce no significant social impacts, positive or negative. This permit requirement is identical to requirements in every other federal fishery. The Council is not proposing a limited access program for this fishery, so there is no need to consider individuals that may potentially be excluded from the fishery. However, the proposed reporting requirements may result in short-term negative social impacts, but the long-term impacts are expected to be positive. The social impacts of the proposed reporting requirements are discussed generally below.

Modifications to reporting requirements are proposed that will affect not just those vessels and dealers catching/purchasing skates, but all vessels and dealers that are required to report all of their fishing-related activity through either logbooks or the dealer weighout database. Options that the Council considered ranged from the status quo to mandatory vessel reporting of landings and discards by species to mandatory dealer reporting of skate purchases by species. The social impacts of this measure will be experienced most by those who will be required to report by individual species. Since vessels will be required to report landings by species, fishermen will experience the associated social impacts. Because dealers will be required to report purchases of skates by species, they too will experience impacts. The impacts of these measures are not expected to be concentrated in any particular fishing community, although it is recognized that most skate dealers reside in Point Judith RI and New Bedford MA.

Changes in Occupational Opportunities: The proposed permitting and reporting requirements are not expected to result in any significant changes to this factor. The proposed measures are not expected to change the structure and/or composition of the fleet, nor are they likely to affect fishing opportunities and the supply/cost of fishing-related employees.

Disruption in Daily Living: Of the factors identified in this assessment, increased reporting burdens and species-specific requirements are likely to affect *disruption in daily living* most. It is possible that sorting time (time spent sorting the catch and discards by species) and reporting time (time spent filling out logbooks) will increase considerably. This could disrupt daily operations on board vessels, especially those that take a larger number of trips that are shorter in duration. If significant enough to compromise overall productivity, the disruptions could lead to the formation of negative attitudes about skate management and an overall decline in job satisfaction for the affected individuals. Although highly unlikely, these impacts could increase stress at the family level, and if they were to persist over the long-term, they could effect the fishing community as a whole.

Regulatory Discarding: This factor is not likely to be affected by the proposed permitting and reporting requirements.

During the development of the proposed action, the Council considered the potential to increase discard mortality under some of the proposed reporting options. If reporting requirements for vessels are such that on-board sorting time increases and skates spend more time on deck, fewer discarded skates are likely to survive. Negative social impacts relating to discarding could result if fishermen see that the skate reporting requirements are resulting in higher discard mortality on their vessels. Fishermen often develop negative feelings and attitudes about regulations that they perceive to be wasteful and/or contrary to conservation. This is one reason that the Council chose not to require that discards of skates be reported by fishermen on a species-specific level.

Safety: The proposed permitting and reporting requirements are not expected to compromise the safety of fishermen and/or fishing operations. Nothing related to permitting and reporting requirements should create the need for fishermen to travel farther from shore to catch skates or to make adaptations that may compromise their safety.

Improved data collection may result in short-term negative impacts but should result in long-term positive impacts on the skate fishery and should ultimately lead to better decision-making, ensuring the long-term effectiveness of this FMP.

6.6.4.4 Social Impacts of Proposed Prohibitions on Possession of Barndoor, Thorny, and Smooth Skates

During the development of the Skate FMP, the Council considered prohibitions on the possession, landing, and/or sale of barndoor skate, thorny skate, and smooth skate. The Council ultimately selected prohibitions on the possession of barndoor, thorny and smooth skates as the proposed action in this FMP. The prohibition on the possession of smooth skate is limited to the Gulf of Maine. The following discussion addresses all three kinds of prohibitions that the Council considered in this FMP.

The information provided in the Skate SAFE Report (Volume II) as well as Sections 7.3 and 6.2 of this document suggests that none of the proposed prohibitions will result in significant impacts due to loss of opportunity in any fishery or loss of revenues from the species proposed for prohibitions. Barndoor and thorny skates are not thought to represent a significant component of the wing fishery, and smooth skate is not known to be landed in either the bait or wing fisheries.

For the most part, the proposed prohibitions serve as precautionary measures to prevent targeting of these species in the future. This, in turn, reduces the likelihood that additional measures will be needed in the future to protect these species, the impacts of which could be much more severe. Also, by preventing future targeting of these species, the Council is taking a *proactive* approach to protecting them before there is potential for a significant negative economic impact on the fishery. As previously mentioned, however, the potential to reduce fishing mortality is highest under a prohibition on possession and lowest under a prohibition on sale (a prohibition on landings falls in-between). If a prohibition on sale had been selected by the Council, for example, the probability would be much higher that additional measures would be required in the future to address the species in question.

One important difference between the prohibitions that the Council considered and their social impacts relates to the flexibility they provide vessels to correctly identify the species and comply with the prohibition. The concern is that more restrictive prohibitions (those on possession, for example) could result in violations for many fishermen who make an honest mistake by missing a prohibited skate on a high volume trip or by mis-identifying a prohibited species. As previously discussed, vessel flexibility tends to decrease as the restrictiveness of the prohibition increases, while the potential to reduce fishing mortality tends to increase as the restrictiveness of the prohibition increases. Ranking the prohibitions considered during the development of this FMP based on flexibility produces the following:

- No Action (most flexible)
- Sale
- Landing
- Possession (least flexible)

Changes in Occupational Opportunities: The proposed prohibitions on possession are not expected to impact opportunities to fish for skates and/or other species. Vessels fishing for skate wings will still be able to land winter skates, which currently compose the majority of skate wing landings. The proposed prohibitions should not change the structure and/or composition of the region's fishing fleets, nor should they affect the supply and/or cost of fishing-related employees.

Disruption in Daily Living: The proposed prohibitions on possession are not expected to alter the daily living and work routines of fishery participants, their families, or their communities. The only reason that vessels may travel to new or different fishing grounds as a result of the prohibitions is if they relocate to avoid concentrations of the prohibited species. This is unlikely because none of these species have historically represented a significant proportion of skate landings. Vessels encountering the prohibited species after the FMP is implemented are not likely to do so more than they have historically in the same areas, so they will likely handle the bycatch as they did in the past. They probably will not relocate to new fishing grounds to avoid prohibited skates if they are familiar with their historical fishing grounds, especially if they are seeking more commercially valuable species in these areas.

Regulatory Discarding: The proposed prohibitions on possession are not expected to generate significant negative social impacts resulting from increased regulatory discarding. However, it must be acknowledged that the proposed prohibitions are indeed likely to generate regulatory discards. The important question to consider is: will negative attitudes develop as a result of a legal requirement to throw three species of skates overboard? The answer to this question is likely to be "no" for two primary reasons. First, none of the three species proposed for prohibition are known to have been commercially valuable in the past, so most fishermen have probably always discarded them. Second, it is believed that many discarded skates survive, especially in comparison to discarded finfish. If skates are released alive, fishermen may feel that they are positively contributing to the conservation of the resource.

Safety: The proposed prohibitions on possession are not expected to compromise the safety of fishermen or fishing operations at sea. As discussed above, it is unlikely that vessels will relocate to new fishing grounds or fish farther from shore as a consequence of the prohibitions. Also, it is unlikely that fishermen will need to make any adaptations to these prohibitions that could compromise their safety.

6.6.4.5 Social Impacts of Proposed Possession Limit for the Wing Fishery

In addition to the no action option, the Council considered three options for a possession limit in the wing fishery: 10,000 pounds, 20,000 pounds, and 30,000 pounds. The rationale supporting a possession limit on wings is to preclude the development of a directed wing fishery at this time and thereby reduce fishing mortality on winter skate, avoid an overfished situation for winter skate, and possibly help improve the overfished status of thorny and barndoor skates. The Council ultimately selected a combination of Options 1 and 2: 10,000 per day (trips less than 24 hours) and 20,000 pounds per trip (trips greater than 24 hours). For reasons discussed in Section 6.5, the impacts of the proposed action are expected to most closely resemble the impacts associated with Option 2 (20,000 pounds).

In general, trip limits can affect the structure of a fishery. If the trip limit is set very low, the inshore sector of the fleet can sometimes manage to fish economically, while the offshore sector of the fleet cannot cover trip expenses. This can change the structure of financial rewards generated in the fishery and can ultimately change the short-term and long-term structure of the fishery itself. These types of outcomes, however, are not likely to result from the skate wing possession limits that are proposed in this FMP. The proposed possession limits serve more to "cap" activity and discourage fishery expansion than to reduce effort or allocate resources among user groups. Therefore, a more important consideration relative to the possession limits proposed in this FMP is whether or not they are likely to negatively affect revenues for a significant number of vessels.

Table 31 below summarizes the potential economic impacts of the possession limits for the skate wing fishery that the Council considered during the development of this FMP. The results in Table 31 are based on reported fishing activity from the 2000 calendar year. These results do not serve as a prediction of the absolute impacts of the possession limits under consideration, but they characterize the likely magnitude of the impacts based on observed and documented skate activity from the 2000 calendar year. Table 31 helps to emphasize that the overall negative economic impact of any of these possession limits is expected to be relatively minor. Across all vessels and communities, the most liberal possession limit (30,000 pounds) would impact the total revenues of five (5) vessels by less than 1%, based on their observed skate activity in 2000. Similarly, the most conservative possession limit (10,000 pounds) would impact the total revenues of three (3) vessels by more than 5%. For some perspective, the numbers of impacted vessels are from a total of 771 vessels that landed any amount of skates during the 2000 calendar year.

Table 31 Total Number of Vessels Potentially Affected by the Proposed Possession Limits for the Wing Fishery

Proposed Possession Limit	No. of Vessels Affected by Possession Limit*	No. of Vessels with Total Revenues Impacted by Less than 1%*	No. of Vessels with Total Revenues Impacted by 2-5%*	No. of Vessels with Total Revenues Impacted by More than 5%*
10,000 pounds	47	29	15	3
20,000 pounds	18	14	4	0
30,000 pounds	5	5	0	0

**Based on reported trips during the 2000 calendar year*
The impacts of the proposed action are expected to most closely resemble the impacts of Option 2 (20,000 pounds).

The economic analysis (Section 6.5) indicates that vessels in the communities of New Bedford and Provincetown, Massachusetts will be most affected by the proposed possession limit for the wing fishery. Total skate wing revenues on trips landing at least 10,000 pounds in 2000 were 0.6% of total skate revenues in New Bedford and 0.7% of total skate revenues in Provincetown. The reduction in skate revenues due to the proposed possession limit would be an even smaller percentage of total port revenues. Because of other, more important fishing activity occurring in New Bedford, the impacts are likely to be more significant in Provincetown, even though the losses are expected to be smaller in terms of absolute numbers.

Changes in Occupational Opportunities: The proposed possession limit is not expected to significantly impact opportunities to fish for skates and/or other species. Vessels fishing for skate wings will still be able to do so on a year-round basis depending on market conditions. Overall, the proposed possession limits should not change the structure and/or composition of the region's fishing fleets, nor should they affect the supply and/or cost of fishing-related employees.

Figure 88 in Section 6.5 (Economic Impacts) presents a count of other federal fishery permits held by the 47 vessels that landed at least one trip with 10,000 pounds or more of skate wings during the 2000 calendar year. According to Figure 88, all potentially affected vessels held multispecies permits, presumably limited access permits with DAS allocations. Almost all potentially affected vessels held permits for monkfish; lobster; fluke; scallop (general category); squid, mackerel, butterfish; bluefish; and surf clam/ocean quahog.

Disruption in Daily Living: The proposed possession limit is not expected to alter the daily living and work routines of fishery participants, their families, or their communities. It is possible that a few vessels may take more trips to compensate for the possession limits, but this adaptation is still not expected to significantly disrupt the daily patterns of most participants in the fishery. The decision to increase the number of trips for skates will have to be made in the context of efficient DAS usage, short-term and long-term business planning, and possible future reductions in DAS. If DAS are reduced significantly (through Amendment 13 or other action), vessels may not find it economically feasible to fish for skates at all, let alone increase the number of trips they take for skates.

An additional impact of this measure may be that some dealers who have historically purchased wings from vessels that land larger amounts will have to adjust their operations accordingly, but the social impacts of this are not likely to be significant.

Regulatory Discarding: This factor may be affected under the proposed possession limit and would be affected most by the 10,000-pound limit that the Council considered. However, based on the economic information in Section 6.2, on average, less than 1% of total trips from 1995-2000 landed more than 10,000 pounds of skate wings (although these trips accounted for a significant portion of total wing revenues). Based on these data, the possession limits themselves should not generate significant regulatory discards. Discarding of skates after the possession limit is implemented is likely to occur as it does now.

Safety: The proposed possession limit is not expected to compromise the safety of fishermen or fishing operations. It is unlikely that vessels will relocate to new fishing grounds or fish farther from shore as a consequence of the possession limit. It is possible that some vessels will opt to take additional trips to compensate for reductions from the possession limit, but the number of vessels doing this is expected to be small. This adaptation would only compromise safety if vessels increase the number of trips they are taking during times of less predictable and more extreme weather. The likelihood of this occurring cannot be predicted at this time.

6.6.4.6 Social Impacts of Letter of Authorization for Bait-Only Vessels

The Council is proposing a requirement for vessels fishing for skate bait only to obtain a letter of authorization to do so. This requirement serves as an enforcement tool and allows for a distinct separation of bait-only vessels so that they are not subject to the possession limit for the wing fishery.

This measure is not expected to result in any significant short-term social impacts, positive or negative. The increased burden of obtaining the letter should not be significant enough to affect any of the factors under consideration.

6.6.5 SIA Conclusions

In general, the social impacts of the management measures proposed in the Skate FMP are likely to be minor. It is important to remember that vessels and communities most dependent on skates are those that participate in the bait fishery. Since none of the measures proposed in this FMP impact revenues or opportunities in the bait fishery, the scope and magnitude of negative social impacts is lessened significantly.

New Bedford and Provincetown are identified as the two communities that are likely to be most affected by the proposed management measures. Although the impacts of the measures proposed in this plan are expected to be relatively minor for both communities, it is important to note the differences between the two communities and emphasize that, in terms of importance and dependence, special consideration should be given to Provincetown, and the impacts of future measures on Provincetown should be weighed carefully.

- Although the absolute numbers are far less in Provincetown than New Bedford, landings and revenues of skates are more economically important to vessels in Provincetown.
- Because of the relatively low commercial value of skates and high value of species like scallops, monkfish, and some flatfish, it is not likely that there are vessels in New Bedford that are substantially dependent on the skate fishery.
- Provincetown's geographic location and isolation as well as the nature of its fishing fleet make it more vulnerable to significant changes to management measures not only for skates, but also for other fisheries.

Over the short-term, any negative social impacts of the measures proposed in this FMP are most likely to result from changes to reporting requirements, regulatory discarding from species prohibitions and possession limits (these impacts are expected to be relatively minor), and the proposed possession limit (these impacts are expected to be significant to only a few individual vessels). Over the long-term, the social impacts of this FMP are expected to be positive. Collecting better fishery information will ultimately improve the effectiveness of the skate management measures and rebuild the resources to their long-term sustainable levels.

7.0 DESCRIPTION OF THE RESOURCE AND THE AFFECTED ENVIRONMENT

This section is intended to provide background information for assessing the impacts, to the extent possible, of the proposed management measures on related physical, biological, and human environments. It includes a description of the stocks and the physical environment of the fishery as well as life history information, habitat requirements, and stock assessments for relevant stocks and a discussion of additional biological elements such as endangered species and marine mammals. This descriptive section also describes the human component of the ecosystem, including socioeconomic and cultural aspects of the commercial and recreational fisheries and the impacts of other human activities on the fisheries in question. Much of the information contained in this section is a compilation of information used to make choices from a range of alternatives during the development of the proposed management action.

This section should supplement and/or update information provided in the Skate SAFE Report, which serves as a source document for this FMP (the SAFE Report represents Volume II of this FMP). If information was already presented in the SAFE Report and no updates or supplements are available, this FMP document will reference the SAFE Report instead of repeating the information.

7.1 BIOLOGICAL ENVIRONMENT

The Essential Fish Habitat Source Documents prepared by the Northeast Fisheries Science Center (NEFSC) of the National Marine Fisheries Service for each of the seven skate species, provide most available biological and habitat information on skates. These technical documents are available in Volume III, Appendix A of this FMP and contain the following information for each skate species in the northeast complex:

- Life history, including a description of the eggs and reproductive habits
- Average size, maximum size and size at maturity
- Feeding habits
- Predators and species associations
- Geographical distribution for each life history stage
- Habitat characteristics for each life history stage
- Status of the stock (in general terms, based on the Massachusetts inshore and NEFSC trawl surveys)
- A description of research needs for the stock
- Graphical representations of stock abundance from NEFSC trawl survey and Massachusetts inshore trawl survey data
- Graphical representations of percent occurrence of prey from NEFSC trawl survey data

Please refer to the source documents (Volume III, Appendix A) for more detailed information on the above topics. All additional biological information is presented below.

7.1.1 Distribution of Skate Species

Distributions of each of the seven skate species from the NEFSC spring and autumn trawl surveys can be found in the following sections of this FMP:

- Skate SAFE Report (Volume II)
- Section 6.1.6, as part of the analysis of the impacts of existing closed areas on skates
- EFH Source Documents (Volume III, Appendix A).

7.1.2 Survey Abundance Indices and Current Stock Status

This section provides the most recent abundance indices from the Northeast Fisheries Science Center (NEFSC) research trawl surveys and updates the status of each skate species based on the biomass reference points included in the proposed overfishing definitions (Section 4.4). According to information presented in this section, barndoor and thorny skates are considered to be in an overfished condition. Other species are not currently considered to be overfished, and little skate, clearnose skate, and rosette skate are considered to be "rebuilt."

Research vessel surveys are designed to provide fishery-independent indices of fish abundance. Two research vessel bottom trawl surveys conducted by the NMFS Northeast Fisheries Science Center represent the longest continuous time series of fishery-independent data in the U.S. waters of the Northwest Atlantic and one of the longest continuous time series of fish abundance data in the world. The autumn survey has been conducted annually since 1963, and an independent spring survey has been conducted annually since 1968. Each survey uses a stratified random sampling design that provides comprehensive coverage of continental shelf waters from Cape Hatteras, North Carolina to the Scotian Shelf off Nova Scotia.

The survey is designed to provide unbiased and relative estimates of fish abundance. Only two research vessels, the Albatross IV and the Delaware II, have been used to conduct the survey over the past 36 years. Both sampling gear (net, footgear) and tow specifications (vessel speed, winch payout, and retrieval) have been standardized to produce comparable annual estimates of abundance within the time series. Both differences in catchability between research vessels and changes in catchability resulting from gear changes have been quantitatively evaluated through designed comparison surveys. Survey coverage extends from inshore waters (15 m) to the edge of the continental shelf (200 m). Fixed sets of strata are used to produce indices of abundance and biomass for each stock unit, as defined by the SAW/SARC process.

Indices of relative abundance have been developed from NEFSC bottom trawl surveys for the seven species in the skate complex, and these form the basis for most of the conclusions about the status of the complex. All statistically significant NEFSC gear, door, and vessel conversion factors were applied to little, winter, and thorny skate indices when applicable (Sissenwine and Bowman, 1978; NEFSC 1991). Juvenile little and winter skates are not readily distinguished in the field. The numbers of juveniles were split between the two species based on the abundance of the adults in the same tow.

7.1.2.1 Winter Skate

A complete time series of NEFSC trawl survey information for winter skate is presented in Section 2.3.1.1 of the Skate SAFE Report (Volume II). This section only provides survey information for the most recent ten-year time period.

The survey data in Table 32 suggest that the abundance of winter skate declined in the early 1990s, but then rebounded to levels similar to those in earlier survey years (see SAFE Report). The 1996-1998 three-year average of 2.83 kg/tow was below the proposed biomass threshold, which led to a conclusion at SAW 30 that winter skate was in an overfished condition. Since that time, survey indices have increased considerably. The most recent three-year average of 4.43 kg/tow is considerably above the proposed threshold of 3.23 kg/tow. Therefore, winter skate is not considered to be in an overfished condition.

Table 32 NEFSC Autumn Survey Indices and Updated Status of Winter Skate

YEAR	AUTUMN SURVEY (kg/tow)
1992	3.58
1993	1.91
1994	2.12
1995	1.99
1996	2.28
1997	2.46
1998	3.75
1999	5.09
2000	4.37
2001	3.82
1999-2001 Three-year average	**4.43**
SAW 30 Biomass Threshold	3.23
CURRENT STATUS	**NOT OVERFISHED**

Status determinations are based on the overfishing definition proposed in Section 4.4.3 of this document.

7.1.2.2 Little Skate

A complete time series of NEFSC trawl survey information for little skate is presented in Section 2.3.1.2 of the Skate SAFE Report (Volume II). This section only provides survey information for the most recent ten-year time period.

Spring survey indices for little skate are currently at the highest levels for the time series presented in Table 33. In fact, survey estimates since 1997 have been and continue to be the highest on record for little skates. The 1999-2001 three-year average of 8.47 kg/tow is well above the proposed biomass threshold of 3.27 kg/tow and even above the proposed biomass target. Therefore, little skate is not considered to be in an overfished condition and is, in fact, considered to be "rebuilt."

Table 33 NEFSC Spring Survey Indices and Updated Status of Little Skate

YEAR	SPRING SURVEY (kg/tow)
1992	5.30
1993	7.52
1994	3.62
1995	2.87
1996	7.57
1997	2.71
1998	7.47
1999	9.98
2000	8.60
2001	6.84
1999-2001 Three-year average	**8.47**
SAW 30 Biomass Threshold	3.27
CURRENT STATUS	**NOT OVERFISHED**

Status determinations are based on the overfishing definition proposed in Section 4.4.3 of this document.

7.1.2.3 Barndoor Skate

A complete time series of NEFSC trawl survey information for barndoor skate is presented in Section 2.3.1.3 of the Skate SAFE Report (Volume II). This section only provides survey information for the most recent ten-year time period.

The data presented in Table 34 indicate that the abundance of barndoor skates has increased significantly in recent years. Very few barndoors were sampled in the survey during the early 1990s, but indices increased considerably after 1996 and continue to increase through 2001. The current three-year average of 0.38 kg/tow is less than the proposed threshold of 0.81 kg/tow. Therefore, barndoor skate is considered to be in an overfished condition. However, the current three-year average of 0.38 kg/tow is considerably higher than the 1996-1998 average of 0.08 kg/tow, suggesting that the resource has rebuilt substantially in recent years, possibly due, in part, to the benefits of the groundfish closed areas on Georges Bank.

Table 34 NEFSC Autumn Survey Indices and Updated Status of Barndoor Skate

YEAR	AUTUMN SURVEY (kg/tow)
1992	0.002
1993	0.14
1994	0.04
1995	0.11
1996	0.04
1997	0.11
1998	0.09
1999	0.30
2000	0.29
2001	0.54
1999-2001 Three-year average	**0.38**
SAW 30 Biomass Threshold	0.81
CURRENT STATUS	**OVERFISHED**

Status determinations are based on the overfishing definition proposed in Section 4.4.3 of this document.

7.1.2.4 Thorny Skate

A complete time series of NEFSC trawl survey information for thorny skate is presented in Section 2.3.1.4 of the Skate SAFE Report (Volume II). This section only provides survey information for the most recent ten-year time period.

The abundance of thorny skates from the NEFSC trawl survey declined through the 1990s and currently remains at record low levels. The 2001 estimate reported in Table 35 is the lowest of the survey time series for thorny skates. The current three-year average of 0.55 kg/tow is less than the SAW 30 biomass threshold of 2.20 kg/tow. Therefore, thorny skate is currently considered to be in an overfished condition.

Table 35 NEFSC Autumn Survey Indices and Updated Status of Thorny Skate

YEAR	AUTUMN SURVEY (kg/tow)
1992	0.96
1993	1.66
1994	1.51
1995	0.78
1996	0.81
1997	0.85
1998	0.65
1999	0.48
2000	0.83
2001	0.33
1999-2001 Three-year average	**0.55**
SAW 30 Biomass Threshold	2.20
CURRENT STATUS	**OVERFISHED**

Status determinations are based on the overfishing definition proposed in Section 4.4.3 of this document.

7.1.2.5 Smooth Skate

A complete time series of NEFSC trawl survey information for smooth skate is presented in Section 2.3.1.5 of the Skate SAFE Report (Volume II). This section only provides survey information for the most recent ten-year time period.

The abundance of smooth skate from the NEFSC trawl survey declined in the 1990s but has increased in recent years to levels similar to those observed in the 1980s (see Skate SAFE Report). The preliminary estimate for 2001 reported in Table 36 is the highest on record for smooth skate since 1980. The current three-year average of 0.17 kg/tow is just above the proposed threshold of 0.17 kg/tow. Therefore, smooth skate is no longer considered to be in an overfished condition.

Table 36 NEFSC Autumn Survey Indices and Updated Status of Smooth Skate

YEAR	AUTUMN SURVEY (kg/tow)
1992	0.13
1993	0.23
1994	0.10
1995	0.19
1996	0.18
1997	0.23
1998	0.03
1999	0.07
2000	0.15
2001	0.29
1999-2001 Three-year average	**0.17**
SAW 30 Biomass Threshold	0.16
CURRENT STATUS	**NOT OVERFISHED**

Status determinations are based on the overfishing definition proposed in Section 4.4.3 of this document.

7.1.2.6 Clearnose Skate

A complete time series of NEFSC trawl survey information for clearnose skate is presented in Section 2.3.1.6 of the Skate SAFE Report (Volume II). This section only provides survey information for the most recent ten-year time period.

The survey abundance of clearnose skate has been at record-high levels since 1998 and appears to be continuing to increase. The preliminary 2001 index reported in Table 37 is the highest of the time series for clearnose skate. The current three-year average of 1.21 kg/tow is well above the proposed threshold of 0.28 kg/tow and above twice the B_{MSY} level. Therefore, clearnose skate is not considered to be in an overfished condition and is considered to be "rebuilt."

Table 37 NEFSC Autumn Survey Indices and Updated Status of Clearnose Skate

YEAR	AUTUMN SURVEY (kg/tow)
1992	0.35
1993	0.50
1994	0.94
1995	0.33
1996	0.43
1997	0.61
1998	1.12
1999	1.05
2000	1.03
2001	1.56
1999-2001 Three-year average	**1.21**
SAW 30 Biomass Threshold	0.28
CURRENT STATUS	**NOT OVERFISHED**

Status determinations are based on the overfishing definition proposed in Section 4.4.3 of this document.

7.1.2.7 Rosette Skate

A complete time series of NEFSC trawl survey information for rosette skate is presented in Section 2.3.1.7 of the Skate SAFE Report (Volume II). This section only provides survey information for the most recent ten-year time period.

The survey abundance of rosette skate has increased over the time series and appears to be continuing to increase. The preliminary 2001 index reported in Table 38 is the highest of the time series for rosette skate. The current three-year average of 0.07 kg/tow is well above the proposed threshold of 0.01 kg/tow and more than twice the B_{MSY} level. Therefore, rosette skate is not considered to be in an overfished condition and is considered to be "rebuilt."

Table 38 NEFSC Autumn Survey Indices and Updated Status of Rosette Skate

YEAR	AUTUMN SURVEY (kg/tow)
1992	0.04
1993	0.02
1994	0.07
1995	0.04
1996	0.04
1997	0.01
1998	0.05
1999	0.07
2000	0.03
2001	0.12
1999-2001 Three-year average	**0.07**
SAW 30 Biomass Threshold	0.01
CURRENT STATUS	**NOT OVERFISHED**

Status determinations are based on the overfishing definition proposed in Section 4.4.3 of this document.

7.1.3 Description of Protected Species

The Council has determined that the following list of species protected either 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 fisheries to be regulated through the proposed Skate FMP.

Cetaceans

Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered

Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella* spp.)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected
Seals	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Phoca groenlandica*)	Protected
Sea Turtles	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Fish	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Barndoor Skate (*Dipturis laevis)*	Candidate Species
Birds	
Roseate tern (*Sterna dougallii dougallii*)	Endangered
Piping plover (*Charadrius melodus*)	Endangered
Critical Habitat Designations	
Right whale	Cape Cod Bay Great South Channel

Although a protected species may be found in the general area utilized by the skate fishery, it may not be affected by the fishery for several different reasons. Some protected species may; inhabit more inshore or offshore areas than those utilized by the skate species; prefer a different depth or temperature zone than skate; or may migrate through the area at different times than skate. In addition, although a protected species may be vulnerable to capture or entanglement in certain fishing gear, it may not be a gear type used in the skate fishery. Therefore, we have broken out the above species list into two groups. The first group contains those species not likely to be affected by the Skate FMP. The second group contains a more detailed assessment for the species that are potentially affected by the Skate FMP.

7.1.3.1 Protected Species Not Likely Affected by this FMP

The Council has reviewed the current information available on the distribution and habitat needs of the endangered, threatened, and otherwise protected species listed above in relation to the action being considered in the proposed Skate FMP. Following this review, the Council has made an assessment that skate fishing operations, as managed by the proposed Skate FMP, are not expected to affect the shortnose sturgeon *(Acipenser brevirostrum*), the Gulf of Maine distinct population segment (DPS) of Atlantic salmon (*Salmo salar*), the roseate tern (*Sterna dougallii dougallii*), the piping plover (*Charadrius melodus*) or the hawksbill sea turtle (*Eretmochelys imbricata*), all of which are listed species under the Endangered Species Act of 1973.

There are several cetaceans protected under the Marine Mammal Protection Act of 1972 (MMPA) that are found in the waters fished by the skate fishery, namely the Risso's dolphin (*Grampus griseus*), spotted and striped dolphins (*Stenella* spp.), and coastal forms of Atlantic bottlenose dolphin (*Tursiops truncatus*). Although these species may occasionally become entangled or otherwise entrapped in certain fishing gear such as pelagic longline and mid-water trawls, these gear types are not used in the skate fishery.

In addition, the Council believes that skate fishing operations will not adversely affect the right whale critical habitat areas listed above. The Council will be asking the NMFS and USFWS for concurrence in these assessments.

Shortnose Sturgeon

The shortnose sturgeon is benthic fish that mainly occupies the deep channel sections of several Atlantic coast rivers. They can be found in most major river systems from St. Johns River, Florida to the Saint John River in New Brunswick, Canada. The species is considered truly anadromous in the southern portion of its range (*i.e.*, south of Chesapeake Bay). However, they spend the majority of their life history within the fresh water sections of the northern rivers with only occasional forays into salt water, and are thus considered to be "freshwater amphidromous" (NMFS 1998a). There have been no documented cases of shortnose sturgeon taken in gear used to catch skate.

The skate fishery in the Northeast Region may extend to shallow water, but not into the intertidal zone of major river systems where shortnose sturgeon are likely to be found. Therefore, there appears to be adequate separation between the two species making it highly unlikely that the proposed skate fisheries will affect shortnose sturgeon.

Atlantic Salmon

The wild populations of Atlantic salmon found in rivers and streams from the lower Kennebec River north to the U.S.-Canada border are considered to be endangered. These rivers 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 wild Atlantic salmon that return to these rivers are perilously small, with total run sizes of approximately 150 spawners occurring in 1999 (Baum 2000).

Capture of Atlantic salmon have occurred in U.S. commercial fisheries or by research/survey vessels. However, none have been documented after 1992. No skate landings have been recorded for the areas adjacent to the Atlantic salmon rivers. In addition, the NMFS fishery research surveys have rarely found skate in the nearshore regions adjacent to the Atlantic salmon rivers. Therefore, it is unlikely that operation of the skate fisheries occurs in or near the rivers where concentrations of Atlantic salmon are most likely to be found. Furthermore, bottom-tending gear used in the skate fishery is not likely to encounter salmon in the open water environment, making it is highly unlikely that the fisheries occurring under the proposed Skate FMP will affect the endangered runs of Atlantic salmon in the Gulf of Maine.

Roseate Tern and Piping Plover

The roseate tern and piping plover inhabit coastal waters and nest on coastal beaches within the Northeast Region. The terns prey on small schooling fishes, and the plovers prey on shoreline invertebrates and other small fauna. Foraging activity for these species occurs either along the shoreline (plovers) or within the top several meters of the water column (terns). Bottom-tending otter trawl, sink gillnet, and longline gear that are used in the skate fishery pose no threat to these species or their forage species.

Hawksbill Sea Turtle

The hawksbill turtle is relatively uncommon in the waters of the Northeast Region. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America where they feed primarily on a wide variety of sponges and mollusks. There are accounts of small hawksbills stranded as far north as Cape Cod, Massachusetts. However, many of these strandings were observed after hurricanes or offshore storms. No takes of hawksbill sea turtles have been recorded in northeast or Mid-Atlantic fisheries where observers have been deployed in the otter trawl (including the Mid-Atlantic) and sink gillnet fisheries that catch skates.

Hawksbills may occur in the southern range of the action area (i.e., North Carolina and South Carolina), but their distribution is not known to overlap with those waters fished by vessels that may catch skate. Therefore, it is unlikely that interactions between hawksbill sea turtles and vessels that catch skates will occur.

Risso's Dolphin

The Risso's dolphin is distributed along the continental shelf edge of North America from Cape Hatteras to Georges Bank. The minimum population estimate for the Risso's dolphin that was derived from limited survey estimates that took place in U.S. waters is 22,916 (Waring et al. 2001). This species has been observed taken in the pelagic drift gillnet, pelagic longline, and mid-water trawl fisheries, but have never been reported in gear capable of catching skate. Although the Risso's dolphin feeding habitat overlaps with the distribution of the multispecies fishery, their pelagic prey species (squid and schooling fishes) would make it unlikely that they would encounter the bottom tending gear used in the skate fishery. Therefore, it is unlikely that the take in this fishery will occur at levels that compromise their ability to maintain optimum sustainable population levels, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

Pelagic Delphinids (Spotted and Striped Dolphins)

The pelagic delphinid complex is made up of small odontocete species that are broadly distributed along the continental shelf edge where depths range from 200 - 400 meters. They are commonly found in large schools feeding on schools of fish. The minimum population estimates for each species number in the tens of thousands. They are known to be taken in pelagic and sink gillnets gear as well as mid-water trawl gear. Their pelagic prey species suggest they do not forage near the bottom, making it unlikely that they would encounter the bottom tending gear used in the skate fishery. Therefore, it is unlikely that the take in this fishery will be at levels that compromise their ability to maintain optimum sustainable population levels, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

Coastal Bottlenose Dolphins

The coastal form of the bottlenose dolphin occurs in the shallow, relatively warm waters along the U.S. Atlantic coast from New Jersey to Florida and the Gulf of Mexico. They rarely range beyond the 25-meter depth contour north of Cape Hatteras. Although they are known to be taken in coastal sink gillnet operations, these fisheries do not overlap multispecies fishery areas. Waring et al. (2001) described the estimated total take of coastal bottlenose dolphins in all fisheries (including those that catch skate) to be below the PBR established for that stock. As described above, the Skate FMP will not increase the gillnet effort in the Northeast Region, and is not expected to extend into the more shallow range of the coastal bottlenose dolphin. Therefore, the Skate FMP will not further inhibit the ability of the bottlenose dolphin to achieve the optimum sustainable population level for the coastal stock, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

Right Whale Critical Habitat

NMFS evaluated the potential effects of the proposed federal multispecies, monkfish, and spiny dogfish fisheries on the two critical habitats that have been designated in the Great South Channel and Cape Cod Bay in the Opinions issued for those fisheries on June 14, 2001. NMFS evaluated the potential effects of the proposed fisheries operations on both prey availability and quality and nursery protection in the critical habitat. There was concern that the operation of these fisheries could diminish the value of the habitat by altering trophic dynamics that could reduce the availability of right whale prey within the critical habitat areas. However, right whales feed primarily on copepods that live in the mid-water zone, making it highly unlikely that bottom-tending skate gear will have any adverse effect on microscopic copepods believed to be unaffected by the use of gear that catch larger fish such as skate. Therefore, the Council does not believe the skate fishery, as operated under the proposed Skate FMP, will affect right whale critical habitat.

7.1.3.2 Status of Protected Species Potentially Affected by this FMP

The potential impacts to protected species that may result from the management alternatives and measures being considered under this FMP are described in Section 5.6 of this document. The section below will focus on the status of the various species listed above that are found in the skate fishing area (Northeast Region) and may be affected by the fishing operations occurring under the proposed Skate FMP. Additional background information on the range-wide status of these species and a description of right whale critical habitat can be found in a number of published documents, including sea turtle status reviews (NMFS and USFWS 1995, Marine Turtle Working Group - TEWG, 1998, 2000) and biological reports (USFWS 1997), recovery plans for the humpback whale (NMFS 1991a), right whale (NMFS 1991b), Kemp's Ridley sea turtle (USFWS and NMFS 1992), Atlantic green sea turtle (NMFS and USFWS 1991), leatherback sea turtle (NMFS and USFWS 1992) and loggerhead sea turtle (NMFS and USFWS 1991); and the 2000 and Draft 2001 Marine Mammal Stock Assessment Reports (Waring et al. 2000, 2001).

Right Whale

Right whales were found historically in all the world's oceans within the temperate to subarctic latitudes. There are three major subdivisions of right whales: North Pacific, North Atlantic, and Southern Hemisphere; with eastern and western subunits found in the North Atlantic (Perry et al. 1999). Because of our limited understanding of the genetic structure of the species, the conservative approach to conservation of this species has been to treat the subunits as separate groups whose survival and recovery is critical to the health of the species.

The northern right whale has the highest risk of extinction of all large whales. Scarcity of right whales is the result of an 800-year history of whaling that continued into the 1960s (Klumov 1962). Records indicate that right whales were subject to commercial whaling in the North Atlantic as early as 1059, with an estimated 25,000-40,000 right whales believed to have been taken between the 11th and 17th centuries. The size of the western North Atlantic right whale population at the termination of whaling is unknown. The stock was first 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 1920s. By the time the species was internationally protected in 1935 there may have been fewer than 100 North Atlantic right whales in the western North Atlantic (Hain 1975; Reeves et al. 1992; Kenney et al. 1995).

Intense whaling was also the cause of the critically endangered status of the North Pacific right whale. Currently, the North Pacific population is so small that no reliable estimate can be given. In the Atlantic, the eastern subpopulation of the North Atlantic population may already be extinct. The fact that the western North Atlantic subpopulation is the most numerous right whale population in the northern hemisphere, and is only estimated to number approximately 300 animals, is testimony to the severely depleted status of this species in the northern hemisphere. In contrast, the southern right whale is recovering with a growth rate of 7% in many areas.

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

NMFS designated three right whale critical habitat areas on June 3, 1994 (59 FR 28793) to help protect important right whale foraging and calving areas within the U.S. These areas are: Cape Cod Bay; the Great South Channel (both off Massachusetts); and the waters adjacent to the southern Georgia and northern Florida coast. 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).

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 primarily on 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 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 (Kenney et al. 1986; Payne et al. 1990) where they have been observed feeding predominantly on copepods, largely of the genera *Calanus* and *Pseudocalanus* (Waring et al. 2000). 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.

However, much about right whale movements and habitat use are still unknown. Approximately 85% of the population is unaccounted for during the winter (Waring et al. 2000). Radio and satellite tagging has been used to track right whales, and has shown lengthy and somewhat distant excursions into deep water off of the continental shelf (Mate et al. 1997). In addition photographs of identified individuals have documented movements of the western North Atlantic right whales as far north as Newfoundland, the Labrador Basin and southeast of Greenland (Knowlton et al. 1992). Sixteen satellite tags were attached to right whales in the Bay of Fundy, Canada, during summer 2000 in an effort to further elucidate the movements and important habitat for North Atlantic right whales. The movements of these whales varied, with some remaining in the tagging area and others making periodic excursions to other areas before returning to the Bay of Fundy. Several individuals were observed to move along the coastal waters of Maine, while others traveled to the Scotian Shelf off Nova Scotia. One individual was successfully tracked throughout the fall, and was followed on her migration to the Georgia/Florida wintering area.

Recognizing the precarious status of the right whale, the continued threats present in its coastal habitat throughout its range, and the uncertainty surrounding attempts to characterize population trends, the International Whaling Commission (IWC) held a special meeting of its Scientific Committee from March 19-25, 1998, in Cape Town, South Africa, to conduct a comprehensive assessment of right whales worldwide. The workshop's participants reviewed available information on the North Atlantic right whale. The conclusions of Caswell et al. (1999) were particularly alarming. Using data on reproduction and survival through 1996, Caswell determined that the western North Atlantic right whale population was declining at a rate of 2.4% per year, with one model suggesting that the mortality rate of the right whale population had increased five-fold in less than one generation. According to Caswell, if the mortality rate as of 1996 does not decrease and the population's reproductive performance does not improve, extinction could occur in 191 years and would be certain within 400 years.

The IWC Workshop participants expressed "considerable concern" in general for the status of the western North Atlantic right whales. This concern was based on recent (1993-1995) observations of near-failure of calf production, the significantly high mortality rate, and an observed increase in the calving interval. It was suggested that the slow but steady recovery rate published in Knowlton et al. (1994) may not be continuing. Workshop participants urgently recommended increased efforts to reduce the human-caused mortality factors affecting this right whale population.

As stated in the IWC Workshop, there is been concern over the decline in birth rate. In the three calving seasons following Caswell's analysis, only 10 calves are known to have been born into the population, with only one known right whale birth in the 1999/2000 season. However, the 2000/2001 calving season had 31 right whale calves sighted, with 27 surviving. This was followed by the 2001/2002 season in which 21 calves were borne in the southeastern calving grounds. Although these births are encouraging, biologists recognize that there may be some additional natural mortality with the calves from these years, and cautious optimism is necessary because of how close the species is to extinction. In addition, efforts to reduce human-caused mortality must be accelerated if these individuals are to survive to sexual maturity and help reverse the population decline.

One question that has repeatedly arisen regarding the western North Atlantic population of right whales is the effect that "bottlenecking" may have played on the genetic integrity of right whales. Several genetics studies have attempted to examine the genetic diversity of right whales. Results from a study by Schaeff et al. (1997) indicate that North Atlantic right whales are less genetically diverse than southern right whales; a separate population that numbers at least four times as many animals with an annual growth rate of nearly seven percent. A recent study compared the genetic diversity of North Atlantic right whales with the genetic diversity of southern right whales. The researchers found only five distinct haplotypes (a maternal genetic marker) exist amongst 180 different North Atlantic right whales sampled, versus 10 haplotypes among just 16 southern right whales sampled. In addition, one of the five haplotypes found in the North Atlantic right whales was observed in only four animals; all males born prior to 1982 (Malik et al. 2000). Because this genetic marker can be passed only from female to offspring, there is an expectation that it will be lost from the population. Two interesting facts about this haplotype are: (1) the last known female with this type was the animal killed by the shore fishery at Amagansett, Long Island in 1907; and (2) this haplotype is basal to all others worldwide (i.e., it is the most ancient of all right whales).

Low genetic diversity is a general concern for wildlife populations. It has been suggested that North Atlantic right whales have been at a low population size for hundreds of years and, while the present population exhibits very low genetic diversity, the major effects of harmful genes are thought to have occurred well in the past, effectively eliminating those genes from the population (Kenney 2000). To determine how long North Atlantic right whales have exhibited such low genetic diversity, researchers have analyzed DNA extracted from museum specimens. Rosenbaum et al. (2000) found these samples represented four different haplotypes, all of which are still present in the current population, suggesting there has not been a significant loss of genetic diversity within the last 191 years. Although his sample size (n=6) was small, it supports the theory that significant reduction in genetic diversity likely occurred prior to the late 19th century.

The role of contaminants or biotoxins in reducing right whale reproduction has also been raised. Contaminant studies have confirmed that right whales are exposed to and accumulate contaminants, but the effect that such contaminants might be having on right whale reproduction or survivability is unknown.

Competition for food resources is another possible factor impacting right whale reproduction. Researchers have found that North Atlantic right whales appear to have thinner blubber than right whales from the South Atlantic (Kenney, 2000). It has also been suggested that oceanic conditions affecting the concentration of copepods may in turn have an effect on right whales since they rely on dense concentrations of copepods to feed efficiently (Kenney 2000). However, evidence is lacking to demonstrate either that a decline in birth rate is related to depleted food resources or that there is a relationship between oceanic conditions and copepod abundance to right whale fitness and reproduction rates.

General Human Impacts and Entanglement

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 such as the sink gillnet gear used to catch skate.

Based on photographs of catalogued animals from 1959 and 1989, Kraus (1990) estimated that 57% of right whales exhibited scars from entanglement and 7% from ship strikes (propeller injuries). Hamilton et al. (1998) updated this work using data from 1935 through 1995. The new study estimated that 61.6% of right whales exhibit injuries caused by entanglement, and 6.4% exhibit signs of injury from vessel strikes. These data may be misleading, as a ship strike may be less of a “recoverable” event than entanglement in rope. It is also known that several whales have apparently been entangled on more than one occasion, and that some right whales that have been entangled were subsequently involved in ship strikes. Furthermore, these numbers are based on sightings of free-swimming animals that initially survive the entanglement or ship strike. Therefore, the actual number of interactions may be higher as some animals are likely drowned or killed immediately, and the carcass never recovered or observed.

It should be noted that no information is currently available on the response of the right whale population to recent (1997-1999) efforts to mitigate the effects of entanglement and ship strikes. However, as noted above, both entanglements and ship strikes have continued to occur. Therefore, it is not possible to determine whether the trend through 1996, as reported by Caswell, is continuing. Furthermore, results reported by Caswell suggest that it is not possible to determine that anthropogenic mortalities alone are responsible for the decline in right whale survival. However, the IWC concluded that reduction of anthropogenic mortalities would significantly improve the species' survival probability.

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. 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. The one bright spot is the 2000/2001 and 2001/2002 calving seasons that are the most promising in the past 7 years in terms of calves born. 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.

Humpback Whale

Humpback whales calve and mate in the West Indies and migrate to feeding areas in the northwestern Atlantic during the summer months. Six separate feeding areas are utilized in northern waters (Waring et al. 2000). Only one of these feeding areas, the Gulf of Maine, lies within U.S. waters contained within the management unit of the FMP (Northeast Region). Most of the humpbacks that forage in the Gulf of Maine visit Stellwagen Bank and the waters of Massachusetts and Cape Cod Bays. Sightings are most frequent from mid-March through November between 41º N and 43º N, from the Great South Channel north along the outside of Cape Cod to Stellwagen Bank and Jeffreys Ledge (CeTAP 1982), and peak in May and August. However, small numbers of individuals may be present in this area year-round. They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by filtering large amounts of water through their baleen to capture prey (Wynne and Schwartz 1999).

Data from a photographic identification catalogue of over 600 individual humpback whales have described the majority of the habitats used by this species (Barlow and Clapham 1997; Clapham et al. 1999). The photographic data have identified that reproductively mature western North Atlantic humpbacks winter in tropical breeding grounds in the Antilles, primarily on Silver and Navidad Banks north of the Dominican Republic. The primary winter range where calving and copulation is believed to take place also includes the Virgin Islands and Puerto Rico (NMFS 1991a). 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. However, observations of juvenile humpbacks since 1989 in the mid-Atlantic have been increasing during the winter months, peaking January through March (Swingle et al. 1993). Biologists theorize that non-reproductive animals may be establishing a winter-feeding range in the mid-Atlantic since they are not participating in reproductive behavior in the Caribbean. The whales using this mid-Atlantic area were found to be residents of the Gulf of Maine and Atlantic Canada (Gulf of St. Lawrence and Newfoundland) feeding groups, suggesting a mixing of different feeding stocks in the mid-Atlantic region. Strandings and entanglements of humpback whales have increased between New Jersey and Florida during the same period (Wiley et al. 1995).

New information has become available on the status and trends of the humpback whale population in the North Atlantic that indicates the population is increasing. However, it has not yet been determined whether this increase is uniform across all six feeding stocks (Waring et al. 2000). For example, although the overall rate of increase has been estimated at 9.0% (CV=0.25) by Katona and Beard (1990), Barlow and Clapham (1997) reported a 6.5% rate through 1991 for the Gulf of Maine feeding group.

A variety of methods have been used to estimate the North Atlantic humpback whale population. However, the photographic mark-recapture analyses from the Years of the North Atlantic Humpback (YONAH) project gave a North Atlantic basin-wide estimate of 10,600 (95% c.i. = 9,300 - 12,100) is regarded as the best available estimate for that population.

<u>General Human Impacts and Entanglement</u>

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

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 was the case for the 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. 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).

In the North Atlantic today, fin whales are widespread and occur from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic pack ice (NMFS 1998b). A number of researchers have suggested the existence of fin whale subpopulations in the North Atlantic. Mizroch et al. (1984) suggested that local depletions resulting from commercial over harvesting supported the existence of North Atlantic fin whale subpopulations. Others have used genetic information to support the existence of multiple subpopulations of fin whales in the North Atlantic and Mediterranean (Bérubé et al. 1998). Although the IWC's Scientific Committee proposed seven stocks for North Atlantic fin whales, it is uncertain whether these stock boundaries define biologically isolated units (Waring et al. 2000). NMFS has designated one stock of fin whale for U.S. waters of the North Atlantic (Waring et al. 2000) where the species is commonly found from Cape Hatteras northward.

Various estimates have been provided to describe the current status of fin whales in western North Atlantic waters. Based on the history and trends of whaling catch, 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 United States continental shelf waters. The latest SAR (Waring et al. 2001) gives a best estimate of abundance for fin whales of 2,814 (CV = 0.21). However, this is considered an underestimate, as too little is known about population structure, and the estimate is derived from surveys over a limited portion of the western North Atlantic. There is also not enough information to estimate population trends.

Despite 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 western 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 the fin whale as the most acoustically common whale species heard in the North Atlantic and described 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.

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

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. and were not given total protection until 1987, with the exception of a subsistence whaling hunt for Greenland. In total, there have been 239 reported kills of fin whales from the North Atlantic from 1988 to 1995.

<u>General Human Impacts and Entanglement</u>

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

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

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: (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 Northeast Region, and extends northeastward to south of Newfoundland. The IWC boundaries for this stock are from the U.S. east coast to Cape Breton, Nova Scotia and east to 42°W longitude (Waring et al. 2000). This is the only sei whale stock within the management unit of this FMP.

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 (NMFS 1998b). Small numbers were also taken off of Spain, Portugal, and West Greenland from the 1920's to 1950's (Perry et al. 1999). In the western North Atlantic, a total of 825 sei whales were taken on the Scotian Shelf between 1966-1972, and an additional 16 were 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 1970s (Perry et al. 1999). There is no estimate for the abundance of sei whales prior to commercial whaling. Based on whaling records, approximately 14,295 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 North 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 (NMFS 1998b). 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 (NMFS 1998b). In the northwest Atlantic, the whales travel along the eastern Canadian coast in autumn on their way to and from the Gulf of Maine and Georges Bank where they occur in winter and spring. Within the Northeast Region, the sei whale is most common on Georges Bank and into the Gulf of Maine/Bay of Fundy region during spring and summer. Individuals may range as far south as North Carolina. It is important to note that sei whales are known for inhabiting an area for weeks at a time then disappearing for year or even decades. This has been observed all over the world, including in the southwestern Gulf of Maine in 1986, but the basis for this phenomenon is not clear.

Although sei whales may prey upon small schooling fish and squid in the Northeast Region, available information suggests that calanoid zooplankton are the primary prey of this species. There are occasional influxes of sei whales further into Gulf of Maine waters, presumably in conjunction with years of high copepod abundance inshore. Sei whales are occasionally seen feeding in association with right whales in the southern Gulf of Maine and in the Bay of Fundy, although there is no evidence of interspecific competition 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 helminthes (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 management purposes (Waring et al. 2000). Abundance surveys are problematic because this species is difficult to distinguish from the fin whale and too little is known of the sei whale's distribution, population structure and patterns of movement.

General Human Impacts and Entanglement

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. However, due to the overlap of this species observed range with the skate fishery areas that use sink gillnet gear, the potential for entanglement does exist. A small number of ship strikes of this species have been recorded, the most recent documented incident occurring in 1994 when a carcass was brought in on the bow of a container ship in Charlestown, Massachusetts. No entanglements in fishing gear have been observed of noted in stranding data. Similar impacts noted above for other baleen whales may also occur. Due to the deep-water distribution of this species, interactions that do occur are less likely to be observed or reported than those involving right, humpback, and fin whales that often frequent areas within the continental shelf.

Blue Whale

Like the fin whale, blue whales occur worldwide and are believed to follow a similar migration pattern from northern summering grounds to more southern wintering areas (Perry et al. 1999). Three subspecies have been identified: *Balaenoptera musculus musculus, B.m. intermedia*, and *B.m. brevicauda* (NMFS 1998c). Only *B. musculus* occurs in the northern hemisphere. Blue whales range in the North Atlantic from the subtropics to Baffin Bay and the Greenland Sea. 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-1960's when 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 (NMFS 1998c). 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 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. 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 (NMFS 1998c). The NMFS recognizes a minimum population estimate of 308 blue whales within the Northeast Region (Waring et al. 2000).

Blue whales are only occasional visitors to east coast U.S. waters. They are more commonly found in Canadian waters, particularly the Gulf of St. Lawrence where they are present for most of the year, and in other areas of the North Atlantic. It is assumed that blue whale distribution is governed largely by food requirements (NMFS 1998c). In the Gulf of St. Lawrence, blue whales appear to predominantly feed on several copepod species (NMFS 1998c).

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 take place in the winter season (NMFS .1998c), 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 during late winter and early spring, particularly along the southwest coast of Newfoundland. 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).

<u>General Human Impacts and Entanglement</u>

Entanglements in fishing gear such as the sink gillnet gear used in the skate fishery and ship strikes are believed to be the major sources of anthropogenic mortality and injury of blue whales. However, confirmed deaths or serious injuries are few. 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 that may have occurred outside the U.S. EEZ (Waring et al. 2000).

Sperm Whale

Sperm whales inhabit all ocean basins, from equatorial waters to the polar regions (Perry et al. 1999). In the western North Atlantic they range from Greenland to the Gulf of Mexico and the Caribbean. The sperm whales that occur in the western North Atlantic are believed to represent only a portion of the total stock (Blaylock et al. 1995). Total numbers of sperm whales off the USA or Canadian Atlantic coast are unknown, although eight estimates from selected regions of the habitat do exist for select time periods. The best estimate of abundance for the North Atlantic stock of sperm whales is 4,702 (CV=0.36) (Waring et al. 2000). The IWC recognizes one stock for the entire North Atlantic (Waring et al. 2000).

The IWC estimates that nearly a quarter-million sperm whales were killed worldwide in whaling activities between 1800 and 1900 (IWC 1971). With the advent of modern whaling the larger rorqual whales were targeted. However as their numbers decreased, whaling pressure again focused on smaller rorquals and sperm whales. From 1910 to 1982 there were nearly 700,000 sperm whales killed worldwide from whaling activities (Clarke 1954). Some sperm 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). Recorded North Atlantic sperm whale catch numbers for Canada and Norway from 1904 to 1972 total 1,995. All killing of sperm whales was banned by the IWC in 1988.

Sperm whales generally occur in waters greater than 180 meters in depth with a preference for continental margins, seamounts, and areas of upwelling, where food is abundant (Leatherwood and Reeves 1983). Sperm whales in both hemispheres migrate to higher latitudes in the summer for feeding and return to lower latitude waters in the winter where mating and calving occur. Mature males typically range to higher latitudes than mature females and immature animals but return to the lower latitudes in the winter to breed (Perry et al. 1999). Waring et al. (1993) suggest sperm whale distribution is closely correlated with the Gulf Stream edge with a migration to higher latitudes during summer months where they are concentrated east and northeast of Cape Hatteras. Distribution 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. 2000).

Mature females in the northern hemisphere ovulate April through August. 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. 2000). Male sperm whales may not reach physical maturity until they are 45 years old (Waring et al. 2000). The sperm whales prey consists of larger mid-water squid 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 deep water sharks, skates, and bony fishes.

General Human Impacts and Entanglement

Few instances of injury or mortality of sperm whales due to human impacts have been recorded in U.S. waters. Because of their generally more offshore distribution and their benthic feeding habits, sperm whales are less subject to entanglement than are right or humpback whales. However, the skate fishery is conducted near the shelf edge and utilizes fixed sink gillnet gear that may pose a threat to sperm whales.

Documented takes primarily involve offshore fisheries such as the offshore lobster pot fishery and pelagic driftnet and pelagic longline fisheries. Ships also strike sperm whales. Due to the offshore distribution of this species, interactions (both ship strikes and entanglements) that do occur are less likely to be reported than those involving right, humpback, and fin whales that more often occur in nearshore areas. 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.

Minke Whale

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

Minke whales are known to be taken in sink gillnet gear used to catch skate. Waring et al. (2000) has described the estimated total take of minke whales in all fisheries (including those that catch skate) to be below the PBR established for that species. The skate wing fishery that utilizes sink gillnet gear lands skate only as incidental catch in other fisheries for demersal species (groundfish, monkfish and scallops). These fisheries operate under FMP’s that contain effort controls developed for each fishery. Additional factors that restrict skate vessels are: (1) the low market value of skate makes it unlikely that a vessel could survive economically without landing other more valued species; and (2) that each of these FMP’s requires permits for any gear “capable of catching” their target species, makes it impossible for any vessel to target only skate and avoid the measures contained in these plans. For these reasons, the proposed Skate FMP will not increase sink gillnet effort in the Northeast Region, and will not further inhibit the ability of minke whales to achieve the optimum sustainable population level for the North Atlantic stock, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

Harbor Porpoise

Harbor porpoise are found primarily in the Gulf of Maine in the summer months. However, they migrate seasonally through regions where the skate are caught. For example, they move through the southern New England area where the skate bait fishery occurs in the spring (March and April). Harbor porpoise also move through the Massachusetts Bay and Jeffrey’s Ledge region in the spring (April and May) and the fall (October November). They are not known to frequent the Georges Bank region where skate are also found.

Harbor porpoise are known to be taken in sink gillnet gear used to catch skate. The historic level of serious injury and mortality of this species in sink gillnets was known to be high relative to the estimated population level, and was addressed in the HPTRP that was developed under the mandates of the MMPA. The HPTRP used a series of time/area closures and required use of acoustical pingers that have reduced the take to acceptable levels. Waring et al. (2001) has described the total estimated average human-caused mortality is 382. The minimum population estimate for 1999 was established at 74,695, and the potential biological removal (PBR) for the harbor porpoise is now set at 747. Although the current mortality estimate is below the latest

PBR level, the stock is still considered a strategic stock requiring continued measures to reduce human-caused mortality from commercial fishing. This is due to the fact that this is the first year that mortality has been below PBR, and there are insufficient data to determine population trends for this species.

The skate wing fisheries that utilize sink gillnet gear land skate only as bycatch in other fisheries for demersal species (groundfish, monkfish and scallops). These fisheries operate under FMP's that contain effort controls developed for, and are subject to the requirements of the HPTRP implemented by NMFS in December 2, 1998. Measures implemented by the HTRP have significantly reduced harbor porpoise takes to acceptable levels under the MMPA.

Atlantic White-Sided Dolphin

White-sided dolphins are found in the temperate and sub-polar waters of the North Atlantic, primarily on the continental shelf waters out to the 100-meter depth contour. The species is distributed from central western Greenland to North Carolina, with the Gulf of Maine stock commonly found from Hudson Canyon to Georges Bank and into the Gulf of Maine to the Bay of Fundy. A minimum population estimate for the white-sided dolphin 19,196 has been derived for U.S. waters (Waring et al. 2000) from limited survey estimates. White-sided dolphins have been observed taken in the multispecies sink gillnet, the pelagic drift gillnet, and several mid-water and bottom trawl fisheries. Waring et al. (2000) described the estimated total take of white-sided dolphins in all fisheries (including those that catch skate) to be below the PBR established for that species. As described above for the minke whale, the proposed Skate FMP will not increase the gillnet effort in the Northeast Region. Therefore, the proposed Skate FMP will not further inhibit the ability of white-sided dolphins to achieve the optimum sustainable population level for the North Atlantic stock, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

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

The pelagic delphinid complex is made up of small odontocete species that are broadly distributed along the continental shelf edge where depths range from 200 - 400 meters. They are commonly found in large schools feeding on schools of fish. The minimum population estimates for each species number in the tens of thousands. They are known to be taken in pelagic and sink gillnets gear as well as mid-water and bottom trawl gear. Although some takes have been observed in the bottom trawl fishery, their pelagic prey species suggest they do not forage near the bottom, making it unlikely that they would frequently encounter the bottom tending gear used in the skate fishery. Therefore, it is unlikely that the take in this fishery will be at levels that compromise their ability to maintain optimum sustainable population levels, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

Harbor Seal

The harbor seal is found in all nearshore waters of the Atlantic Ocean above about 30 degrees latitude (Waring et al. 2001). In the western North Atlantic they are distributed from the eastern Canadian Artic and Greenland south to southern New England and New York, and occasionally the Carolinas (Boulva and McLaren 1979; Gilbert and Guldager 1998). It is believed that the harbor seals found along the U.S. and Canadian east coasts represent one population (Waring et al. 2001). Harbor seals are year-round inhabitants of the coastal waters of eastern Canada and Maine, and occur seasonally along the southern New England and New York coasts from September through late-May. However, breeding and pupping normally occur only in waters north of the New Hampshire/Maine border. Since passage of the MMPA in 1972, the number of seals found along the New England coast has increased nearly five-fold with the number of pups seen along the Maine coast increasing at an annual rate of 12.9 percent during the 1981-1997 period (Gilbert and Guldager 1998). The minimum population estimate for the harbor seal is 30,990 based on uncorrected total counts along the Maine coast in 1997 (Waring et al. 2001).

Harbor seals are taken in sink gillnet gear used to catch skate. Waring et al. (2001) has described the estimated total take of harbor seals in all fisheries to be below the PBR of 1,859 established for that species. All vessels that utilize sink gillnet gear will be operating under the ALWTRP due to the requirement that any gear capable of catching multispecies must adhere to the ALWTRP requirements. Since a sink gillnet cannot be deployed in the Northeast waters without the possibility of catching a species covered under the Multispecies FMP, they will be included in the ALWTRP The Skate FMP is not likely to increase sink gillnet effort in the Northeast Region. Therefore, it will not further inhibit the ability of harbor seals to achieve the optimum sustainable population level for the North Atlantic stock, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

Gray Seal

The gray seal is found on both sides of the North Atlantic, with the western North Atlantic population occurring from New England to Labrador. There are two breeding concentrations in eastern Canada; one at Sable Island and one that breeds on the pack ice in the Gulf of St Lawrence. There are several small breeding colonies on isolated islands along the coast of Maine and on outer Cape Cod and Nantucket Island in Massachusetts (Waring et al. 2001). The population estimates for the Sable Island and Gulf of St Lawrence breeding groups was 143,000 in 1993. The gray seal population in Massachusetts has increased from 2,010 in 1994 to 5,611 in 1999, although it is not clear how much of this increase may be due to animals emigrating from northern areas. Approximately 150 gray seals have been observed on isolated island off Maine.

Gray seals are taken in sink gillnet gear used to catch skate. Waring et al. (2001) has described the estimated total take of gray seals from 1959 to 1999 in all fisheries to be between 50 and 155 animals which is well below the PBR of 8,850 established for that species. As stated in the harbor seal discussion above, all vessels that utilize sink gillnet gear will be operating under the ALWTRP. Since a sink gillnet cannot be deployed in the Northeast waters without the possibility of catching a species covered under the Multispecies FMP, they will be included in the ALWTRP. The Skate FMP is not likely to increase sink gillnet effort in the Northeast Region. Therefore, it will not further inhibit the ability of gray seals to achieve the optimum sustainable population level for the North Atlantic stock, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

Harp Seal

The harp seal occurs throughout much of the North Atlantic and Artic Oceans, and have been increasing off the East Coast of the United States from Maine to New Jersey. Harp seals are usually found off the U.S. from January to May when the western stock of harp seals is at their most southern point of migration (Waring et al. 2001). Harp seals congregate on the edge of the pack ice in February through April when breeding and pupping takes place. The harp seal is highly migratory, moving north and south with the edge of the pack ice. Non-breeding juveniles will migrate the farthest south in the winter, but the entire population moves north toward the Artic in the summer. The minimum population estimate for the western North Atlantic is 5.2 million seals.

A large number of harp seals are killed in Canada, Greenland and the Artic. The Canadian kill is controlled by DFO who set the allowed kill at 275,000 in 1997. Mortality in Greenland and the Artic may exceed 100,000 (Waring et al. 2001). Harp seals are also taken in sink gillnet gear used to catch skate. Waring et al. (2001) has described the estimated total take of harp seals from 1959 to 1999 in all fisheries to range between 78 and 694 animals depending on the location of the pack ice edge which drives the seals farther south into the range of the sink gillnet fishery. Even with the highest takes observed, the take is well below the PBR of 156,000 established for that species. As stated in the harbor seal discussion above, all vessels that utilize sink gillnet gear will be operating under the ALWTRP and HPTRP. Therefore, they will be included in the take reduction measures of those plans The Skate FMP is not likely to increase sink gillnet effort in the Northeast Region. Therefore, it will not further inhibit the ability of harp seals to achieve the optimum sustainable population level for the North Atlantic stock, or cause their serious injury and mortality levels to exceed the PBR levels allowed for commercial fisheries under the MMPA.

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 that allow it to forage into the colder Northeast Region waters (NMFS and USFWS, 1995). Evidence from tag returns and strandings in the western North 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 western North Atlantic during the warmer months along the continental shelf, and near the Gulf Stream edge. 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 (CeTAP 1982). Shoop and Kenney (1992) also observed concentrations of leatherbacks during the summer off the south shore of Long Island and New Jersey. Leatherbacks in these waters are thought to be following their preferred jellyfish prey.

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. Since populations or subpopulations of leatherback sea turtles have not been formally recognized, the conservative approach is to treat leatherback nesting populations as distinct.

Leatherbacks are predominantly a pelagic species and feed on jellyfish and other soft-body prey. Time-depth-recorder data collected by Eckert et al. (1996) indicate that leatherbacks are night feeders and are deep divers, with recorded dives to depths in excess of 1,000 meters. However, leatherbacks may feed in shallow waters if there is an abundance of jellyfish near shore. For example, leatherbacks occur annually in shallow bays such as Cape Cod and Narragansett Bays during the fall.

Leatherbacks are a long lived species (> 30 years), 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 (Zug and Parham 1996 and NMFS 2001). Leatherbacks nest from March through July and produce 100 eggs or more in each clutch, or a total of 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 that reach the ocean are virtually unknown (NMFS and USFWS 1992).

Status and Trends of Leatherback Sea Turtles

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 exploitation of eggs (Ross 1979). On some beaches nearly 100% of the eggs laid have been harvested (Eckert 1996).

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 United States. Recent information suggests that western North Atlantic populations declined from 18,800 nesting females in 1996 (Spotila et al. 1996) to 15,000 nesting females by 2000. In contrast, Eastern Atlantic (i.e., off Africa, numbering ~ 4,700) and Caribbean (4,000) populations appear to be stable. It does appear that the Western Atlantic portion of the population is being subjected to mortality beyond sustainable levels, resulting in a continued decline in numbers of nesting females.

General Human Impacts and Entanglement

Anthropogenic impacts to the leatherback population include fishery interactions as well as 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 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).

Leatherback interactions with the southeast shrimp fishery are well documented. Turtle Excluder Devices (TEDs), typically used in the southeast shrimp fishery to minimize sea turtle/fishery interactions, are less effective for the larger leatherbacks. Therefore, the NMFS established a zone to restrict, when necessary, shrimp trawl activities from off the coast of Cape Canaveral, Florida to the Virginia/North Carolina Border.

Leatherbacks are also susceptible to entanglement in lobster and crab pot gear. The probable reasons may be: 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. 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. 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.

As noted, there are many human-related sources of mortality to leatherbacks. A tally of all leatherback takes anticipated annually under current biological opinions was projected to be as many as 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 that are capable of destroying nesting beaches. Spotila et al. (1996) 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."

Kemp's Ridley Sea Turtle

The Kemp's ridley is the most endangered of the world's sea turtle species. Of the world's seven extant species of sea turtles, the Kemp's ridley has declined to the lowest population level. Kemp's ridleys nest in daytime aggregations known as arribadas, primarily on a stretch of beach in Mexico called Rancho Nuevo. Most of the population of adult females nest in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the early 1970s, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population declined further through the mid-1980s.

Status and Trends of Kemp's Ridley Sea Turtles

The TEWG (1998; 2000) indicated that the Kemp's ridley population appears to be in the early stage of exponential expansion. Nesting data, estimated number of adults, and percentage of first time nesters have all increased from lows experienced in the 1970s and 1980s. From 1985 to 1999, the number of nests observed at Rancho Nuevo and nearby beaches has increased at a mean rate of 11.3% per year, allowing cautious optimism that the population is on its way to recovery. For example, nesting data indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and 702 nests in 1985 then increased to produce 1,940 nests in 1995. Estimates of adult abundance followed a similar trend from an estimate of 9,600 in 1966 to 1,050 in 1985 and 3,000 in 1995. The increased recruitment of new adults is illustrated in the proportion of neophyte, or first time nesters, which has increased from 6% to 28% from 1981 to 1989 and from 23% to 41% from 1990 to 1994.

Kemp's ridley nesting occurs from April through July each year. Little is known about mating but it is believed to occur before the nesting season in the vicinity of the nesting beach. Hatchlings emerge after 45-58 days. Once they leave the beach, neonates presumably enter the Gulf of Mexico where they feed on available sargassum and associated infauna or other epipelagic species (USFWS and NMFS, 1992). Ogren (1988) suggests that the Gulf coast, from Port Aransas, Texas, through Cedar Key, Florida, represents the primary habitat for subadult ridleys in the northern Gulf of Mexico. However, at least some juveniles will travel northward as water temperatures warm to feed in productive coastal waters off Georgia through New England (USFWS and NMFS, 1992).

Juvenile Kemp's ridleys use northeastern and Mid-Atlantic coastal waters of the U.S. Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Ridleys found in Mid- Atlantic waters are primarily post-pelagic juveniles averaging 40 centimeters in carapace length, and weighing less than 20 kilograms (Terwilliger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June (Keinath et al., 1987; Musick and Limpus, 1997). Studies have found that post-pelagic ridleys feed primarily on a variety of species of crabs. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal, 1997).

With the onset of winter and the decline of water temperatures, ridleys migrate to more southerly waters from September to November (Keinath et al., 1987; Musick and Limpus, 1997). Turtles who do not head south soon enough face the risks of cold-stunning in northern waters. Cold stunning can be a significant natural cause of mortality for sea turtles in Cape Cod Bay and Long Island Sound. For example, in the winter of 1999/2000, there was a major cold-stunning event where 218 Kemp's ridleys, 54 loggerheads, and 5 green turtles were found on Cape Cod beaches. The severity of cold stun events depends on: the numbers of turtles utilizing Northeast waters in a given year; oceanographic conditions; and the occurrence of storm events in the late fall. Coldstunned turtles have also been found on beaches in New York and New Jersey. Cold-stunning events can represent a significant cause of natural mortality, in spite of the fact that many cold-stun turtles can survive if found early enough.

General Human Impacts and Entanglement

Like other turtle species, the severe decline in the Kemp's ridley population appears to have been heavily influenced by a combination of exploitation of eggs and impacts from fishery interactions. From the 1940s through the early 1960s, nests from Ranch Nuevo were heavily exploited (USFWS and NMFS, 1992), but beach protection in 1966 helped to curtail this activity (USFWS and NMFS, 1992). Currently, anthropogenic impacts to the Kemp's ridley population are similar to those discussed above for other sea turtle species. Takes of Kemp's ridley turtles have been recorded by sea sampling coverage in the Northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries.

Kemp's ridleys may also be affected by large-mesh gillnet fisheries. In the spring of 2000, a total of five Kemp's ridley carcasses were recovered from a North Carolina beach where 277 loggerhead carcasses were found. Cause of death for most of the turtles recovered was unknown, but the mass mortality event was suspected to have been from a large-mesh gillnet fishery operating offshore in the preceding weeks. It is possible that strandings of Kemp's ridley turtles in some years have increased at rates higher than the rate of increase in the Kemp's ridley population (TEWG 1998).

Green Sea Turtle

Green turtles are distributed circumglobally. In the western Atlantic they range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean, but are considered rare north of Cape Hatteras (Wynne and Schwartz, 1999). Most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida (Ehrhart 1979). Green turtles were traditionally highly prized for their flesh, fat, eggs, and shell, and directed fisheries in the United States and throughout the Caribbean are largely to blame for the decline of the species. In the Gulf of Mexico, green turtles were once abundant enough in the shallow bays and lagoons to support a commercial fishery. However, declines in the turtle fishery throughout the Gulf of Mexico were evident by 1902 (Doughty 1984).

In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). Occasional nesting has been documented along the Gulf coast of Florida, at southwest Florida beaches, as well as the beaches on the Florida panhandle (Meylan et al., 1995). The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the ten years of regular monitoring, perhaps due to increased protective legislation throughout the Caribbean (Meylan et al., 1995). Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Recent population estimates for the western Atlantic area are not available.

While nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging and breeding grounds. Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. Pelagic juveniles are assumed to be omnivorous, but with a strong tendency toward carnivory during early life stages. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas, shifting to a chiefly herbivorous diet (Bjorndal 1997). Green turtles appear to prefer marine grasses and algae in shallow bays, lagoons and reefs (Rebel 1974) but also consume jellyfish, salps, and sponges.

As is the case for loggerhead and Kemp's ridley sea turtles, green sea turtles use mid-Atlantic and northern areas of the western Atlantic coast as important summer developmental habitat. Green turtles are found in estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and North Carolina sounds (Musick and Limpus 1997). Like loggerheads and Kemp's ridleys, green sea turtles that use northern waters during the summer must return to warmer waters when water temperatures drop, or face the risk of cold stunning. Cold stunning of green turtles may occur in southern areas as well (*i.e*., Indian River, Florida), as these natural mortality events are dependent on water temperatures and not solely geographical location.

<u>General Human Impacts and Entanglement</u>

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

Loggerhead Sea Turtle

Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans in a wide range of habitats. These include open ocean, continental shelves, bays, lagoons, and estuaries (NMFS and USFWS 1995). Loggerhead sea turtles are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks (Wynne and Schwartz 1999). Under certain conditions they may also scavenge fish (NMFS and USFWS 1991). Horseshoe crabs are known to be a favorite prey item in the Chesapeake Bay area (Lutcavage and Musick 1985).

<u>Status and Trends of Loggerhead Sea Turtles</u>

The loggerhead sea turtle was listed as threatened under the ESA on July 28, 1978. The species was considered to be a single population in the North Atlantic at the time of listing. However, further genetic analyses conducted at nesting sites indicate the existence of five distinct subpopulations ranging from North Carolina, south along the Florida east coast and around the keys into the Gulf of Mexico, to nesting sites in the Yucatan peninsula and Dry Tortugas (TEWG 2000 and NMFS SEFSC 2001). Natal homing to those nesting beaches is believed to provide the genetic barrier between these nesting aggregations, preventing recolonization from turtles from other nesting beaches.

The threatened loggerhead sea turtle is the most abundant of the sea turtles listed as threatened or endangered in the U.S. waters. In the western North Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the gulf coast of Florida. The southeastern U.S. nesting aggregation is the second largest and represents about 35 % of the nests of this species. The total number of nests along the U.S. Atlantic and Gulf coasts between 1989 and 1998, ranged from 53,014 to 92,182 annually, with a mean of 73,751. Since a female often lays multiple nests in any one season, the average adult female population was estimated to be 44,780 (Murphy and Hopkins 1984).

However, the status of the northern loggerhead subpopulation is of particular concern. Based on the above, there are only an estimated 3,800 nesting females in the northern loggerhead subpopulation, and the status of this northern population based on number of loggerhead nests, has been classified declining or stable (TEWG 2000). Another factor that may add to the vulnerability of the northern subpopulation is that genetics data show that the northern subpopulation produces predominantly males (65%). In contrast, the much larger south Florida subpopulation produces predominantly females (80%) (NMFS SEFSC 2001).

The activity of the loggerhead is limited by temperature. Loggerheads commonly occur throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. Loggerheads may also occur as far north as Nova Scotia when oceanographic and prey conditions are favorable. Surveys conducted offshore as well as sea turtle stranding data collected during November and December off North Carolina suggest that sea turtles emigrating from northern waters in fall and winter months may concentrate in nearshore and southerly areas influenced by warmer Gulf Stream waters (Epperly et al. 1995). This is supported by the collected work of Morreale and Standora (1998) who tracked 12 loggerheads and 3 Kemp's ridleys by satellite. All of the turtles followed similar spatial and temporal corridors, migrating south from Long Island Sound, New York, during October through December. The turtles traveled within a narrow band along the continental shelf and became sedentary for one or two months south of Cape Hatteras.

Loggerhead sea turtles do not usually appear on the most northern summer foraging grounds in the Gulf of Maine until June, but are found in Virginia as early as April. They remain in the mid-Atlantic and northeast areas until as late as November and December in some cases, but the majority leaves the Gulf of Maine by mid-September. Aerial surveys of loggerhead turtles north of Cape Hatteras indicate that they are most common in waters from 22 to 49 meters deep, although they range from the beach to waters beyond the continental shelf (Shoop and Kenney 1992).

All five loggerhead subpopulations are subject to natural phenomena that cause annual fluctuations in the number of young produced. For example, there is a significant overlap between hurricane seasons in the Caribbean Sea and northwest Atlantic Ocean (June to November), and the loggerhead sea turtle nesting season (March to November). Sand accretion and rainfall that result from these storms as well as wave action can appreciably reduce hatchling success. In 1992, Hurricane Andrew affected turtle nests over a 90-mile length of coastal Florida; all of the eggs were destroyed by storm surges on beaches that were closest to the eye of this hurricane (Milton et al. 1994). Other sources of natural mortality include cold stunning and biotoxin exposure.

General Human Impacts and Entanglement

The diversity of the sea turtles life history leaves them susceptible to many human impacts, including impacts on land, in the benthic environment, and in the pelagic environment. Anthropogenic factors that impact the success of nesting and hatching include: beach erosion, beach armoring and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; beach driving; coastal construction and fishing piers; exotic dune and beach vegetation; and poaching. An increased human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, and an increased presence of native species (e.g., raccoons, armadillos, and opossums) which raid and feed on turtle eggs.

Loggerhead sea turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic gyre for as long as 7-12 years before settling into benthic environments. Loggerhead sea turtles are impacted by a completely different set of threats from human activity once they migrate to the ocean. During that period, they are exposed to a series of long-line fisheries that include the U.S. Atlantic tuna and swordfish longline fisheries, an Azorean long-line fleet, a Spanish long-line fleet, and various fleets in the Mediterranean Sea (Aguilar et al. 1995, Bolten et al. 1994, Crouse 1999). Observer records indicate that, of the 6,544 loggerheads estimated to be captured by the U.S. Atlantic tuna and swordfish longline fleet between 1992-1998, an estimated 43 were dead (Yeung 1999). For 1998, alone, an estimated 510 loggerheads (225-1250) were captured in the longline fishery. Aguilar et al. (1995) estimated that the Spanish swordfish longline fleet, which is only one of the many fleets operating in the region, captures more than 20,000 juvenile loggerheads annually (killing as many as 10,700).

Once loggerheads enter the benthic environment in waters off the coastal U.S., they are exposed to a suite of fisheries in federal and State waters including trawl, purse seine, hook and line, gillnet, pound net, longline, and trap fisheries. Loggerhead sea turtles are captured in fixed pound net gear in the Long Island Sound, in pound net gear and trawls in summer flounder and other finfish fisheries in the Mid-Atlantic and Chesapeake Bay, in gillnet fisheries in the Mid-Atlantic and elsewhere, and in monkfish, spiny dogfish, and northeast sink gillnet fisheries.

In addition to fishery interactions, loggerhead sea turtles also face other man-made threats in the marine environment. These include oil and gas exploration and coastal development, as well as marine pollution, underwater explosions, and hopper dredging. Offshore artificial lighting, power plant entrainment and/or impingement, and entanglement in debris or ingestion of marine debris are also seen as possible threats. Boat collisions and poaching are two direct impacts that affect loggerheads.

7.1.3.3 Other Species of Concern

Barndoor Skate

Barndoor skate is considered a candidate species under the ESA as a result of two petitions to list the species as endangered or threatened that were received in March and April 1999. In June 1999, the agency declared the petitioned actions to be warranted and requested additional information on whether or not to list the species under the ESA. At the 30th Stock Assessment Workshop (SAW 30) held in November 1999, the Stock Assessment Research Committee (SARC) reviewed the status of the barndoor skate stock relative to the five listing criteria of the ESA. The SARC provided their report to the NMFS in the SAW 30 document (NEFSC 2000). NMFS published a decision on the petitions on September 27, 2002 (67FR61055-61061) that the petitioned actions are not warranted at this time. However, NMFS is leaving barndoor skate on the agency's list of candidate species due to remaining uncertainties regarding the status and population structure of the species.

The barndoor skate occurs from Newfoundland, the Gulf of St. Lawrence, off Nova Scotia, the Gulf of Maine, and the northern sections of the Mid-Atlantic Bight down to North Carolina. It is one of the largest skates in the Northwest Atlantic and is presumed to be a long-lived, slow growing species. Barndoor skates inhabit mud and sand/gravel bottoms along the continental shelf, generally at depths greater than 150 meters. They are believed to feed on benthic invertebrates and fishes (Bigelow and Schroeder 1953).

The barndoor skate is often caught as a bycatch species in the offshore trawl and sink gillnet fisheries that target multispecies, monkfish, and spiny dogfish. When landed, barndoor skates are used in the wing fishery. Their offshore distribution and large size make them unlikely to be used in the directed skate fishery for lobster bait.

The abundance of barndoor skate declined continuously through the 1960's. Since 1990, their abundance has increased slightly on Georges Bank, the western Scotian shelf, and in Southern New England, although the current NEFSC autumn survey biomass index is less than 5% of the peak observed in 1963. The species was identified as an overfished species at the SAW 30 (NEFSC 2000). Skates are sensitive to overutilization generally because of their limited reproductive capacity. This is a characteristic of all of the larger species in the Northeast skate complex that are relatively slow-growing, long-lived, and late maturing.

Restoration of the overfished skate species is major goal of the proposed Skate FMP. Therefore, pending the Council's successful achievement of this goal, barndoor skate should not be further depleted by management actions taken under the proposed Skate FMP.

7.2 PHYSICAL ENVIRONMENT

"The Effects of Fishing on Marine Habitats of the Northeastern United States" (available in Volume III, Appendix B of this FMP document), provides detailed descriptions of the habitats of the Northeast Shelf Ecosystem. The Northeast Shelf Ecosystem includes 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. A number of distinct subsystems compose the region, including the Gulf of Maine, Georges Bank, and the Mid-Atlantic Bight.

Physical characteristics of each of these subsystems are described in this document. Included is information on geographic boundaries of the areas, geological characteristics, topography including depth range and presence of basins and ledges, current systems, salinity, temperature and density of the water, sediment type and benthic habitat types. This document also provides similar information on coastal areas within the Northeast Shelf Ecosystem. The physical characteristics of the region are described in detail to provide a backdrop for a broader discussion within this document on the effects of fishing on marine habitats as well as the determination and evaluation of management measures and their effects.

Please refer to this document in Volume III, Appendix B for detailed information about the physical environment.

7.2.1 Threats to Habitat

The EFH Final Rule (67 FR 2343) directs the Council to assess the potential adverse effects of all fishing equipment types used in waters described as EFH. This evaluation is to consider the impacts of all fishing equipment types used in EFH on different types of habitat found within EFH. The EFH Final Rule also directs the Council to identify non-fishing related activities that may adversely affect EFH. The FMP is to describe the EFH most likely to be adversely affected by these activities.

7.2.1.1 Fishing-Related Threats

All the alternatives and actions proposed in this FMP are intended to control and, in some cases, reduce the amount of fishing effort for skates. Except for the directed bait fishery off Rhode Island, most skate landings come from incidental catch in the groundfish fishery managed under the Northeast Multispecies FMP. The alternatives and actions proposed in this FMP, therefore, are unlikely to increase any adverse impacts to the EFH of any managed species that may be associated with the skate fishery.

The Council is required to identify and assess fishing activities that may adversely affect EFH. The Magnuson-Stevens Act defines fishing as:

Definition of Fishing [16 U.S.C. 1802]:

(15) The term "fishing" means -- any activity, other than scientific research conducted by a scientific research vessel, that involves

(A) the catching, taking, or harvesting of fish;

(B) the attempted catching, taking, or harvesting of fish;

(C) any other activity that can reasonably be expected to result in the catching, taking, or harvesting of fish; or

(D) any operations at sea in support of, or in preparation for, any activity described in subparagraphs (A) through (C).

Such term does not include any scientific research activity which is conducted by a scientific research vessel.

Adverse effects are any impact which reduces the quality and/or quantity of EFH and may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH (see EFH Final Rule, 67 FR 2343, at § 600.810).

In the EFH Final Rule, the Council is urged to act to minimize the effects of fishing on EFH if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature. Temporary impacts are those that are limited in duration and that allow the particular environment to recover without measurable impact. Minimal impacts are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions.

The effects of fishing, such as the direct effects of gear on seafloor habitats (e.g., direct removal of epifauna, smoothed bedforms) and the indirect effects of fishing (e.g., producing shifts in the benthic community because of initial removals of fauna), and other habitat related fishing activities that can be controlled by the Council are considered in this evaluation. The evaluation should include, if known: a description of the mechanisms or processes of fishing gear causing adverse effects on habitat; the particular portion of EFH that is affected; a description of known or potential habitat functions disturbed or disrupted by these effects and the extent of such disturbance or disruption; options the Council will consider to minimize adverse effects from fishing practices; and mitigation measures to conserve and enhance EFH adversely affected by fishing activities, if appropriate. A gear evaluation should consider the impact of the gear and rate gear types according to their impact on different types of EFH, and the Council should consider the severity of the effect, the amount of EFH affected, and the duration/lasting impact of the adverse effect. NMFS suggests the Council also take into account the sensitivity, rarity, resistance, and resilience of different habitat types.

The Council's Omnibus EFH Amendment (1998) describes the primary fishing gears used in the New England and Mid-Atlantic areas. This Amendment also provides an evaluation of potential adverse impacts to a variety of habitat types. The description of fishing gears and the evaluation contained in the EFH Amendment are incorporated here by reference (NEFMC 1998). As a supplement to the information provided in the Omnibus EFH Amendment, a recent report prepared by NMFS, entitled *The Effects of Fishing on Marine Habitats of the Northeastern United States* (Draft 2001) is provided in Volume III, Appendix B of this FMP, and is incorporated in its entirety by reference.

The Skate Fishery

An assessment of the impacts to EFH that may be associated with the skate fishery must address the two main categories of the skate fishery: the directed bait fishery and the bycatch wing fishery. The full descriptions of these two categories of the overall skate fishery are provided elsewhere in this document, but the following is intended as a brief review of the factors relevant to the discussion of potential fishing-related impacts to habitat. All of the data and information used in the following sections to identify and characterize the skate fishery come from the 2000 SAFE Report for the Northeast Skate Complex (NEFMC 2001).

The two fisheries are substantively different in at least two ways. The bait fishery primarily targets skates and lands skates whole. The wing fishery is largely an incidental catch fishery and primarily lands only the skate wings. The bait fishery is based principally out of two ports in Rhode Island (Point Judith and Tiverton) which accounted for nearly 90% of all bait landings in 1999. Stonington, Connecticut, accounted for nearly 9% of the 1999 bait landings, with the remaining 1999 landings coming from ports in Maine, New Hampshire, Massachusetts, New York, New Jersey, and Maryland. New Bedford, MA is the principal wing port, accounting for over 58% of all wing landings in 1999, while other ports in Massachusetts contributed another 18% of 1999 landings. Rhode Island ports added another 10% and ports in Maine, New Hampshire, Connecticut, New York, New Jersey, and Maryland contributed the remaining 13% in 1999.

Between 1995 and 1999, inclusive, 60.5% of all skate landings were attributed to the skate wing fishery and 39.5% were attributed to the bait fishery. Most of the skate landings (over 80%) come from a relatively few fishing areas (ten statistical areas). As indicated in the Skate SAFE report for 2000, nearly 51% of all skate landings come from statistical areas 539 and 537. Another 17.5% of landings come from three statistical areas on Georges Bank, 521, 522 and 562. Statistical areas 538, 613, 514, 526, and 525 contribute another 12.5%. No other statistical area contributes more than 2% of the total skate landings.

Bait Fishery

Because of the differences between the bait fishery and the wing fishery, the potential impacts to habitat will be considered separately. Although the bait fishery is smaller than the wing fishery (less than 40% of total skate landings), it is almost entirely a directed fishery for skates, so this has more significant implications from a habitat perspective. As noted above, most bait landings go to ports in Rhode Island. Most skate landings come from statistical areas 539 and 537, off Rhode Island. Although the vessel trip reports cannot be used to differentiate areas fished for bait versus wings, industry reports and information from the state of Rhode Island suggests that almost all bait landings come from these two statistical areas.

Skates landed as bait are harvested using a variety of fishing gears including pelagic longlines, pots and traps, seines, scallop dredges, hook and line, and gillnets, but most (94.4%) bait landings from 1995 - 1999 were harvested using otter trawls. Gillnets accounted for 3% of 1995-1999 landings. The remaining gear types, including unknown gear, collectively accounted for approximately 2.5% of bait landings. This information suggests that otter trawls are the fishing gear type of most significance in assessing any potential impacts to habitat associated with the skate bait fishery.

A recent workshop intended to review available information on the effects of fishing in the Northeastern U.S. considered the likely effects of various fishing gears on gravel, sand, and mud habitats (NREFHSC 2002, provided as Appendix C in Volume III of this FMP). The order of priority for concern over potential adverse impacts to benthic habitats suggests that impacts to gravel are the highest priority, impacts to sand are the second priority, and impacts to mud are the third priority (of three). A more detailed examination of concern by both sediment type and gear type reveals the following priority list: (1) otter trawls in gravel; (2) scallop dredges in gravel; (3) otter trawls in mud; (4) scallop dredges in sand; (5) clam dredges in sand; (6) otter trawls in sand; (6) nets and lines in gravel [*a tie*]; and (8) pots and traps in mud.

Figure 89 displays sediment type information for statistical areas 539 and 537. As indicated in Figure 89, almost all of this area is either sand or a composite of sand, silt and clay. The rest of the area is comprised of a few small areas of gravely sand. Gravely sand, a sediment category as defined by Poppe *et al.* (1989), may have a higher relative "importance" as a substrate for biogenic structure than less complex substrates such as Sand, Mud or Muddy Sand. It may not be as "important" as substrates such as Gravel and Bedrock.
Based on the above information, it seems unlikely that there would be any impacts to habitat associated with the directed skate bait fishery that would be of concern. Almost the entire bait fishery is constrained to two statistical areas, thus this fishery is not widespread around the New England and/or Mid-Atlantic region, and although the fishery is primarily prosecuted using otter trawl gear, the area in which the fishery occurs is comprised of habitat types that are believed to be among the least vulnerable to fishing gear activity (see Figure 89).

In their assessment of the effects of fishing activity on marine habitats of the northeastern United States (provided in Volume III, Appendix B), NMFS (2002) summarizes studies of the impacts and recovery associated with bottom otter trawls done in the Northeast Region on similar sand/silt/clay habitats. This summary reports that much of the associated disturbance is from "wake turbulence rather than direct physical contact of the net with the bottom." The summary indicates that the most notable evidence of the passage of the trawl is from the tracks made by the trawl doors. They also report that these tracks "were soon obscured by tidal currents." The report concludes that the tracks did not cause habitat loss (NMFS 2002).

Barnette (2001) also evaluates the potential impacts of various fishing gears on marine habitats, including otter trawls. Barnette concludes that the magnitude of trawling disturbance is highly variable and the ecological effect of trawling depends upon site-specific characteristics such as bottom type, water depth, community type, gear type, as well as the intensity and duration of trawling and natural disturbance. He also concludes that "trawls have a minor overall physical impact when employed on sandy and muddy substrates" (Barnette 2001).

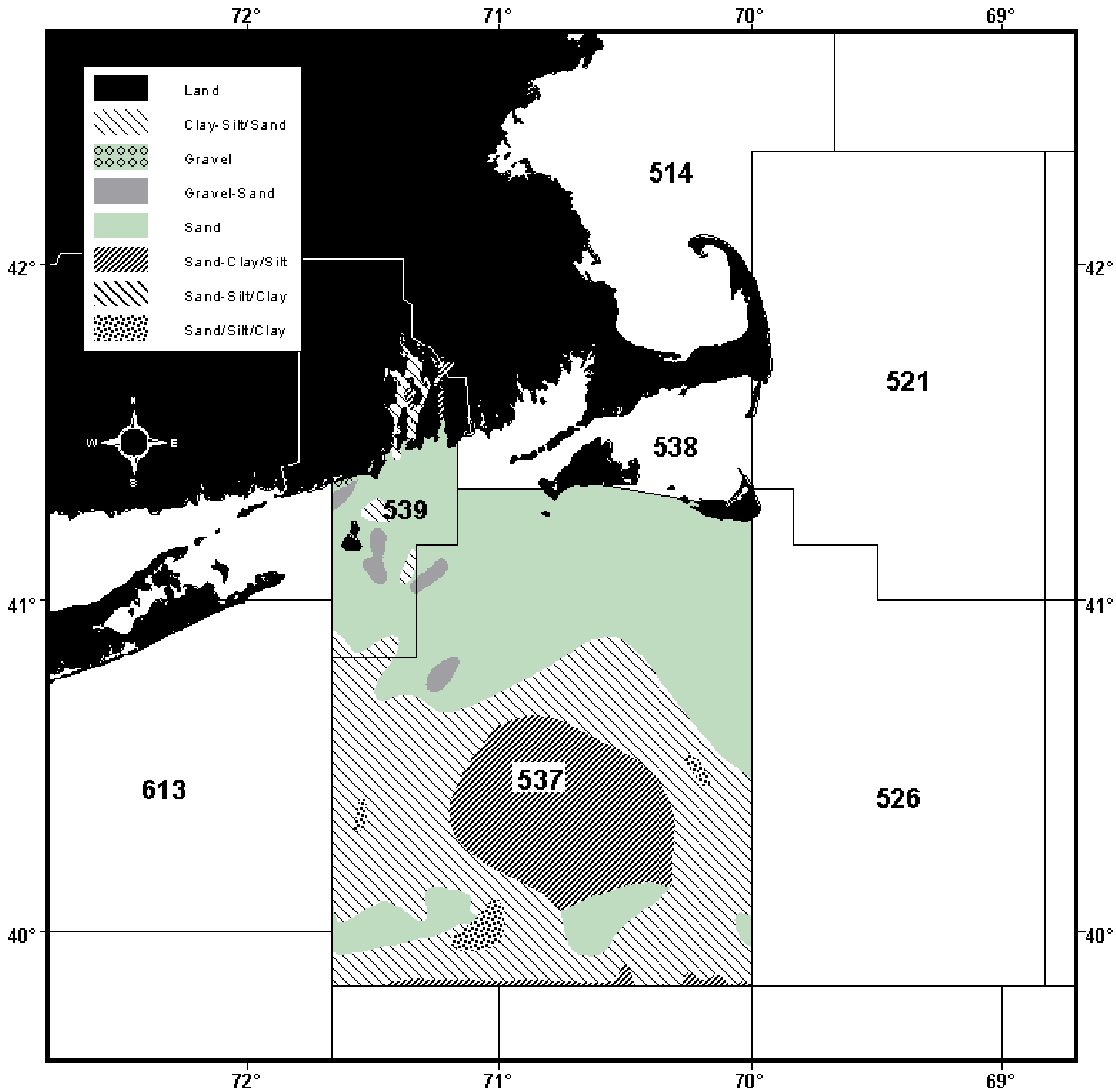
Recent work by Collie et al. (2000) indicates that although a clear ranking for expected impacts did not emerge, responses to bottom-tending mobile gear in sand habitats were usually less negative than in other habitat types (such as gravel, mud, or biogenic). Collie et al. (2000) also suggests that primarily sandy habitats tend to recover from the effects of fishing-related disturbance much quicker than other habitat types. Work done by DeAlteris et al. (1999) on a nearby area around the mouth of Narragansett Bay concludes that the effects of trawling are less significant in shallow sand habitats than in deeper mud habitats, in part due to the differences in the frequency and intensity of natural disturbances in different habitats.

As noted above, the most used gear type in this fishery after the otter trawl is the gillnet. Although all types of fishing gear that come in contact with the bottom have some degree of effect on benthic habitats, static gear such as gillnets are generally considered to have relatively insignificant effects on habitat compared with the bottom-tending mobile gears (Barnette 2001; NMFS 2002; NREFHSC 2002). Some of the other gear types used in this fishery (e.g., scallop dredges) may be associated with adverse impacts, but the scope of this gear use is much, much smaller than otter trawls and gillnets and will not be considered further.

Based on this information, the directed skate bait fishery is not expected to cause adverse impacts that are more than minimal and not temporary in nature on any areas designated as EFH for any species. Since the effects of the directed skate bait fishery do not exceed the threshold for an adverse effect established in the EFH Final Rule (67 FR 2343), consideration of management measures to minimize, avoid, or otherwise mitigate these effects are not necessary in this FMP.

Figure 89: Sediment Types with Principal Bait Fishing Areas

The sediment type information is based on Poppe et al. 1989.



Wing Fishery

The majority of all fishing activity for skates occurs from the skate wing fishery. Because most of the bait fishing occurs in statistical areas 539 and 537, the majority of fishing activity for skate wings occurs in the other statistical areas described above (521, 522, 562, 538, 613, 514, 526, and 525). The most significant factor related to assessing potential impacts to habitat associated with the wing fishery is that this is almost entirely a bycatch and incidental catch fishery. Fishermen that land skate wings, therefore, are all participants of other fisheries, primarily the mixed species groundfish fishery. As such, their fishing activities are regulated under the Northeast Multispecies FMP.

Most landings of skate wings are attributed to otter trawls (77.5% from 1995 - 1999) and another 20% of landings of skate wings are harvested with gillnets (20.5% from 1995 - 1999). The remaining 2% of wing landings from 1995 - 1999 are attributed to a variety of fishing gears including hook and line, scallop dredges, and seines. Although otter trawls are sometimes identified with adverse impacts to benthic habitats when fishing occurs over complex bottom (see Appendix B in Volume III of the FMP), the potential impacts to EFH from fishing activities managed under the Northeast Multispecies FMP were addressed in the Council's Omnibus EFH Amendment (NEFMC 1998) and will be addressed again in an upcoming major amendment to the groundfish plan. Amendment 13 to the Northeast Multispecies FMP will include a complete assessment of all fishing gear types used in the mixed species groundfish fishery, including the various configurations of bottom otter trawls, gillnets, hook and line, etc. Amendment 13 will also include consideration of a variety of management measures to reduce, mitigate, avoid, or otherwise minimize the adverse effects to EFH that are identified as associated with all aspects of the groundfish fishery.

Because the upcoming major amendment to the groundfish plan will serve as the principal review and assessment of the impacts of fishing on fish habitat and as the principal mechanism for the consideration of management measures to minimize these affects, such an assessment and consideration of management measures in this plan would be premature. The effects of the skate bycatch fishery will be dealt with in the FMPs managing the primary fisheries (upcoming major amendments to the Sea Scallop and Northeast Multispecies FMPs -- Amendments 10 and 13, respectively); therefore consideration of management measures to minimize, avoid, or otherwise mitigate these effects is not appropriate in this FMP. For details on the review process for changes to measures to minimize adverse effects of skate fishing on EFH, see Section 4.6.3 of this document (p. 64).

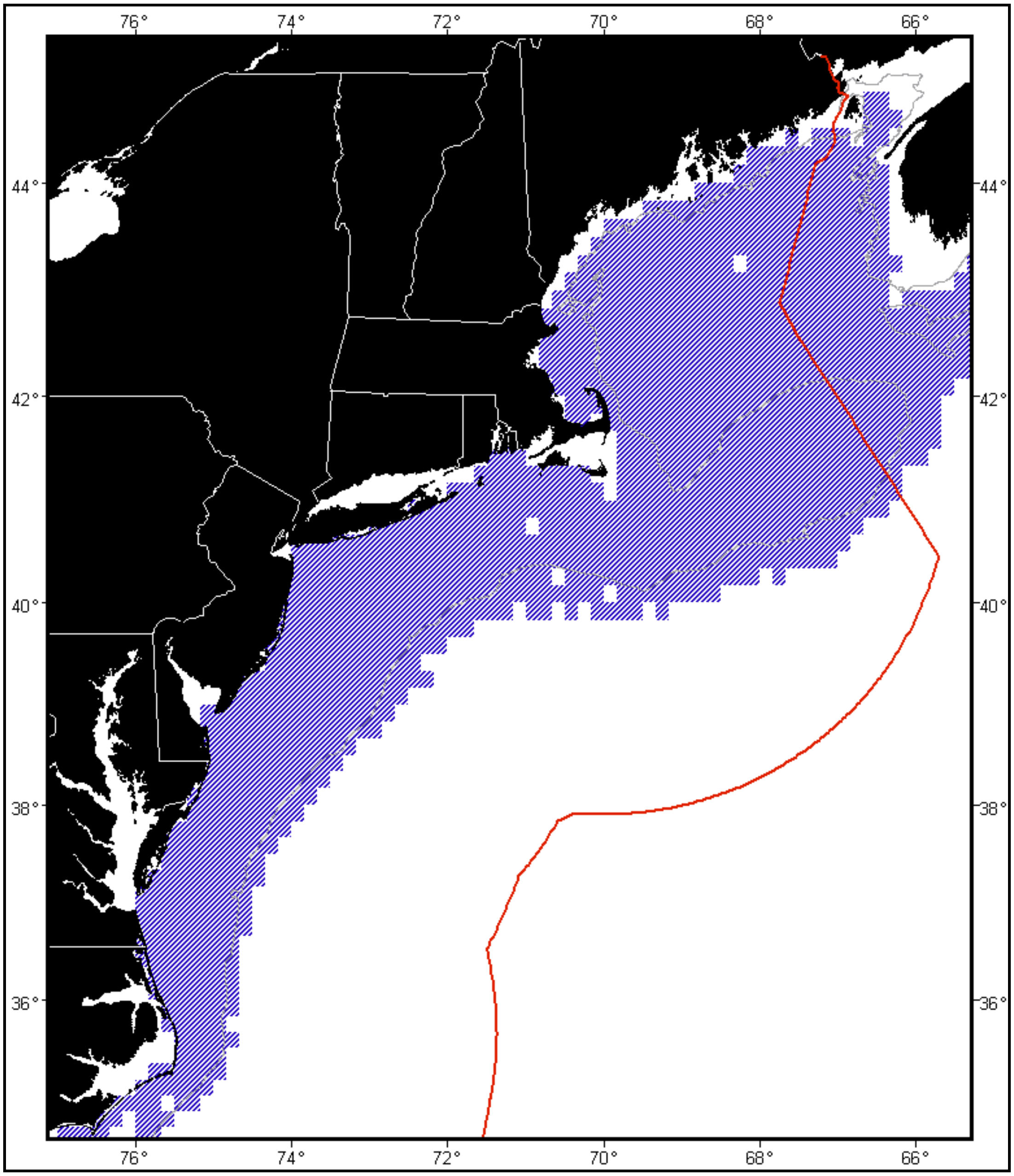
Other Fisheries

The Skate FMP must also evaluate the potential effects of all other federally-managed fisheries on habitat identified as EFH for skates. This is a three-step process: (1) identify the other fisheries that occur in areas designated as EFH for skates; (2) identify the gear types used in these fisheries; and (3) identify and evaluate the potential adverse impacts to skate EFH that may result from these fishing gears.

Figure 90 displays a composite of the 100% options for juveniles and adults of all seven species. This is a very broad area that covers practically all potential fishing areas north of Cape Hatteras, North Carolina, out to the deepest extent of the NMFS trawl survey (approximately 350 meters).

Figure 90 Broadest Possible Extent of Skate EFH

The shaded areas on this map represent a composite of the broadest possible EFH designations for juveniles and adults of all seven species of skates managed under the Skate FMP. Once the Council selects specific EFH designations for each species, this composite will likely change to reflect the subset of these areas that represent the actual EFH designations.



The most common fisheries that occur within this area are the groundfish fishery (managed under the Northeast Multispecies FMP), the scallop fishery (managed under the Sea Scallop FMP, the monkfish fishery (managed under the Monkfish FMP and the Northeast Multispecies and Scallop FMPs), and the clam fisheries (managed under the Surfclam and Ocean Quahog FMP).

Because the areas that may be designated as EFH for skates cover almost all fishing grounds north of Cape Hatteras, North Carolina, all fishing gears used in the Northeast Region have the potential to be associated with effects on skate EFH. Figures 10 - 28 of the draft report "The Effects of Fishing on Marine Habitats of the Northeastern United States" (Volume III, Appendix B) identify general locations of fishing trips for all the major fishing gear types used in the Northeast Region. These fishing gears include otter trawls, beam trawls, clam dredges, scallop dredges, mussel dredges, sea urchin dredges, Danish seines, Scottish seines, lobster pots, fish pots, crab pots, conch/whelk pots, sink gillnets, and hand lines. These gear types can be divided into two main categories: the static gears and the bottom-tending mobile gears. Although all types of fishing gear that come into contact with the seafloor have some effect on benthic habitat, static gears (gillnets, hand lines, and pots and traps) are believed to be associated with significantly less impact relative to the bottom-tending mobile gears. As indicated in the report from the fishing gear effects workshop held in October 2001 (Volume III, Appendix C), the level of concern over the potential adverse impacts to benthic habitats from pots and traps and nets and lines are much less than for trawls and dredges.

In addition to general levels of concern and differences in relative impacts, trawls and dredges also are used much more than the static gears. Table 6 in Appendix B displays the percentage of landings by species for each type of fishing gear used in the Northeast Region in 1999. Thus, the discussion of potential adverse effects to skate EFH can be limited to trawls and dredges rather than the full universe of fishing gears used in the Northeast Region.

The Council's Omnibus EFH Amendment (1998) describes the primary fishing gears used in the New England and Mid-Atlantic areas. This Amendment also provides an evaluation of potential adverse impacts to a variety of habitat types. The description of fishing gears and the evaluation contained in the EFH Amendment are incorporated here by reference (NEFMC 1998). As a supplement to the information provided in the Omnibus EFH Amendment, the NMFS report (2002), Appendix B, is also incorporated in its entirety by reference. Appendix B provides a description of the fishing gears, explains the types of effects fishing gears can have on benthic habitats, summarizes the available scientific information on the impacts of each type of fishing gear on a variety of habitat types, the recovery of these habitat types following the impacts, and evaluates the management implications of these impacts. Volume III, Appendix C, the report on the "Workshop on the Effects of Fishing Gear on Marine Habitats of the Northeastern United States, October 23-25, 2001," also provides information on the potential impacts to a variety of habitats from the various types of fishing gear used in the Northeast Region and is incorporated here in its entirety by reference.

From the EFH text descriptions provided in Section 4.6.2.2 of this document, it is clear that skates occupy areas that include the three major sediment types: sand, gravel, and mud. The applicable conclusions of the gear effects workshop include the following:

Otter Trawls

1. Can permanently remove major physical features in gravel and mud habitats.
2. Can have impacts on biological structure in gravel, sand, and mud habitats that may last months to years.
3. Can have impacts on physical structure in gravel, sand, and mud habitats that may last days to months in sand and months to years in gravel and mud.
4. Can affect changes in benthic prey in sand habitats that may last months to years.

Scallop Dredges

1. Can have impacts on biological structure in gravel and sand habitats that may last months to years in sand and several years in gravel.
2. Can have impacts on physical structure in gravel and sand habitats that may last days to months in sand and months to years in gravel.
3. Can effect changes in benthic prey in gravel habitats that may last months to years.

Clam Dredges

1. Can have impacts on biological structure in sand habitats that may last months to years, depending upon the species composition.
2. Can have impacts on physical structure in sand habitats that may last days to months.

These types of effects are likely to occur throughout the range of skate EFH, especially since the managed skate species (as a complex) utilize sand, gravel, and mud habitats.

Amendments 13, 10 and 2 to the NE Multispecies, Sea Scallop and Monkfish FMP's (respectively) are currently being developed by the Council and they include comprehensive reviews of the impacts associated with these fisheries. These amendments also identify, review and analyze a wide range of management measures to minimize the adverse impacts associated with these fisheries. Specific impacts of fishing with gear types utilized in the skate fishery are addressed in these amendments. Section 4.6.3 of this document (p. 64) outlines a review process that is triggered by changes in any of these management actions, ensuring that impacts of fishing on skate EFH are addressed as the major FMPs that regulate gear types and fishing practices employed by this fishery are changed.

7.2.1.2 Non-Fishing-Related Threats

The EFH Final Rule requires that FMPs identify and characterize activities other than fishing that potentially reduce the quantity and/or quality of essential fish habitat. This section of the FMP will serve as a reference of non-fishing related threats and activities for the Council, NMFS, habitat management action agencies, and other interested parties. Once EFH for skates is designated, federal agencies must consult with NMFS regarding any proposed activities that may adversely affect EFH for skates. NMFS must provide federal and state agencies with conservation recommendations regarding any agency action that may adversely affect the EFH. The Council is also empowered to comment on any federal or state agency action that would affect the habitat, including EFH, of a species under the Council's authority. To assist with these consultation and commenting activities, this section of the FMP addresses those activities most likely to reduce the quantity and/or quality of essential fish habitat for the skate species complex. This document is not meant to serve as an exhaustive review and analysis of the impacts of all potentially detrimental activities; yet, it should highlight notable threats and provide enough information to determine if further examination or monitoring of a proposed activity is necessary.

7.2.1.2.1 Inshore Habitats

Inshore habitats have been impacted by decades of habitat destruction and degradation throughout the United States (NOAA 1994). Development of coastal lands for a suite of reasons has reduced habitat important to the spawning, breeding, feeding, and growth of finfish, shellfish, and aquatic vegetation. NOAA (1994) estimates that half of the original 11.7 million acres of coastal wetlands have been lost since 1780 and continue to be removed at a rate of 20,000 acres per year. The dynamic and productive nature of inshore habitats are threaten by point sources and non-point sources of contamination, and physical destruction. The flux of chemical, biological, and physical threats into inshore habitats impact fishery resources.

Chemical Threats

Oil (characterized as petroleum and any derivatives) may be a major stress on inshore fish habitats (see Wilk and Barr 1994 for review). Short-term impacts include interference with the reproduction, development, growth and behavior (e.g., spawning, feeding, etc.) of fishes, especially early life-history stages (see Gould et al. 1994 for review). Carcinogenic and mutagenic properties of oil compounds are receiving increasing attention around the world (Larsen 1992). Oil spills may cover and degrade coastal habitats and associated benthic communities, or may produce a slick on the surface waters which disrupts the pelagic community. Oil has been demonstrated to disrupt the growth of vegetation in estuarine habitats (Lin and Mendelssohn 1996). These impacts may eventually lead to disruption of community organization and dynamics in affected regions. Oil can persist in sediments for years after the initial contamination. This may cause problems to physiological and metabolic processes of demersal fishes (Vandermeulen and Mossman 1996). Non-point sources of oil are municipal and agricultural run-off, industrial shipping, recreational boating, and contaminated sediments. Point sources include power plant discharge, marine transportation (i.e., ferries, freighters, and tankers), energy and mineral exploration and transportation, and ocean disposal of contaminated dredged material.

Metal contaminants are found in the water column and persist in the sediments of coastal habitats, including urban centers and fairly uninhabited regions, and are a potential environmental threats (Larsen 1992; Readman et al. 1993 Buchholtz ten Brink 1996). High levels of metals are found in the sediments of New England estuaries due to past industrial activity (Larsen 1992). Heavy metals may initially inhibit reproduction and development of marine organisms, but at high concentrations, they can directly or indirectly contaminate or kill fish and invertebrates. The early life-history stages of fish are the most susceptible to the toxic impacts associated with heavy metals (Gould et al. 1994). Shifts in phytoplankton species composition can occur. This shift in the plankton composition may lead to an alteration of community structure by replacing indigenous producers with species of little worth as a food source to the trophic structure. Heavy metals have also been implicated in disrupting endocrine secretions of marine organisms, potentially disrupting natural biotic properties (Brodeur et al. 1997). While long-term impacts do not appear notable in marine organisms, heavy metals may move upward through trophic levels and accumulate in fish at toxic levels (bioaccumulation), which can eventually cause health problems in human consumers. Municipal and agricultural run-off, contaminated groundwater and sediments, industrial shipping, recreational boating, and atmospheric deposition are non-point sources of heavy metals. Point sources include industrial discharge, power plants, ocean disposal of dredged material, and marine transportation [e.g., hull paint containing lead to hinder biofouling – tributyltin (the use of tributylin has been banned in many regions but persists in the environment)].

Nutrients are essential for healthy ecosystems and control the productivity of the environment. However, nutrient over-enrichment can cause habitat degradation (ASMFC 1992; NOAA 1997). Eutrophication is a well-documented impact involving nutrient over-enrichment occurring in coastal habitats (see O'Reilly 1994; Wilk and Barr 1994 for review). Habitats that become eutrophic are characterized by low dissolved oxygen (anoxia is possible), high turbidity, phytoplankton and filamentous algal blooms, and inhibited denitrification. Severely eutrophic conditions may reduce submerged aquatic vegetation (SAV) (Short and Burdick 1996; Goldsborough 1997), cause mass mortality of fish and invertebrates, and alter long-term natural community dynamics. Harmful algal blooms (HABs), commonly known as "red tides," associated with unnatural nutrient levels have been known to stimulate fish disease and kills (NSF and NOAA 1998). Excess nutrients within coastal waters originate from non-point sources such as municipal and agricultural run-off, contaminated groundwater and sediments, atmospheric deposition, septic systems, industrial shipping, recreational boating, wildlife feces, and nuisance and toxic algae. Point sources include industrial discharge, aquariums, sewage treatment plants, water diversion, ocean disposal of contaminated dredged material, silviculture, and energy and mineral exploration and transportation.

Pesticides found in coastal habitats have killed marine organisms, and they accumulate in sediments and can be re-released into the water column during substrate disturbance (e.g., channel dredging). Pesticides may bioaccumulate by being absorbed by sediments and detritus then ingested by zooplankton, plankters, which in turn are eaten by fish (ASMFC 1992). This accumulation may cause health problems in humans consumers. Several pesticides are know to be endocrine disrupter of marine organisms. Agricultural run-off is a major non-point source, but pesticides can also occur at notable levels in residential areas. Other sources of pesticide discharge into coastal waters include atmospheric deposition and contaminated groundwater and sediments (non-point sources) and ocean disposal of dredged material and water diversion (point source) (see Meyers and Hendricks 1982 for review).

Herbicides may alter long-term natural community structure by hindering aquatic plant growth or destroying aquatic plants. Hindering plant growth can have notable effects on fish and invertebrate populations by limiting nursery and forage habitat. Chemicals used in herbicides may be endocrine disrupters. Coastal development and water diversion contribute substantial levels of herbicides entering fish and shellfish habitat. The major non-point sources are agricultural and municipal run-off, contaminated groundwater, and atmospheric deposition (Goldsborough 1997). Herbicides are also frequently used to inhibit colonization of boat hulls and pipes by micro-algae and subsequent growth of seaweeds (Readman et al. 1993).

Inshore regions can be impacted by the influx of acid. The brackish waters of estuaries are especially sensitive to acid effluents due to the lower buffering capacity of the higher salinity, oceanic waters. Acidification potentially disrupts or prevents reproduction, development and growth of fish (USFWS 1995). Continual influx of acid to marine habitats can hinder the survival and sustainability of fisheries. Municipal and agricultural run-off, contaminated groundwater, and atmospheric deposition are potential non-point sources of acid influx to marine habitats. Industrial discharge and sewage treatment plant discharge are point sources of acid entering fish and shellfish habitat.

Chlorine can exert acute and sublethal effects on marine organisms (Sasikumar et al. 1993; Manning et al. 1996), especially early life history stages (Hose et al. 1989). The USEPA water quality criterion for chlorine discharge in marine and estuarine systems may not exceed 7.5 μg/L as a four day average and 13 μg/L as one-hour average more than once every three years (USEPA 1986). Chlorine effluent can decrease habitat quality and quantity leading to reduction of fishery resources. Chlorinated compounds [e.g., organochlorides – polychlorinated biphenyls (PCBs)], which can harm humans, have been found to accumulate in the tissue of fish (Eldridge and Meaburn 1992). Long-term stress from chlorine on the habitat can alter natural community structure and dynamics. Compounds containing chlorine are often used to inhibit settlement of biofouling organisms (Sasikumar et al. 1993). Chlorine non-point sources include septic systems and contaminated groundwater, and point sources include discharge from sewage treatment plants, industrial facilities, and power plants.

Thermal effluents in inshore habitat can be a severe problem by directly altering the benthic community or killing marine organisms, especially larval fish. Temperature influences biochemical processes of the environment and the behavior (e.g., migration) and physiology (e.g., metabolism) of marine organisms (Blaxter 1969). Long-term thermal discharge may change natural community dynamics. Sources of thermal pollution include industrial and power plant discharge. Forestry activities such as clear-cutting and the alteration or removal of riparian habitat can also lead to above normal water temperatures contributing to the degradation of habitat conditions.

Metabolic and/or excess food entering the marine environment can increase levels of nutrients and pathogens and lead to eutrophication and alteration of local benthic dynamics. A major source of metabolic and food wastes is agricultural facilities. Run-off from farmlands, including animal wastes and organic fertilizers, may contribute to the degradation of habitat. Septic systems, wildlife feces, and nuisance / toxic algae (non-point source), livestock waste and sewage treatment plants (point sources) are other sources of organic wastes potentially impacting habitat.

Fish and invertebrate habitat may be negatively impacted by an unnatural influx of suspended particles (Arruda et al. 1983). Lethal and sub-lethal impacts to marine organisms may occur with various concentrations of suspended sediments (Barr 1993). Short-term impacts of an increase in suspended particles include high turbidity, reduced light, and sedimentation which may lead to the loss of SAV and other benthic structure. Other problems associated with suspended solids include respiration disruption of fishes and invertebrates, disruption of water transport rates in marine organisms, reduction of filtering efficiency of invertebrates, sorption of metals and organic materials, reduction of egg buoyancy, disruption of ichthyoplankton development, reduction of growth and survival of filter feeders, and decreased foraging efficiency of sight-feeders (Messieh et al. 1991; Barr 1993). Toxic metals and organics absorbed by suspended solids may recur and become more available to marine organisms in the habitat when disturbed (e.g., dredging). Resuspension of sediments may supply nutrients to the water column that are needed for primary production. However, increased flux of nutrients into the water column may stimulate phytoplankton production and contribute to increased turbidity and alteration of nutrient cycles. Frequent high levels of suspended particles can lead to the loss of habitat for particular creatures. Suspended particles enter coastal areas from non-point source municipal and agricultural run-off, industrial shipping and recreational boating, and point source industrial discharge (e.g., pulp mills), dredging, ocean disposal of dredged material, water diversion, energy and mineral exploration and transportation, erosion control, silviculture, and marine transportation.

Radioactive wastes may be a potential threat degrading inshore habitat used by finfish and shellfish species. Fishery resources may accumulate radioactive isotopes in tissues posing problems for the resource and consumers (ICES 1991). Long-term exposure to radioactive wastes may alter the natural dynamics of the populations of fisheries and habitat. Potential sources of radioactive wastes are sunken vessels and submarines, municipal run-off, atmospheric deposition, contaminated groundwater and sediments (e.g., past dumping locations), and industrial and power plant discharge (e.g., nuclear power plants).

Sea levels have fluctuated through the history of earth and have been rising since the end of the Pleistocene. Changes in the rate of sea level rise result from tectonic and postglacial isostatic adjustments and effects of atmospheric temperature (Valiela 1995). Concern has been voiced that global warming and subsequent sea level rise may be accelerated by the continued release of greenhouse gases from the burning of fossil fuels and forests and using aerosol-producing substances (i.e., the greenhouse effect). Greenhouse gases, including carbon dioxide, methane, and chlorofluorocarbons, are discharged into the atmosphere from respiration of all living organisms, burning fossil fuels and forests, and using aerosols. Possible impacts on inshore habitats from sea level rise are the loss of wetlands, salinization of freshwater environments (eliminating freshwater supplies), and change in natural marine biotic (e.g., species composition) and abiotic (e.g., currents) properties (see Kelley 1992 for review). Salt marshes may be unable to accrete fast enough to keep pace with sea level rise; however, salt marshes can easily keep pace with the sea level rise found on the northeast coast of the United States (Valiela 1995) provided uplands are undeveloped adjacent to the salt marsh. Conflicting studies indicate that salt marshes of Maine are not keeping pace with sea level rise (Wood et al. 1989). According to Bigford (1991), the severity of the impacts of sea level rise on natural resources (e.g., marine organisms) depends on physical obstruction to inland habitat shifts from natural and human barriers, resilience of species to withstand new environmental conditions during periods of erosion-induced transition and the rate of environmental change.

Biological Threats

The introduction of nonindigenous species and/or reared species to the environment has been documented (Rosecchi et al. 1993; USFWS 1995; Witman 1996) and have been tied closely to human activities (Pearce 1998). Exotic introductions have apparently increased with the development of large, powerful vessels and aquaculture. The transportation of nonindigenous organisms to new environments can have many severe impacts on habitat (Omori et al. 1994). New pathogens or higher concentrations of disease can be spread throughout the environment resulting in deleterious habitat conditions. Non-native plants (e.g., *Phragmites*) potentially degrade coastal habitat by changing natural habitat qualities. Introduced organisms increase competition with indigenous species or forage on indigenous species which can reduce fish and shellfish populations. For example, the introduction of bryozoan (*Membranipora membranacea*) has reduced kelp populations, ascidian (*Botrylloides diegensis*) has competitively displaced native hydroids, nudibranch (*Tritonia plebia*) has reduced invertebrate prey populations, and macroalgae (*Codium fragile*) has changed benthic structure (see Witman 1996). Long-term impacts of the introduction of nonindigenous and reared species can change the natural community structure and dynamics, lower the overall fitness and genetic diversity of natural stocks, and pass and/or introduce exotic lethal disease. Exotic fish, shellfish, pathogens, and plants enter the environment from industrial shipping (e.g., ballast), recreational boating, aquaculture, biotechnology, and aquariums. Nonindigenous species of algae accidentally introduced to the environment is another potential problem for habitat.

An increase in natural levels of nutrients induced by human activities can stimulate population explosions of nuisance and toxic algae [harmful algal blooms (HABs)] which have detrimental impacts to habitat and toxic effects on organisms and humans (see Milligan and Cosper 1994; O'Reilly 1994; Boesch et al. 1997; Burkholder and Glasgow 1997). Organisms responsible for HABs have naturally occurred in the environment for a long time, so the apparent increase bloom events may simply reflect better detection of natural phenomena (NSF and NOAA 1998). However, the current increased intensity and frequency of HABs compared to the past appears to indicate more toxic algal species, more algal toxins, more areas affected, more fishery resources affected, and higher economic losses (Boesch et al. 1997; NSF and NOAA 1998). Blooms of HABs have been nearly an annual event in coastal waters of New England for several years (White et al. 1993). Nonindigenous algal species may be introduced to the environment from ballast water of commercial vessels, recreational boating, shellfish transfer (e.g., seeding), dredging, and disposal of sediments (Boesch et al. 1997), adding to the potential problem of blooms. HAB-related events have occurred around the entire coast of the United States. HABs can indicate eutrophic conditions, alter, impair, or kill plankton and fish communities, smother indigenous vegetation, and lower dissolved oxygen (NOAA 1997). Certain toxic organisms (e.g., *Pfiesteria* spp.) are associated with HABs and have caused major outbreaks of disease and fish kills (Burkholder et al. 1992; NCSU 1998). These short-term impacts can eventually change the natural processes of habitat, reducing viable fish and shellfish populations.

The spread of disease among marine organisms is a potential adverse impact to fish habitat in coastal regions. Pathogens introduced inadvertently (e.g., via run-off) or advertently (e.g., from restocking programs) may spread infections which can be sublethal or lethal and possibly decrease the health and fitness of fish stocks (Kent et al. 1995). Human influences (e.g., nutrient over-enrichment) also have been illustrated to stimulate blooms of naturally occurring pathogens (NCSU 1998). The toxic dinoflagellate, *Pfiesteria piscicida* and other species, has been implicated as the primary causative agent of many fish kills and disease episodes in estuaries and inshore areas (Burkholder et al. 1992; NCSU 1998). Shellfish area closures have resulted from the infestation of diseases (i.e., paralytic, amnesic, and neurotoxic shellfish poisoning) caused by pathogens (i.e., *Alexandrium, Pseudo-nitzchia, Gymnodinium breve* respectively), but the toxins also move up through the trophic web, affecting zooplankton, fish eggs and larvae, juvenile and adult fish, birds, and marine mammals (Boesch et al. 1997). Direct sources of pathogens entering the environment include non-point sources such as municipal and agricultural run-off, septic systems, wildlife feces, industrial shipping, and recreational boating, and point sources such as disposal of dredged material, biotechnology labs, aquariums, and sewage treatment (ASMFC 1992).

Physical Threats

Channel dredging is a frequent long-term maintenance activity associated with coastal development, port and harbor development, and vessel activity (see Barr 1987 for review). The increased need for channel dredging has resulted from increased marine transportation, increased vessel size, expansion of commercial fleets, and alterations in sedimentation patterns of estuaries due to increased coastal settlement and urbanization (Messieh et al. 1991). The short-term impacts to habitat can be substantial. Dredging resuspends sediments and associated contaminants and potentially degrades habitat quality and fish populations. Changes in tidal prism, depth, water temperature, salinity, water velocity, bottom topography, and sediment type are associated with dredging of channels. The changes can decrease dissolved oxygen and SAV distribution and density while smothering the surrounding benthic community. The reconfiguration of sediment type and the removal of biogenic structure may decrease the stability of the bottom and increase the ambient turbidity levels (Messieh et al. 1991). The dredged channel can increase the transport of sediment and siltation rates in the embayment resulting in alteration of local habitats. Increased siltation can effect spawning, feeding, and recruitment habitat (Messieh et al. 1991). Fragmentation of habitat can hinder the movements (i.e., dispersal, recruitment, migrations, etc.) of organisms. The continual maintenance involved with channel dredging can eventually change the indigenous habitat and population dynamics of the region.

The dredging and filling of wetlands for shoreline, coastal, port, and harbor development removes and alters habitat surrounding the developed area. Dredge and fill reduces the wetland function (i.e., retain floodwater and uptake nutrients) and decreases the amount of detrital food source available to biotic communities. Hydrological modifications from dredge and fill activities and general coastal development (e.g., golf courses) may increase the amount of run-off entering the coastal environments that may contribute to the degradation of fishery resources. Along with these specific impacts of wetland dredge and fill activities, the short- and long-term impacts are similar to channel dredging.

Marina and dock construction is an inevitable result of shoreline and port development. Regions that ports are constructed usually contain important estuarine habitats such as salt marshes and grass flats. The development of ports and harbors usually removes or alters these important habitat features (Vandermeulen 1996). The construction of marinas and docks also aggregates contaminants associated with the vessels that use the facilities. Along with contamination of the habitat, the construction of marinas changes habitat parameters such as tidal prism, depth, water temperature, salinity, current velocity and SAV composition, distribution, and abundance. SAV is removed during construction and shaded by the physical structures after construction eventually destroying the vegetation. Mooring chains are frequently used in embayments surrounding marinas and docks. Mooring chains potentially degrade habitat conditions through physical disturbance of benthic features (e.g., SAV). Repeated small-scale habitat loss can have cumulative effects and can fragment habitat which can have a detrimental impact on fish and shellfish stocks. The long-term presence of marinas can contaminate the localized area and change natural habitat qualities and population dynamics in the region. Channel dredging and its associated threats is directly related to the development of ports and harbors.

Vessel activity, including industrial shipping, recreational boating, and marine transportation (e.g., ferry transportation), may contribute to the physical degradation of marine habitats and related marine organisms. Increased vessel activity within coastal waters is directly related to increase in coastal urbanization and port and harbor development. There is generally a paucity of information of boating use levels, but there has been increasingly more boats using coastal waters for the last two decades (Stolpe 1996). Recreational boating may also be a particular concern since most boating activity occurs in warmer months – the time of greatest biological activities in east coast estuaries (Stolpe 1996). The severity of boating-induced disruption on coastal habitats may depend on the geomorphology of the impacted area (i.e., water depth, width of channel or tidal creek, etc.), current speed, composition of sediments, vegetation type and extent of cover, and classification of boat traffic (Yousef 1974; Karaki and vanHoften 1975; Barr 1993). The benthos, shoreline, and pelagic habitat may be disturbed or altered from vessel use in inshore regions, and may result in a cascade of cumulative impacts from hundreds of trips per day in heavily used areas (Barr 1993).

As more people move to the coast, development pressure increases and structures are often constructed along the coastline to prevent erosion and stabilize shorelines. Attempts to protect beaches and reduce shoreline erosion are associated with the development of the coast. Bulkheads, seawalls, jetties, and groins are structures designed to slow or stop the shoreline from eroding. In many cases the opposite occurs with erosion rates increasing along the regulated area. Adjacent coastal habitat is altered and potential short- and long-term impacts to fish and shellfish stocks are associated with the presence of the erosion control structures.

Development of the shoreline may include structures which restrict tidal movements (i.e., roads, bridges, dikes, etc.). The natural flushing of estuarine habitats (e.g., salt marshes) can be hindered by the construction of tidal restricting structures. Confined inshore waters with restricted water exchange may allow HABs to persist (Boesch et al. 1997). Water properties (i.e., salinity, dissolved oxygen, flow, etc.) are altered changing the habitat characteristics that may hinder migratory, spawning, feeding and dispersal movements of marine organisms resulting in depleted stocks of fish and invertebrate species. The hindrance or blockage of tidal flushing and associated biotic movements can degrade associated habitat by altering the natural dynamics.

Dam construction and operation occurs along the New England coast for flood control, power generation, and reservoir formation. Dams alter water flow and sedimentation patterns, depth, water temperature, salinity and stream bed properties. Estuaries directly lose freshwater input with the construction of dams. Migration of fishes is hindered or blocked. Fishes are impinged and entrained, and exposed to dissolved gas supersaturation, aggregated contaminants, and high concentrations of predators and disease in the habitat surrounding dams. The disruption of fish development because of riverine dam construction can directly change the natural habitat and fishery dynamics of inshore regions. The loss of wetlands by the reduction of freshwater input and sediments can have potentially serious impacts on both fish and invertebrate populations.

Freshwater flows into inshore environments are subject to human alteration through water diversion and use and modifications to the watershed (i.e., deforestation, tidal restrictions, and stream channelization) (Boesch et al. 1997). Water withdrawal for freshwater drinking supply, power plant coolant systems, and irrigation occurs along urban and agricultural coasts causing potential detrimental effects on marine habitats and is associated with coastal development. The mass flow of water into a power plant and other reservoirs results in entrainment and impingement of fishes (especially early life-history stages of fish). Larval and juvenile demersal fishes along with invertebrates are susceptible to entrainment and impingement around intake pipes (ASMFC 1992). Critical habitat is lost for marine organisms that are not capable of settling around the intake and may adversely affect fish and shellfish populations by adding another source of mortality to the early life stage which often determines recruitment and strength of the year-class (Travnichek et al. 1993). Water withdrawal and diversion along with anthropogenic watershed changes have been related to the increase in some HABs (Boesch et al. 1997) impacting aquatic and marine habitat. The continued diversion and use of water from coastal waters can lead to degradation of fish and shellfish habitats.

Inshore habitats are impacted by deforestation. Silviculture practices and coastal development contribute to the removal of vegetation and subsequently an increase of impervious surfaces along a river which increases stream bank and stream bed erosion and sedimentation of riparian and estuarine habitat. Hydrologic characteristics (e.g., water temperature) are changed and greater variation in stream discharge is associated with the forestry industry (USFWS 1995). Debris (i.e., wood and silt) are released into the water as a result of the harvest of the forest which can smother benthic habitat. Deforestation can alter or impair natural habitat structures and dynamics.

There is an increasing demand for good-quality sand and gravel aggregate and an increasing exploration for oil, and offshore habitats are being seen as a possible source (Messieh et al. 1991). Mining presents potential direct and indirect problems within inshore habitats such as issues related to toxicity of operational chemicals, accidental discharge of wastes, removal of benthic flora and fauna, changes in substrate character, and the suspension of sediments (ICES 1991). Mining can have direct and indirect impacts to the habitat of the mining site and surrounding regions. Structures are built within habitats to assist in mining and transporting materials. In a review by Pearce (1994), the effects of mining have been listed as: (1) “destruction” of existing benthic biotic community; (2) resuspension of sediments with negative impacts on fishes; (3) changes in bottom topography and sediment composition; and (4) consequences related to the sediment transport from the site by currents. Gravel, mineral, and oil mining occur in inshore environments which are essential for fisheries, and operational and accidental discharges are an environmental concern (Messieh et al. 1991).

Debris, either floating on the surface, suspended in the water column, covering the benthos, or along the shoreline within inshore habitat can have deleterious impacts on fish and shellfish habitat (see Coe and Rogers 1997). Debris is usually defined as man-made solid objects introduced into the environment (Hoagland and Kite-Powell 1997). Benthic communities can be smothered or shaded by debris which results in alteration of the benthic community. Marine organisms may ingest pellets or plastic fragments or become entangled in rope or plastic strings which eventually kill the organisms. The natural processes of the environment are potentially disrupted by debris discharged into inshore habitats. Hoagland and Kite-Powell (1997) review the type, sources, and fates of marine debris in the Gulf of Maine. Plastics account for nearly half of the marine debris found in Maine, New Hampshire, and Massachusetts. Metals, glass, and paper also constitute a proportion of debris in the three states. Cigarette butts are a potential problem in marine environments. Major non-point sources of non-fishing related debris entering the marine environment include industrial shipping, recreational boating, municipal run-off, and decaying shoreline structures. Solid waste disposal, landfills, offshore mineral exploration, and industrial discharge are potential point sources of debris (USEPA 1994).

Disposal of dredged material can disrupt and degrade natural habitat and biotic communities. The stresses associated with dredged material (i.e., oil, heavy metals, nutrients, suspended particles etc.) can threaten the habitat of the dump site and adjacent areas. Along with contaminating the habitat, direct disturbance of the benthic and pelagic communities occurs with disposal. Benthic communities are smothered, associated physicochemical conditions are altered, and increased turbidity may hinder pelagic processes (e.g., photosynthesis of algae) by material settling to the bottom. The potential deleterious impacts of dredged material disposal can alter local and surrounding community structure.

7.2.1.2.2 Offshore Habitats

There are many high energy habitats in which environmental conditions are continuously changing. Benthic and pelagic marine life may be disrupted by a number of threats within offshore waters. Contamination migrates away from the coast and potentially endangers the health of offshore habitats. Offshore waters are being looked to more frequently to supply new resources or resources that have been eliminated from coastal environments. Deep, stable waters and high energy offshore habitats may be disturbed by increasing amounts of non-fishing threats that may disrupt environmental conditions. Low levels of disturbance in deep, stable habitats may present serious implications on finfish and shellfish populations. Chemical, biological, and physical threats continue to grow in areas important for fishery resources in the offshore region.

Chemical Threats

Oil can have severe detrimental impacts on offshore habitat. Spills or blowouts can produce an oil slick on surface waters which can disrupt the entire pelagic community (i.e., phytoplankton, zooplankton, ichthyoplankton). Oil can interfere with reproduction, development, growth and behavior (e.g., feeding) of fishes, especially in early ontogenetic stages. Carcinogenic and mutagenic properties of oil compounds are receiving increasing attention around the world (Larsen 1992). Contaminated sediments may degrade benthic communities. Non-point and point sources of oil in offshore habitats originate from industrial shipping, recreational boating, marine transportation, energy and mineral exploration and transportation, and ocean disposal of contaminated dredged material.

Marine organisms can be contaminated or killed directly and indirectly from the stress of heavy metals discharged into offshore waters. Sediment accumulates the toxic metals, and fishes bioaccumulate contaminants which can cause health problems in human consumers of fish. Industrial and recreational shipping and atmospheric deposition are non-point sources of heavy metals. Ocean disposal of contaminated dredged material, energy and mineral exploration (e.g., drilling muds), and marine transportation (e.g., hull paint containing lead) introduce heavy metals into the environment (Larsen 1992; Buchholtz ten Brink 1996).

Localized eutrophic conditions, characterized by phytoplankton and filamentous algal blooms (HABs), high turbidity, low dissolved oxygen, and low denitrification rates, can occur in offshore habitats with unnaturally high concentrations of nutrients. Any increase in the nutrient levels of the open ocean will markedly effect the productivity of phytoplankton communities (Omori et al. 1994). Increasing the surface productivity may increase the flux of material from the sea surface to the deep sea benthos (Omori et al. 1994). The stable, deep sea environment is trophically linked to the surface waters and an increase flux of organic matter may have notable impacts on bottom habitats (Omori et al. 1994). Other toxic organisms may be implicated with the blooms of noxious algae causing outbreaks of disease or fish kills. Nutrients enter offshore waters from non-point sources such as industrial shipping, recreational boating, and atmospheric deposition, and point sources, including ocean disposal of contaminated dredged material, and energy and mineral exploration and transportation.

Fish and invertebrate populations may be impacted by the input of pesticides into offshore habitats. Contaminated sediments can accumulate in the benthos providing a potential source of stress through trophic levels. Pesticides enter offshore habitats through atmospheric deposition illustrating a potential non-point source, and ocean disposal of dredged material illustrating a point source. Herbicides and fungicides can alter marine habitats by hindering phytoplankton growth and possibly leading to lasting community structure change. Alteration of the photosynthetic plankton community can alter fishery dynamics by replacing natural plankton species composition with new species. The change in the planktonic community may change the lower trophic structure so cascade effects may hinder fish populations (e.g., bottom-up process).

Herbicides can be released into offshore habitats from atmospheric deposition and disposal of dredged material.

Unnatural levels of suspended particles in offshore habitats can increase turbidity, smother benthic habitat, hinder respiration, disrupt water transport rates, and reduce filtering efficiency of organisms. Other problems associated with suspended solids include sorption of toxic metals and organic materials, reduction of egg buoyancy, disruption of ichthyoplankton development, reduction of growth and survival of filter feeders, and decreased foraging efficiency of sight-feeders (Barr 1993). The functions (e.g., photosynthesis) and properties (e.g., dissolved oxygen) of the entire water column may be frequently disrupted. Long-term flux of suspended sediments to offshore waters may provide a source of nutrients that stimulate primary production and contribute to increased turbidity and altered nutrient cycles. Continued high levels of suspended material within offshore waters can lead to fragmentation and alteration of localized community of benthic and pelagic organisms. Suspended particles enter the offshore environment from ocean disposal of dredged material and mining practices.

Biological Threats

Nonindigenous species and reared species potentially impact natural populations by transmitting diseases (exotic or natural), increasing competition with indigenous species, increasing predation on natural organisms, and altering the natural genetic pool (e.g., less genetic heterogeneity). These deleterious impacts can potentially lead to lower fitness of stocks and change the natural community structure and dynamics. Human activities are closely associated with exotic introductions. Shipping (e.g., ballast water), aquariums, and biotechnology are potential sources of nonindigenous species in offshore waters. Dredged material disposal may introduce algal species that degrade habitat conditions.

An increase in natural levels of nutrients induced by human activities can stimulate population explosions of nuisance and toxic algae [harmful algal blooms (HABs)] which have detrimental impacts to habitat and toxic effects on organisms and humans (see O'Reilly 1994; Boesch et al. 1997). Organisms responsible for HABs have occurred naturally in the environment for a long time, so an apparent increase in bloom events may simply reflect better detection of natural phenomena (NSF and NOAA 1998). However, the current increased intensity and frequency of HABs compared to the past appears to indicate more toxic algal species, more algal toxins, more areas affected, more fishery resources affected, and higher economic losses (Boesch et al. 1997; NSF and NOAA 1998). Nonindigenous algal species may be introduced to the environment from ballast water of commercial vessels, recreational boating, shellfish transfer (e.g., seeding), dredging, and disposal of sediments (Boesch et al. 1997), adding to the potential problem of blooms. HABs can indicate eutrophic conditions, alter, impair, or kill plankton and fish communities, and lower dissolved oxygen (NOAA 1997). Certain toxic organisms (e.g., *Pfiesteria* spp.) are associated with HABs and have caused major outbreaks of disease and fish kills within inshore waters (NCSU 1998); however, these outbreaks may spread to offshore habitats. These short-term impacts can eventually cause a change in the natural processes of habitat reducing viable fish and shellfish populations.

Pathogens can be a serious problem in offshore waters by spreading disease and possibly impacting the long-term success, health, and fitness of fish and invertebrate populations. Shellfish area closures may be required as a result of the spread of diseases (i.e., paralytic, amnesic, and neurotoxic shellfish poisoning) which have impacts on human health. For example, paralytic shellfish toxins have been detected in Atlantic surfclams (*Spisula solidissima*), Atlantic sea scallops (*Placopecten magellanicus*), northern horse mussels (*Modilus modiolus*), and ocean quahogs (*Arctica islandica*) within areas of Georges Bank at levels exceeding the public health safety threshold (White et al. 1993). Potential origins for pathogens in the environment include non-point sources of discharge such as industrial shipping, recreational boating, and point sources of discharges such as aquariums and biotechnology (NOAA 1992). Localized regions of high nutrients may trigger outbreaks in harmful organisms that may hinder the health and success of fish and shellfish populations.

Physical Threats

There is an increasing demand for good-quality sand and gravel aggregate and an increasing exploration for oil, and offshore habitats are being seen as a possible source (Messieh et al. 1991). Mining presents potential direct and indirect problems to habitat of the mining site and surrounding regions such as issues related to toxicity of operational chemicals, accidental discharge of wastes, removal of benthic flora and fauna, changes in substrate character, and the suspension of sediments (ICES 1991). Structures are also built within habitats to assist in mining and transporting materials. In a review by Pearce (1994), the effects of mining have been listed as: (1) “destruction” of existing benthic biotic community; (2) resuspension of sediments with negative impacts on fishes; (3) changes in bottom topography and sediment composition; and (4) consequences related to the sediment transport from the site by currents. Gravel, mineral, and oil mining occur in marine environments which are essential for fisheries, and operational and accidental discharges are an environmental concern (Messieh et al. 1991).

Gravel aggregates are abundant throughout the Gulf of Maine and are a potential source for mining (Messieh et al. 1991). Gravel/mineral mining is associated with an increase in stress to the surrounding habitat and removal and disturbance of substrate (Scarrat 1987). The alteration to the mining site can fragment habitat, negatively impacting fish and shellfish populations. Long-term mining sites potentially can change natural habitats and associated fish and shellfish populations (Wilk and Barr 1994).

Oil mining has similar impacts as gravel/mineral mining with more risk associated with accidental spills and blow-outs which can disrupt habitat (Wilk and Barr 1994). Oil wells are in the initial stage of exploration in offshore New England waters. Drilling muds and well cuttings are potential wastes of oil exploration. Drilling muds (either water-based or oil-based muds) are complex and variable mixture of fluids, suspended solids, and chemical additives (Messieh et al. 1991). If exploration results in notable amounts of resources, industrial development may occur in offshore waters; leading to larger amounts of drilling wastes and discharge (Messieh et al. 1991).

Debris discharged or transported offshore may degrade and disrupt benthic and pelagic habitats (see Coe and Rogers 1997). Debris within offshore habitat can smother benthic communities or be ingested by fish (Hoagland and Kite-Powell 1997). Reduction of habitat by destroying the benthos can alter community structure and hinder the sustainability of fisheries. Debris non-point sources include industrial shipping and recreational boating, and a point source includes ocean disposal of garbage and mineral exploration (USEPA 1994).

Disposal of dredged material can disrupt and degrade natural habitat and biotic communities. The associated stresses of dredged material (i.e., oil, heavy metals, nutrients, suspended particles etc.) potentially threaten the habitat of the dump site and adjacent areas. Providing a flux of nutrients to offshore habitats from dredged material may be a notable source contributing to algal blooms. Along with contaminating the habitat, direct disturbance of the benthic and pelagic communities occurs with disposal. Benthic communities are smothered, associated physicochemical conditions are altered, and increased turbidity may hinder pelagic processes (e.g., photosynthesis of algae) by material settling to the bottom. The potential deleterious impacts of dredged material disposal can alter local and surrounding community structure.

7.2.2 Habitat Conservation Recommendations

The Magnuson-Stevens Act requires all FMPs to identify actions to promote the conservation and management of fishery resources and EFH. Prior to the concept of EFH, conservation primarily involved management measures to reduce overfishing and rebuild overfished stocks. Such measures embraced the need to minimize and avoid the mortality of bycatch. While these issues remain very important in fishery management, the EFH amendment will strengthen the role of the Council to further conserve and enhance EFH and related fishery resources.

The EFH Final Rule at Subpart K directs the Council to describe options to avoid, minimize, or compensate for the adverse effects of activities identified in the non-fishing threats section of this amendment, especially in habitat areas of particular concern. The Council has the discretion to provide comments on non-fishing activities authorized by federal and state agencies which impact the EFH of non-anadromous fish species. The conservation and enhancement options promoted by the Council include, as directed in the Final Rule: the enhancement of rivers, streams, and coastal areas; improving water quality and quantity; watershed analysis and planning; and habitat creation.

The enhancement of rivers, streams, and coastal areas may include reestablishing endemic trees or other appropriate native vegetation on riparian areas adjacent to EFH, restoring natural bottom characteristics, removing unsuitable materials from areas affected by human activities, or adding gravel or substrate to stream areas to promote spawning. Improving water quality and quantity may include the use of best land management practices, improved treatment of sewage, proper disposal of waste materials, and providing appropriate in-stream flows. Watershed analysis and planning may include encouraging local and state efforts to minimize destruction / degradation of wetlands, restore and maintain the ecological health of watersheds, and encourage the restoration of native species. Habitat creation may be considered as a means of replacing lost or degraded EFH.

The conservation recommendations offered by the Council in the Omnibus EFH Amendment (NEFMC 1998) are incorporated here by reference. Due to the limited nature of the directed skate bait fishery and the fact that the majority of skate landings are landed as incidental catch in other fisheries, the Council offers no additional conservation recommendations at this time.

7.2.3 Habitat Information and Research Needs

The EFH Final Rule directs the Council to include recommendations, preferably in priority order, for research efforts that the Council and NMFS view as necessary for carrying out their EFH management mandate. The Council has identified four high-level information and research needs to assist with the long-term management of skate essential fish habitat:

1. Additional research to make available sufficient information to support a higher level of description and identification of EFH (i.e., Level 3 and 4).
2. Additional research necessary to identify and evaluate actual and potential adverse effects on EFH including, but not limited to, direct physical alteration, impaired habitat quality/functions, cumulative impacts from fishing, or indirect adverse effects such as sea level rise, global warming and climate shifts, and non-equipment related fishery impacts.
3. Additional research on the effects of different types of fishing equipment on EFH.
4. Research needed to quantify and mitigate the potential adverse effects on EFH identified in this amendment and determined to be an impediment to maintaining a sustainable fishery and the contribution of the managed species to a healthy ecosystem.

The Council also recommends additional research to expand our understanding of skate life history information that will contribute to the comprehensive identification of the habitat requirements of the species or species assemblages, including all life history stages, as well as to provide habitat-related information that defines the interrelationship between the species, the environment and the food web. Specific research and information needs for each species of skate are identified in the EFH source documents (Appendix A of Volume III).

7.3 HUMAN ENVIRONMENT

The human environment encompasses a variety of characteristics of the fishing industry and fishing communities along the Atlantic coast, including the cultural composition of communities, employment history, education, regulatory restrictions on fishing, and economic constraints on community development. This section discusses these characteristics so as to give the reader enough background information to adequately assess the impacts of the management alternatives presented in this document. Since very little is known about directed skate fishing, much of the descriptive information contained in this section was compiled by Skate PDT members through a series of interviews and discussions with participants in the skate fishery. In addition, several fishermen and buyers throughout the region, representatives from industry associations, and representatives from several processing facilities provided information to characterize both the skate bait fishery and the skate wing fishery.

Additional information about the human environment affected by this FMP is presented in the 2000 Skate SAFE Report (Volume II) and should be referenced accordingly.

7.3.1 Description of the Skate Fisheries

7.3.1.1 The Skate Bait Fishery

Characterizing the historical magnitude of the skate bait fishery is somewhat difficult because formal reporting requirements for skates have not yet been implemented. As such, information on the number of participants, landings, and even ports of landing is incomplete. Information from the Skate SAFE Report (Volume II) suggests that the skate bait fishery is a rather small and discrete fishery in terms of the number of participating vessels and as compared to the wing fishery. According to the dealer weighout database, in 1999, 120 vessels landed skate bait on 1,304 trips. Twenty one (21) vessels landed 80% of the total skate bait during the 1999 calendar year, and most of these vessels were medium-sized otter trawl vessels from Point Judith, Rhode Island.

7.3.1.1.1 Rhode Island Bait Fishery

Skates have been targeted commercially in Rhode Island for decades for utilization primarily as lobster bait. The majority of bait skates landed in Rhode Island (>90%) are little skates (*Leucoraja erinacea),* with a small percentage of winter skates (*Leucoraja ocellata)*. There is also a seasonal gillnet incidental catch fishery as part of the directed monkfish gillnet fishery, in which skates (mostly winter skates) are sold both for lobster bait and as cut wings for processing. Fishermen have indicated that the market for skates as lobster bait has been relatively consistent and was increasing until the recent lobster fishery restrictions (pot limits) were implemented. The impact of the recent lobster pot limits on the skate fishery is currently unknown.

The directed skate bait fishery by Rhode Island vessels occurs primarily in federal waters less than 40 fathoms from the Rhode Island/Connecticut/New York state waters boundary east to the waters south of Martha's Vineyard and Nantucket out to approximately 69 degrees. Effort on skates increases in state waters seasonally to accommodate the amplified effort in the spring through fall lobster fishery. In terms of the directed lobster bait fishery, it is estimated that between 30 – 50 Rhode Island otter trawl vessels ranging from 50 – 70 feet dominate the bait market. Ten of those vessels from RI have identified directed skate bait fishing as their sole source of income between June – October annually, with less than 5% of their trip revenues from other species during that time.

Dayboat vessels (<24 hours) directing on skates land between 20,000 – 30, 000 pounds of skates per trip, while trip boats fish 2 – 3 days and land between 70,000 – 85,000 pounds per trip. Incidental catches of skates from vessels targeting either groundfish or the Southern New England mixed trawl fishery (squids, scup, fluke, whiting, mackerel, monkfish, etc.) are estimated at 5,000 pounds and are often sold directly to a lobster vessel (rather than through a dealer). Otherwise, many vessels indicate they do not bother to keep skates caught incidentally due to low market value or deck/hold capacity.

As the number of vessels targeting lobsters has increased, so has the demand for skates. Skates are the preferred bait for the Southern New England inshore and offshore lobster pot fishermen, as the skate meat is tough and holds up longer in the pot than other soft bait choices. Herring, mackerel, and menhaden are also used for bait, usually on trips of shorter duration, in colder water temperatures, or when skates are in short supply.

Skates caught for lobster bait are landed whole by otter trawlers and either sold 1) fresh, 2) fresh salted, or 3) salted and strung or bagged for bait by the barrel. Inshore lobster boats usually use 2 – 3 skates per string, while offshore boats may use 3 – 5 per string. Offshore boats may actually "double bait" the pots during the winter months when anticipated weather conditions prevent the gear from being regularly tended. The presence of sand fleas and parasites, water temperature, and anticipated soak time between trips are determining factors when factoring in the amount of bait per pot.

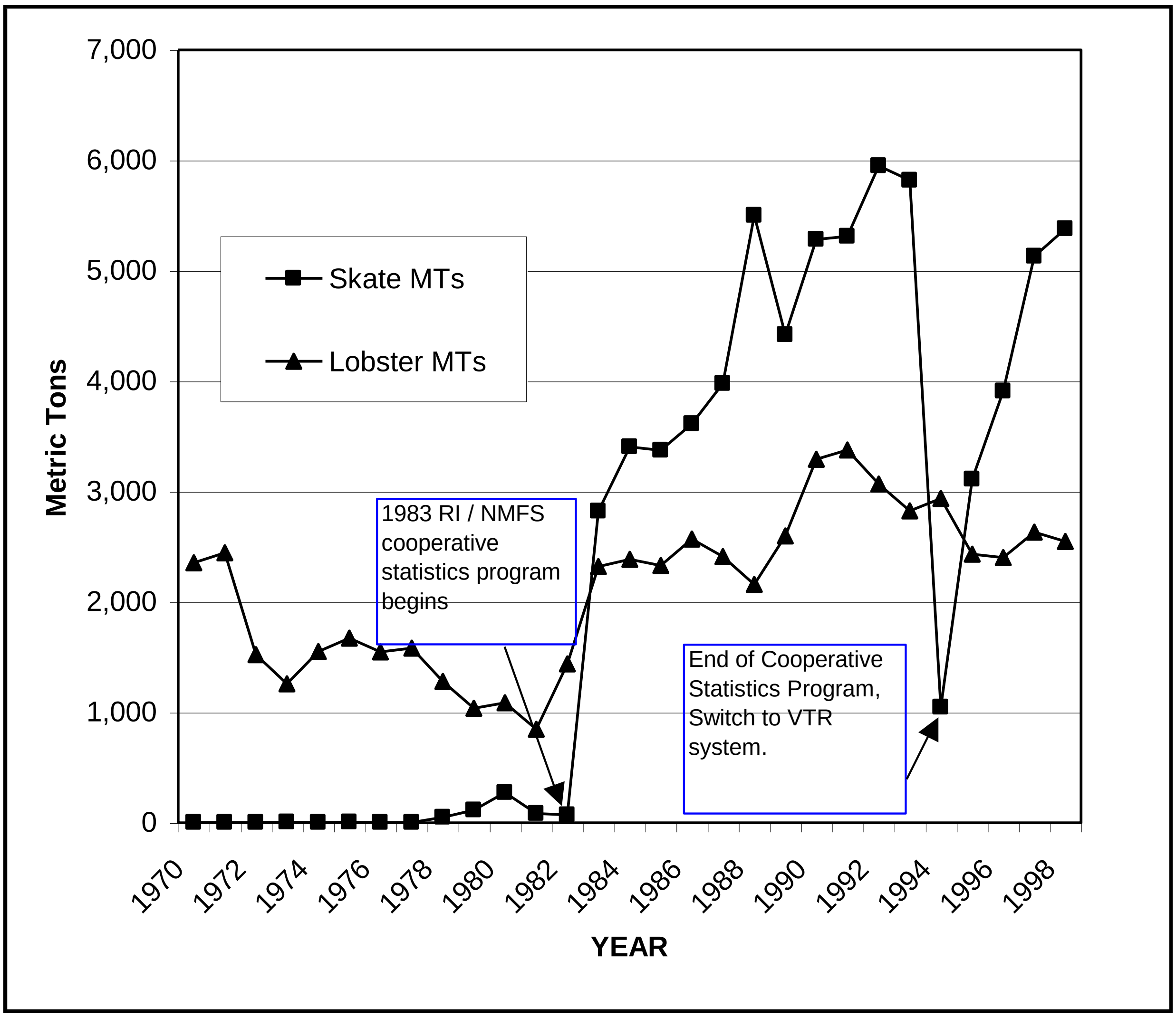
Size is a factor that drives the dockside price for bait skates. For the lobster bait market, a "dinner plate" is the preferable size to be strung and placed inside lobster pots. Little and winter skates are rarely sorted prior to landing, as fishermen acknowledge that species identification between little skates and small winter skates is very difficult. Ex-vessel skate prices remain relatively stable at an average of about $0.06 per pound (see the Skate SAFE Report for a more detailed discussion of price). Quality and cleanliness of the skate are also factors in determining the price paid by the dealer, rather than just supply and demand. The quantity of skates landed on a particular day has little effect on price because there has been ready supply of skates available for bait from the major dealers, and the demand for lobster bait has been relatively consistent. Numerous draggers and lobster vessels have historically worked out seasonal cooperative business arrangements with a stable pricing agreement for skates.

In Rhode Island, there are two major dealers involved in the skate bait market. One reports supplying skates to 150 lobster businesses located in Point Judith, Wickford, Newport, Westerly, and Jamestown, RI, along with businesses scattered throughout Connecticut and Massachusetts. The company buys from 20 – 30 vessels throughout the year, and eleven employees are charged with offloading, salting, and stringing bait for inshore and offshore lobster vessels. The lobster businesses supplied by the company employ between 2 – 5 crewmembers per vessel. The other major skate dealer in Rhode Island supplies both local vessels and numerous offshore lobster vessels fishing in the Gulf of Maine. Skates are supplied to this dealer from draggers working out of Tiverton, RI and New Bedford, MA.

Approximately eighty percent of the skates landed for bait are sold as strung bait, at about $0.85 for a string of three skates, usually 150 strings per barrel for $127.50. Under current lobster pot limitations, the minimum bait costs for inshore areas limited to 800 pots is estimated at $680 per trip and $1530 per trip for offshore lobster vessels limited to 1800 pots. Offshore vessels reported carrying between 10 – 30 barrels of bait per trip, which could reflect different baiting patterns. Skates are also sold by the barrel unsalted and unstrung ($37- 43) or by the barrel unstrung and salted ($52). A tremendous volume of salt is used in the bait operations, up to 130,000 pounds weekly during the peak of lobster season. Barrels of skates may weigh between 500 – 600 pounds. Menhaden bait (pogies) prices vary between $38 – $50 per barrel, depending upon the port and the weight.

Due to direct, independent contracts between draggers and lobster vessels as well as limited reporting requirements, landings of skates are estimated to be under-documented. While bait skates are usually landed (rather than transferred at sea) they are not always reported because they can be sold directly to lobster vessels, which are not required to report as dealers. In addition, until this FMP is implemented, anyone landing skates who does not possess a federal fisheries permit is not required to submit vessel trip reports. The time series of skate landings shows a significant increase in landings in the 1990s (6,700mt in 1989; about 11,400 mt annually from 1990 to present). Fishermen and state fisheries managers attribute the increase in skate landings in 1990 to better reporting and documentation, rather than a significant expansion of the skate fishery. The increase in landings in the Rhode Island skate fishery are coincident with the state's implementation of a comprehensive system to document commercial fishery landings data (Figure 91).

Figure 91 Annual Landings of Skates and Lobsters in Rhode Island



7.3.1.1.2 Other Bait Fishery Ports

Vessels from other ports (New Bedford, and Martha's Vineyard, MA; Block Island, Long Island, Stonington CT, and, to a lesser degree, Chatham and Provincetown, MA) have been identified as participating in the directed skate bait fishery to some extent. Suppliers indicate that some of these vessels have independent contracts with lobster vessels and supply them directly with skates on a seasonal basis. It can be expected that additional ports have undocumented participation in the bait fishery where local lobstermen are supplied with bait skates on an informal basis by accommodating fishermen from the same or nearby ports.

Lobster bait usage varies regionally and from port to port, based upon preference and availability. Some lobstermen in the northern area (north of Cape Cod) prefer herring, mackerel, menhaden and hakes (whiting and red hake) for bait, which hold up in colder water temperatures; however, the larger offshore lobster vessels still indicate a preference for skates and redfish in their pots. Some offshore boats have indicated they will use soft bait during the summer months when their soak time is shorter. The offshore Gulf of Maine lobster vessels (approx. seven of them) estimate they utilize over 1.2 million pounds of skates annually for bait. Skates used by the offshore Gulf of Maine vessels are caught by vessels fishing in the Southern New England area.

7.3.1.1.3 The Southern New England Sink Gillnet Fishery

The Southern New England sink gillnet fishery targets winter skates (*Leucoraja ocellata*) seasonally along with monkfish. Highest catch rates are in the early spring and late fall when the boats are targeting monkfish, at about a 5:1 average ratio of skates to monks (more skates than monks due to monkfish trip limits in the southern area). Little skates (*Leucoraja erinacea*) are also caught incidentally year-round in the gillnets and sold for bait. Several gillnetters indicated that they keep the bodies of the winter skates cut for wings and also salt them for bait. Gillnetters have become more dependent upon skate incidental catch due to cutbacks in their fishery mandated by both the Monkfish and Groundfish FMPs. Gillnet vessels use 12-inch mesh when monkfishing, catching larger skates. Under the current monkfish regulations, gillnetters in Southern New England are fishing with about 1/3 less nets due to monkfish trip limits, with a resultant decrease in skate catches. Southern New England fishermen have reported catching barndoor skates in the last couple of years, which they consider to be unusual for this fishery.

Gillnet fishermen fishing with heavier twine (.90mm) for dogfish and monkfish, primarily in the Mid-Atlantic region, do not catch as many skates in their gillnets. Fishermen reportedly went to the heavier twine to avoid catching skates. The Harbor Porpoise Take Reduction Plan also requires that fishermen west of the 72º 30' line use the heavier gear to avoid entanglements.

7.3.1.2 The Skate Wing Fishery

In contrast to the skate bait fishery, the wing fishery tends to be more of an incidental catch fishery. Determining the historical magnitude of the skate wing fishery is somewhat difficult. Skates caught both domestically and by foreign fleets were not identified by product code in the early landings records. Only in recent years have skate wing landings been identified separately from general skate landings. Information from the Skate SAFE Report (Volume II) suggests that the skate wing fishery is larger and more diverse in terms of participating vessels than the skate bait fishery. In 1999, 775 vessels landed skate wings on 13,614 trips, and most were medium and large-sized trawl vessels. Thirty seven (37) vessels landed 33% of the wings that were landed during the 1999 calendar year.

In response to the New England groundfish crisis, fisheries managers and biologists encouraged the industry to switch to the species long labeled “underutilized,” namely skates, dogfish, and mackerel. The market for skate wings expanded in the mid 1980s until the mid 1990s, the bulk of the market being an export market. Attempts to develop domestic markets were short-lived, and the majority of the skate wing market remains overseas.

Winter skate, thorny skate, and barndoor skate are considered sufficient in size for processing of wings. The geographic and seasonal distributions of these three large skates overlap somewhat. Thorny skates reside primarily in the Gulf of Maine. They are likely mixed most with winter skate catches from the Great South Channel. Winter skate likely dominate skate wing catches from Georges Bank and extend down the continental shelf to Cape Hatteras as well as shallow strata in the Gulf of Maine. Although the reported range of the barndoor skate is wide, the present population appears to be centered on the southern edge of Georges Bank. The population has been at low levels for many years, which suggests that little of the recent skate wing landings would be attributable to this species.

Currently, landed skate wings are seldom identified to species. Processors state that they prefer skate wings of at least 1-1 1/4 lb. skin-on. A one-pound skinless wing is estimated to weigh about 1.3-pounds skin-on. Skate processors buy whole, hand-cut, and/or onboard machine-cut skates from vessels primarily out of Massachusetts and Rhode Island. Cutting machines were developed in 1988 in response to increasing markets for skate wings and increased participation in the fishery. However, the practice of onboard machine cutting has decreased since that time and may not exist at all anymore. Cutting machines have been somewhat problematic because they can leave wing meat on the body of the skate or cut too close to the cartilage, decreasing the quality of the product and/or requiring additional hand-cutting. Processors prefer hand-cut wings because hand-cutting generally produces a better product and higher yield. Because of the need to cut the wings, it is relatively labor-intensive to fish for skates. Many vessels have therefore opted to maximize their DAS by targeting more profitable groundfish species rather than increasing their participation in the skate fishery.

New Bedford emerged early-on as the leader in production, both in landed and processed skate wings, although skate wings are landed in ports throughout the Gulf of Maine and extending down into the Mid-Atlantic. New Bedford still lands and processes the greatest share of skate wings.

The majority (79%) of reported skate wing landings 1995 – 1999 were landed by otter trawl, while most of the remaining wing landings were brought in by gillnets (19%). In general, 10,000–15,000 pounds of landed wings is considered to be a large trip for an otter trawler. Gillnetters tend to land smaller amounts (2,000 – 3,000 pounds of wings during peak seasons). It is assumed that more vessels land skate wings as an incidental catch in mixed fisheries than as a targeted species. Vessels landing skate wings in ports like Portland, ME, Portsmouth, NH, and

Gloucester, MA are likely to be landing them incidentally while fishing for species like groundfish and monkfish.

There is also a seasonal skate wing fishery in Provincetown, MA. Buyers in Provincetown believe that most vessels land skate wings in Provincetown as incidental catch. However, 2 – 3 vessels from Provincetown reportedly target skates seasonally around Stellwagen Bank. Provincetown buyers cite market limitations as the primary reason that more effort has not expanded into this fishery. All skate wings that are landed in Provincetown are shipped to New Bedford for processing.

Fishermen and dealers also cite market limitations as a factor for low participation in the wing fishery in Rhode Island. Many of the companies that experimented with the wing market in the Rhode Island area quickly got out of it, due to low profit margins. Production has reportedly dropped by 80% since the early 1990s for some dealers in the state of Rhode Island.

There is a limited domestic demand for processed skate wings from the white tablecloth restaurant business. Winter skates landed by gillnet vessels are reported to go almost exclusively to the wing market. Some skates are cut onboard the vessel, while many are sold whole and sent for processing. Fishermen indicate that dealers prefer large-sized winter skates for the wing market (over three pounds live weight), which are caught seasonally by Southern New England gillnet fishermen.

The current market for skate wings remains primarily an export market. France, Korea, and Greece are the leading importers. France prefers skate wings, a processed product that is either skinless or skinless and boneless; frozen individually wrapped in poly (IWP). The Korean market generally prefers whole processed skates, and there is a Japanese market for wings. Anecdotal information suggests that there may be a Portuguese market that prefers barndoor skates over winter and thorny skates because they are the least stringy, most tender and flavorful of the wing skates. Interestingly, processors reported that barndoors fetch the lowest ex-vessel prices of the wing skates because they cannot be skinned by machine, as the skin tears too easily.

Brokers have also secured skates for the European and Asian markets from Argentina and Canada. Argentina initially produced a significant amount of skates, but they were reportedly of poor quality. Processing techniques have improved, and Argentina now provides the bulk of the European and Asian market. Argentina supplements their skate production with large skates produced from the U.S. west coast fishery. Canadian production of skates for the export market has diminished, as some of the industry switched toward more lucrative crab and shrimp fisheries.

There are currently four known major skate wing processors in New England and another two companies in the Mid-Atlantic. The companies reportedly buy most wings from vessels out of the New Bedford and Mid-Atlantic ports. One major skate processing facility in New Bedford reports that about 90% of its product is landed in New Bedford, with the remainder trucked from Provincetown, Scituate, and other ports primarily in Massachusetts. Processors report that while demand for the product is generally consistent, profit margins are extremely low. One processor mentioned that the strong U.S. dollar makes the exported product more expensive.

Data of annual production of processed and exported skate products is sparse. Limited trade data was collected by NOAA/NMFS for the New England Fisheries Development Program in 1975. Reports from an international seafood trade expert at the Seafood Institute indicate that skate export poundage was tracked through "Euro Stat Data" until 1995 or 1996, then abandoned. Customs does not track the exports, and no census data exists specific to skate exports.

7.3.2 Commercial Fishery Landings

The Skate SAFE Report (Volume II) presents commercial fishery landings and revenues that are not repeated in this section of the FMP document. The SAFE Report can be referenced for the following information:

- Annual commercial landings of skates on a calendar-year basis
- Annual commercial landings of skates by state, market category, gear, and port on a calendar-year basis
- Canadian landings of skates
- Area-specific catch information from Vessel Trip Reports

So that the fishery information in this FMP document is the most up-to-date and includes information from at least part of 2001, the data presented below are on a fishing year basis (May 1 – April 30) instead of a calendar year basis.

7.3.2.1 Live Weight Versus Landed Weight

Skate landings can be presented in two formats: (1) *live weight*, the estimated total weight of the skates landed, converted to whole skates for wings and (2) *landed weight*, the actual weight of fish landed for commercial sale, including whole skates for bait and just wings for food.

In general, NMFS estimates commercial skate landings from the dealer weighout database and reports total skate landings according to *live weight* (i.e., the weight of the whole skate). This means that a conversion factor is applied to all wing landings so that the estimated weight of the entire skate is reported and not just the wings. While *live weight* is necessary to consider from a biological and stock assessment perspective, it is important to remember that vessels' revenues associated with skate landings are for *landed weight* (vessels in the wing fishery only make money for the weight of wings they sell, not the weight of the entire skate from which the wings came). Therefore, the fishery information presented in the following subsections of this FMP document represents the *landed weight* of skates instead of the *live weight*. In contrast, the landings information presented in the SAFE Report (Volume II) reflects *live weight*, unless otherwise specified.

7.3.2.2 Vessel Trip Reports Versus Dealer Weighout Reports

Skate landings are likely to be under-documented because skates have never been federally-managed, and vessels currently are not required to possess a permit specifically for skate fishing in federal waters. The owner or operator of any vessel issued a federal fishery permit (limited access or open access, with the exception of lobster permits) must submit a daily fishing log report (Vessel Trip Report, VTR) for all fishing trips, regardless of species fished for or taken. The VTR contains detailed information on various aspects of each trip, including area fished and pounds of individual species landed and/or discarded.

Under current regulations, vessels harvesting skates in federal waters that do not have a federal vessel permit for another fishery do *not* have to submit VTRs. (This could occur if a vessel that does not possess *any* federal fisheries permits fishes in one of the Southern New England exempted fisheries for skates.) However, a vessel that has a federal permit for other federal fisheries such as multispecies, scallop, dogfish, or monkfish is required to report (via VTR) all species caught and discarded on each trip, including skates, whether the skates are caught incidentally or as the target species. Because skates currently may be caught and sold by vessels without any federal permits (and therefore not reported through VTR), the amount of skate reported on the Vessel Trip Reports may be an underestimation of the total amount of skates caught and/or landed.

A fish dealer who purchases fish for which there is a federal vessel permit (monkfish, multispecies, scallops, or dogfish, for example) must have the corresponding federal dealer permit. Federally-permitted dealers are required to submit a weekly report which lists all fish purchases (except surf clam and ocean quahog dealers who are required to report only surf clam and ocean quahog purchases). For example, if a dealer has a dealer permit for multispecies, the dealer must also report purchases of skates and all other species in addition to purchases of multispecies. The landings and price data from these weekly reports comprise the "dealer weighout database."

Skates can currently be sold to any dealer because no federal vessel or dealer permits exist. Because skates do not have to be sold *only* to federally permitted dealers, skate landings reported by federally permitted dealers may be an underestimation of the total amount of skate purchased by dealers. One non-reporting bait dealer in New Bedford has been identified whose business is selling fish racks from local processors, in addition to skates landed on order by local vessels.

While both the VTR and the dealer weighout database are likely to under-document skate landings, the Skate PDT believes that the dealer weighout database currently is more reliable than the VTR for several reasons. Because vessels are not required to have a specific permit to fish for skates, the total number of vessels catching skates and the proportion of the total catch that is captured in the VTR remains unknown. There may be skate fishing occurring exclusively in state waters, and there may be several vessels fishing in the Southern New England exempted fisheries for skates without any other federal permits. In fact, it is likely that there are vessels fishing for skates exclusively in state waters to supply local lobster vessels with bait (in small communities on the Cape and the Islands, for example). Any of these vessels that do not possess a federal multispecies (or other) permit are not required to report their catch through a VTR.

Most dealers are likely to have at least one federal fishery permit because very few deal exclusively with skates. This means that most dealers purchasing skates are submitting weekly reports documenting purchases from all species. One dealer in RI has been identified whose business is almost entirely skates, but that dealer claims to have been voluntarily reporting skate purchases for years. The dealer data is assumed to be more reliable for skate landings at this time. In addition, dealers report skate purchases by market category/product code, which is helpful in characterizing skate fishing activity for the wing market and for the lobster bait market. Market categories for skates are also available in the VTR database, but in almost all cases, vessels report their skate landings as “unclassified skates” rather than by market category.

Therefore, the fishery information presented in the following subsections of this FMP document is from the dealer weighout database. Section 3.2.7 of the Skate SAFE Report (Volume II) presents VTR information for “area fished.”

7.3.2.3 Landings by Fishing Year and Market Category

Section 3.2.2 of the Skate SAFE Report (Volume II) presents a time series of total annual landings of skates (calendar year, *live weight*) from 1960-1999. Additional information is presented below (fishing year, *landed weight*).

Table 39 reports the total landed weight of skates (wings and bait) and total skate revenues from the dealer weighout database for fishing years 1994-2000. Over this time series, total landings averaged 14,103,000 pounds, and total revenues averaged $3,839,440 (in 1999 dollars). The 1996 fishing year (FY96) represents the time series high, with landings totaling more than 18,500,000 pounds. With the exception of the 1998 fishing year (FY98), reported landings and revenues since FY96 have been relatively stable.

Table 39 Total Reported Skate Landings and Revenues, Fishing Years 1994-2000

FISHING YEAR	TOTAL LANDED WEIGHT (Thousands of pounds)	TOTAL REVENUES (Thousands of 1999 dollars)
1994	7,828.7	4,995
1995	9,075.8	2,933.6
1996	18,593.6	6,038.4
1997	15,435	2,982.1
1998	17,361.4	3,469.6
1999	15,299	3,101.1
2000	15,127.7	3,356.3

Source: NMFS Dealer Weighout Database

Federally-permitted dealers report most of the skates they purchase by two separate market categories: unclassified skates (code 3650) and unclassified wings (code 3651). There are also product codes specifically for little skates (3660), winter skates (3670), and barndoor skates (3680), but these are very seldom used. In fact, landings from these other product codes were not included in this section because they represent less than 1% of the total skate landings in any given year.

Unclassified skates (3650) are assumed to be landed whole and used primarily for lobster bait. Unclassified wings (3651) are assumed to be landed as wings and used primarily for seafood consumption (most wings are exported to international seafood markets). While the landings by market category from the dealer weighout data may not be entirely complete (for reasons previously discussed), they can be examined to identify the general proportion of skate landings that are used for either the lobster bait market or the seafood market. They can also be disaggregated into individual ports to characterize skate fishing activity in the port (see Section 7.3.3).

Table 40 separates total reported skate landings and revenues into those assumed to be from the bait fishery (3650, unclassified skates) and the wing fishery (3651, unclassified wings). The inconsistencies in the time series, particularly with the bait fishery in FY94 and FY95, are probably a result of mis-reporting and under-reporting and highlight the reasons why implementing better reporting requirements for skates is so important. Excluding FY94 and FY95, the data presented in Table 40 suggest that less than 50% of the total weight of skates landed is from the wing fishery. From FY96-FY00, wing landings averaged 46% of total skate landings. In terms of revenues, however, skate wings are much more commercially valuable than skate bait. From FY96-FY00, revenues from wing landings averaged 81% of the total revenues from skate landings.

While wing landings represent less than one-half of the total pounds of skates landed, converting them to *live weight* produces a different result. The landings information presented in the Skate SAFE Report (see Volume II) indicates that based on *live weight*, skate wings accounted for about 60% of the total skate catch from 1995-1999.

It is difficult to identify trends in either the bait or wing fishery based on the information presented in Table 40, especially because these data are considered to be incomplete. Landings in both the bait and wing fisheries appear to be somewhat inconsistent, which is again due, in part, to under-reporting and mis-reporting.

Table 40 Total Reported Skate Landings and Revenues by Market Category, Fishing Years 1994-2000

FISHING YEAR	MARKET CODE	LANDED LBS (Thousands)	REVENUES (Thousands of 1999 dollars)
1994 Bait	3650 – Uncl. Skates	753.1	65.5
1994 Wings	3651 – Uncl. Wings	7,075.6	4,929.5
1994 TOTAL	3650 + 3651	7,828.7	4,995
1995 Bait	3650 – Uncl. Skates	5,780.4	1,227.1
1995 Wings	3651 – Uncl. Wings	3,295.3	1,706.5
1995 TOTAL	3650 + 3651	9,075.8	2,933.6
1996 Bait	3650 – Uncl. Skates	8,395.3	1,033.7
1996 Wings	3651 – Uncl. Wings	10,198.3	5,004.6
1996 TOTAL	3650 + 3651	18,593.6	6,038.4
1997 Bait	3650 – Uncl. Skates	10,088.1	832.5
1997 Wings	3651 – Uncl. Wings	5,346.9	2,149.6
1997 TOTAL	3650 + 3651	15,435	2,982.1
1998 Bait	3650 – Uncl. Skates	10,136.6	653
1998 Wings	3651 – Uncl. Wings	7,224.8	2,816.6
1998 TOTAL	3650 + 3651	17,361.4	3,469.6
1999 Bait	3650 – Uncl. Skates	8,511.3	542.1
1999 Wings	3651 – Uncl. Wings	6,787.8	2,559
1999 TOTAL	3650 + 3651	15,299	3,101.1
2000 Bait	3650 – Uncl. Skates	6,609.7	474
2000 Wings	3651 – Uncl. Wings	8,518	2,882.3
2000 TOTAL	3650 + 3651	15,127.7	3,356.3

Source: NMFS Dealer Weighout Database

7.3.2.4 Landings by Gear

The otter trawl is the primary gear used to catch skates. Almost all skates caught for the lobster bait fishery are caught with an otter trawl. Gillnets are the secondary gear used to catch skates. Almost all skates that are caught with gillnets are landed as wings. Most otter trawl and gillnet gear used to catch skates is identical to gear used in the multispecies and monkfish fisheries. In fact, most skate wings are caught incidentally in the multispecies and monkfish fisheries.

Other gears in which skates are consistently caught include hook gear (mostly bottom longline) and scallop dredges. Skate landings from these gear types usually account for more than 99% of total annual skate landings and are examined in detail below. Landings by gear are also reported in the Skate SAFE Report (see Volume II) from 1995-1999 for otter trawl, gillnet, hook and line, scallop dredge, seines, pots and traps, pelagic longline, other dredges, unknown gear, and all other gears combined.

Table 41 summarizes skate landings by otter trawl vessels from the NMFS dealer weighout database for fishing years 1994-2000. Data from FY94 and FY95 in particular appear to be problematic in terms of mis-reporting and under-reporting. From FY96-FY00, skate landings from otter trawl vessels averaged about 90% of total skate landings. In terms of landed weight, an average of 55% of skate landings from otter trawl vessels are for the bait fishery, with the remaining 45% for the wing fishery. (The Skate SAFE Report suggests about a 50/50 ratio in terms of live weight.) Again, almost all skates landed for the bait fishery are landed by otter trawl vessels. In fact, from FY96-FY00, bait landings by otter trawl vessels accounted for an average 97% of total bait landings. Wing landings by otter trawl vessels accounted for an average 83% of total wing landings for the same time period.

Table 41 Reported Skate Landings by Otter Trawls, Fishing Years 1994-2000

FISHING YEAR	Bait Landed (% of total skate landings from otter trawl)	Wings Landed (% of total skate landings from otter trawl)	TOTAL LANDINGS (% of total skate landings from all gears)
1994	742.4 (10.8%)	6,107.8 (89.2%)	6,850.1 (87.5%)
1995	5,717.2 (69.4%)	2,519.1 (30.6%)	8,236.3 (90.8%)
1996	8,360.5 (47.5%)	9,246.3 (52.5%)	17,606.8 (94.7%)
1997	8,882.3 (57.5%)	4,275.3 (42.5%)	13,157.6 (85.2%)
1998	10,090.9 (63.5%)	5,807 (36.5%)	15,898 (91.6%)
1999	8,382.7 (59.9%)	5,620.3 (40.1%)	14,002.9 (91.5%)
2000	6,548.1 (48.5%)	6,966.3 (51.5%)	13,514.4 (89.3%)

Landings are expressed in thousands of pounds.
Source: NMFS Dealer Weighout Database

Table 42 summarizes skate landings by gillnet vessels from the NMFS dealer weighout database for fishing years 1994-2000. Data from FY97 in particular appear to be problematic in terms of mis-reporting and/or under-reporting. For the time series, skate landings from gillnet vessels averaged about 8.5% of total skate landings. With the exception of FY97, an average 3.4% of skate landings from gillnet vessels are for the bait fishery, with the remaining 96.6% for the wing fishery. Generally (excluding FY97), bait landings from gillnet vessels have accounted for 1% or less of total skate bait landings. Wing landings from gillnet vessels have averaged about 15% of total wing landings.

Table 42 Reported Skate Landings by Gillnets, Fishing Years 1994-2000

FISHING YEAR	Bait Landed (% of total skate landings from gillnet)	Wings Landed (% of total skate landings from gillnet)	TOTAL LANDINGS (% of total skate landings from all gears)
1994	6.6 (0.9%)	690.3 (99.1%)	696.9 (8.9%)
1995	33.3 (4.6%)	689.2 (95.4%)	722.4 (8%)
1996	31.7 (3.6%)	847.3 (96.4%)	879 (4.7%)
1997	1,205.7 (57.4%)	893.8 (42.6%)	2,099.4 (13.6%)
1998	5.8 (0.5%)	1,180.4 (99.5%)	1,186.2 (6.8%)
1999	90.6 (7.7%)	1,087.7 (92.3%)	1,178.2 (7.7%)
2000	49.1 (3.3%)	1,421.7 (96.7%)	1,470.8 (9.7%)

Landings are expressed in thousands of pounds.
Source: NMFS Dealer Weighout Database

Table 43 summarizes skate landings by bottom longline vessels from the NMFS dealer weighout database for fishing years 1994-2000. Generally, bottom longline vessels do not land large quantities of skates and have contributed to less than 1% of the total skate landings since the 1995 fishing year. Almost all skates that are landed by bottom longline vessels are for the wing fishery.

Table 43 Reported Skate Landings by Bottom Longlines, Fishing Years 1994-2000

FISHING YEAR	Bait Landed (% of total skate landings from bottom longline)	Wings Landed (% of total skate landings from bottom longline)	TOTAL LANDINGS (% of total skate landings from all gears)
1994	3.8 (2.3%)	158.3 (97.7%)	162.1 (2.1%)
1995	0 (0%)	51.9 (100%)	51.9 (0.6%)
1996	0 (0%)	39 (100%)	39 (0.2%)
1997	0 (0%)	37 (100%)	37 (0.2%)
1998	0 (0%)	46.7 (100%)	46.7 (0.3%)
1999	12.4 (26.7%)	34 (73.3%)	46.4 (0.3%)
2000	0 (0%)	16.3 (100%)	16.3 (0.1%)

Landings are expressed in thousands of pounds.
Source: NMFS Dealer Weighout Database

Table 44 summarizes skate landings by scallop dredge vessels from the NMFS dealer weighout database for fishing years 1994-2000. Similar to bottom longline vessels, scallop dredge vessels do not land large quantities of skates. Since FY94, skate landings from scallop dredge vessels have accounted for far less than 1% of the total skate landings.

Table 44 Reported Skate Landings by Scallop Dredges, Fishing Years 1994-2000

FISHING YEAR	Bait Landed (% of total skate landings from scallop dredge)	Wings Landed (% of total skate landings from scallop dredge)	TOTAL LANDINGS (% of total skate landings from all gears)
1994	0 (0%)	94.7 (100%)	94.7 (1.2%)
1995	24.9 (57.8%)	18.3 (42.2%)	43.1 (0.5%)
1996	2 (10.9%)	16.3 (89.1%)	18.3 (0.1%)
1997	0 (0%)	24.9 (100%)	24.9 (0.2%)
1998	39.8 (35.3%)	73.1 (64.7%)	112.9 (0.7%)
1999	0.2 (14.3%)	1.2 (85.7%)	1.4 (0.01%)
2000	0 (0%)	8.5 (100%)	8.5 (0.05%)

Landings are expressed in thousands of pounds.
Source: NMFS Dealer Weighout Database

7.3.2.5 Landings by Port

Section 3.2.6 of the Skate SAFE Report (Volume II) identifies the following ports as the top ports of landing for skate bait and wings:

Skate Bait Landings

1. Point Judith, RI
2. Tiverton, RI
3. Stonington, CT
4. Cape May/Wildwood, NJ
5. New Bedford, MA
6. Belford, NJ and Newport, RI (only recently)

Skate Wing Landings

1. New Bedford/Westport, MA
2. Provincetown, MA
3. Point Judith, RI
4. Hampton Bay, NY
5. Portland, ME
6. Gloucester, MA
7. Point Pleasant, NJ

Landings information for these and other ports from calendar years 1995-1999 are presented in the SAFE Report. In addition, updated information on landings and revenues for these and other ports is presented in Section 7.3.3 below.

7.3.3 Port/Community Information

7.3.3.1 Introduction

This section summarizes available fishery, social, economic, and cultural information about vessels and communities engaged in skate fisheries. Information contained in this section is useful for assessing the economic, social, and community impacts of the Skate FMP management measures and helps to meet the Council's legal requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and the National Environmental Policy Act (NEPA) as well as other applicable law.

NEPA requires federal agencies to consider the interactions of natural and human environments, and the impacts on both systems of any changes due to governmental activities or policies. This consideration is to be done through the use of "a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences ... in planning and decision-making" [NEPA section 102(2)(a)]. Unquantified environmental amenities and values must be considered and weighed on par with technical and economic considerations. Unquantified amenities and values include such factors as angler satisfaction, job satisfaction and an independent life-style for commercial fishermen, and the opportunity to see species, such as salmon, in the wild for the non-consumptive user of marine fishery resources. Technical considerations include the management of fishing gears and enforceability of regulations.

NEPA specifies that the term "*human environment*" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment [40 CFR 1508.14]. When analyses predict that a fishery management action or policy will have a significant effect on the human environment, a detailed Environmental Impact Statement (EIS), including results of various analyses, must be prepared. The Skate FMP development process consequently requires the development of an EIS.

The MSFCMA has reflected the NEPA approach in the National Standards for fishery management. The "prohibition on overfishing" standard (NS1), "use of best available scientific information" standard (NS2), and the "fair and equitable allocation" standard (NS4) are examples of this. Where a "system for limiting access to the fishery in order to achieve optimum yield" [MSFCMA section 303(b)(6)] is deemed necessary, the MSFCMA requires the Secretary of Commerce and the Council to consider in depth the economic and social impacts of the system. In 1990, the MSFCMA was amended further and required that an FMP must assess, specify, and describe the likely effects of conservation and management measures on participants in the affected fishery, and the effects on participants in other fisheries that may be affected directly or indirectly [MSFCMA section 303(a)(9)]. This requirement strengthened the relationship between the MSFCMA and NEPA.

In the 1996 amendments to the MSFCMA, Congress added provisions directly related to social and economic factors for consideration by Councils and NMFS. National Standard 8 of the MSFCMA states that:

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

National Standard 8 requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. "Sustained participation" is interpreted as continued access to the fishery within the constraints of the condition of the resource.

In summary, a full range of impact assessments – ecological, economic, and social – are necessary not only to meet MSFCMA and NEPA requirements, but also to improve the Council's decision-making process.

7.3.3.2 Available Information about Skate Communities

It is fortunate that the skate fishery overlaps as much as it does with the multispecies fishery because a substantial amount of information is available about the communities engaged in the multispecies fishery. This FMP builds on that information and supplements it with skate-specific data. While it is not practical to include all available social and community information in this FMP document, appropriate references are included in the following subsections so that readers and reviewers can access any additional materials in which they are interested. In addition, most of these additional materials can be obtained by contacting the Council office.

Madeleine Hall-Arber et. al. recently completed a report entitled, "*Fishing Communities and Fishing Dependency in the Northeast Region of the United States*" as part of a grant received through the Marine Fisheries Initiative (MARFIN). This MARFIN Report serves to lay the groundwork for regional and community data sharing among managers, fishing industry participants, and fishing communities. It complements an economic input-output model (based on IMPLAN) currently being updated at Woods Hole Oceanographic Institution. One unique feature of the MARFIN Report is that it attempts to characterize and quantify fishing dependence in various coastal communities. Measuring fishing dependence is complicated and requires consideration of fishing history, infrastructure, social institution, gentrification, etc.. These and other issues are described in the MARFIN Report.

While it is not practical to include the MARFIN Report as part of the Skate FMP document (it is more than 400 pages), it should be noted that the MARFIN Report serves as an important reference. It is noted in the subsections below when additional information can be obtained by referencing the MARFIN Report as well as other relevant materials.

The MARFIN Report updates economic, social, and cultural data for fishing communities in New England (Maine – Connecticut), but does not include Mid-Atlantic states. Bonnie McCay et. al. recently received funding to conduct similar research for the Mid-Atlantic states. McCay et. al. propose to use demographic, ethnographic, survey, and participatory methods to develop community profiles for Mid-Atlantic fishing communities that are comparable in structure and scope to those used by Hall-Arber et al. This, combined with the MARFIN Report for the New England states, should provide a baseline database that can be used to assess the impacts of changes in the regulatory environment on fisheries and fishing communities now and in the future. Since the MARFIN and McCay et. al. work is intended to represent a starting point for the systematic collection of social and community information, the data should be updated regularly as more information becomes available.

While a similar report for the Mid-Atlantic states is currently not available, McCay and Cieri did recently complete general updates to port profiles for the Mid-Atlantic region as work funded by the Mid-Atlantic Council (McCay and Cieri, 2000). Resources were quite limited, but McCay and Cieri utilized NMFS landings data, census information, brief visits to ports and interviews with key informants, and other materials where available to characterize fishing ports in the Mid-Atlantic region. This information will serve as the most recent information for these ports until additional work is completed. Again, while it is not practical to include this report as part of the Skate FMP document, it should be noted that this report serves as another important reference. It is noted in the subsections below when additional information can be obtained by referencing the McCay and Cieri 2000 report.

The references for the two documents discussed above are:

Hall-Arber, Madeleine, Christopher Dyer, John Poggie, James McNally and Renee Gagne, 2001. *Fishing Communities and Fishing Dependency in the Northeast Region of the United States.* MARFIN Project Final Report to National Marine Fisheries Service, 429 pp.

McCay, Bonnie and Marie Cieri, April 2000. *Fishing Ports of the Mid-Atlantic.* Report to the Mid-Atlantic Fishery Management Council, Dover, Delaware, 183 pp.

The two additional reports described below contain fishing community information and serve as useful references.

In October 1996, Aguirre International completed a report entitled, *An Appraisal of the Social and Cultural Aspects of the Multispecies Groundfish Fishery in New England and the Mid-Atlantic Regions*. This report was intended to be the result of the first phase of a comprehensive assessment of the social and cultural characteristics of fishing communities involved in the multispecies fishery. The recently completed MARFIN Report builds on the information presented in the Aguirre Report and includes more information about dependence, gentrification, and other important issues. However, the Aguirre Report is still useful for some historic information and for a snapshot of some fishing communities around the time of implementation of Amendments 5 and 7. The communities profiled in the Aguirre Report include:

- **Primary Ports:** Portland, ME; Gloucester, MA; Chatham, MA; New Bedford, MA; Point Judith, RI
- **Secondary Ports:** Stonington and Downeast, ME; Portsmouth, NH and southern Maine ports; Provincetown, MA; Newport, RI; Montauk, NY; Ocean City, MD; Tidewater, VA; Wanchese, NC.

Bonnie McCay et. al. completed a report for the Mid-Atlantic Council detailing aspects of fishing communities in the Mid-Atlantic region in December 1993. This report was intended to serve as a source document for social and economic impact assessments and contains useful information about the fisheries in which vessels in these communities participate. While it does not include much social and community information (demographics, cultural information, etc.), the economic and fisheries information is helpful to characterize communities' involvement in and dependence on various fisheries, including the multispecies fishery. The report provides information on communities throughout the Mid-Atlantic area, including ports in New York, New Jersey, and Rhode Island, as well as Stonington, CT, New Bedford and Chatham, MA, Wanchese, NC, Ocean City, MD, and Hampton Roads, VA.

The references for the two documents discussed above are:

Aguirre International, October 1996. *An Appraisal of the Social and Cultural Aspects of the Multispecies Groundfish Fishery in New England and the Mid-Atlantic Regions.* Submitted to NOAA under Contract Number 50-DGNF-5-00008, 141 pp.

McCay, Bonnie, Blinkoff, Belinda, Blinkoff, Robbie, and Bart, David, December 1993. *Report, Part 2, Phase I, Fishery Impact Management Project, to the Mid-Atlantic Fishery Management Council.* Report to the Mid-Atlantic Fishery Management Council, Dover, Delaware, 179 pp.

7.3.3.3 Fishing Communities of Interest for the Skate FMP

Section 316 of MSFCMA defines a fishing community as:

> *"a community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community."*

It is important to note that fishing communities are not bounded or separated from the commerce and institutional apparatus of the larger cities and towns in which they are located. In fact, most fishing communities rely on a rather complicated network of business and social ties that extend well beyond the boundaries of their communities and often into other fishing communities in the region.

As part of the development of Amendment 13 to the Multispecies FMP, coastal communities throughout the Northeast Region were organized into primary and secondary *community groups* based on participation in the groundfish fishery since the 1994 fishing year. The community groups are assembled in such a way that additional information about them can be obtained by cross-referencing information about the sub-regions in the MARFIN Report. The community groups are essentially subsets of the sub-regions identified in the MARFIN Report. They also help to streamline the assessment process, while still providing a mechanism to consider impacts on all ports in which groundfish are landed.

For the most part, social and demographic statistics are compiled by the Census Bureau at the county level, so the community groups include those communities that can be found within the same county or within adjacent counties, depending on how the MARFIN sub-regions are structured. That way, county-level census data may be more useful to characterize changes in the fishing communities located within a particular county or within adjacent counties.

While approximately 46 primary and secondary community groups from ME-NC were identified for as part of the Amendment 13 process, the scope and range of skate fisheries does not require consideration of all 46 groups. The distribution of skate landings throughout the region is far less wide, and it is possible to identify a smaller list of community groups that include the vast majority of the skate fishery. In addition, given the limited skate-specific information that is available, it is not necessary to differentiate between primary and secondary community groups for skates at this time.

The list below identifies the community groups that will be the focus of the Skate FMP. Additional information is presented for each of these community groups in the following subsections.

1. Portland, Maine
2. Gloucester, Massachusetts
3. New Bedford/Fairhaven, Massachusetts
4. Provincetown, Massachusetts
5. Point Judith, Rhode Island

6. *Western Rhode Island* – Charlestown, Westerly, South Kingstown (Wakefield), and North Kingstown (Wickford)
7. *Eastern Rhode Island* – Newport, Tiverton, Portsmouth, Jamestown, Middletown, and Little Compton
8. *Eastern Long Island, NY* – Montauk, Hampton Bay, Shinnecock, and Greenport
9. *Northern Coastal New Jersey* – Point Pleasant, Belford, Long Beach/Barnegat Light, Barnegat, Highlands, Belmar, Sea Bright, and Manasquan
10. *Southern Coastal New Jersey* – Cape May, Wildwood, Burleigh, Sea Isle City, Ocean City, Stone Harbor, and Avalon

It should be noted that some skate landings have been reported from ports in Connecticut as well. Unfortunately, detailed data at the trip and individual-vessel level for CT ports are not available for use at this time. Council staff is currently working with staff from CT DEP to obtain this information and will provide it for the final Skate FMP document if possible. Also, the MARFIN Report provides detailed profiles of New London and Stonington, Connecticut. It also includes a general profile of the Connecticut sub-region. These profiles should be referenced for additional information about fishing communities in CT.

In addition to the information presented in this FMP document, Section 3.2.6 of the Skate SAFE Report (see Volume II) includes annual skate landings by market category for all ports engaged in skate fisheries from 1995-1999.

7.3.3.3.1 Portland, Maine

Portland, Maine has been identified as a central and primary port for the multispecies fishery, but this community's involvement in the skate fishery is limited and rather insignificant relative to other fishing activity in the area. The MARFIN Report provides a detailed profile of Portland as well as a general demographic profile of Cumberland County, the county in which Portland is located. These profiles should be referenced for social and demographic data not contained in this FMP document. In addition, the Portland Fish Exchange (PFE) publishes an annual report that details activity at the Exchange. These reports include information about prices, annual and monthly landings, cull sizes, and other important economic information. Information about the PFE can be obtained from its website, www.portlandfishexchange.com.

Maine became a state in 1820, and Portland became the capital. Portland has a rich history in commercial fishing, and it is considered an active port still today. Revenues from the commercial fishing industry may only represent about ten percent of the city's gross product, but commercial fishing is considered culturally important to the city. Portland showed its support for the presence of a strong commercial fishing industry when it helped establish the Portland Fish Exchange in 1987. Portland then became the first city on the East Coast with a display auction for the sale of fresh fish. After a somewhat rocky start, the Portland Fish Exchange has been very successful, and about 90% of groundfish landed in Portland goes through the auction.

According to the 1990 Census, 64,358 people lived in Portland in 1989. The racial and ethnic background of Portland citizens has been primarily English, French, and Irish, but experts predict that these figures will radically change in the 2000 Census. MARFIN reports that Portland has

21 processors of fresh and frozen seafood. Respondents estimated that 300-400 households are directly dependent on commercial fishing and about 1,500-2,000 households are indirectly dependent. MARFIN also found that the majority of fishermen from Portland are from Maine and are year-round harvesters. It is interesting to note that the limiting factor in the growth of fish processing in Maine seems to be due more to labor shortages than lack of fish.

MARFIN reports that trawlers, longliners, and gillnetters have traditionally worked out of Portland. According to 1992 NMFS permit data, 68 commercial vessels were homeported in Portland, and in 1997 that number fell to 51. When groundfish fishermen faced cut backs in days-at-sea regulations, a number of large groundfish vessels switched to the herring, mackerel, and squid fisheries. Some smaller groundfish vessels turned to lobster fishing instead. The groundfish industry in Portland seems to be recuperating, and in 2000 there were at least 18 large groundfish boats. Another shift in the groundfish fleet has been in the pattern of ownership. The MARFIN Report found that before DAS limitations, most vessels in Portland were owner-operated; today more of Portland's groundfish fleet is comprised of owners of two and three vessels. Some key informants in the MARFIN survey indicated that the cumulative impacts of Amendment 5 and 7 are what has affected Portland the most. The top ten species landed in Portland in 1997 according to the MARFIN Report (in order of pounds landed) were: herring, lobster, shrimp, plaice, cod, witch flounder, pollock, monkfish, white hake and silver hake. The recreational fishing industry seems to be limited in Portland, but it was reported that there are five marinas in South Portland.

Fishing Activity in Portland

Table 45 summarizes landings and revenues by multispecies permit holders in Portland from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 45 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

Overall, the number of multispecies-permitted vessels that land fish in Portland has decreased by 25% since FY94. While the number of multispecies vessels has declined, the total landings by these vessels have increased by 81% over the time series. However, total revenues have fallen by 21%; this is explained by the significant increase in low-value, small mesh non-multispecies since FY96 (probably herring). Skate landings by multispecies permit holders in Portland were not significant over the time series and actually declined 66% from FY94 to FY00. In FY94, skate landings only accounted for 1.1% of total landings by multispecies permit holders in Portland; in FY00, this percentage fell to only 0.2%. Skate revenues represent an even smaller fraction of total fisheries revenues for multispecies vessels in Portland.

Multispecies vessels landing in Portland do not appear to be substantially involved or dependent on the skate fisheries. For example, in FY00, skate landings in Portland accounted for 1.2% of total wing landings and 0.7% of all skate landings. Skate revenues in Portland accounted for 1.8% of total wing revenues and 1.6% of all skate revenues in FY00. Virtually no bait skates are landed in Portland, despite Maine's significant involvement in the lobster fishery. This is because lobstermen north of Cape Cod tend to prefer herring, mackerel, menhaden and hakes (whiting and red hake) over skates for lobster bait.

Table 45 Landings and Revenues from Multispecies Permit Holders in Portland, Maine (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**189**	**193**	**172**	**184**	**137**	**145**	**139**
TOTAL							
Landings	27,221.1	27,579.3	30,697	57,070.8	32,727.6	40,873	49,309.8
Revenues	32,004.9	30,748.2	27,688.2	24,236.5	20,658.6	24,618.8	25,322.8
SKATE BAIT							
Landings	3.8	0.2	0	0	0.3	0	0
Revenues	2.8	0.1	0	0	0.2	0	0
SKATE WINGS							
Landings	303.1	200.6	206.6	0.02	144.1	150.2	102.6
Revenues	203.2	117.8	110.9	0.003	69.8	81.2	52.3
GROUNDFISH							
Landings	17,010.7	15,002	14,622.3	13,979.3	12,652.8	11,952.3	15,588.9
Revenues	21,130.2	19,019.3	16,731	14,927.2	14,632.5	14,870.3	16,371.5
SMALL MESH MULTISPECIES							
Landings	1,322.9	1,906.4	3,219.9	1,179.6	147.3	143.2	17.1
Revenues	461.4	635.1	1,169	305	46.5	55.1	9.2
SMALL MESH NON-MULTISPECIES							
Landings	3,684.7	5,240.7	8,120.2	38,714.5	15,869	23,816.6	30,313.7
Revenues	3,700.8	4,324.5	4,561.1	4,861.4	1,869	2,983.4	2,075.3
HIGH VALUE SPECIES							
Landings	63.1	239.8	52.9	45.3	23	27.7	1.1
Revenues	545.4	963.5	228.9	156.9	117.5	190.2	6.5

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.
Skate bait represents market category 3650, and skate wings represent market category 3651.
Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.
Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.
Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.
High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.2 Gloucester, Massachusetts

Gloucester, Massachusetts is another central and primary port for the multispecies fishery that has had limited involvement in skate fisheries. The MARFIN Report provides a detailed profile of Gloucester. It also includes a general profile of the North Shore sub-region and Essex County, the county in which Gloucester and the North Shore communities are located. These profiles should be referenced for social and demographic data not contained in this FMP document.

Gloucester has been a fishing port since it was founded in 1623. One individual told MARFIN researchers, "everyone in Gloucester knows a fisherman." It is a tight community where fishing is still an honorable profession. It was mentioned in the MARFIN Report that Gloucester is probably diversified enough to sustain itself without fishing, but it is hard to imagine a city like Gloucester without commercial fishing. Gloucester's inner harbor is a "designated port area," thus legally bound to maintaining marine dependent uses.

The 1990 Census reported that 28,716 individuals lived in Gloucester, and in 1996, that number increased to 29,267. In 1997, there were 226 federally-permitted vessels in Gloucester. One respondent from the MARFIN Report estimated that 90% of the fleet was born in the Gloucester area, and sixty percent of those individuals have fishing in their family history. Gloucester is the original home of frozen fish thanks to Gloucester native, Clarence Birdseye, who developed the technique of freezing fish. Today, Gloucester is still the leader in processing frozen fish, but most of the fish is imported from Canada, Iceland, and Norway. Gloucester has a large infrastructure for commercial fishing including dealers, trucking companies, the Gloucester Display Auction, and several fuel companies. In 1997, it was estimated that there were 1,581 employees earning $58 million in the seafood processing and wholesaling industry in Gloucester.

Most fishermen in Gloucester are full-time, but due to fishery regulations many have supplemented their income with other land-based jobs such as mechanics or construction workers. The MARFIN Report found that most fishermen from Gloucester are full-time groundfish fishermen or lobstermen. There are numerous fishing-related organizations in Gloucester, and many of them have been active in the regional fisheries management process. The communication between the fishing industry and government representatives is said to be "strong" in Gloucester. The presence of recreational fishing is growing, and whale watching is another active industry in this port.

Fishing Activity In Gloucester

Table 46 summarizes landings and revenues by multispecies permit holders in Gloucester from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 46 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

Overall, the number of multispecies vessels that land fish in Gloucester has declined by 12% since FY94. Total landings by multispecies vessels in this community have decreased by 20%, and total revenues are down 7% over the time series. The largest decrease in landings occurred between FY98 to FY99; this significant drop was due to a major decline in small mesh non-multispecies landings, more specifically herring. In fact, because of the large volumes, herring landings are primarily responsible for the variations in total landings over the time series. Skate landings by multispecies permit holders in Gloucester were not significant over the time series and actually declined 14% from FY94 to FY00. Skate landings account for far less than 1% of total landings by multispecies permit holders in Gloucester. Skate revenues represent an even smaller fraction of total fisheries revenues for multispecies vessels in Gloucester.

Multispecies vessels that land fish in Gloucester do not appear to be substantially involved or dependent on the skate fisheries. For example, in FY00, skate landings in Gloucester accounted for 2.8% of total wing landings and 1.6% of all skate landings. Skate revenues in Gloucester accounted for 3% of total wing revenues and 2.6% of all skate revenues in FY00. Virtually no bait skates are landed in Gloucester. This is because lobstermen north of Cape Cod tend to prefer herring, mackerel, menhaden and hakes (whiting and red hake) over skates for lobster bait.

Table 46 Landings and Revenues from Multispecies Permit Holders in Gloucester, Massachusetts (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**350**	**286**	**297**	**292**	**321**	**280**	**308**
TOTAL							
Landings	46,564.5	53,732.7	70,790	76,172.5	105,586.6	36,732	37,186.4
Revenues	27,272.2	22,367	21,243.6	22,906.6	25,713	24,563.4	25,350.7
SKATE BAIT							
Landings	4	0.01	0	0	0	0	0
Revenues	2.3	0.004	0	0	0	0	0
SKATE WINGS							
Landings	269.1	139.9	98.9	105.8	135.7	236.5	234.6
Revenues	156.4	65	43.7	38.4	54.5	95.5	85.6
GROUNDFISH							
Landings	14,405.3	11,887.3	12,016.3	12,468.6	12,950.9	13,038	14,302.4
Revenues	17,204.3	13,530	11,904.4	13,428.5	14,866.4	15,842.4	15,264.5
SMALL MESH MULTISPECIES							
Landings	3,370.4	2,877.9	2,621.7	2,104.5	2,072.7	2,894.7	2,508.8
Revenues	1,216.2	1,029.7	769	821.8	967.5	1,553	1,133.6
SMALL MESH NON-MULTISPECIES							
Landings	19,034.7	28,405.3	47,048.2	51,336.6	77,945	13,089.3	13,088.9
Revenues	1,725.5	1,974.7	2,612.2	2,863.8	4,305.9	772.3	720.6
HIGH VALUE SPECIES							
Landings	319.1	187.7	466.9	345.7	301.7	297.9	352.8
Revenues	2,350.8	1,444.7	2,835.6	2,802.9	1,919.1	1,892.1	1,716.8

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.

Skate bait represents market category 3650, and skate wings represent market category 3651.

Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.

Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.

Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.

High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.3 New Bedford/Fairhaven, Massachusetts

New Bedford and Fairhaven, Massachusetts is a primary community group for the multispecies fishery that has some involvement in both the skate bait and wing fisheries. In fact, New Bedford is the top port of landing for skate wings.

The MARFIN Report provides detailed profiles of New Bedford and Fairhaven, Massachusetts. It also includes a general profile of Bristol County, the county in which the New Bedford and Fairhaven are located. These profiles should be referenced for social and demographic data not contained in this FMP document.

The New Bedford/Fairhaven region was the largest whaling area in the United States, and turned to harvesting and processing finfish and shellfish in the late 1880s. In 1997, the New Bedford Chamber of Commerce said that 60% of the city's economy was supported by the fishing industry. MARFIN noted that a 1999 report found that the seafood industry contributed nearly $609 million in sales and 2,600 jobs, 90 and 70 percent of the sales and employment harborwide. MARFIN found that in the New Bedford/Fairhaven area, there are roughly 75 seafood processors, and wholesale fish dealers, and 200 other shoreside industries; together these businesses employ around 6,000-8,000 additional workers.

Historically, scallops and yellowtail flounder made up the majority of landings in this area. New Bedford is a very industrial waterfront and while it dwarfs Fairhaven in size, there are numerous boat yards and marinas in Fairhaven as well. According to the 1990 Census, 99,922 people lived in New Bedford and 16, 132 in Fairhaven. New Bedford has the largest percentage of Portuguese population in the United States. MARFIN found that the majority of the dragger fleet is Portuguese, while the Norwegian population in New Bedford/Fairhaven work on scallop boats.

MARFIN identified New Bedford as the port with the most developed infrastructure for groundfishing and the top port in New England for groundfish landings and revenues. MARFIN reported that there are roughly 250 fishing vessels in New Bedford; close to 100 of these are scallop vessels, and the majority of the rest are groundfish and monkfish vessels. The fleet in Fairhaven is mostly scallopers, but the size is about half of what it was before the groundfish and scallop Amendments were implemented. MARFIN estimated the numbers of fishermen to range from 1,800 to 3,000 for the area over time. The majority of boats in the area are owner-operated, and several owners have small fleets of vessels. The MARFIN Report found that it is more likely to find family members working together on groundfish vessels than on scallop vessels. There are numerous fishing-related organizations in the area, and they have a significant role in providing support the fishing community. MARFIN indicated that both federal and state legislators generally support the fishing industry in this area, and communication with these representatives is good.

When Georges Bank closed, many fishermen in this area went south to fish for fluke. Most fishermen interviewed in the later part of the MARFIN survey agreed that DAS is the regulation with the most impact on scallopers and groundfishermen. Fishermen are becoming more selective with their fishing effort, getting the most out of every fishing day possible, but some of the older fishermen are finding it difficult to adapt. MARFIN concluded that the uncertainty in the fishing industry and it's future is what most fishermen in this area are concerned about. Most fishermen who responded said they hoped their children would not go into fishing, due to the difficulties associated with constantly changing regulations and lack of financial security.

Fishing Activity in New Bedford

Table 47 summarizes landings and revenues by multispecies permit holders in New Bedford/Fairhaven from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 47 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

Fishing activity in the port of New Bedford/Fairhaven has really rebounded since FY94. The number of multispecies vessels that landed fish in this area increased 17% over the time series. Total landings and revenues by multispecies vessels increased by 48% and 72% respectively, with a significant increase of 23% in total landings from FY99 to FY00. This increase is mostly due to increased scallop fishing activity by general category and combination vessels (see high value species).

Skate fishing activity in New Bedford appears to have been somewhat inconsistent over the time series, but this may be a result of mis-reporting and under-reporting because skates were not a federally-managed species associated with formal reporting requirements. While reported landings of skate wings in FY00 were almost identical to those in FY94, revenues from skate wings in FY00 were 52% lower than they were in FY94. Overall, the importance of skate fisheries in New Bedford and Fairhaven has declined, due in part to the low commercial value of skates and the high commercial value of scallops. In FY94, skate landings and revenues represented 11.8% and 4.8% of total landings and revenues respectively by multispecies permit holders in New Bedford/Fairhaven. In FY00, these percentages declined to 8% (landings) and 1.3% (revenues).

In general, multispecies vessels landing skates in New Bedford/Fairhaven participate much more in the wing fishery than the bait fishery. These vessels are likely catching wing skates while they are fishing for species like groundfish, monkfish, and to a lesser extent scallops. In FY00, wing landings in New Bedford/Fairhaven accounted for 61.2% of total wing landings, and wing revenues accounted for 64% of total wing revenues. Bait landings in New Bedford/Fairhaven accounted for 0.6% of total bait landings in FY00, and bait revenues accounted for 0.5% of total bait revenues.

Table 47 Landings and Revenues from Multispecies Permit Holders in New Bedford/Fairhaven, Massachusetts (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**329**	**329**	**345**	**344**	**355**	**385**	**385**
TOTAL							
Landings	44,407.6	42,409.8	49,098.4	43,574.8	51,098.8	53,623.4	65,698
Revenues	80,155.8	79,779.6	93,654.6	82,601.1	85,837.7	120,925.5	137,468.3
SKATE BAIT							
Landings	7.1	387.1	112.7	515.8	24.9	132.3	42.5
Revenues	5.7	32.2	5.7	43.6	1.8	10.1	2.4
SKATE WINGS							
Landings	5,222.7	1,923.6	8,563.8	3,354	4,307.6	4,148	5,217.2
Revenues	3,858.1	1,063.8	4,308.8	1,466.9	1,788.8	1,610.2	1,845.7
GROUNDFISH							
Landings	18,482.3	17,202.5	20,856.6	20,691.7	21,279.7	22,980.8	31,010.7
Revenues	24,227.3	23,336.3	25,470.9	24,779	26,989.8	28,126.7	31,884.3
SMALL MESH MULTISPECIES							
Landings	78.2	41.5	91.7	85.8	59.9	194.9	1,131
Revenues	23.1	11.8	30.6	19.4	15.3	66.1	399.5
SMALL MESH NON-MULTISPECIES							
Landings	504.9	923.1	718.6	2,229.2	7,059.5	3,892.4	1,103
Revenues	330.9	540.1	228.2	831.2	2,146.2	1,685.9	565.4
HIGH VALUE SPECIES							
Landings	6,905.5	7,031	8,629.3	6,538.4	6,693.8	13,691.6	18,370.3
Revenues	37,711.3	38,473.6	51,724.8	41,891.7	39,507.8	74,257.1	89,185.5

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.

Skate bait represents market category 3650, and skate wings represent market category 3651.

Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.

Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.

Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.

High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.4 Provincetown, Massachusetts

Provincetown is a secondary multispecies port that has increased its involvement in the skate wing fishery in recent years. In fact, information from the industry suggests that the Provincetown fleet may be one of the only fleets that actually targets skate wings on a seasonal basis. The MARFIN Report provides a detailed profile of Provincetown, Massachusetts. It also includes a general profile of the Cape and Islands sub-region and Barnstable County, the county in which Provincetown is located. These profiles should be referenced for social and demographic data not contained in this FMP document.

Provincetown, often referred to as "P-Town," is located at the tip of Cape Cod. MARFIN documented that it grew very slowly during the 18th century and its population fluctuated with the price of fish. By the mid 1800s as whaling became a major industry in New England, Provincetown transformed into "the largest and safest natural harbor on the New England coast."

However, MARFIN reported that in the last 15 or so years, the commercial fishing industry in Provincetown has experienced a major downturn due to inshore area closures and declines in fish stocks. Because P-town did not diversify in its industry's development, the vessels have not been able to recover. Furthermore, there is little support from local representatives and the community at large to preserve the commercial fleet in Provincetown. MARFIN reports another disadvantage for P-town is its geographical location. Although Provincetown is the second deepest natural harbor in the world, its location is too far from major fish markets. The Portuguese community and influence in Provincetown is still very strong, but in the last 25 years, many more successful Portuguese fishermen have left and moved to New Bedford.

MARFIN documented that in 1996, there were 28 large vessels and 19 small jig boats, and only 17 of the 28 larger vessels were in safe working condition. In 2001, only eight of the 28 large vessels are reported to be in operation, along with twelve small longlining/jigging/lobstering boats. The MARFIN Report estimates that 25 individuals are involved in groundfish fishing, 20 in lobstering, and ten in other small-scale fisheries. It is predicted that these 55 individuals affect 26 households in Provincetown. MARFIN found that fishermen from Provincetown believe that closures in nearby waters, including Stellwagen, and limited DAS restrictions are the measures that have impacted fishermen most. MARFIN concludes that, "Provincetown epitomizes what can go wrong in a port highly reliant on one fishery albeit a multispecies fishery."

Fishing Activity in Provincetown

Table 48 summarizes landings and revenues by multispecies permit holders in Provincetown from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 48 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

Similar to other areas on Cape Cod, the number of multispecies vessels landing fish in Provincetown has declined by 46% since FY94. FY00 marked the lowest number on record, with only 44 groundfish vessels landing in P-Town as compared to 82 in FY94. Total landings by multispecies vessels in P-Town are only down 5%, mostly due to improved activity in recent years (FY98-FY00). Total revenues for the time series are up 15% over the time series.

Skate fishing activity in Provincetown is limited to a small, informal bait fishery and the wing fishery, and it has increased substantially in recent years. Over the time series, skate wing landings increased 728%, and skate wing revenues increased 380%. The most significant increases were observed between FY97 and FY98 when vessels landing in P-Town may have shifted some effort from groundfish to skate wings (the first round of Gulf of Maine rolling closures were implemented at the start of FY98). From FY97 to FY98, landings of skate wings in Provincetown increased 471% to a time series high of more than 750,000 pounds.

Overall, the importance of the skate wing fishery in Provincetown has increased considerably. In FY94, skate landings and revenues represented 1.8% and 2% of total landings and revenues respectively in Provincetown. In FY00, these percentages increased to 16% and 8.3% respectively. Therefore, relative to many other communities in the region, it can be argued that Provincetown is substantially engaged in and dependent on skate fisheries. Information presented in the Skate SAFE Report supports this notion. Section 3.7.4 of the SAFE Report (see Volume II) indicates that Provincetown was the leading port in terms of economic dependence on the skate fishery in 1999, deriving 6.1% of its total fisheries revenues from skates.

Provincetown's contribution to total skate wing landings is also more substantial than many other communities (with the exception of New Bedford/Fairhaven). In FY00, skate wing landings in Provincetown accounted for 7.3% of total wing landings. Skate wing revenues in P-Town accounted for 6.8% of total wing revenues.

During the scoping process for this Skate FMP, fishermen and dealers from Provincetown testified that the landings and revenues information from the dealer weighout database appear to under-report skate fishing activity in Provincetown. One dealer claimed that he moved more than a million pounds of wings from Provincetown alone in 1999. It has already been noted that the data from the dealer database are likely to underestimate skate activity due to under-reporting. It is possible, in Provincetown particularly, that some landings are not appearing in the dealer database because they were transported/trucked from Provincetown (to New Bedford, for example) without being recorded by a local dealer. The Skate PDT is working with the industry and port agents in Provincetown to better understand why these discrepancies may exist. If any additional information becomes available, it will be presented in the Final EIS for this FMP.

Table 48 Landings and Revenues from Multispecies Permit Holders in Provincetown, Massachusetts (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	82	84	97	74	64	66	44
TOTAL							
Landings	4,085.3	1,885.5	2,196.7	2,838.7	3,537	4,068.7	3,897.3
Revenues	2,047.2	1,972.1	1,797.7	2,266.6	2,431.6	3,032	2,362.9
SKATE BAIT							
Landings	0	0	0	0	0.2	0	0
Revenues	0	0	0	0	0.02	0	0
SKATE WINGS							
Landings	75.5	46.9	40.5	132.1	754.6	531.4	625.4
Revenues	40.8	12.4	10.6	36.3	256.7	205.8	195.6
GROUNDFISH							
Landings	818.3	973.8	836	906.9	808.1	689.9	1,286.1
Revenues	1,001.7	1,392	974.2	1,327.1	976	780.5	1,198
SMALL MESH MULTISPECIES							
Landings	1,774.8	77	715.8	1,217	920.7	1,812	1,452.2
Revenues	503.7	23.4	284	373.8	507.2	1,347.8	509.5
SMALL MESH NON-MULTISPECIES							
Landings	57.6	4.6	4.3	30.1	25.3	21.9	23.8
Revenues	16.8	3.1	2.1	8.3	5.8	16.8	7.2
HIGH VALUE SPECIES							
Landings	19.9	24.7	48.5	46.6	49.3	47.4	57.5
Revenues	145.4	279.6	362.9	370.8	304.5	319.9	254.2

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.

Skate bait represents market category 3650, and skate wings represent market category 3651.

Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.

Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.

Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.

High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.5 Point Judith, Rhode Island

Point Judith, RI is a primary multispecies port and the leading port for skate bait landings. The vast majority of skates caught for lobster bait are landed in Point Judith. The MARFIN Report provides a detailed profile of Point Judith, Rhode Island. It also includes a general profile of Washington County, the county in which Point Judith is located. These profiles should be referenced for social and demographic data not contained in this FMP document.

The Point Judith/Galilee fishing village developed in the mid-1800s, with the first commercial fishermen using hook and line, beach seines, and floating fish traps. Today, Galilee is a major commercial fishing port. Tourism and gentrification are said to be forcing the fishing industry into the economic background in South County, RI. However, Pt. Judith is the second largest port in New England after New Bedford. Therefore, this port has remained a significant commercial fishing region despite pressures from the recreational sector and the tourism industry.

Point Judith is within the Narragansett township, and based on 1990 Census data, there were 14,985 people in this community, the median income in 1989 was $35,545, and the number of fishermen that live in this town has remained fairly constant over time. The MARFIN Report describes the Point Judith fleet as very diverse and adaptable. Overall, the fleet is fairly modern and in good repair due to the willingness of boat owners to innovate and use different gears and participate in different fisheries. When MARFIN collected their data, there were 134 commercial vessels in this port, ranging from 45-90 ft, with most being ground trawlers. The majority of larger vessels from Point Judith harvest squid, herring, and whiting. There were 40 inshore and 10 offshore lobster boats at the time MARFIN conducted their research. There are many support industries along the waterfront in Point Judith including dockside fuel pumps, restaurants, bait shops, commercial and recreational marine suppliers, and vessel repair shops. The Town Dock employs 50 people and 20-50 part-time employees.

The Town Dock receives a variety of groundfish, but about seven years ago, there was a decrease in landings of groundfish, and the processors shifted their focus. This has caused problems for the few fishermen that still target groundfish in the area. The MARFIN Report found that there are approximately 500 households involved in commercial fisheries in Point Judith, and another 400 indirectly dependent households. The majority of fishermen from Point Judith are first-generation white males. Most fishermen live within a 20-mile radius from the port. MARFIN concluded that the major issues facing this port include gear conflicts, area restrictions, and competition for resources with the recreational sector.

Fishing Activity in Point Judith

Table 49 summarizes landings and revenues by multispecies permit holders in Point Judith from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 49 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

The number of multispecies vessels that land fish in Point Judith, RI has decreased 9% since FY94. In general, these boats are relatively diversified, participating in many different fisheries including groundfish, whiting, herring, squid, and tuna during each fishing year. In addition, several trawl vessels target skates for lobster bait during some or all of the year. Total landings and revenues from multispecies vessels in Point Judith have declined over the time series, by 32% and 20% respectively.

While vessels land both wings and bait in Point Judith, the majority of skate fishing activity in the area is directed at the skate bait fishery. Data from FY94 appear inconsistent, which is likely due to mis-reporting and under-reporting. Excluding FY94, documented landings of skate bait appear to have increased from FY95 to FY99 and then decreased in FY00 to levels similar to those in FY95. It cannot be determined whether or not this time series accurately reflects activity in the skate bait fishery because the database is considered to be incomplete for reasons previously discussed. Landings of wings in Point Judith also appear to have increased in recent years, but this again may be a result of issues related to reporting. Overall, the time series indicates that landings of wings increased 195% and revenues increased 71%.

Because of the low commercial value of skate bait, Point Judith's overall economic dependence on skate fisheries is quite small. In FY95, landings of skates (both bait and wings) represented 10.1% of total landings in Point Judith, and revenues from skates represented 3.9% of total fisheries revenues. In FY00, skate landings accounted for 12.5% of total landings in Point Judith, and skate revenues accounted for 1.9% of Point Judith's total fisheries revenues. However, it is important to remember that there are vessels in Point Judith that target skates for bait either seasonally or year-round. While the community's overall dependence on the fishery may be insignificant, there are vessels within the community that are likely to be substantially dependent on the fishery.

Overall, Point Judith is the leading contributor to skate bait landings in the region. In FY00, skate bait landings and revenues from Point Judith accounted for 76.2% and 73.3% of total bait landings and revenues respectively. Skate wing landings and revenues in Point Judith accounted for 7.1% and 5.7% of total wing landings and revenues in FY00.

Table 49 Landings and Revenues from Multispecies Permit Holders in Point Judith, Rhode Island (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**193**	**214**	**192**	**169**	**172**	**174**	**175**
TOTAL							
Landings	66,827.4	53,353.2	65,725.3	67,732.6	56,807.6	49,146.4	45,112.8
Revenues	32,933.9	31,927.7	33,094.6	37,926.8	30,009.3	34,140	26,327.7
SKATE BAIT							
Landings	1.3	5,264.1	7,888.7	7,664.1	7,671.7	6,337.3	5,034.7
Revenues	0.5	1,179.4	968.7	648	461.5	383.5	347.4
SKATE WINGS							
Landings	204.8	153.8	275	263.8	338.6	357.5	604
Revenues	95.8	64.1	127.1	83	114.4	118.3	163.9
GROUNDFISH							
Landings	1,349.8	1,080.8	1,537.7	1,849.1	2,441.4	2,531.8	3,130
Revenues	1,558.8	1,410.3	1,897.2	2,186.8	3,002.3	2,790.1	2,904.2
SMALL MESH MULTISPECIES							
Landings	13,305.5	9,438.1	10,647.9	11,236.2	11,843.3	9,551.5	11,139.4
Revenues	4,918.8	3,730.5	3,993.1	3,957	3,786.1	3,412.6	3,612.4
SMALL MESH NON-MULTISPECIES							
Landings	44,422.8	30,953.8	34,227.4	38,983.4	27,695.9	22,451.5	18,716.7
Revenues	16,096	13,503.6	11,115.9	16,665	10,890.4	12,362.5	7,369
HIGH VALUE SPECIES							
Landings	1,353.8	1,542.8	2,006.2	1,945.7	1,656.4	2,104.7	1,197.7
Revenues	4,789.5	5,507.2	6,717	6,790.6	5,899.9	8,089.5	5,200.2

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.
Skate bait represents market category 3650, and skate wings represent market category 3651.
Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.
Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.
Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.
High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.6 Western Rhode Island

The Western RI group is a secondary multispecies port group that includes Charlestown, Westerley, South Kingstown (Wakefield), and North Kingstown (Wickford).

Table 50 summarizes landings and revenues by multispecies permit holders in Western Rhode Island from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 50 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

Fishing activity by multispecies vessels in Western RI has been extremely variable over the time series. The number of multispecies vessels that landed fish in this community group varied from year to year and was three times higher in FY00 than in FY94. Groundfish activity has been almost non-existent in this community group. Similarly, and despite Rhode Island's significant involvement in skate fisheries, skate fishing activity in this community group has been virtually non-existent. The vast majority of landings and revenues by multispecies permit holders in this area have come from small mesh non-multispecies. These landings increased 174% from FY94-FY00, but also have been variable.

Table 50 Landings and Revenues from Multispecies Permit Holders in Western Rhode Island (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**10**	**19**	**27**	**18**	**23**	**16**	**30**
TOTAL							
Landings	7,693.9	39,605.4	26,806.3	10,488.5	18,510.3	907.4	20,966.8
Revenues	3,449.1	10,901.9	4,723.4	980.5	2,329.7	861.9	1,371.4
SKATE BAIT							
Landings	0	0	0	0	0	0	0
Revenues	0	0	0	0	0	0	0
SKATE WINGS							
Landings	0	0.5	1.2	0.05	2.9	0.1	0.05
Revenues	0	0.1	0.6	0.01	1	0.07	0.01
GROUNDFISH							
Landings	0	0.5	11.7	3	27.4	2	2
Revenues	0	0.5	11.4	2.7	27.4	1.9	2.4
SMALL MESH MULTISPECIES							
Landings	9.1	15	0.05	0	37.7	75.9	0.5
Revenues	3.4	5.5	0.02	0	6.2	24.7	0.2
SMALL MESH NON-MULTISPECIES							
Landings	7,642.5	39,501.5	26,711.1	10,427.7	18,335.1	794.4	20,920.4
Revenues	3,414.7	10,834.4	4,586.2	780.8	1,979.5	709.4	1,192.9
HIGH VALUE SPECIES							
Landings	3.1	3.9	5.6	47.6	60.4	29.6	25.7
Revenues	14.2	18.8	21	180.6	220.1	112.1	131.7

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.

Skate bait represents market category 3650, and skate wings represent market category 3651.

Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.

Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.

Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.

High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.7 Eastern Rhode Island

The Eastern RI group is a secondary multispecies port group that includes Newport, Tiverton, Portsmouth, Jamestown, Middletown, and Little Compton. The MARFIN Report provides detailed profiles of Newport, Tiverton, and Jamestown, Rhode Island. These profiles should be referenced for social and demographic data not contained in this FMP document.

Table 51 summarizes landings and revenues by multispecies permit holders in Eastern Rhode Island from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 51 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

The number of multispecies vessels that land fish in the Eastern RI region has recently rebounded to levels similar to those in FY94. Over the time series, the number of multispecies vessels landing fish in this community group has declined 10%. Total landings by multispecies vessels in this area decreased 12%, while total revenues in FY00 were almost identical to those in FY94. Groundfish landings and revenues have exhibited similar trends, decreasing sharply after FY94, then rebounding to levels well above those observed in FY94. Overall, groundfish landings have increased 107% to a time series high of 1,686,500 pounds in FY00.

Fishing activity in both the bait and wing fisheries in Eastern Rhode Island also has increased over the time series. In total, skate landings and revenues in FY00 are both 130% higher than they were in FY94. Landings in the bait fishery increased 104%, and landings in the wing fishery increased 285% over the time series. The most significant increases were observed between FY96 and FY97.

Increased participation in the skate fisheries and slightly decreased landings of other species have led to an increased dependence on skates in this community group. In FY94, skate landings and revenues accounted for 5.4% and 0.9% respectively of total fisheries landings and revenues for this community group. In FY00, these percentages increased to 14.2% and 2%.

Next to Point Judith, Eastern RI is the leading area for skate bait landings. In FY00, bait landings in Eastern RI accounted for 17% of total bait landings, and wing landings accounted for 4.2% of total wing landings. Bait revenues accounted for 16.4% of total bait revenues, and wing revenues accounted for 3.7% of total wing revenues in FY00.

Table 51 Landings and Revenues from Multispecies Permit Holders in Eastern Rhode Island (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**111**	**86**	**53**	**76**	**83**	**83**	**100**
TOTAL							
Landings	11,860	8,979.6	9,310.9	9,030.1	10,075.3	8,331.3	10,412.1
Revenues	9,264.7	9,199.1	6,514.1	7,147.1	9,042.8	8,965.6	9,252.1
SKATE BAIT							
Landings	549.6	0.8	104.9	1,675.1	2,060.9	1,602.2	1,121
Revenues	30.8	0.4	6.4	120.9	150.7	102.9	77.8
SKATE WINGS							
Landings	93.6	30.5	20.6	76.3	237.4	256.9	360.4
Revenues	49.6	12.7	7.6	28.2	82.6	80.3	106.7
GROUNDFISH							
Landings	816.3	398.2	590.6	953.9	1,141.1	955	1,686.5
Revenues	862.9	475.2	658.2	965	1,365.4	1,003.4	1,638.6
SMALL MESH MULTISPECIES							
Landings	459.2	582.6	686.1	733.7	576.1	240.8	1,374.9
Revenues	136.4	156.4	242.4	183.7	135.4	74.8	426.8
SMALL MESH NON-MULTISPECIES							
Landings	7,238	3,767.8	5,725.5	3,302.3	1,959	1,565.5	2,861.4
Revenues	2,797.3	1,886.5	1,293.7	1,990.8	1,322	1,143.6	1,547.2
HIGH VALUE SPECIES							
Landings	879.5	1,012.8	711.6	497.3	702.4	610.7	591.6
Revenues	3,177.2	3,977.4	2,880.9	2,191.3	2,925	2,631.3	2,650.1

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.
Skate bait represents market category 3650, and skate wings represent market category 3651.
Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.
Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.
Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.
High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.8 Eastern Long Island, New York

The Eastern Long Island community group includes the ports of Montauk, Hampton Bays (Shinnecock), and Greenport. The McCay and Cieri Report provides detailed profiles of Montauk, Hampton Bays, and Greenport, along with information about many other smaller ports in Eastern Long Island. These profiles should be referenced for social and demographic data not contained in this FMP document.

Due to funding constraints, McCay and Cieri Report is not a complete analysis of the dependence of these communities on fishery resources, but it can provide guidance about how vulnerable these communities are to regulatory change. There are many other smaller ports in eastern Long Island that were discussed in the McCay and Cieri Report, but only the communities specified in this group are discussed below.

Greenport is the largest port on the North Fork of Long Island with five large offshore vessels, one medium-sized dragger, two small 40' draggers, 3 trap vessels, 4 lobstermen, 4 or 5 conch potters, 4 or 5 gillnetters, and 25 or so baymen. The fishermen from this area have adapted over time and taken advantage of different gears and species. McCay and Cieri found that despite local support, the commercial fleet in Greenport has decreased significantly in the last 20 years. Many fishermen in this area offload in a variety of ports in the area, and do not always land primarily in Greenport. There are several charter and party boats in the area.

Montauk is located at the tip of the South Fork on Long Island, and is the largest fishing port in New York. McCay and Cieri found that otter trawls and longlines are the principle gear types, and loligo squid and silver hake were the two most important finfish species in 1998. Furthermore, Montauk is the leading U.S. port for tilefish landings, which amounted to 21% of total revenues for Montauk in 1998. The majority of fish landed in Montauk is sold on consignment in the Fulton Fish Market in New York City. When researching the number of crew employed in the area, one individual told McCay and Cieri that there are about three longliners who employ eight per boat (double crew), he employs ten on his two boats, the two largest vessels each employ ten crew members, and there are about 20-30 lobstermen.

Hampton Bays/Shinnecock is the second largest port in New York after Montauk. McCay and Cieri determined that this port is primarily a dragger fishing port, and loligo squid and whiting made up 70% of total revenues in 1998. There is a Municipal Dock on the west side of the Shinnecock Inlet, a commercial fish dock, the local fisherman's cooperative, and a marina. One respondent in this report estimated that there are 30 boats working out of Shinnecock, and fewer are owner-operated than in the past. Even though fishermen are landing less, prices have been good, so fishermen appear to be sustaining themselves pretty well in this area. The town of South Hampton is generally supportive of the commercial fishing industry, but some fishermen feel that the regulators are trying to "squeeze them out."

Fishing Activity in Eastern Long Island

Table 52 summarizes landings and revenues by multispecies permit holders in Eastern Long Island from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 52 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

The number of multispecies vessels that land fish in the Eastern Long Island region of New York has increased 63% since FY94. This suggests that ports in Eastern Long Island are becoming more important ports of landing for multispecies vessels and that overall multispecies activity in the area has increased considerably. Total landings have increased by 152% over the time series, and total revenues have increased 32%. Multispecies landings increased steadily and significantly, by 583% over the entire time series. Multispecies revenues also increased 438% over the time series.

Skate fishing activity in Eastern Long Island has been limited almost exclusively to the wing fishery and has increased considerably since FY94. From FY94 to FY00, skate wing landings and revenues increased 927% and 688% respectively. The most significant increases were documented between FY96 and FY97. Despite these increases, skate fishing activity still contributes very little to overall fishing activity. In FY00, wing landings and revenues contributed 1.4% and 0.6% respectively to total landings and revenues in Eastern Long Island. Landings of wings in Eastern Long Island accounted for 3.6% of total wing landings in FY00.

Table 52 Landings and Revenues from Multispecies Permit Holders in Eastern Long Island, NY (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**131**	**173**	**164**	**194**	**200**	**195**	**213**
TOTAL							
Landings	8,453.1	22,097	21,057.4	27,616.3	28,652	25,398.7	21,333.2
Revenues	11,815.1	19,138.7	16,655.2	21,208.6	21,761.7	20,075.1	16,254
SKATE BAIT							
Landings	0.2	1.4	3.1	2.7	1	1.3	1.1
Revenues	0.1	0.8	1.5	1.1	0.3	0.6	0.4
SKATE WINGS							
Landings	30	65.1	88	335.2	497.6	324.7	308.1
Revenues	13	29	39.3	127.6	166.1	112.5	102.5
GROUNDFISH							
Landings	237.4	631.6	983.1	1,102.8	1,719.2	1,352.7	1,620.5
Revenues	293.9	869.6	1,269.4	1,448.5	2,095.4	1,574.8	1,580.2
SMALL MESH MULTISPECIES							
Landings	3,779.8	9,834.8	10,411.4	10,776.2	13,811.4	7,712.8	4,734.8
Revenues	2,120.2	4,721	5,139.7	5,051.8	6,023.7	3,806	2,442.5
SMALL MESH NON-MULTISPECIES							
Landings	1,869.8	6,811.3	4,377.6	10,354.1	7,261.2	10,739.4	11,052.5
Revenues	1,424	3,900	3,600.8	7,791.4	6,655.4	8,336.4	6,632.8
HIGH VALUE SPECIES							
Landings	556	721	110.4	88.1	94.7	103	303.9
Revenues	3,005.8	2,902.6	410.7	297.7	312.7	404.5	1,033.1

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.
Skate bait represents market category 3650, and skate wings represent market category 3651.
Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.
Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.
Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.
High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.9 Northern Coastal New Jersey

The Northern Coastal NJ group is a secondary multispecies port group that includes Point Pleasant, Belford, Long Beach/Barnegat Light, Barnegat, Highlands, Belmar, Sea Bright, and Manasquan. The McCay and Cieri Report provides detailed profiles of Point Pleasant, Belford, Long Branch/Barnegat Light, Barnegat, Highlands, Belmar, Sea Bright, and Manasquan. It also includes a general profile of the Northern Coastal NJ sub-region. These profiles should be referenced for social and demographic data not contained in this FMP document.

Table 53 summarizes landings and revenues by multispecies permit holders in Northern Coastal New Jersey from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 53 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

Fishing activity in Northern Coastal New Jersey has remained at relatively high levels over the time series presented below. The number of multispecies vessels that land fish in Northern Coastal NJ community group increased 46% since FY94. Total landings by multispecies vessels in this community group have decreased by 22% overall. In contrast, total revenues actually increased 26% over the time series. This is most likely due to shifts towards higher value species like scallops, as the data indicate. Landings and revenues of high value species (scallops, tuna, lobsters) increased 167% and 147% respectively over the time series. Groundfish landings have increased 141% since FY94, with one relatively low year in FY97.

The majority of skate fishing activity in Northern Coastal New Jersey occurs in the wing fishery. Skate bait landings in the area have increased in recent years but have been somewhat inconsistent, which suggests that the trends could be due to mis-reporting and/or under-reporting. Landings and revenues from skate wings in FY00 were 809% and 417% higher, respectively, than they were in FY94. Over the time series, the importance of skates to Northern Coastal New Jersey has increased but is still relatively minor. In FY94, skate landings and revenues represented 0.1% of total landings and revenues for this community group; in FY00, skate landings represented 1.4% of total landings, and skate revenues accounted for 0.4% of total revenues in Northern Coastal New Jersey. Wing landings from this community group contributed 3.9% to total wing landings for the region in FY00.

Table 53 Landings and Revenues from Multispecies Permit Holders in Northern Coastal New Jersey (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	113	112	133	147	151	167	165
TOTAL							
Landings	30,407.4	18,016.1	22,742.2	25,683.7	25,480.8	27,624	23,704.3
Revenues	18,495.3	12,129.6	14,690	16,772.7	17,233.4	24,283.4	23,252.7
SKATE BAIT							
Landings	0.5	29.2	0.09	0	212.9	165.8	65.5
Revenues	0.2	0.9	0.03	0	23.8	14.5	6.5
SKATE WINGS							
Landings	29.1	78.6	137.1	310.6	217.2	171.5	264.6
Revenues	18.6	40.2	63.6	107.4	78.8	58.4	96.2
GROUNDFISH							
Landings	350.7	521.2	639.3	192.8	494.8	724	843.5
Revenues	442.3	676.6	875.7	291.1	568.6	720.3	750
SMALL MESH MULTISPECIES							
Landings	2,482.2	1,800.2	1,648.6	2,346.4	1,164.9	980.7	1,103.7
Revenues	1,219.9	843.5	629.6	955.7	455.2	396	468.6
SMALL MESH NON-MULTISPECIES							
Landings	3,442.7	2,931.1	1,404.6	3,414.9	1,572.3	1,454.5	1,739.5
Revenues	1,901.7	1,478.2	948.1	2,047.5	1,222.1	858.2	949.8
HIGH VALUE SPECIES							
Landings	993.6	963.5	990.9	1,189.3	1,232.2	2,103.4	2,651.9
Revenues	4,964.7	4,334.1	5,543.6	6,388.4	5,981	9,877.2	12,249.7

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.

Skate bait represents market category 3650, and skate wings represent market category 3651.

Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.

Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.

Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.

High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.3.3.10 Southern Coastal New Jersey

The Southern Coastal NJ group is a secondary multispecies port group that includes Cape May, Wildwood, Burleigh, Sea Isle City, Ocean City, Stone Harbor, and Avalon. The McCay and Cieri Report provides detailed profiles of Cape May, Wildwood, Burleigh, Sea Isle City, Ocean City, Stone Harbor, and Avalon. It also includes a general profile of the Southern Coastal NJ sub-region. These profiles should be referenced for social and demographic data not contained in this FMP document.

Table 54 summarizes landings and revenues by multispecies permit holders in Southern Coastal New Jersey from the dealer weighout database. Because skate fishing activity is so closely related to multispecies fishing activity and because there are no specific permits for skate fishing at this time, fishery information for multispecies permit holders is likely to capture the vast majority of any skate fishing activity that is currently documented in the dealer weighout database. The data presented in Table 54 are reported from dealers based on where the fish are landed and help to characterize the extent of skate and other fishing activity occurring in the area and the importance of the area as a port of landing.

The number of multispecies vessels that land fish in the Southern Coastal NJ region has decreased by 27% since FY94. Total landings and revenues by multispecies vessels in this area have been rather variable, but overall, they declined 4% and 21% respectively from FY94 to FY00. What little groundfish landings have been recorded in this community group have decreased 19% since FY94.

Skate landings have remained at relatively low levels over the time series and have been limited almost entirely to landings of bait. The time series of bait landings has been too variable to draw any conclusions about skate activity in the area. Overall, though, landings and revenues of skates represent a very small fraction (less than 1%) of total landings and revenues in Southern Coastal NJ.

Table 54 Landings and Revenues from Multispecies Permit Holders in Southern Coastal New Jersey (Dealer Activity)

Fishing Year	1994	1995	1996	1997	1998	1999	2000
Number of Vessels	**183**	**163**	**145**	**128**	**138**	**116**	**134**
TOTAL							
Landings	61,769	70,267.6	57,207.2	64,604.9	81,300.4	47,696.5	59,006.5
Revenues	29,364.6	27,230.8	25,616.3	24,367.4	22,838	20,123.8	23,123.4
SKATE BAIT							
Landings	166.3	42.9	52.4	209.2	143.7	122.3	25.7
Revenues	13.5	3.6	4	14.1	10.7	9.3	1.6
SKATE WINGS							
Landings	5.5	0.1	2.2	12.8	4	4.4	0.9
Revenues	2.5	0.05	0.6	3.8	1.2	0.9	0.2
GROUNDFISH							
Landings	15.8	10.2	16.1	16.5	20.4	13.6	12.8
Revenues	14.3	9.4	7.8	9.3	15.5	8.3	8.8
SMALL MESH MULTISPECIES							
Landings	136.8	112.6	355.2	182	69.6	29.2	74.6
Revenues	42.6	40.2	143.7	45.9	22.6	9.4	20.1
SMALL MESH NON-MULTISPECIES							
Landings	32,650.9	37,913	26,849	42,030.8	57,867	25,801.9	37,295.4
Revenues	11,514.5	11,320.8	8,578	12,749.5	11,285.7	6,350.2	5,141.2
HIGH VALUE SPECIES							
Landings	1,917	1,492.5	1,538.8	1,048.1	1,214.5	1,796.6	3,312.3
Revenues	9,413	7,513.8	8,394	6,318.1	6,542.8	8,671.9	14,467.1

Landings are in thousands of pounds and revenues are in thousands of 1999 dollars.
Skate bait represents market category 3650, and skate wings represent market category 3651.
Groundfish includes cod, haddock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, pollock, redfish, and white hake.
Small Mesh Multispecies includes silver hake, red hake, offshore hake, and ocean pout.
Small Mesh Non-Multispecies includes butterfish, herring, mackerel, scup, shrimp, loligo squid, and illex squid.
High Value Species includes bluefin tuna, bigeye tuna, yellowfin tuna, American lobster, and sea scallops.

7.3.4 Recreational Fishery Information

See Section 3.3 of the Skate SAFE Report (Volume II).

In general, skates have little to no recreational value and are not intentionally pursued in any recreational fisheries. The Skate SAFE Report includes a general description of recreational fishing activity on skates and presents skate catch information from the Marine Recreational Fisheries Statistics Survey (MRFSS). There is no new or additional recreational fishery information to present in this FMP document.

7.3.5 Bycatch Information

Section 3.4 of the Skate SAFE Report (Volume II) presents preliminary discard estimates for skates from SAW 30, calculated from NEFSC Domestic Sea Sampling and Dealer Weighout data for 1989-1998. The estimates were derived by gear type and primary species group caught on a sea sampled trip. A species group was considered the primary target when it constituted more than 50% of the total trip landings. This may result in an underestimation of total skate discards because some trips (2,604 of 11,834) were mixed, and no species or group comprised 50% of the trip.

Generally, the estimates from SAW 30 ranged from high values between 50,000 and 70,000 mt in 1989-1990 to a low of 14,700 mt in 1994. Otter trawls and scallop dredges account for >90% of the total discards. Over the 1989-1998 period, the biomass of total discards are estimated to be two (1998) to eight times (1989) the reported total landings. The commercial fishery discard mortality rate of skates, and therefore the magnitude of total skate discard mortality, is unknown.

The subsections below present additional bycatch information that supplements the information presented in the Skate SAFE Report.

7.3.5.1 Sea Sampling Summaries

One way to investigate skate bycatch information is to query the sea sampling database. The sea sampling program was created primarily to gather information about the interactions of marine mammals with commercial fishing gear. Because the main focus of this database is on marine mammals, the primary gear that has been researched is gillnet. However, the primary gear used by fishermen in skate fisheries is not gillnet, so this is one limitation of the database. When attempting to examine the bycatch levels of skate populations by the different gear sectors, it would be more useful to sample more dredge and otter trawl trips. Therefore, this analysis does not compare gear sectors; it simply summarizes the data within the sea sampling database.

Sea sampling data was pulled from May 1994 – December 2000. The total number of observed trips per year by gear sector was determined. This was then compared with the vessel trip report (VTR) estimated number of trips, and a sea sampling percentage was calculated. Table 55 below describes the sea sampling percent coverage for gillnet, otter trawl, and scallop dredge gear for the seven-year time series.

There are several limitations of the sea sampling database, but it still may be useful to examine this information to get a general idea of the level and nature of skate bycatch. It is important to note that the sea sampling survey program only observes a very small percentage of the total fishing activity in New England; therefore, it is not appropriate to determine skate bycatch rates by extrapolating the sea sampling data to the entire fleet. Furthermore, since the temporal and geographic focus of the sea sampling program is on marine mammal interactions, it is not representative of normal fishing behavior in the region. In particular, because the focus is on marine mammal interactions, it is very unlikely that many skate trips (wings or bait) were observed. Additionally, skate identification is relatively difficult, and it is possible that the seven different species of skates were not always accurately identified on observed trips.

Table 55 Sea Sampling Coverage for Three Gear Sectors from May 1994 – December 2000

	Gillnet	**Otter Trawl**	**Dredge**
Sea Sampling Number of Trips	7,954	1,158	191
VTR Estimated Number of Trips	102,708	257,534	37,818
Sea Sampling % Coverage	**7.74%**	**0.45%**	**0.51%**

Source: NMFS Sea Sampling Database

Table 56 – Table 59 summarize available sea sampling data for gillnets, otter trawls, and scallop dredges. From May 1994 – December 2000, there were 7,954 gillnet trips observed in the sea sampling program. Based on these data, the majority of skates caught on observed gillnet trips is kept, especially winter skates (Table 56). Larger winter skates are probably kept by gillnetters for the wing fishery. Note that very small amounts of rosette, clearnose, and smooth skates were also kept on observed gillnet trips. In fact, a significant portion of each of the seven skate species was kept, ranging from 33.56% - 92.25%. Overall, 670,729.9 pounds of skates were caught on observed gillnet trips, and 79.85% of that catch was kept. After multispecies, monkfish, and "other," skates were the fourth largest species category kept by weight for the observed trips in the gillnet gear sector.

From May 1994 – December 2000, there were 1,158 trips observed in the otter trawl fishery. Otter trawl vessels discarded more skates than they kept on observed trips. It is important to remember the significant limitations of the data (0.45% coverage on otter trawls) and recognize the fact that some otter trawls target skates for the bait fishery with little bycatch (See Section 7.3.5.2). Based on the data in Table 57, it appears that observers did not sample many (if any) trips on vessels participating in the Southern New England bait fishery. Over the time series, 2,839,949.3 lbs. of skates were caught on the observed otter trawl trips (significantly more than on the observed gillnet trips). While some skates are landed, 88.33% of all the skates caught from these observed otter trawl trips were discarded. On the observed trips, winter and little skates were kept the most.

There were 191 scallop dredge trips in the sea sampling program from May 1994 – December 2000 (not including coverage in the closed area access program), which equates to 0.51% observer coverage. Practically no skates that were caught on observed scallop dredge trips were kept; only a very small percentage of winter skates were kept (presumably larger ones for the wing market, see Table 58). Over the time series, 1,360,845.4 lbs. of skates were caught on sampled trips in the scallop fishery, and 99.8% were discarded. After the species category "other" and scallops, skates were the third largest species category caught by weight on the observed dredge trips. Scallops were the species with the highest kept percentage (96.05%), followed by monkfish (80.82%).

The recent scallop exemption program implemented in Framework Adjustment 13 to the Sea Scallop FMP permitted scallop vessels to enter the year-round closed areas with specific access restrictions. Since the exemption program included a mandatory 25% observer coverage for trips in the closed areas, the sea sampling data from this program gives a more accurate picture of skate bycatch for the scallop fleet entering the closed areas. From May – December 2000, according to the sea sampling database, 226 scallop trips were observed in the closed areas. The most updated information about the number of vessels that participated in the scallop exemption program can be found on the NMFS Statistics Office web site (www.nero.nmfs.gov/ro/fso/reports_frame.htm). According to this source, as of December 14, 2000, 128 vessels entered Closed Area I, and 35.1% of the trips were observed. The most updated information available for Closed Area II is from August 14, 2000; 80 vessels made 164 trips into Closed Area II, and 51.2% of them were observed. Last, as of October 3, 2000, 136 vessels made trips into the Nantucket Lightship closed area and 35.3% of those trips were observed.

According to the sea sampling data for the exemption program, and similar to the general observer data for scallop dredges, virtually no skates that were caught on the observed trips were kept (Table 59). The total number of skates kept from all seven species was only 156.0 lbs. out of the 737,566.1 lbs. of skates that were caught. It is interesting to note that after scallops, skates were the second largest species caught by weight within the closed areas. Table 59 summarizes the different skate species that were caught on observed trips in the scallop exemption program and compares the bycatch level of skates with other species caught in this exemption program fishery.

The number of skates discarded from observed trips in the exemption program differs by species. Little skates had the largest bycatch by weight (over 115,000 lbs.), while smooth skate bycatch came to only 491 lbs. on the observed trips. Some skate bycatch was unidentified and totaled 404,185 lbs. for the time series. According to the sea sampling database for the scallop exemption program, the skate species that was identified with the greatest bycatch level in Closed Area I was little skates (over 16,000 lbs.). Overall, from May to December 2000, the observed scallop exemption trips documented approximately 140,000 lbs. of skate bycatch in Closed Area I, over 500.000 lbs. in Closed Area II, and almost 50,000 lbs. in the Nantucket Lightship Closed Area.

Table 56 Summary of Sea Sampling Data for the Gillnet Gear Sector

There were 7,954 trips observed from May 1994 – December 2000 (7.74% observer coverage).

	Barndoor	Clearnose	Little	Rosette	Smooth	Thorny	Winter	Skates Unidentified	ALL SKATES
KEPT	3,397.4	11,108.2	47,278.7	526.0	4,098.0	4,519.9	382,844.1	81,797.2	**535,569.5**
DISCARD	1,030.7	13,322.6	62,222.4	165.8	718.4	8,948.3	32,150.4	16,601.8	**135,160.4**
Grand Total	**4,428.1**	**24,430.8**	**109,501.1**	**691.8**	**4,816.4**	**13,468.2**	**414,994.5**	**98,399.0**	**670,729.9**
KEPT %	76.72%	45.47%	43.18%	76.03%	85.08%	33.56%	92.25%	83.13%	**79.85%**
DISCARD %	23.28%	54.53%	56.82%	23.97%	14.92%	66.44%	7.75%	16.87%	**20.15%**
	Fluke	**Monkfish**	**Multispecies**	**Other**	**Scallops**	**Small Mesh**	**ALL SKATES**	**TOTAL**	
KEPT	11,502.0	2,256,352.5	5,073,426.6	11,395,525.4	282.2	53,115.3	**535,569.5**	**19,325,773.5**	
DISCARD	1,756.3	60,619.8	83,340.6	983,413.3	209.0	7,608.9	**135,160.4**	**1,272,108.3**	
Grand Total	**13,258.3**	**2,316,972.3**	**5,156,767.2**	**12,378,938.7**	**491.2**	**60,724.2**	**670,729.9**	**20,597,881.8**	
KEPT %	86.75%	97.38%	98.38%	92.06%	57.45%	87.47%	**79.85%**	**79.85%**	
DISCARD %	13.25%	2.62%	1.62%	7.94%	42.55%	12.53%	**20.15%**	**20.15%**	

Table 57 Summary of Sea Sampling Data for the Otter Trawl Sector

There were 1,158 trips observed from May 1994 – December 2000 (0.45% observer coverage).

	Barndoor	Clearnose	Little	Rosette	Smooth	Thorny	Winter	Skates Unidentified	ALL SKATES
KEPT	1,082.0	14,575.7	173,302.0	321.0	2,135.0	4,867.0	125,597.5	151,591.9	473,472.1
DISCARD	21,398.3	346,670.4	1,367,283.5	14,515.7	7,648.1	33,880.4	238,790.6	336,290.2	2,366,477.2
Grand Total	**22,480.3**	**361,246.1**	**1,540,585.5**	**14,836.7**	**9,783.1**	**38,747.4**	**364,388.1**	**487,882.1**	**2,839,949.3**
KEPT %	4.81%	4.03%	11.25%	2.16%	21.82%	12.56%	34.47%	31.07%	16.67%
DISCARD %	95.19%	95.97%	88.75%	97.84%	78.18%	87.44%	65.53%	68.93%	83.33%
	Fluke	**Monkfish**	**Multispecies**	**Other**	**Scallops**	**Small Mesh**	**ALL SKATES**	**TOTAL**	
KEPT	688,266.3	702,844.9	2,644,623.3	12,463,229.1	28,776.1	854,192.2	473,472.1	17,855,404.0	
DISCARD	67,732.7	133,502.2	319,586.1	3,788,213.4	37,910.1	839,995.6	2,366,477.2	7,553,417.3	
Grand Total	**755,999.0**	**836,347.1**	**2,964,209.4**	**16,251,442.5**	**66,686.2**	**1,694,187.8**	**2,839,949.3**	**25,408,821.3**	
KEPT %	91.04%	84.04%	89.22%	76.69%	43.15%	50.42%	16.67%	16.67%	
DISCARD %	8.96%	15.96%	10.78%	23.31%	56.85%	49.58%	83.33%	83.33%	

Table 58 Summary of Sea Sampling Data for the Scallop Dredge Sector (Not Including Closed Area Access Program)

There were 191 trips observed from May 1994 – December 2000 (0.51% observer coverage).

	Barndoor	Clearnose	Little	Rosette	Smooth	Thorny	Winter	Skates Unidentified	ALL SKATES
KEPT			232.0		150.0		1,187.0	1,184.0	2,753.0
DISCARD	3,816.8	33,953.8	805,457.4	467.2	29,192.0	23,195.2	89,765.3	372,244.7	1,358,092.4
Grand Total	**3,816.8**	**33,953.8**	**805,689.4**	**467.2**	**29,342.0**	**23,195.2**	**90,952.3**	**373,428.7**	**1,360,845.4**
KEPT %	0.00%	0.00%	0.03%	0.00%	0.51%	0.00%	1.31%	0.32%	0.20%
DISCARD %	100.00%	100.00%	99.97%	100.00%	99.49%	100.00%	98.69%	99.68%	99.80%
	Fluke	**Monkfish**	**Multispecies**	**Other**	**Scallops**	**Small Mesh**	**ALL SKATES**	**TOTAL**	
KEPT	6,188.2	415,265.5	16,527.2	23,132.1	5,658,935.0	181.4	2,753.0	6,122,982.4	
DISCARD	38,376.4	98,560.4	117,191.9	9,005,160.9	232,754.9	12,727.4	1,358,092.4	10,862,864.3	
Grand Total	**44,564.6**	**513,825.9**	**133,719.1**	**9,028,293.0**	**5,891,689.9**	**12,908.8**	**1,360,845.4**	**16,985,846.7**	
KEPT %	13.89%	80.82%	12.36%	0.26%	96.05%	1.41%	0.20%	36.05%	
DISCARD %	86.11%	19.18%	87.64%	99.74%	3.95%	98.59%	99.80%	63.95%	

Table 59 Summary of Sea Sampling Data from the Sea Scallop Exemption Program

There were 226 trips observed from May through December 2000.

	Barndoor	Clearnose	Little	Rosette	Smooth	Thorny	Winter	Skates Unidentified	ALL SKATES
KEPT	45.0		17.0			1.0	4.0	89.0	156.0
DISCARD	30,913.9	63,513.0	115,879.3	24,654.5	491.0	5,268.6	92,511.0	404,178.8	737,410.1
Grand Total	**30,958.9**	**63,513.0**	**115,896.3**	**24,654.5**	**491.0**	**5,269.6**	**92,515.0**	**404,267.8**	**737,566.1**
KEPT %	0.15%	0.00%	0.01%	0.00%	0.00%	0.02%	0.00%	0.02%	0.02%
DISCARD %	99.85%	100.00%	99.99%	100.00%	100.00%	99.98%	100.00%	99.98%	99.98%
	Fluke	**Monkfish**	**Multispecies**	**Other**	**Scallops**	**Small Mesh**	**ALL SKATES**	**TOTAL**	
KEPT	20.5	210,069.7	60,736.2	3,397.3	1,673,468.7	179.8	156.0	1,948,028.2	
DISCARD	2,312.6	99,731.9	278,811.6	237,578.8	2,686,343.9	24,159.0	737,410.1	4,066,347.9	
Grand Total	**2,333.1**	**309,801.6**	**339,547.8**	**240,976.1**	**4,359,812.6**	**24,338.8**	**737,566.1**	**6,014,376.1**	
KEPT %	0.88%	67.81%	17.89%	1.41%	38.38%	0.74%	0.02%	32.39%	
DISCARD %	99.12%	32.19%	82.11%	98.59%	61.62%	99.26%	99.98%	67.61%	

7.3.5.2 Rhode Island Sea Sampling Data

Since Amendment 5 to the Multispecies FMP was implemented, vessels wishing to target skates have been required to utilize Days-At-Sea (DAS). Southern New England boats that routinely target skates for bait for the lobster fleet have contended that bycatch of regulated species is minimal, and is below the 5% threshold required to exempt the skate fishery from DAS usage. The areas where fishing vessel captains claim low regulated bycatch encompass statistical areas 539, 611, and parts of 537 during the months June-September. With the current DAS allocations, many vessels routinely use up a large percentage of their annual allocation during the months of the directed skate bait fishery.

In response to repeated requests from industry to verify groundfish bycatch, in anticipation of the forthcoming Skate FMP and further cuts in DAS proposals, the Rhode Island Division of Fish and Wildlife (RIDFW) instituted expanded sea sampling coverage on the skate bait fleet during 2000 and 2001. Little skates have dominated the skates species caught for bait in the Southern New England area, with a small bycatch of other skate species (mostly juvenile winter skates). Little skates are not in an overfished condition, and overfishing is not thought to be occurring on this species.

A total of 17 trips and 64 tows were sampled in the two-year seasonal fishery. Data on target and bycatch species, along with skate species composition and little skate length frequencies within statistical areas 539 and 611 were collected. The proportion of little skates to all other species captured during this study was **97.84%**.

Small proportions of winter (1.82%), clearnose (0.31%) and barndoor skate (0.03%)were also caught during the study. Groundfish totals fell well below the 5% exempted fishery criteria in this study. Regulated multispecies captured throughout the course of this study included winter flounder, witch flounder, yellowtail flounder, windowpane flounder, silver hake, and red hake. Additionally, small amounts of monkfish and fluke were documented.

Sea sampling data indicate minimal and insignificant groundfish mortality and that the proportion of skates to total biomass caught falls well below the 5% exempted fishery criteria. The Rhode Island Division of Fish and Wildlife is in the process of finalizing a report on the skate bait fishery and will be forwarding the results to NMFS to request an exemption from current DAS requirements for this fishery between the months of mid-June to mid-September.

7.3.6 Processing and Marketing Information

Much of this information is presented in Section 7.3.1 of this document as well.

Skates caught for lobster bait are landed whole by otter trawlers and either sold 1) fresh, 2) fresh salted, or 3) salted and strung or bagged for bait by the barrel. Bait skates are "processed" in that most are salted and strung or bagged by the buyers as preparation for use in lobster pots. A tremendous volume of salt is used in the bait operations, up to 130,000 pounds weekly during the peak of lobster season. Barrels of skates may weigh between 500 – 600 pounds. All "processing" of skates for lobster bait occurs at the level of the buyer/dealer and not the processor. No processing facilities are involved with skate products for use as lobster bait.

Skate wings are processed for export to various international markets. Winter skate, thorny skate, and barndoor skate are considered sufficient in size for processing of wings. Processors state that they prefer skate wings of at least 1-1 1/4 lb. skin-on. A one-pound skinless wing is estimated to weigh about 1.3-pounds skin-on. Skate processors buy whole, hand-cut, and/or onboard machine-cut skates from vessels primarily out of Massachusetts and Rhode Island. Cutting machines were developed in 1988 in response to increasing markets for skate wings and increased participation in the fishery. However, the practice of onboard machine cutting has decreased since that time and may not exist at all anymore. Cutting machines have been somewhat problematic because they can leave wing meat on the body of the skate or cut too close to the cartilage, decreasing the quality of the product and/or requiring additional hand-cutting. Processors prefer hand-cut wings because hand-cutting generally produces a better product and higher yield.

There are currently four known major skate wing processors in New England and another two companies in the Mid-Atlantic. The companies reportedly buy wings from vessels mostly from New Bedford and Mid-Atlantic ports. One major skate processing facility in New Bedford reports that about 90% of its product is landed in New Bedford, with the remainder trucked from Provincetown, Scituate, and other ports primarily in Massachusetts. Processors report that while demand for the product is generally consistent, profit margins are extremely low. One processor mentioned that the strong U.S. dollar makes the exported product more expensive.

In total, nine processors from MA, RI, NY, and NH reported processing 3.9 million pounds of unspecified skate products. No further description of product form is available (e.g., whether frozen or fresh). Sales amounted to $3.2 million, for an average price of $0.81. These firms employ 514 workers.

The activities involved with skate processing depend on the market which the product serves. However, almost all wings are frozen for export. France, Korea, and Greece are the leading importers. France prefers skate wings, a processed product that is either skinless or skinless and boneless; frozen individually wrapped in poly (IWP). The Korean market generally prefers whole processed skates, and there is a Japanese market for wings.

Brokers have also secured skates for the European and Asian markets from Argentina and Canada. Argentina initially produced a significant amount of skates, but they were reportedly of poor quality. Processing techniques have improved, and Argentina now provides the bulk of the European and Asian market. Argentina supplements their skate production with large skates produced from the U.S. west coast fishery. Canadian production of skates for the export market has diminished, as some of the industry switched toward more lucrative crab and shrimp fisheries.

Data of annual production of processed and exported skate products is sparse. Limited trade data was collected by NOAA/NMFS for the New England Fisheries Development Program in 1975. Reports from an international seafood trade expert at the Seafood Institute indicate that skate export poundage was tracked through "Euro Stat Data" until 1995 or 1996, then abandoned. Customs does not track the exports, and no census data exists specific to skate exports.

7.3.7 Other Economic Factors

The Skate SAFE Report (Volume II) includes additional economic information that is not repeated in this FMP document. The SAFE Report can be referenced for the following economic information:

- Annual commercial landings and revenues of skates on a calendar-year basis and by state, market category, gear, and port
- Dockside prices for bait and wings
- Preliminary price models and supply/demand information
- Vessel-level revenues from skates
- Skate dealer activity

7.3.8 Safety Factors

The U.S. Coast Guard's First Cost Guard District office maintains an extensive database of fishing vessel safety incidents that occurred in the Northwest Atlantic since January 1, 1993. Most of the information is for reportable casualties, defined as:

- A grounding;
- Loss of propulsion, primary steering or any associated control system that reduces the maneuverability of the vessel;
- An occurrence materially and adversely affecting the vessel's seaworthiness including but not limited to: fire, collision, sinking and flooding;
- A loss of life;
- An injury that requires professional medical treatment and that renders the individual unfit to perform his or her routine duties;
- An occurrence causing property damage in excess of $25,000.

In addition, the database includes information on Emergency Position Indicating Radiobeacon (EPIRB) alerts and trip terminations because of safety violations. The data for 1993 through 1999 are available to the public via a website (http://www.uscg.mil/d1/staff/m/fvs/statistics.html).

While the data are not organized by fishery, in many instances the type of vessel (scalloper, longline, gillnet, trawler, etc.) is recorded. Most skates are caught by otter trawl and, to a lesser extent, gillnet vessels. While these gears are used in a variety of fisheries, examining the number of accidents on these vessels may give an indication of the number of accidents that have occurred in fisheries of which skates are a component.

Figure 92 shows the number of accidents for all fisheries since 1993. The data has been compiled into fishing years. Generally, the number of safety incidents declined for most types of accidents. Fire incidents, however, have increased since 1993. Figure 93 illustrates information on the same type of casualties, but only for incidents identified as being on trawl, gillnet, or longline vessels. The data continue to show modest declines in the number of incidents since 1993, with the exception of fires.

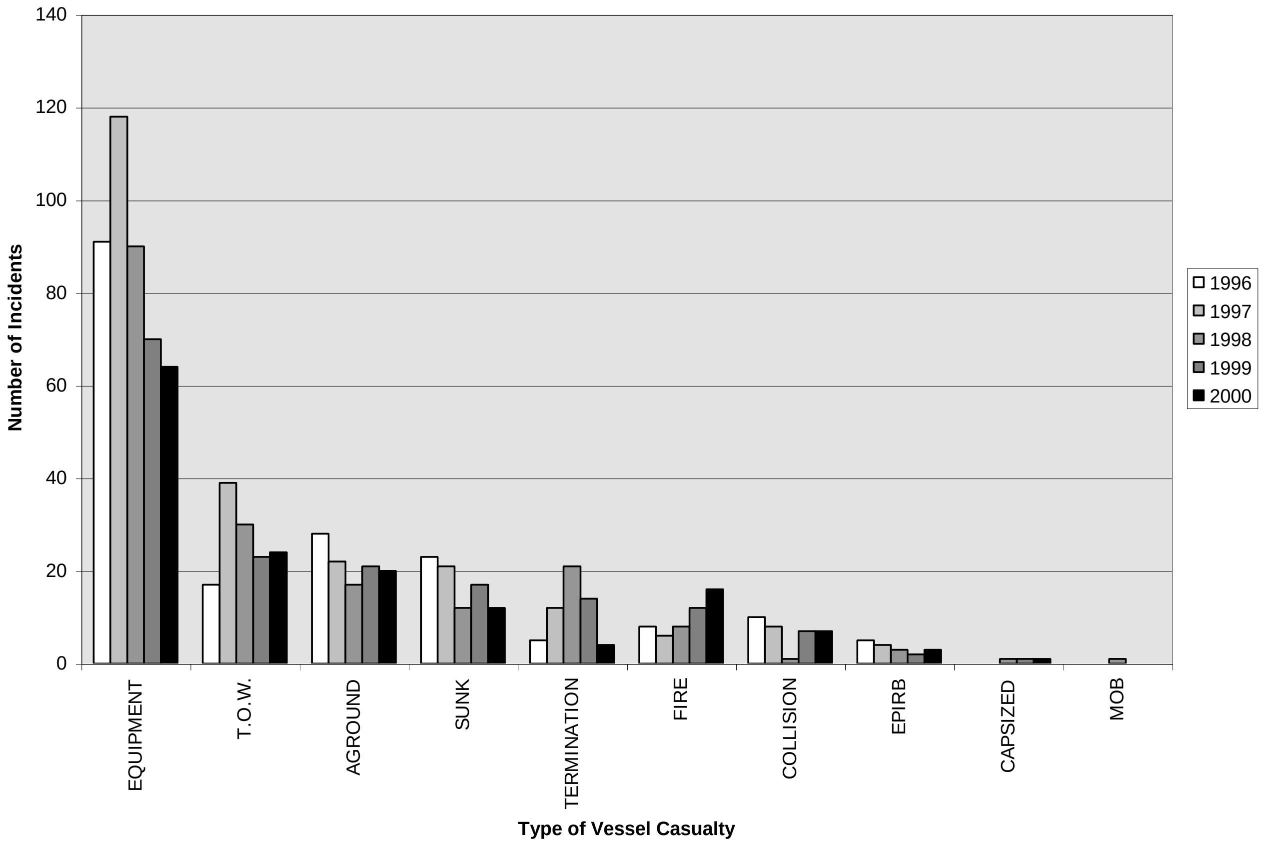
Figure 94 summarizes reported deaths or injuries for all fisheries. Unlike the overall level of incidents, the trends these types of incidents are less clear. While the number of injuries in all fisheries declined in 1998, it immediately returned to prior levels in 1999 and remained nearly constant. The number of deaths has not shown any clear trend over the entire period. Deaths more than doubled in groundfish fishing year 2000 compared to the previous year, but had fluctuated without a clear trend prior to that increase. As shown in Figure 94 and Figure 95, the trends among trawl, gillnet, and longline vessels were similar to those for all fisheries. With the exception of a peak in fishing year 1999, injuries remained relatively constant. Deaths among these vessels show the same trends as in all fisheries. The number of deaths more than doubled in fishing year 2000.

The number of reported injuries and deaths on trawl, gillnet, and longline vessels was further examined by vessel length (Figure 96 and Figure 97). Injury information does not reflect any clear trend. For vessels less than 75 feet in length, the number of injuries has remained relatively constant. Injuries on vessels 75 feet and over was fairly constant until a large increase occurred in fishing year 2000. For all vessel sizes, the number of deaths increased in fishing year 2000. Vessels between 50 and 75 feet in length have a seen an increase in the number of deaths for two consecutive years.

The data, with some exceptions, does not include information on the fishery that the vessel was participating in at the time of the accident. As an example, trawl vessels are used in a variety of fisheries in New England, and it should not be concluded that all the accidents by these vessels occurred in the groundfish fishery or in any other fisheries that use trawls. While examining the data allows a determination on the number of accidents that occurred, there is no simple way to determine if accident rates have increased or declined because the data cannot be directly compared to measures of fishing effort (such as days absent, DAS, pounds landed, revenues, etc.). Some general statements, however, can be made:

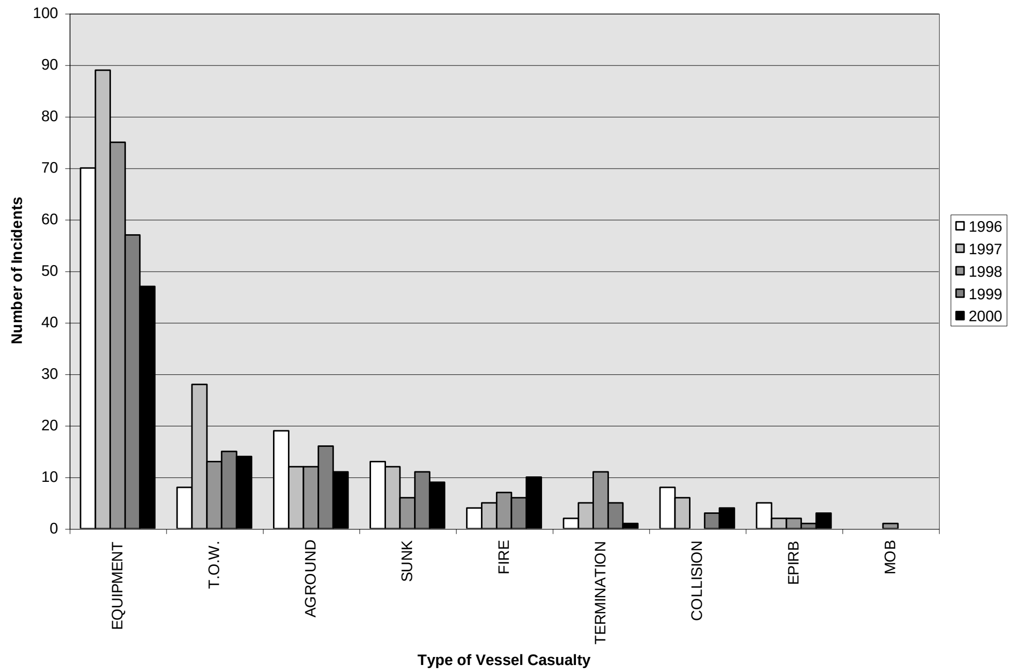
- The number of reported incidents for trawl, longline, and gillnet vessels has declined since groundfish fishing year 1996.
- The number of deaths for these three gears has increased, though it is unknown in what fisheries the deaths occurred.
- With the exception of those vessels 75 feet and over in length (trawl, gillnet, and longline), the number of injuries has remained relatively constant. Vessels over 75 feet in length experienced an increase in the number of injuries in fishing year 2000.

Figure 92 Vessel Safety Incidents, All Fisheries, Groundfish Fishing Years



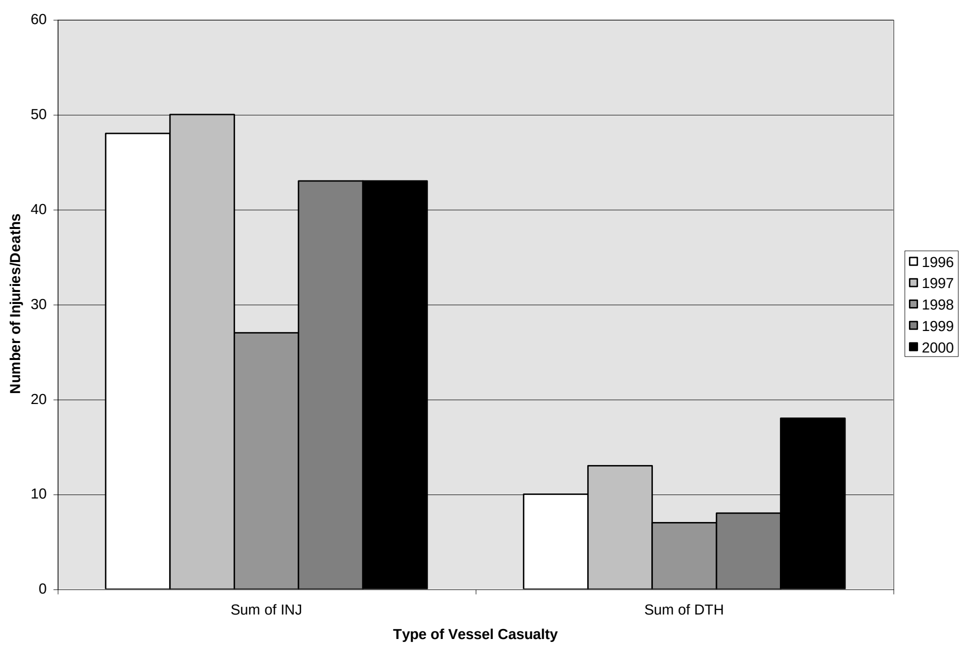
Source: U.S. Coast Guard, unpublished data.

Figure 93 Vessel Safety Incidents, Trawl, Gillnet, and Longline Vessels, Groundfish Fishing Years



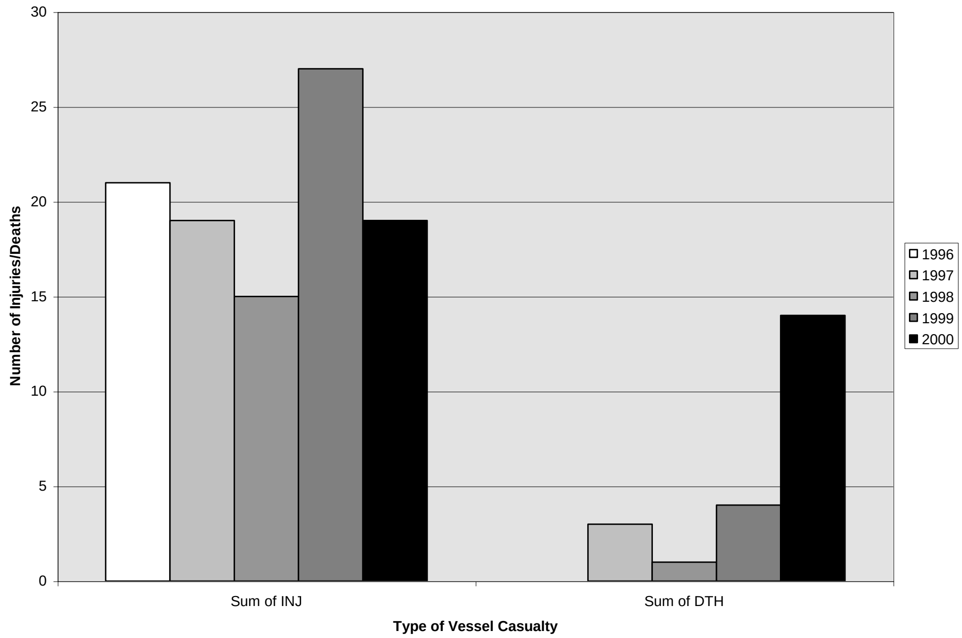
Source: U.S. Coast Guard, unpublished data.

Figure 94 Fishing Vessel Deaths and Injuries, All Fisheries, Groundfish Fishing Years



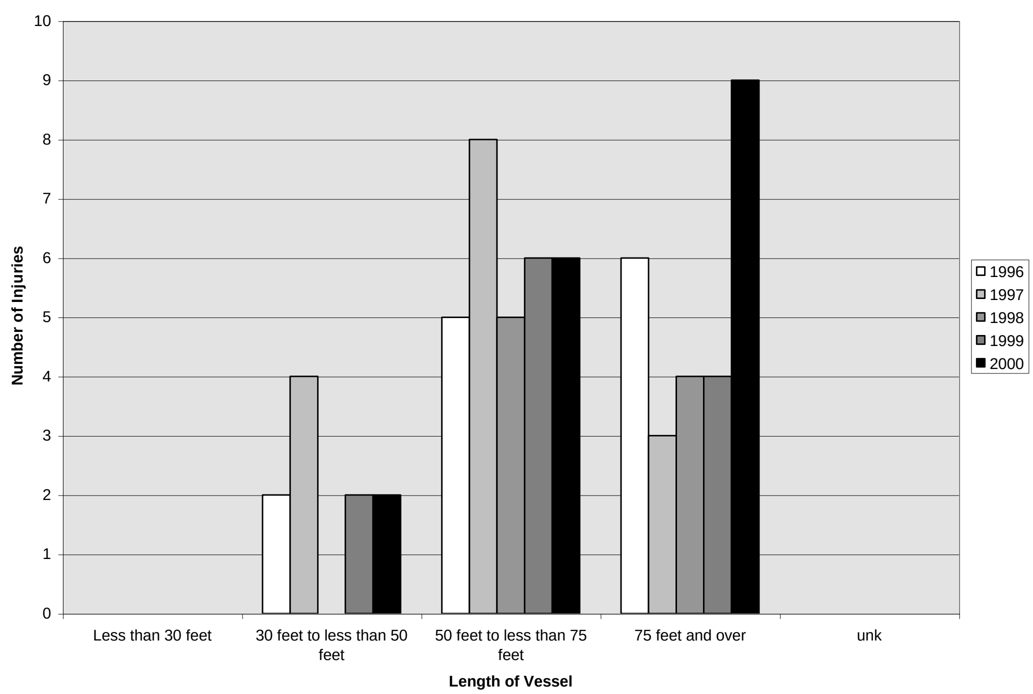
Source: U.S. Coast Guard, unpublished data.

Figure 95 Fishing Vessel Deaths and Injuries, Trawl, Longline, and Gillnet Fisheries, Groundfish Fishing Years



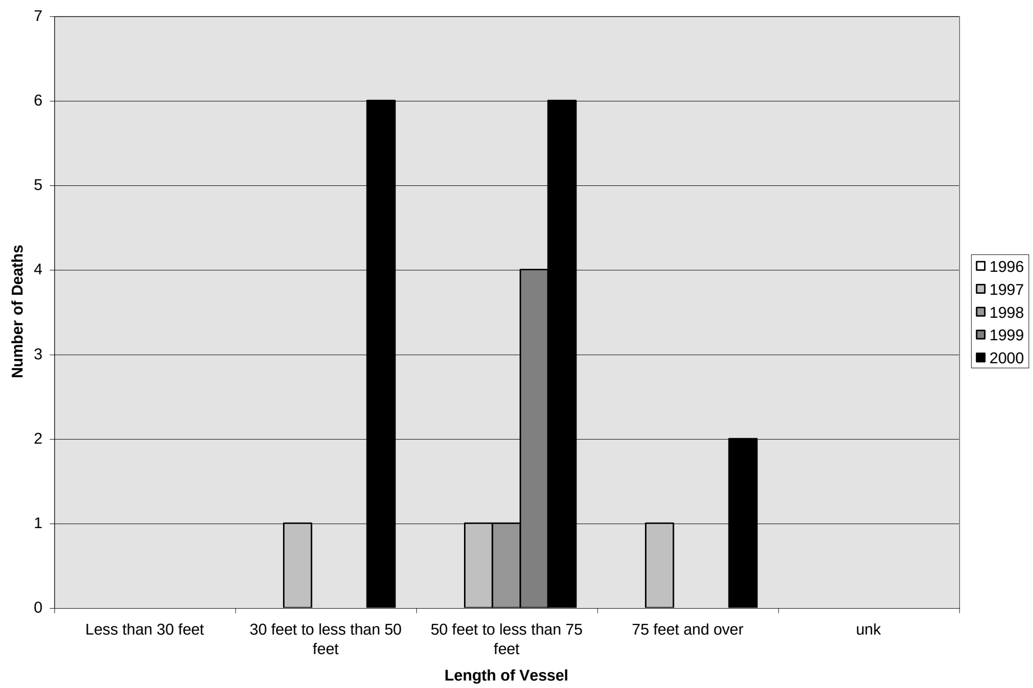
Source: U.S. Coast Guard, unpublished data.

Figure 96 Number of Fishing Vessel Injuries by Length of Vessel, Trawl, Longline, and Gillnet Gear Only, Groundfish Fishing Years



Source: U.S. Coast Guard, unpublished data.

Figure 97 Number of Fishing Vessel Deaths, by Vessel Length, Trawl, Gillnet, and Longline Vessels Only, Groundfish Fishing Years



Source: U.S. Coast Guard, unpublished data.

8.0 DATA AND RESEARCH NEEDS

Adequate and comprehensive scientific information (both biological and socioeconomic) about the species and fisheries proposed to be managed under the Skate FMP is currently lacking. This information is critical to managing the Northeast Region's skate complex consistent with the Sustainable Fisheries Act. Without this information, uncertainty in the scientific data will constrain the ability of the Council to take appropriate management actions. In addition, effective monitoring and appropriate recommendations for management adjustments, especially for fisheries in which skates are caught incidentally, hinge on the availability of more comprehensive scientific information about these species.

One of the primary objectives of this FMP is to collect information critical for substantially improving knowledge of skate fisheries by species and for monitoring: (a) the status of skate fisheries, resources, and related markets and (b) the effectiveness of skate management approaches. To achieve this objective, the Council is proposing to implement a comprehensive permit and catch reporting program. Such a program addresses many of the data and research needs discussed below, but much additional research will be necessary to obtain the necessary biological and ecological information about the individual species in the complex.

During SAW 30, the SARC identified the following sources of uncertainty relative to the assessment of the Northeast Region's skate complex:

1) The species composition and size structure of landings are unknown.
2) The true level of discards and the discard mortality rate are unknown.
3) A lack of information on the stock structure of the species in the skate complex has increased the uncertainty of conclusions about historical trends in abundance, recommendations of appropriate biological reference points, and conclusions about the status of barndoor skate relative to ESA listing factors.
4) Life history data are uncertain for winter and little skate and incomplete and totally lacking for five species.
5) Mortality estimates are based on equilibrium assumptions which are only partially met for these stocks. A preferable approach for future assessments would be an age-based method for determining mortality rates and estimates of longevity. This will require several years of future adequate length and age sampling, both from the commercial and research survey catches.
6) The proposed SFA biomass reference points are based on selected time periods of survey indices, but it is unknown how these relate to true estimates of B_{MSY}.

Based on the above sources of uncertainty, the SARC identified the following "research recommendations:"

1) The commercial fishery statistics sampling programs should be adapted to report skates landings by species.
2) Commercial fishery size composition data should be collected by species.
3) Sea sampling of directed skate landings and skate bycatch should be increased, and the identification of the species composition of the skate catch improved.
4) Age and growth studies, for all seven species in the complex, are needed.
5) Maturity and fecundity studies, for all seven species in the complex, are needed. Use of life history models requires these data and may prove useful in establishing biological reference points for the skate species.
6) Estimates of commercial and recreational fishery discard mortality rates, for different fishing gears and coastal regions and/or bottom types, for all seven species in the complex, are needed.
7) Studies of the stock structure of the species in the skate complex are needed to identify unit stocks. Stock identification studies, especially for barndoor, thorny, winter, and little skate, are needed.
8) Explore possible stock-recruit relationships by examination of NEFSC survey data. A simultaneous examination of the species in the complex may prove a useful first step.
9) Investigate trophic interactions between skate species in the complex, and between skates and other groundfish.
10) Further consideration of the validity of NEFSC trawl survey catchability conversion factors for skate species is needed (diel, gear, vessel).

11) Investigate the influence of annual changes in water temperature or other environmental factors on shifts in the range and distribution of the species in the skate complex. Establish the bathymetric distribution of the species in the complex off the U.S. Northeast coast.
12) Investigate the SEAMAP survey data for clearnose and rosette skate.
13) Investigate historical NEFSC survey data from the Albatross III cruises during 1948-1962 when they become readily accessible, as they may provide valuable historical context for long term trends in skate biomass.
14) Recalculate the error distributions of the survey indices using alternative distributions.

In addition to the above, during the development of the SAFE Report, the Skate PDT recommended the following:

- Promote comprehensive reporting, including items discussed above as well as direct sales from bait to lobster fishermen.
- Urge all dealers to use the species utilization code to better understand the total amount of skates sold for lobster bait.
- Urge all processors to report production in the Processed Products Survey.
- Urge states that report via the General Canvas to report landings by vessel permit number in order to better identify small businesses for the *regulatory impact review*.
- Collect trade statistics (Q and V) – U.S. exports by country and U.S. imports by country.
- Estimate production and/or cost functions for directed bait and wing fisheries.
- Estimate price models for bait and wing landings using current data (assuming that reporting is more complete).

The Skate Committee also has identified the transboundary nature of these species and the extent of overlap with Canadian skate fisheries as important sources of uncertainty.

9.0 FMP CONSISTENCY WITH THE MAGNUSON-STEVENS ACT

9.1 COMPLIANCE WITH THE 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:

National Standards [16 U.S.C. 1851 § 301]

In General. – Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the…national standards for fishery conservation and management.

This section summarizes, in the context of the National Standards, the analyses and discussion of the proposed action that appear in various sections of this document.

(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

Section 4.4.3 of this document (p. 21) proposes overfishing definitions for each of the skate species managed under this FMP. Consistent with the National Standard Guidelines (NSGs), the overfishing definitions include biomass-based and fishing mortality-based reference points to evaluate when a skate species is in an overfished condition and when overfishing may be occurring. Because information is currently not available to accurately estimate fishing mortality rates for the skate species, the proposed overfishing definitions include proxy reference points for fishing mortality that are based on trends in the NEFSC trawl survey.

Section 4.3.3 of this document (p. 15) specifies, to the extent possible, Optimum Yield (OY) for the individual species in the Northeast skate complex. In general, OY will equate to the yield of skates that results from effective implementation of the Skate FMP. Consistent with the NSGs and the Magnuson-Stevens Act, the Council intends that OY cannot exceed MSY or the allowable portion of MSY necessary to be consistent with the MSY-based control rule (see Section 4.5.2 of this document for a discussion of control rules). If the Skate FMP is successful in achieving its objective of rebuilding the skate species to their long-term target biomass levels, then the measures in the FMP should provide for extraction of the optimal amount of skates.

Related to OY are the following important considerations:

- The Council is proposing a management regime that it believes includes the most appropriate management measures to protect and rebuild the skate resources, maintain sustainable levels of fishing effort for some skate species, and has the least impact on other fisheries in the Northeast Region.
- Based on available information and the analyses presented in this document, the proposed action provides sufficient protection for the resources to prevent overfishing and rebuild overfished stocks.

- Landings that occur under the measures proposed in this FMP are intended to equate to OY.

To be as precautionary as possible, the Council is setting OY at zero for barndoor skate, thorny skate, and smooth skate, the three species proposed for prohibition in this FMP. For other species, because fishery data are lacking, there is currently no time series of catch or landings on which to base an absolute specification of OY. OY for these species will therefore be defined as the amount that is harvested legally under the provisions of this FMP and the yield that results from the management measures in other fisheries to the extent that these measures further impact (and likely reduce) the harvest of skates.

Section 4.5 of this document (p. 30) specifies a rebuilding program for overfished skate species. Currently, barndoor and thorny skates are considered to be in an overfished condition (based on the proposed overfishing definitions) and will be subject to a rebuilding program when the Skate FMP is implemented. Consistent with NMFS' NSGs, the rebuilding programs for barndoor and thorny skates will commence as soon as the management measures in the Skate FMP are implemented. The general conclusion that the Skate PDT and the Council reached is that rebuilding time periods for the species in the skate complex will be on the order of decades.

The rebuilding program for overfished skate species requires Council action if the three-year moving average of the appropriate survey mean weight per tow does not increase when compared to the average for the three years previous. The advantage to this rebuilding program is that it takes a proactive approach by requiring that the survey average must be increasing over time to ensure rebuilding. Nevertheless, it will be important to allow for maximum flexibility and discretion while evaluating progress towards rebuilding.

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

As discussed throughout this FMP, adequate and comprehensive scientific information (both biological and socioeconomic) about the species and fisheries proposed to be managed under the Skate FMP is currently lacking. One of the primary objectives of this FMP is to collect information critical for substantially improving knowledge of skate fisheries by species and for monitoring: (a) the status of skate fisheries, resources, and related markets and (b) the effectiveness of skate management approaches. Many of the measures proposed in this FMP are intended to improve the information base on which appropriate skate management approaches are dependent.

Data limitations and research needs are specifically discussed in Sections 2.0, 7.2.3, and 8.0 of this document, as well as throughout the remainder of the document. Despite current data limitations, the conservation and management measures proposed in this FMP are based on the best *available* scientific information. General fishery information was collected from representative members of the fishing industry by the Skate PDT and was utilized in the development of this FMP (see Section 7.3 and Volume II of this FMP). Much, if not all, of the available scientific literature on the biology and ecology of the skate species also was utilized in the development of this FMP (see Volumes II and III).

The Skate Plan Development Team includes technical experts from the NEFMC staff, NMFS Regional Office staff, the Northeast Fisheries Science Center, and the States of Massachusetts and Rhode Island. As more and better information becomes available, the PDT will update the information base on which this FMP is dependent.

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The management unit proposed in this FMP (the Northeast Region) is discussed in Section 4.1 (p. 8) and includes the species of concern, the identification of distinct stocks (if any), and the geographic area subject to management. The proposed management unit applies to all seven species in the Northeast skate complex.

Two of the skate species in the Northeast complex are distributed significantly farther south than the other species: clearnose and rosette skates. The ranges of these two species extend from the Southern New England area southward, well beyond the extent of the NEFSC trawl survey and into waters off the coast of Florida. The Council considered managing these species throughout the extent of their ranges, that is, from Maine – Florida. However, it seems neither practical nor prudent for the New England Council to attempt to manage skate resources as far south as Florida, and the ranges of none of the other five skate species extend as far south. Therefore, to ensure that all interrelated stocks of skates are managed in close coordination, the Council chose to retain clearnose and rosette skate in the proposed management unit.

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

The management measures proposed in this FMP do not discriminate between residents of different states. Because there is no limited/controlled access program proposed at this time, access to the skate resources is open to vessels from all states. In addition, the management measures proposed in this FMP apply equally throughout the management unit (Northeast Region). However, fishermen in some areas may be affected by the management measures more than others, depending on their level of economic dependence on the skate resources. For example, the analysis indicates that fishermen from Massachusetts (New Bedford and Provincetown, specifically) will be more affected by the proposed possession limit on skate wings because they rely on skates for a larger proportion of their revenues than fishermen from other states.

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

The Council considered efficiency in the utilization of fisheries resources when developing the measures proposed in this FMP, and none of the proposed measures have economic allocation as their sole purpose. This FMP proposes to promote overall efficiency in fisheries that catch skates by constraining fishing effort on skates and establishing species-specific measures to protect and rebuild skates. The proposed prohibitions on barndoor, thorny, and smooth skates represent proactive steps towards protecting the skate resources and rebuilding them to long-term sustainable levels. The proposed possession limit for the skate wing fishery is intended to prevent an expansion of the wing fishery, which could affect efficiency. The utilization of fishery resources is more efficient when stocks are rebuilt, as landings and fishery yields are likely to increase from current levels under a rebuilt stock.

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

The Council accounted for variations in fisheries, fishery resources, and catches in several ways during the development of this FMP. First, the Council considered and analyzed a range of management options and alternatives in this FMP. Different permit and catch reporting options were considered specifically to improve the skate information base while accounting for variations in fishing practices. Different kinds of prohibitions (for barndoor, thorny, and smooth skates) were considered to account for variations in fishing practices and problems associated with species identification in high volume fisheries. A complete discussion of the non-preferred alternatives and the alternatives that the Council rejected can be found in Section 5.0 of this document (p. 101).

Second, this FMP accounts for variations among and contingencies in fisheries, fishery resources, and catches by acknowledging the overlap between skates and other fisheries like multispecies, monkfish, and scallops. Section 5.0 of the Skate SAFE Report (Volume II) discusses other FMPs that affect the skate resources. Much of this information was considered in developing the baseline of management measures in other fisheries that promote the rebuilding of the skate resources (see Section 4.16, p. 79). To the extent possible, this FMP will rely on management measures in other fisheries to continue to protect skates beyond the specific measures proposed in this FMP.

Third, this FMP establishes several processes to facilitate periodic review of conditions in the fishery an adjust the management measures according to such variations. Section 4.7 (p. 67) establishes a review and monitoring process for this FMP to ensure that all information is updated regularly and management adjustments are made as appropriate. For management adjustments, this FMP establishes a framework adjustment process (see Section 4.8, p. 67). In addition, the review process specified in Section 4.16.2 (p. 95) provides a mechanism to account for variations in other fisheries and their FMPs to ensure that skate rebuilding will continue as management measures in other fisheries are adjusted. Section 4.6.3 (p. 64) establishes a similar process to account for variations in the EFH components of this and other FMPs.

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

The Council considered the costs and benefits of a range of alternative to achieve the goals and objectives of this FMP. It considered the potential costs of management action to the industry relative to the costs associated with taking no action. Short-term costs associated with the proposed management action should be compensated by long-term economic gains.

The Council also considered administrative and enforcement costs associated with the management measures under consideration. For example, the proposed federal permit for skates (Section 4.9, p. 70) minimizes administrative costs associated with issuing a new federal permit by establishing only one permit category for all vessels. The proposed prohibitions on possession of barndoor, thorny, and smooth skates were selected, in part, because they are easier to enforce than the other prohibitions that were considered, and they should therefore minimize some of the enforcement costs associated with this FMP.

The reliance on the baseline of existing management measures in other fisheries (Section 4.16.1, p. 80) and the review process to consider changes to these baseline measures (Section 4.16.2, p. 95) clearly minimize costs and avoid unnecessary duplication by reducing the complexity of measures proposed in this FMP and recognizing the overlap of skates with other fisheries in the Northeast Region. To the extent that this FMP can rely on existing measures in other FMPs, additional necessary skate-specific measures are likely to remain relatively simple, avoiding redundancy and minimizing complexity in the myriad of fisheries regulations throughout the Northeast Region.

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

The Council considered the importance of fishery (skate) resources to affected communities and provided those communities with continuing access to skate resources to the extent possible, but not at the expense of compromising the conservation objectives of this FMP. Many of the specific measures proposed in this FMP are intended to constrain effort on skates and prevent fishery expansion, while still providing access to the resources for the vessels and communities that are most dependent on skates.

Section 7.3 of this document characterizes skate fishing activity and dependence (defined as percentage of total fisheries revenues from skates) for most communities that are known to land skates in either the bait or wing fisheries. Details about the bait and wing fisheries are also provided in Section 7.3. Additional information about skate fisheries and communities is presented in the 2000 SAFE Report (Volume II). The social and community impact assessment for this FMP can be found in Section 6.6 (p. 245).

In general, the only communities with substantial involvement in and/or dependence on skate fishing are: Point Judith, RI; New Bedford, MA; Provincetown, MA; and eastern Rhode Island (Newport, Tiverton, Portsmouth, Jamestown, Middletown, and Little Compton). The vast majority of skate fishing activity in RI ports, however, is in the skate bait fishery. Since none of the measures proposed in this FMP directly impact vessels participating in the skate bait fishery, the social and community impact assessment focuses on impacts to the communities of New Bedford and Provincetown.

Although the economic impacts of the measures proposed in this plan are expected to be relatively minor for both New Bedford and Provincetown, it is important to note the differences between the two communities and emphasize that, in terms of importance and dependence, special consideration should be given to Provincetown, and the impacts of future measures on Provincetown should be weighed carefully.

- Although the absolute numbers are far less in Provincetown than New Bedford, landings and revenues of skates are more economically important to vessels in Provincetown.
- Because of the relatively low commercial value of skates and high value of species like scallops, monkfish, and some flatfish, it is not likely that there are vessels in New Bedford that are substantially dependent on the skate fishery.
- Provincetown's geographic location and isolation as well as the nature of its fishing fleet make it more vulnerable to significant changes to management measures not only for skates, but also for other fisheries.

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

Bycatch is an important consideration in this FMP, especially because of the incidental-catch nature of the skate wing fishery. Unfortunately, information about the absolute amount of skate bycatch occurring in fisheries like groundfish, monkfish, and scallops is lacking. Section 3.4 of the Skate SAFE Report (Volume II) presents preliminary discard estimates for skates from SAW 30, calculated from NEFSC Domestic Sea Sampling and Dealer Weighout data for 1989-1998. Generally, the estimates from SAW 30 ranged from high values between 50,000 and 70,000 mt in 1989-1990 to a low of 14,700 mt in 1994. Otter trawls and scallop dredges account for >90% of the total discards. Over the 1989-1998 period, the biomass of total discards are estimated to be two (1998) to eight times (1989) the reported total landings. The commercial fishery discard mortality rate of skates, and therefore the magnitude of total skate discard mortality, is unknown.

Without better information about skate bycatch, specific measures to address bycatch and bycatch mortality were difficult to develop at this time. This FMP attempts to minimize the mortality of bycatch through the proposed prohibitions on possession of barndoor, thorny, and smooth skates. Although the survival rate of discarded skates is unknown, it is believed that a greater percentage of skate discards survive as compared to finfish (cod, flounder, etc.). Available information suggests that skates may be heartier than finfish and may have lower discard mortality rates. It is therefore assumed that a significant proportion of skates returned to the water quickly will survive.

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

Fishing is an inherently dangerous occupation; participants in the fishery must constantly balance the risks imposed by weather and other natural conditions against the potential economic benefits of taking a trip. A management plan should be designed so that it does not encourage dangerous behavior by the participants. Section 7.3.8 of this document (p. 374) summarizes updated information about the safety of fisheries of which skate is a component.

The social impact assessment of the measures proposed in this FMP (Section 6.6, p. 245) includes considerations of the effects of the proposed management measures on safety. The safety of fishermen and fishing operations at sea is an extremely important social impact factor, as decreased safety often increases stress at the individual and family level, which can exacerbate many family and societal problems. In addition, the impacts of fishing-related casualties can be felt throughout fishing communities, where close-knit groups have longstanding family and social networks.

- The proposed permitting and reporting requirements are not expected to compromise the safety of fishermen and/or fishing operations at sea. Nothing related to permitting and reporting requirements should create the need for fishermen to travel farther from shore to catch skates or to make adaptations that may compromise their safety.
- The proposed prohibitions on possession are not expected to compromise safety. It is unlikely that vessels will relocate to new fishing grounds or fish farther from shore as a consequence of the prohibitions. Also, it is unlikely that fishermen will need to make any adaptations to these prohibitions that could compromise their safety.
- The proposed possession limit for skate wings is not expected to compromise safety. It is unlikely that vessels will relocate to new fishing grounds or fish farther from shore as a consequence of the possession limit. It is possible that some vessels will opt to take additional trips to compensate for reductions from the possession limit, but the number of vessels doing this is expected to be small. This adaptation would only compromise safety if vessels increase the number of trips they are taking during times of less predictable and more extreme weather. The likelihood of this occurring cannot be predicted at this time.

9.2 OTHER REQUIRED PROVISIONS OF THE MSFCMA

Section 303 of the Magnuson-Stevens Fishery Conservation and Management Act contains 14 additional required provisions for FMPs, which are discussed below. Any FMP prepared by any Council, or by the Secretary, with respect to any fishery, shall:

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the National Standards, the other provisions of this Act, regulations implementing

recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law;

This new Fishery Management Plan for the Northeast skate complex contains all required elements of FMPs as specified in the MSFCMA. The measures that are necessary and appropriate for the conservation and management of the skate fisheries are described in Section 4.0 of this FMP (p. 8). The rebuilding program proposed for overfished skate species is specified in Section 4.5 (p. 30). A discussion of this FMP's consistency with the National Standards in the MSFCMA is provided in Section 9.1 (p. 382). Section 10.0 (p. 393) discusses this FMP's consistency with other applicable laws. None of the measures proposed in this FMP apply to foreign fishing vessels. In addition, no recommendations by international organizations in which the United States participates apply to this FMP.

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

Section 7.0 (p. 259) of this document and the 2000 Skate SAFE Report (Volume II of this FMP) present all available fishery information, including information about the number of vessels involved, the quantity and type of fishing gear used, the species of fish involved and their location, and all other relevant issues. There are no foreign fishing and Indian treaty fishing rights that apply to this FMP.

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

Section 4.3 (p. 9) of this FMP assesses and specifies, to the extent possible, the maximum sustainable yield and optimum yield from the skate fisheries. These sections also include a summary of the information utilized in making determinations about MSY and OY.

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

This assessment is included in Section 4.3 (p. 9) of this FMP. All of the OY for skates is anticipated to be harvested by fishing vessels of the United States.

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

Section 4.10 of this FMP (p. 72) describes the skate-specific reporting requirements proposed in this FMP. Data considerations relative to this FMP are discussed in Section 8.0 (p. 379).

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery;

The proposed framework adjustment process is intended to allow for temporary and/or real-time adjustments to management measures to address these issues as they arise. Section 4.8 (p. 67) describes the proposed framework adjustment process and identifies the types of management measures that may be implemented through a framework adjustment to the Skate FMP.

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

Section 4.6 (p. 37) of this document identifies and describes Essential Fish Habitat for each of the seven species in the Northeast skate complex. Section 7.2.1 (p. 296) describes the effects of the skate fisheries on EFH and the effects of other fisheries on the EFH of skate species. Section 7.2.2 (p. 318) identifies skate conservation recommendations suggested by the Council.

The majority of skate fishing occurs as part of other fisheries in the Northeast Region, like groundfish, monkfish, and scallops. Many EFH considerations, therefore, have been addressed in the FMPs for these other fisheries. The conservation recommendations offered by the Council in the Omnibus EFH Amendment (NEFMC 1998) are incorporated into the Skate FMP by reference. Due to the limited nature of the directed skate bait fishery and the fact that the majority of skate landings are landed as incidental catch in other fisheries, the Council offers no additional conservation recommendations at this time.

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

Adequate and comprehensive scientific information (both biological and socioeconomic) about the species and fisheries proposed to be managed under the Skate FMP is currently lacking. This information is critical to managing the Northeast Region's skate complex consistent with the

MSFCMA. Without this information, uncertainty in the scientific data will constrain the ability of the Council to take appropriate management actions. In addition, effective monitoring and appropriate recommendations for management adjustments, especially for fisheries in which skates are caught incidentally, hinge on the availability of more comprehensive scientific information about these species.

One of the primary objectives of this FMP is to collect information critical for substantially improving knowledge of skate fisheries by species and for monitoring: (a) the status of skate fisheries, resources, and related markets and (b) the effectiveness of skate management approaches. To achieve this objective, the Council is proposing to implement a comprehensive permit and catch reporting program. Such a program addresses many of the data and research needs discussed below, but much additional research will be necessary to obtain the necessary biological and ecological information about the individual species in the complex.

Section 2.0 (p. 3) identifies some important management issues related to the need for scientific information to ensure the effectiveness of this FMP. Section 8.0 (p. 379) identifies data and research needs specific to the Skate FMP.

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

The analyses contained in Section 6.0 (p. 163) of this document assess the potential biological impacts of the proposed management measures as well as the potential economic and social impacts on the human environment. This includes the impacts of this FMP on current fishery participants, participants in other fisheries, small commercial fishing entities (vessels), seafood dealers, and fishing communities. The fishery impact statement, which discusses the potential impacts of the measures proposed in this FMP on other fisheries, is provided in Section 6.3 (p. 215).

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

Section 4.4.3 of this document (p. 21) proposes overfishing definitions for each of the skate species managed under this FMP. Consistent with the National Standard Guidelines (NSGs), the overfishing definitions include biomass-based and fishing mortality-based reference points to evaluate when a skate species is in an overfished condition and when overfishing may be occurring. Because information is currently not available to accurately estimate fishing mortality rates for the skate species, the proposed overfishing definitions include proxy reference points for fishing mortality that are based on trends in the NEFSC trawl survey. Section 4.4.3 also includes discussion of how the criteria were determined. Since the biomass reference points were developed at SAW 30, the Skate SAFE Report (Volume II) can be referenced for more detailed information about the assessments conducted as part of SAW 30.

Section 4.5 of this FMP (p. 30) describes the rebuilding program that is proposed for overfished skate species. Additional species-specific management measures are proposed to prevent overfishing and rebuild the fisheries; these measures are described throughout Section 4.0 of this document.

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority-- (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided;

For a discussion of the reporting requirements proposed in this FMP, including requirements to report bycatch using the VTR forms as well as sea sampling and study fleets, see Section 4.10 of this document (p. 72).

This FMP attempts to minimize the mortality of bycatch through the proposed prohibitions on possession of barndoor, thorny, and smooth skates. Although the survival rate of discarded skates is unknown, it is believed that a greater percentage of skate discards survive as compared to finfish (cod, flounder, etc.). Available information suggests that skates may be heartier than finfish and may have lower discard mortality rates. It is therefore assumed that a significant proportion of skates returned to the water quickly will survive.

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

This FMP proposes no recreational fishery management measures. In general, skates have little to no recreational value and are not intentionally pursued in any recreational fisheries.

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

Section 7.3.2 of this document (p. 326) and Section 3.2 of the Skate SAFE Report (Volume II) describe the various sectors of the industry that participate in the skate fisheries. Recognizing that fishery information is considered incomplete, these sections identify any trends evident in the available landings data for skates.

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

There are no known recreational or charter fishing enterprises involved in the skate fisheries. The commercial sector is the only sector involved in the fisheries. Therefore, all allocations, restrictions, and/or benefits are anticipated to be borne solely by the commercial sector. If it becomes necessary in the future, the Council may develop management measures to address the recreational sector and/or charter fishing sectors of the fisheries, should these sectors develop.

10.0 RELATIONSHIP TO OTHER APPLICABLE LAW

While this document has been prepared primarily in response to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act, it also addresses other applicable laws and administrative orders that the Council must consider in developing an FMP. These laws and administrative orders are addressed in the subsections below.

10.1 EXISTING APPLICABLE LAWS

There are four types of existing laws and policies which may be applicable to this FMP and the measures proposed by the Council. These laws and policies are addressed in the subsections below.

10.1.1 Fishery Management Plans

There are many FMPs implemented in the U.S. EEZ within the same general geographic area as the Council's proposed management area for the Skate FMP. The following list identifies all known approved FMPs developed for the U.S. EEZ along the Atlantic Coast:

New England Council:	Atlantic Herring FMP; Atlantic Salmon FMP; Monkfish FMP; Northeast Multispecies FMP; Sea Scallop FMP; Red Crab FMP.
Mid-Atlantic Council:	Atlantic Mackerel, Squid and Butterfish FMP; Bluefish FMP; Dogfish FMP; Summer Flounder, Scup and Black Sea Bass FMP; Surfclam and Ocean Quahog FMP; Tilefish FMP.
South Atlantic Council:	Atlantic Coast Red Drum FMP; Coastal Migratory Pelagics FMP; Coral, Coral Reef and Live/Hard Bottom Habitats FMP; Golden Crab FMP; Shrimp FMP; Snapper Grouper FMP; Spiny Lobster FMP.
Secretarial Plans (NMFS):	American Lobster FMP; Atlantic Billfish FMP; Atlantic Tunas, Swordfish and Sharks FMP.

As previously discussed, there are several fisheries and FMPs that overlap and interact with skates considerably. The most notable of these FMPs are those for multispecies, monkfish, sea scallops, and lobsters. These FMPs and their interactions with skates are discussed in Section 4.16 of this document.

10.1.2 Treaties and International Agreements

Foreign fishing is prohibited within the U.S. EEZ for anadromous species and continental shelf fishery resources beyond the EEZ out to the limit of U.S. jurisdiction under the Convention of the Continental Shelf, unless authorized by an international agreement existing prior to passage of the Magnuson-Stevens Act and still in force or authorized by a Governing International Fishery Agreement issued subsequent to the Magnuson-Stevens Act. There are no pre- or post-Magnuson-Stevens Act agreements affecting the Northeast skate complex.

10.1.3 Federal Laws and Policies

All applicable federal laws and policies, including the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA) are identified and discussed in Section 10.0 of this document.

10.1.4 State and Local Laws and Policies

There are no state or local laws, regulations, or policies that apply to the skate fishery.

10.2 ADMINISTRATIVE PROCEDURES ACT

Sections 551-553 of the Federal Administrative Procedures Act 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 opportunity to comment before the agency promulgates new regulations.

Development of the Skate FMP provided many opportunities for public review, input, and access to the rulemaking process. Section 15.0 of this document (p. 442) lists all public meetings at which the measures proposed in the Skate FMP were discussed. In addition to entertaining public comments throughout the FMP development process, the Council notified the public of two formal review and comment periods, one associated with FMP scoping, and one associated with the NEPA-required 45-day comment period on the Draft FMP/EIS.

10.3 COASTAL ZONE MANAGEMENT ACT

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 (CZMA) requires that all federal activities which directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The coastal zone management programs for the following states were reviewed to determine the consistency of the proposed Skate FMP with the state programs: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. The Draft FMP/EIS was provided to all affected states listed above. In addition, the Final FMP/EIS and all supporting documents were provided to all affected states listed above, along with a letter stating the Council's initial CZMA consistency determination.

No state letters of concurrence with the Council's determination have been received at the time of the submission of this FMP. Copies of the consistency letters to the states as well as the states' responses will be on file and can be obtained by contacting the Council office.

10.4 ENDANGERED SPECIES ACT

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The Council has concluded, at this writing, that the proposed Skate FMP and the prosecution of the skate fishery is not likely to jeopardize any ESA-listed species or alter or modify any critical habitat, based on the discussion of impacts in this document. The Council is seeking the concurrence of the National Marine Fisheries Service in this matter. For further information on the potential impacts of the fishery and the proposed management action on listed species, see Section 6.4 of this document (p. 215).

10.5 EXECUTIVE ORDER 12612 (FEDERALISM)

The Executive Order on Federalism established nine fundamental federalism principles to which Executive agencies must adhere in formulating and implementing policies having federalism implications. The E.O. also lists a series of policy making criteria to which agencies must adhere when formulating and implementing policies that have federalism implications. However, no federalism issues or implications have been identified relative to the actions proposed in this FMP and its associated regulations.

This FMP does not contain policies with federalism implications sufficient to warrant preparation of an assessment under E.O. 12612. The affected states have been closely involved in the development of the proposed management measures through their involvement in the Regional Fishery Management Council process (i.e., all affected states are represented as voting members on at least one Council). This FMP was developed with the full participation and cooperation of the state representatives of the New England Council, and the Draft FMP/EIS was provided to the Mid-Atlantic Council for their review and consideration. No comments were received from any state officials relative to any federalism implications of the proposed Skate FMP.

10.6 EXECUTIVE ORDER 12866 (REGULATORY REVIEW)

The requirements of E.O. 12866 are addressed in Section 10.10.1 of this document (p. 397).

10.7 EXECUTIVE ORDER 13158 (MARINE PROTECTED AREAS)

The Executive Order on Marine Protected Areas requires each federal agency whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions, and, to the extent permitted by law and to the maximum extent practicable, in taking such actions, avoid harm to the natural and cultural resources that are protected by an MPA.

The E.O. directs federal agencies to refer to the MPAs identified in a list of MPAs that meet the definition of MPA for the purposes of the Order. The E.O. requires that the Departments of Commerce and the Interior jointly publish and maintain such a list of MPAs. As of the date of submission of this FMP, the list of MPA sites has not been developed by the departments. No further guidance related to this Executive Order is available at this time.

10.8 MARINE MAMMAL PROTECTION ACT

The NEFMC has reviewed the impacts of the Skate FMP on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA, and will not alter existing measures to protect the species likely to inhabit the skate management unit. For further information on the potential impacts of the fishery and the proposed management measures, please see Section 6.4 of this document (p. 215).

10.9 PAPERWORK REDUCTION ACT

The purpose of the Paperwork Reduction Act (PRA) is to control paperwork requirements imposed on the public by the federal government. The authority to manage information and record-keeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

This Skate FMP contains collection of information requirements subject to the PRA, including new federal permits for skates (vessels, dealers, and operators), catch reporting requirements for vessels and dealers, and a letter of authorization for bait-only vessels. The PRA package prepared in support of this FMP and the information collection identified above, including the required 83-I forms and supporting statements, has been submitted to OMB for approval under separate cover. Copies of supporting PRA documents can be obtained by contacting the Council office.

10.10 EXECUTIVE ORDER 12866 AND THE REGULATORY FLEXIBILITY ACT (RFA)

This Fishery Management Plan has been prepared primarily in response to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act. This integrated Skate FMP document includes all elements of the FMP and EIS as well as the following Regulatory Impact Review (RIR) and Initial Regulatory Flexibility Act Analysis (IRFAA). This chapter addresses the components of the RIR and IRFAA. Many components of the RIR and IRFAA are discussed in the body of the FMP and are not repeated in the following subsections. Section and page references are provided throughout the discussion below to aid reviewers in referencing the appropriate sections of this integrated document.

10.10.1 E.O. 12866

The Regulatory Impact Review (RIR) provides an assessment of the costs and benefits of proposed action and other alternatives in accordance with the guidelines established by Executive Order (E.O.) 12866. The regulatory philosophy of E.O. 12866 stresses that, in deciding whether and how to regulate, agencies should assess all costs and benefits of all regulatory alternatives and choose those approaches that maximize net benefits to the society. The RIR also serves as a basis for determining whether any proposed regulations are a "significant regulatory action" under the criteria provided in E.O. 12866 and whether the proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act of 1980 (RFA), as amended in 1996.

This RIR summarizes the effects of the proposed action and other options considered in this framework adjustment. This framework document contains all of the elements of the RIR/RFA. NOAA's "Guidelines for Economic Analysis of Fishery Management Actions" (August 2000) states that if elements of the RIR are included in another section of the document, the appropriate section must be referenced within the RIR. The following RIR elements are referenced accordingly:

Statement of the Problem and Need for Action –	Section 2.2, p. 5
Skate FMP Goals and Objectives –	Section 3.0, p. 7
Proposed Action –	Section 4.0, p. 8
Alternatives to the Proposed Action –	Section 5.0, p. 101
Biological Impacts –	Section 6.1, p. 163
Economic Impacts –	Section 6.5, p. 227
Measures with No Direct Economic Impacts –	Section 6.5.2, p. 228
Distribution of Impacts –	Section 6.5.4.2, p. 239
Social Impacts –	Section 6.6, p. 245

Executive Order 12866 defines a “significant regulatory action” as one that is likely to result in:

(1) an annual effect on the economy of $100 million or more or one which adversely affects in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities;
(2) a serious inconsistency or interference with an action taken or planned by another agency;
(3) alteration of the budgetary impact of entitlement, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; or
(4) novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in the Executive Order.

A comprehensive RIR with a bioeconomic model and formal benefit-cost and a risk assessment was compromised by poor landings and market data and by the fact that skates destined for the wings market are part of mixed species catches in the multispecies groundfish fishery. From a cumulative impact standpoint, the proposed restrictions on possession of skates have a negligible impact on the fishing industry when compared to the proposed reductions in fishing effort and EFH measures in the groundfish fishery. Nonetheless, this plan only concerns skate management.

Most measures in this FMP do not have direct economic impacts on the fishing industry or economy because they are more administrative in nature and relate to the collection of better skate-specific fishery information. See Section 6.5.2 for a list of the measures that are not expected to result in any direct economic impacts. The quantitative economic impact analysis was therefore restricted to the proposed possession limits.

The economic impact analysis of the proposed action suggests that the expected impacts will fall nowhere near an annual effect on the economy greater than $100 million. The proposed possession limit for the skate wing fishery represents a combination of Options 1 and 2 that were considered during the development of this FMP. The economic impact analysis presented in Section 6.5 of this document (p. 227) indicates that the proposed possession limit would most likely have a minor impact on fishermen and the economy resulting from a small amount of discarding and a small number of groundfish trips that would end early due to the limits.

The 20,000-pound per trip limit on skate wings results in an average annual loss of about $144,000 in producer surplus, assuming the years 1995-2000 are indicative of activity in the near future (Table 27, p. 237). Over a five-year period, the net present value of these average losses would amount to about $629,000 (7% discount rate; Table 28, p. 238). The two possession limit options that the Council rejected likewise had small losses over five years: $1.515 million with a 10,000-pound limit, and $268,000 with 30,000-pound limit. The 30,000-pound possession limit was rejected because it most likely would not conserve winter skates.

As practically all skate wings are exported, consumer surplus in the United States was not part of the benefit-cost analysis. Further, dockside wings prices are not responsive to landings, possibly because the US provides only a small amount of the global supply.

The proposed action also includes a 10,000-pound limit on skate wing landings for one-day trips. This measure will most likely have a negligible affect on the fishing industry because it will rarely apply. For example, in 2000, three vessels landed more than 10,000 pounds of skate wings on five trips that lasted one day or less. The excess amounted to 10,520 pounds, and was only a small fraction of their skate and annual fish landings. Skate wings tend to be landed while fishing under groundfish days-at-sea allocations. Steaming time makes one-day trips a wasteful use of days-at-sea.

Available data and comment from industry suggest that barndoor skates, thorny skates, and smooth skates in the Gulf of Maine are not important to the wing market at this time. Hence, the impacts of the zero possession limit of these species is also expected to be minor.

Skate harvest rights policies which would create incentives among fishermen to conserve skates are complicated by the fact that skates for the wing market are typically caught by draggers and, to an extent, gillnetters on groundfish trips. The groundfish fishery – and other fisheries that land small amounts of skate wings (e.g., scallop, monkfish) – are already subject to limited entry and effort quotas. Skate harvest rights would have to be integrated with harvest rights for other species caught jointly.

The second criterion specified in E.O. 12866 is whether the proposed action would create a serious inconsistency or otherwise interfere with actions taken or planned by another agency. The activity proposed under this action involves commercial fishing for skates in the federal waters of the U.S. EEZ. NOAA Fisheries, in consultation with the Council, is the sole agency responsible for regulating this activity; therefore, there is no interference with actions taken by another agency. This proposed action would create no inconsistencies in the management and regulation of commercial fisheries in the Northeast Region. This FMP takes extra steps to ensure that skate management is fully integrated with the management of other fisheries resources in the region, as Section 4.16 (p. 79) establishes a link between management measures in other fisheries and skate resources. Thus, this proposed action would not be considered to be significant under the second criterion specified in E.O. 12866.

The third criterion for significance is whether the action would materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients. The proposed action is to establish regulations governing the skate fisheries in the Northeast Region. This action is unrelated to any entitlements, grants, user fees, or loan programs, and therefore cannot be considered to be significant under the third criterion specified in E.O. 12866.

The fourth criterion specified in E.O. 12866 is whether the proposed action would raise any novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the E.O. The proposed action establishes a management program for the Northeast skate complex in accordance with the Magnuson-Stevens Fishery Conservation and

Management Act. Much of the FMP addresses administrative and technical requirements of the M-S Act. Precedent has clearly been set for this action through the development of similar Fishery Management Plans throughout the nation. The proposed action, therefore, would not be considered significant under the fourth and final criterion specified in E.O. 12866.

10.10.2 Initial Regulatory Flexibility Act Analysis (IRFAA)

The purpose of the Regulatory Flexibility Act (RFA) is to reduce the impacts of burdensome regulations and record-keeping requirements on small businesses. To achieve this goal, the RFA requires government agencies to describe and analyze the effects of regulations and possible alternatives on small business entities. On the basis of this information, the Initial Regulatory Flexibility Act Analysis (IRFAA) determines whether the proposed action would have a "significant economic impact on a substantial number of small entities." Note that the term "substantial number" has no specific statutory definition and the criterion does not lend itself to objective standards. 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.

The RFA applies to any rule or regulation that must undergo "notice and comment" under the Administrative Procedures Act (APA), specifically those rules published as *proposed rules*. When the RFA applies, the Council must assess the impacts of the regulations to determine if they will have a significant economic impact on a substantial number of small entities. During the development of the Skate Fishery Management Plan, the Council carefully considered the potential impacts of the proposed action on small entities, alternatives to the proposed action (and their potential impacts), as well as how to minimize negative impacts on affected small entities.

- The statement of the problem/need for management action is discussed in Section 2.2 of this document (p.5).
- The objectives of this Fishery Management Plan are described in Section 3.0 of this document (p. 7).
- The proposed action is described in Section 4.0 of this document (p. 8).
- Alternatives to the proposed action are described in Section 5.0 of this document (p. 101).
- The economic analysis of the proposed action is presented in Section 6.5 of this document (p. 227). The economic analysis focuses on the effects of the proposed action versus the effects of the "status quo" or "no action." Relevant subsections of the economic analysis are as follows:
  - Measures with No Direct Economic Impacts – Section 6.5.2, p. 228
  - Impacts of Proposed Prohibitions for Barndoor, Thorny, and Smooth Skates – Section 6.5.3, p. 229
  - Impacts of Proposed Possession Limit for the Wing Fishery – Section 6.5.4, p. 230
  - Distribution of Impacts – Section 6.5.4.2, p. 239
    - Port and Gear Impacts – Section 6.5.4.2.1, p. 239
    - Small Businesses – Vessel Impacts – Section 6.5.4.2.2, p. 239

- Small Businesses – Dealer Impacts – Section 6.5.4.2.3, p. 244

A brief summary of the Affected Human Environment (the small entities to which this rule applies) is provided in Section 7.3 of this document (p. 319). The human environment encompasses a variety of characteristics of the fishing industry and fishing communities along the Atlantic coast, including the cultural composition of communities, employment history, education, regulatory restrictions on fishing, and economic constraints on community development. The Affected Human Environment section of this document discusses these characteristics so as to give the reader enough background information to adequately assess the impacts of the management alternatives presented in this document. In addition to the information presented in Section 7.3, the Skate SAFE Report (Volume II) should be referenced for information about the affected small entities. Together, this FMP and the SAFE Report include all available information about the small entities engaged in skate fisheries and affected by the action proposed in this FMP.

NMFS' guidelines for RFA analysis suggests two criteria to consider in determining the significance of regulatory impacts, namely disproportionality and profitability.

- Disproportionality – Do the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities?
- Profitability – Do the regulations significantly reduce profit for a substantial number of small entities?

According to SBA standards, any fish harvesting or hatchery business is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has annual receipts of not in excess of $3.5 million. All entities affected by the proposed action meet the criteria for "small entities," so issues related to disproportionality do not apply. Issues related to profitability are discussed within the context of the economic impacts of the proposed action on small entities (Section 6.5) and are summarized in the subsections below.

10.10.2.1 Issues Raised During Public Comment Period

Section E.12.0 of this document summarizes the issues raised during the 45-day public comment period required by NEPA and the Skate FMP public hearings conducted by the Council. This section should be referenced for further information. No issues specific to the RFA were raised during the public comment period.

10.10.2.2 Impacts on Small Entities

This rule applies to vessels in the multispecies groundfish fishery and, to a much less extent, scallop and monkfish fishermen who land skate wings for the overseas market. Likewise, processors of skate wings for export are potentially impacted by the possession regulations. Vessels in the nearshore skate bait fishery and the lobster fishery which uses skate bait should not be impacted economically from the proposed action.

Section 6.5.4 of this document (p. 230) presents information on the number of vessels and dealers/processors potentially affected by this rule. Because information is lacking, no method could be devised to predict future landings or the future number of impacted vessels. Therefore, the experience during 1995-2001 was used to frame what could happen in the near future.

Between 1995-2000, the number of vessels that landed skate wings declined from 933 to 771, and the number of trips reporting skate wing landings ranged from 13,589 in 2000 to 15,152 in 1998 (Table 26, p. 232). Although not available when the trip limit analysis was done for this FMP, year 2001 data show a reduction in effort: 735 vessels and 12,040 trips.

Only a small number of vessels might be impacted by the 20,000-pound overall trip limit on skate wings. During the same years, between four (4) and 32 vessels landed above this limit. In 2000, 18 out of 771 vessels (2.3 %) exceeded the limit on one or more trips. In 2001, 14 out of 735 vessels (1.9 %) landed skate wings above the 20,000-pound limit.

The Council also proposes a 10,000-pound limit on skate wing landings on trips lasting a day (24 hours) or less. In 2000, this limit would have affected only five trips by three vessels.

Impacts on annual vessel revenues are likely to be even smaller than these incidence data might suggest once the landings of other species on the same trips and in other fisheries are considered (see Section 6.5.4.1). For example, the potential revenue loss for the 18 vessels which landed more than 20,000 pounds of skate wings on at least one trip during 2000 was less than 5% of total annual revenues for each vessel; the impact was less than 1% for 14 of these vessels.

The results are similar for the approximately 130 dealers/processors (depending on year) who purchased skate wings from fishermen during 1995-2001, primarily in New Bedford and Provincetown, MA. For example, in 2000, eight (8) out of 124 dealers would have been impacted by a 20,000-pound trip limit, but by 1% or less of total seafood purchases. In 2001, five (5) out of 121 dealers bought skate wings from fishermen who landed trips with more than 20,000 pounds; less than 4 % of each of their total fish purchases was comprised of skate wings in excess of the 20,000-pound limit.

The impacts of the prohibitions on possession of barndoor skate, thorny skate, and smooth skate in the Gulf of Maine can not be quantified, but the status of these resources and information provided by industry suggest little if any impact on fishermen or dealer/processors.

10.10.2.3 Compliance Requirements

Proposed reporting requirements are discussed in Section 4.10 of this document. One of the objectives of the FMP is to have fishermen and dealers report landings by species and product form to improve available fishery information. Fishermen and dealers already report skate landings as “unclassified”. There is no extra reporting requirement per se - just new categories. However, entities could be challenged to learn how to identify skates to the species level with the identification guides that will be provided. The “unclassified” category is retained, though, as for other managed species.

10.10.2.4 Steps Taken to Minimize Significant Impacts

Section 5.0 discusses alternatives to the proposed action, including those considered by the Council but rejected. The potential impacts of several alternatives were mitigated by the Council's decisions.

- The zero possession limit on smooth skates was restricted to the Gulf of Maine in order to avoid overlap and species identification problems with little skate in the southern New England bait fishery which supplies bait to lobster fishermen.
- The Council combined Options 1 and 2 for possession limits in skate wing fishery. The 10,000 pound limit applies to short (1-day or less) trips where it will be much less likely to constrain fishermen from an economic perspective.
- Requirements to land skates whole for identification purposes would create significant amounts of shoreside waste for processors. The cost would reduce dockside prices for fishermen.
- The Council decided against limiting the bait fishery to little skates in order to protect small winter skates because it is difficult to tell the two species apart. The bait fishery is a high-volume fishery which would be difficult to prosecute with the identification order.
- Possession limits in the bait fishery were rejected due to likely impacts on the lobster fishery where skate bait is utilized.
- Area closures for skates were rejected because it would exacerbate an already complex area closure system in the Northeast Region.
- The proposal to require heavier twine in sink gillnet fisheries to reduce incidental catches of skates was rejected because gillnet fishermen land only about 20 percent of total skates and the added costs to gillnet fisheries were perceived to out of proportion.

10.11 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

This section addresses the requirements of the National Environmental Policy Act (NEPA) and includes additional required components of the Final Environmental Impact Statement for the Skate FMP.

FISHERY MANAGEMENT PLAN FOR THE NORTHEAST SKATE COMPLEX

Proposed Actions:	Measures to implement the FMP for skates in the Northeast Region, which include permitting specifications; catch reporting requirements; other administrative requirements; a rebuilding program for overfished skate species; prohibitions on the possession of certain skate species; possession limits for the skate wing fishery; and a monitoring and framework adjustment process. A baseline of specific management measures in other FMPs that impact the skate resources are also identified, and a process for reviewing significant changes to this baseline of measures is established.
Type of Statement:	Final Environmental Impact Statement (FEIS)
Lead Agency:	New England Fishery Management Council
Cooperating Agencies:	National Marine Fisheries Service
For Further Information:	Paul Howard, Executive Director New England Fishery Management Council 50 Water Street, Mill #2 Newburyport, Massachusetts 01950 Phone: (978) 465-0492 Fax: (978) 465-3116
Abstract:	The New England Fishery Management Council proposes management measures to implement a new Fishery Management Plan (FMP) for the Northeast Region's skate complex. The proposed action addresses the requirements of the Magnuson-Stevens Fishery Conservation and Management Act and all other applicable laws. The proposed action is described in Section 4.0 of this integrated document (p. 8). Alternatives to the proposed action, including the no action alternative, non-preferred alternatives, and alternatives considered but rejected, are described in Section 5.0 of this document (p.101). All required biological, economic, and social analyses are also included in this integrated document.

10.11.1 Environmental Impact Statement

NEPA requires preparation of an Environmental Impact Statement (EIS) for major federal actions that significantly affect the quality of the environment. The Council published a Notice of Intent (NOI) to prepare this EIS in the *Federal Register* on January 2, 2001, which was followed by four scoping meetings throughout the potentially-affected region. The Council prepared a scoping document that outlined some of the major issues and types of management measures that the Council might consider during the development of the Skate FMP. The Council invited discussion on the scoping document and any other issues of concern at the scoping meetings as well as suggestions for appropriate management measures to implement in various skate fisheries.

During preparation of the Draft FMP/EIS, the Council held seven meetings of its Skate Oversight Committee, and four of those meetings were held in conjunction with the Skate Advisory Panel. Five public hearings on the Draft Skate FMP/EIS were conducted in New Bedford, MA; Narragansett, RI; Provincetown, MA; Portsmouth, NH; and Wilmington, DE. Additional meetings of the Skate Committee and Council were held after public hearings to select final management measures for this FMP. All of these meetings, as well as numerous Plan Development Team meetings, were open to the public.

The following Table of Contents for the EIS is provided to aid reviewers in referencing the appropriate corresponding sections of this integrated document.

E.1.0 EXECUTIVE SUMMARY

Please see the Executive Summary at the beginning of this integrated FMP/EIS document.

E.2.0 BACKGROUND AND PURPOSE

E.2.1 BACKGROUND

For a description of the background for this EIS, please see Section 2.1 of this integrated FMP/EIS document (p. 3).

E.2.2 STATEMENT OF THE PROBLEM

For a statement of the problem associated with the Northeast skate complex and its associated fisheries, please see Section 2.2 of this integrated FMP/EIS document (p. 5).

E.2.3 PURPOSE AND NEED FOR ACTION

For a description of the purpose and need for the action associated with this EIS, please see Section 2.2 of this integrated FMP/EIS document (p. 5).

E.2.4 MANAGEMENT GOALS AND OBJECTIVES

For a description of the management goals and objectives associated with this EIS, please see Section 3.0 of this integrated FMP/EIS document (p. 7).

E.2.5 SCOPING PROCESS

Through several meetings, the Council, its Skate Oversight Committee, and Skate Advisory Panel held preliminary public discussions on the issues to be addressed in this FMP while the Skate PDT collected necessary information and developed the Skate SAFE Report. At this time, the Council gathered information and input from the public during a scoping process to help them identify management issues and develop a range of effective management alternatives to be considered in the Draft EIS and public hearing document. Four scoping meetings were held between January 23, 2001 and February 12, 2001. During these public meetings, representatives from the fishing industry, environmental groups, and other interested parties discussed their concerns and provided input on the proposed management measures.

The need for more scientific and fishery information was frequently discussed during the scoping process. Some concern was expressed about the source and credibility of survey data used to examine the condition of the skate complex. In addition, the suggestion was made to create an observer program which would enhance the accuracy of trip reporting and incorporate more detail, including species composition of catches, into landings data. Others showed support for an observer program and the establishment of cooperative research projects for surveying the northeast skate complex. Specifically, it was suggested that efforts be made to examine skate discard mortality, potential advancements in bycatch reduction and gear selectivity, and skate life history.

Other issues discussed during the scoping process included the challenges of skate species identification, goal-setting and adherence to a specific timeline for implementation of management measures, consideration of closed areas for skate management, methods of developing overfishing definitions, and possible complications resulting from permit requirements for the skate fishery. To the extent possible, the Council considered and addressed these concerns and issues during the development of the measures proposed in this FMP.

E.3.0 SUMMARY OF THE EIS

E.3.1 ISSUES TO BE RESOLVED

For a description of the issues to be resolved associated with this EIS, please see Section 2.3 of this integrated FMP/EIS document (p. 6).

E.3.2 MAJOR CONCLUSIONS

This EIS concludes that the action proposed in the Skate Fishery Management Plan will have positive impacts on the related physical, biological, and human environments. Analyses of the impacts of the proposed management action are presented in Section 6.0 of this integrated document (p. 163).

E.3.3 AREAS OF CONTROVERSY

NOAA Administrative Order 216-6 defines "controversial" as referring to a substantial dispute which may concern the nature, size, or environmental effects, but not the propriety, of a proposed action.

The fundamental need for the Skate FMP and its associated measures was more controversial during the development of this FMP than the specific management measures themselves. Many people felt that creating a Skate FMP was redundant, as skates are indirectly managed through measures in the Multispecies, Monkfish, and Scallop FMPs. This, in combination with significant concerns about species identification difficulties and an obvious lack of information, created controversy during the initial stages of development of this FMP. These concerns are evident in the summaries of the scoping meetings held in 2001 and even in the public hearing summaries during the comment period for the Draft FMP. This controversy, however, represents dispute concerning the propriety of the proposed action, not the nature, size or environmental effects of the proposed action.

One area of controversy relates to species identification difficulties and potential problems with prohibitions on possession of certain skate species and requirements to report landings and discards by individual species. A few of the seven species of skates in the northeast complex are very difficult to distinguish from one another, making the reporting of landings and discards by species a significant challenge. For example, in a high volume fishery like the bait fishery, it may not be reasonable to expect that fishermen will be able to examine each skate individually to determine the species since it is almost impossible to distinguish a little skate from a juvenile winter skate. This problem is complicated due to the co-occurrence of these species within geographic areas. Successful identification of these skates to the species level requires additional knowledge of their anatomy and other physical characteristics. Some of the small-sized skate species are also difficult to differentiate (clearnose, little, smooth, rosette), as are some of the large-sized species (thorny and winter; barndoor skates can be more easily identified).

During the comment period on the Draft FMP/EIS, many comments expressed concern about species identification and the potential problems associated with some of the proposed measures that rely on the ability of fishermen, dealers, and enforcement agents to accurately distinguish different species of skates. The industry feared that mistakes made by honest fishermen trying to identify skates would result in violations, especially in high-volume fisheries. In selecting the final management measures, the Council tried to balance the need to obtain species-specific fishery data with the controversy surrounding the realities of skate species identification. The proposed catch reporting requirements reflect this balance by requiring landings to be reported by individual species, but utilizing general size categories for the reporting of discards. The prohibitions for certain species were adopted because of the necessity to provide additional protection to the three species most in need of conservation.

E.4.0 DESCRIPTION OF THE MANAGEMENT ALTERNATIVES

E.4.1 PROPOSED ACTION

For a description of the action proposed in the Skate FMP, please see Section 4.0, p. 8 of this integrated FMP/EIS document.

E.4.2 ALTERNATIVES TO THE PROPOSED ACTION

For a description of the alternatives to the proposed action, please see Section 5.0, p. 101 of this integrated FMP/EIS document. The alternatives to the proposed action are separated into the no action alternative (Section 5.1), non-preferred alternatives (Section 5.2), and rejected alternatives (Section 5.3).

E.5.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

E.5.1 INTRODUCTION

A full description of the affected environment, including a description of the resource species, the habitat, fishing activities, economic characteristics, and social characteristics of those likely to be affected by the actions under consideration and proposed in this EIS can be found in Section 7.0 of this integrated FMP document. Additional background material can be found in Volumes II and III of this FMP. Volume II is the 2000 Skate SAFE Report, which summarizes all stock assessment and fishery evaluation information available at that time. Volume III includes all supporting materials for skate essential fish habitat (EFH).

The description of the affected environment is intended to present sufficient background information on the various resources and entities likely to be affected by the actions proposed and/or under consideration in this EIS. This section presents relevant information on the resource components of the existing environment. It summarizes the available information on the physical, biological and ecological, and human components of the environment involved in the skate fisheries. Please refer to Section 7.0 of this document for additional information (p. 259).

E.5.2 PHYSICAL ENVIRONMENT

For a description of the physical environment affected by this FMP/EIS, please see Section 7.2 of this document (p. 296). Much of the information in Section 7.2 is incorporated by reference and is actually presented in Volume III of this document (EFH supporting materials).

E.5.3 BIOLOGICAL ENVIRONMENT

E.5.3.1 General Biological Information

Available biological information about the species in the Northeast Region skate complex is presented in Section 7.1 of this document (p. 259). References to additional information presented in Volumes II and III of this FMP are noted where appropriate.

E.5.3.2 Abundance and Present Stock Condition

Information about recent survey abundance indices for each of the seven skate species is presented in Section 7.1.2 of this document (p. 260). Section 7.1.2 also updates current stock conditions based on the reference points developed at SAW 30. Historical survey abundance indices can be found in the Skate SAFE Report (Volume II).

E.5.3.3 Ecological Relationships

This information can be found in the EFH Source Documents for the seven species in the skate complex. Please see Volume III, Appendix A of this document for the EFH Source Documents.

E.5.4 HUMAN ACTIVITIES

For a description of the human activities affected by this FMP/EIS, please see Section 7.3 of this integrated document (p. 319).

E.6.0 ENVIRONMENTAL IMPACTS

The impacts of the management measures proposed in this FMP have been analyzed to the extent possible with current information. The assessment of impacts can be found in Section 6.0 of this document. The following list provides references to important impact assessments for this EIS:

Biological Impacts – Please see Section 6.1 of this integrated FMP/EIS document (p. 163).

Ecological Impacts On Other Species – Please see Section 6.3 of this integrated FMP/EIS document (p. 215).

Impacts To EFH – Please see Section 6.2 of this integrated FMP/EIS document (p. 210).

Economic Impacts – Please see Section 6.5 of this integrated FMP/EIS document (p. 227).

Social And Community Impacts – Please see Section 6.6 of this integrated FMP/EIS document (p. 245).

Impacts On Marine Mammals And Protected Species – Please see Section 6.4 of this integrated FMP/EIS document (p. 215).

E.7.0 CUMULATIVE EFFECTS

Cumulative effects result from the proposed action's incremental impacts when these impacts are added to the impacts of other past, present, and reasonably foreseeable future actions.

In 1997, the Council on Environmental Quality (CEQ) published a handbook entitled, *Considering Cumulative Effects Under the National Environmental Policy Act*. The CEQ identified the following eight principles of cumulative effects analysis, which will be considered in the discussion of the cumulative effects of this proposed action:

1. Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions.
2. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken, no matter who (federal, non-federal, or private) has taken the actions.
3. Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.
4. It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
5. Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
6. Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.
7. Cumulative effects may last for many years beyond the life of the action that caused the effects.
8. Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accumulate additional effects, based on its own time and space parameters.

This Skate FMP represents the first management program developed specifically for the northeast skate complex. There are no past actions associated specifically with skates to consider in a cumulative effects analysis for this fishery, except for past management measures in other fisheries that have impacted skates, which are identified and discussed in many sections of this document (see additional discussion below). The present actions associated specifically with skates are identified, discussed, and analyzed to the extent possible in this integrated FMP/EIS document. Impact analyses of the proposed management measures begin in Section 6.0 (p.163) of this document.

Since it is not practical to analyze the cumulative effects of an action on the universe, the most meaningful and relevant considerations for the Skate FMP include:

1. the direct effects of the proposed skate measures on the skate resources;
2. the indirect effects of the proposed skate measures on other fishery resources; and
3. the and indirect effects of management measures in other fisheries on the skate resources.

The analyses presented in Section 6.0 of this integrated document suggest that there are not likely to be any indirect effects of the proposed skate management measures on other fishery resources, so the cumulative effects assessment focuses on points #1 and #3 above.

The most significant direct effects of the proposed action are reductions in fishing mortality for wing skates, rebuilding of the currently overfished skate species, and the acquisition of species-specific fishery information critical to effectively managing these fisheries in the future. The effects of the no action alternative would be to continue the prosecution of the skate fisheries as they are prosecuted today, that is, indirectly managed through the multispecies regulations and largely under-documented. The no action alternative and its impacts are discussed in Section 5.1 (p. 101) of this document.

In addition to the direct and indirect effects on the resource, its ecosystem, and the participants in the fishery, there can be cumulative effects as a result of similar or synergistic management actions. This is most often apparent in multispecies fisheries where single-species regulations combine to result in more significant effects on the participants and the fishery than would occur from the regulations for one species alone. This is the core of the cumulative effects issue as it relates to skates, groundfish, monkfish, scallops, and other fisheries in the region.

The Skate FMP is unique in that cumulative effects, in a sense, are considered to be one of its cornerstones. The Council is relying on the cumulative effects of management measures in other FMPs to further promote skate rebuilding now and in the future, so this concept is integrated into almost every aspect of this FMP. Specifically, issues related to cumulative effects are addressed in several sections of this integrated FMP/EIS document.

Section 3.0, Skate FMP Goals and Objectives, p. 7: The goals and objectives of the proposed Skate FMP recognize the impacts of other management actions on the skate resources and the significant overlap of skate fishing activity and multispecies, monkfish, scallop, and other fishing activity.

Section 4.2, Fishing Year, p. 9: The proposed fishing year recognizes the overlap of skate fishing activity and multispecies fishing activity by establishing the skate fishing year based on the multispecies fishing year.

Section 4.3, Specification of MSY/OY, p. 9: The proposed specification of MSY and OY recognizes that future skate yields may be affected by management measures in other fisheries, particularly the multispecies fishery.

Section 4.16, Management Measures in Other Fisheries, p. 79: This section emphasizes issues related to cumulative effects by identifying specific management measures in other fisheries that impact the skate resources. This section also describes, to the extent possible, foreseeable changes to these management measures and the impacts that these changes may have on the skate resources and fisheries. These measures include, but are not limited to, multispecies management measures like closed areas and DAS; gear restrictions for the multispecies, monkfish, and scallop fisheries; measures in the Lobster FMP that may affect future demand for skate bait; and marine mammal regulations throughout the region. It also includes a discussion of the potential impacts of Multispecies Amendment 13 and Scallop Amendment 10, two significant management actions that may be implemented in the foreseeable future. The foundation of the Skate FMP is the interconnectivity of skate fisheries with other fisheries in the region, and this section serves to tie these issues together and relate them to the cumulative effects of present and future management actions.

Section 6.1.6, Impacts of Closed Areas, p. 193: This section characterizes the benefits of the existing groundfish year-round closed areas for each species in the skate complex. It describes past and present benefits afforded to skates by these closed areas and again recognizes the interconnected nature of these fisheries.

Section 6.1.7, Impacts of Other Groundfish Management Measures, p. 210: This section provides a brief discussion of the impacts of other groundfish management measures on skates, such as present and future Multispecies DAS reductions and gear restrictions.

Section 6.2, Impacts on Habitat, p. 210: This section provides a discussion of the potential impacts on habitat of changes to the management measures in other fisheries that have been identified as beneficial to skates.

Section 6.3, Impacts on Other Species (Fishery Impacts), p. 215: This section again focuses on the overlap of skate fishing with other fishing activity in the area. The premise of this discussion is that the skate-specific management measures are expected to have far less impact on other species than the management measures for other species will have on skates.

E.8.0 DETERMINATION OF SIGNIFICANCE

Section 6.02 of the NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act, provides specific guidance on determining the significance of fishery management actions. The nine criteria to be addressed are as follows:

1. May the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?
2. May the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?
3. May the proposed action be reasonably 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?
4. May the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

5. May the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitats of these species?
6. May the proposed action be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?
7. May the proposed action be reasonably expected to have a substantial impact on biodiversity and ecosystem function within the affected area?
8. Are significant social or economic impacts interrelated with significant natural or physical environmental effects?
9. What is the degree to which the effects on the quality of the human environment are likely to be highly controversial?

The Council has reviewed the nine criteria relative to the action proposed in this Skate FMP. Based on these criteria and since this is a new Fishery Management Plan, the Council has determined that the proposed action represents a significant action and has prepared an EIS in accordance with the National Environmental Policy Act.

E.9.0 OTHER REQUIRED CONSIDERATIONS

E.9.1 UNAVOIDABLE ADVERSE EFFECTS

Section 6.0 of this document discusses the likely effects of the proposed management measures and alternatives that were considered by the Council during the development of this FMP. This includes analyses and discussion of the potential biological, ecological, economic, and social impacts to the skate resources, their environment, and the associated fisheries. There are no unavoidable adverse effects identified in this FMP. Overall, the proposed action is expected to have significant positive effects on the skate resources relative to the no action alternative.

E.9.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The development and implementation of this FMP for the northeast skate complex is intended to ensure the long-term productivity and sustainability of the skate resources and associated fisheries. In order to ensure the long-term productivity of the resources and their fisheries, the necessary management measures may cause some short-term adverse economic and social impacts to some current participants in the fishery. Without these management measures, the short-term use of the skate resources could have adverse impacts on the long-term productivity of the resources and the sustainability of their associated fisheries. Overall, the proposed action is expected to have significant positive effects on the skate resources relative to the no action alternative.

E.9.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

There are no known irreversible or irretrievable commitments of resources associated with this FMP and the proposed action. Under the no action alternative, while there are unlikely to be any irreversible commitments of resources, there may be irretrievable losses if the skate resources in question become overexploited to a level that takes a long time for the populations to recover. The risks of irretrievable losses are difficult to measure. On one hand, they may be higher in this fishery than in many others in the northeast due to the relatively slow growth and low fecundity of some of the skate species. On the other hand, they may not be as high due to the relatively low commercial value of some of the skate resources.

E.10.0 LIST OF PREPARERS

The list of individuals involved in preparation of this integrated FMP/EIS document is provided in Section 11.0 of this document.

E.11.0 LIST OF PERSONS RECEIVING COPIES OF THE DEIS

Initially, the Council distributed the Draft FMP/EIS to members of the Skate PDT and Skate Advisory Panel. These individuals include:

Tom Nies, NEFMC Staff
Thomas Warren and Martin Jaffe, NMFS Northeast Regional Office
Kathy Sosebee and Mark Terceiro, NEFSC (Population Dynamics)
Steve Edwards, NEFSC Social Sciences
April Valliere, RI Division of Fish and Wildlife
Jeremy King, MA Division of Marine Fisheries
David Wallace, Chairman, Cambridge, MD
Chuck Casella, Medford, MA
Sonja Fordham, Ocean Conservancy, Washington DC
James Gutowski, Barnegat Light, NJ
Andrea Incollingo, Kingston, RI
Louis Julliard, Southboro, MA
David Marciano, Beverly, MA
John Pappalardo, Chatham, MA
William Phoel, PhD, Tom’s River, NJ
James Sulikowski, Durham, NH
Robert Westcott, Wakefield, RI

As part of the review process for consistency with applicable laws such as the CZMA and the ESA, the Council distributed the Draft FMP/EIS to the following individuals:

Ms. Kathleen Leydon, Maine Coastal Program
Mr. David Hartman, New Hampshire Coastal Program
Mr. Tom Skinner, Massachusetts Coastal Zone Management

Mr. Grover Fugate, Rhode Island Coastal Resources Council
Mr. Tom Oullette, Connecticut Office of Long Island Sound Programs
Mr. George Stafford, New York Division of Coastal Resources
Mr. Lawrence Torok, New Jersey Division of Coastal Resources
Mr. Nicholas Di Pasquale, Delaware DNREC
Ms. Gwynne Schultz, Maryland Coastal Zone Management Division
Ms. Laura McKay, Virginia Coastal Resources Management Program
Ms. Donna Moffitt, North Carolina Division of Coastal Management
Mr. E. James Tabor, Pennsylvania Department of Environmental Protection
Mr. Chris Brooks, South Carolina Ocean and Coastal Resources Management
Mr. Daniel Furlong, Mid-Atlantic Fishery Management Council
Mr. Robert Mahood, South Atlantic Fishery Management Council
Captain Vincent O'Shea, Atlantic States Marine Fisheries Commission

In addition, the Council prepared a notice to its "Interested Party" list for skates that announced the availability of the DEIS and public hearing document and announced the schedule for public hearings. A Notice of Availability of the DEIS was also published in the *Federal Register* on August 30, 2002. At that time, anyone on the "Interested Party" list or any other member of the public was able to call the Council office and request a copy of the DEIS for their review. There are approximately 222 individuals on the "Interested Party" mailing list for skates. The Council also made the Draft FMP/EIS available for downloading through its website (www.nefmc.org).

E.12.0 SUMMARY OF PUBLIC COMMENTS ON DRAFT SKATE FMP/EIS

Appendix I-A of Volume I includes summaries from the five public hearings that the Council conducted for the Draft Skate FMP/EIS as well as copies of written comments received during the NEPA 45-day comment period on the Draft FMP/EIS. The following paragraphs summarize the major issues discussed and comments received during the 45-day public comment period. Not every public comment received is summarized in the paragraphs below. For this reason, Appendix I-A should be referenced for more detailed information.

Scientific Information

Several commenters noted the paucity of scientific and fishery data on which the Skate FMP is based and questioned the validity of the existing data. Some people felt that there was insufficient data to develop this FMP at this time. Many of those who questioned the validity of existing data pointed to recent problems that have been identified with the NMFS survey gear aboard the R/V Albatross. They noted that skate overfishing definitions and rebuilding programs rely entirely on trawl survey data. One commenter suggested species like skates and flatfish will be most affected by the problems with the trawl survey gear. In contrast, another commenter remarked that declines in some of the skate surveys began long before problems with the gear were identified.

Response: Once a stock is identified as being in an overfished condition, the Magnuson-Stevens Act requires the Council to develop a Fishery Management Plan to end overfishing and rebuild the stock as quickly as possible. Information from SAW 30 indicated that three species of skates were in an overfished condition (now, only two species remain in an overfished condition), which resulted in a legal requirement for the Council to develop this FMP. Once the Council begins development of a Fishery Management Plan, it must rely on the best available scientific information (National Standard 2).

The Council recognizes that biological and fishery information is lacking for skates, but it still must rely on the best *available* information to develop this FMP. For this reason, many of the measures proposed in the FMP are focused most on collecting better information. In addition, one of the primary objectives of this FMP is to collect information critical for substantially improving knowledge of skate fisheries by species and for monitoring: (a) the status of skate fisheries, resources, and related markets and (b) the effectiveness of skate management approaches. As more and better information becomes available, the Council will update the information base for this FMP and make management adjustments as appropriate.

Overfishing Definitions and Rebuilding Programs

The majority of commenters supported Overfishing Definition Option 2, which utilizes biomass reference points developed at SAW 30 and proxy fishing mortality reference points based on percentage declines in the three-year moving average of the trawl survey. Some commenters supported Rebuilding Option 1 because it would be less disruptive to more important commercial fisheries (i.e., it would lead to fewer "false triggers") and it would provide the Council and Skate PDT with more discretion and flexibility in this data-poor situation. Others supported Rebuilding Option 2, which includes triggers and requires that overfished skate populations continue to increase over time. One commenter favored Rebuilding Option 4 because it includes triggers for management action and specified targets for population growth and therefore offers the best assurances that skate populations will increase significantly under the rebuilding plans.

Response: The Council considered all of these comments when selecting the proposed overfishing definitions and rebuilding program. The Council selected the overfishing definitions and rebuilding program that are the most scientifically justifiable in the face of significant uncertainty and data limitations. Flexibility is a critical factor in the application of both the overfishing definitions and the proposed rebuilding program.

The overfishing definitions incorporate the Council's Scientific and Statistical Committee's recommendation to not use the fishing mortality reference points proposed in SAW 30, but it does utilize the SAW 30 biomass reference points (targets and thresholds). The proxies for fishing mortality reference points in the proposed overfishing definitions are based on an observed decline in the survey biomass index for each species. This approach is intended to address the question of how much change in the biomass index is necessary for the trend to be declared "real." While it is important to not overreact to annual variability in the survey indices, it is also important to not miss a true signal of overfishing.

The Council ultimately selected a slightly-modified version of Rebuilding Option 2, which was most supported by the public. The slight modification relates to how the three-year averages are calculated for comparison; this approach minimizes the occurrence of "false triggers." The advantage to the proposed rebuilding program is that it takes a proactive approach by requiring that the survey average must be increasing over time to ensure rebuilding. Nevertheless, it will be important to allow for maximum flexibility and discretion while evaluating progress towards rebuilding.

Permits

- Some commenters felt that a separate skate permit is unnecessary and redundant.
- Several commenters suggested that multispecies permits be used for skate permits as well, since much of the skate fishery already occurs under Multispecies DAS and the other multispecies regulations.
- Some commenters supported Permit Option 2, which created separate "directed" and "incidental catch" permits. One commenter noted that this terminology can potentially cause confusion in that the skate fishery is largely a bycatch fishery, and most skates, landed or not, are caught incidentally.

Response: A separate federal skate permit improves enforcement of the Skate FMP management measures and is consistent with permitting in other federal fisheries in the Northeast Region. It establishes a database of potentially affected entities and provides a mechanism for NMFS to notify the industry of regulatory changes and other important skate developments. It also establishes a potential parameter or criterion for a future limited access program. For example, if limited access is adopted for the skate fishery in the future, the qualification criteria could be based on possession of a federal skate permit combined with some level of skate landings and/or other criteria. This may provide an incentive for some skate vessels fishing only in state waters to obtain the federal permit now (in hopes of obtaining a limited access permit in the future, should one be established with qualification criteria based on previous possession of the federal permit). Any state waters vessels that can be incorporated into the federal permit database with the implementation of the Skate FMP will improve the accuracy of skate fishery data, as these vessels also would be required to submit logbooks once they obtain the federal permit.

For the purposes of public hearings, the Council selected Permit Option 2 as its preferred option, but ultimately selected Permit Option 1. The Council selected Option 1 because it recognized that little, if any, additional fishery data would be obtained under Permit Option 2. There are no incentives in the Skate FMP for vessels to obtain the proposed "incidental catch" permit instead of the "directed" permit, so it was assumed that most, if not all vessels would obtain the "directed" permit in order to leave themselves more options in the future. For this reason, the Council elected to simplify the permit process and require only one general, open access permit for skates at this time.

Reporting Requirements and Species Identification Issues

Many comments were received regarding the proposed reporting requirements. The vast majority of comments expressed concern about the proposed requirements because of species identification difficulties.

- A few commenters recommended that bycatch (discard) reporting requirements be as simple as possible in order to minimize bycatch mortality and ensure compliance.

- Many commenters expressed concern over the possibility of violations being issued for honest mistakes, especially in high-volume fisheries.
- One commenter suggested that the Council develop clear and simple methods of species identification for skates.
- Several commenters recognized the need for better fishery data and supported requirements to report landings of skates by individual species. However, they did not support species-specific bycatch reporting because of concerns related to the potential to increase bycatch mortality.

Response: The Council clearly recognizes problems associated with species-specific reporting requirements. The proposed action represents the most realistic way to collect better fishery data through vessel and dealer reporting. Mandating the reporting of skate landings by individual species represents a significant step towards improving fishery information and achieving the objectives of the Skate FMP. The Council recognizes that mandating the reporting of discards by individual species may not be practical and may actually increase discard mortality for some species of skates. It is likely that unwanted skates would stay on the deck of a fishing vessel longer if the crew is required to sort the bycatch and differentiate the species that are being discarded. For this reason, the Council is requiring that discards be reported only by size category.

The Council will rely on data from sea sampling trips and study fleets to obtain species-specific discard information. To the extent possible, the Skate PDT will use these data to characterize the species composition of skate discards in the various fisheries of which skates are a component. The Council urges sea samplers to make species-specific skate data collection a higher priority. The Council also recommends that training programs be established for sea samplers and fishermen participating in study fleets to improve skate identification by species.

Because species-specific information is critical to the long-term success of this FMP, the Council is working closely with NMFS and the NEFSC to develop a species identification guide for skate vessels and dealers as well as enforcement agents, sea samplers, and port agents. Draft copies of this guide were made available at the skate public hearings for review and comment. Final copies of the guide are expected to be distributed prior to implementation of the Skate FMP.

Prohibitions on Possession/Landing/Sale

- Many commenters supported the proposed prohibitions on barndoor and thorny skates because they recognized the need to protect these two species as much as possible.
- One commenter supported prohibitions on landing instead of possession because of the potential to issue violations on high-volume trips with unsorted catch on the deck. This individual observed that once a vessel lands the fish, possession of any species is intentional, and possession of prohibited species should be considered a violation once the boat returns to the dock to sell the catch.
- One commenter noted that while a prohibition on the possession of smooth skates may not be very helpful, the smooth skate resource is far from rebuilt and requires additional management attention.

Response: The Council recognizes the need to take proactive steps to continue to rebuild barndoor, thorny, and smooth skates. As a result, the Council selected prohibitions on possession, the most conservative prohibitions under consideration, for all three of these species. For the purposes of public hearings, the no action option was preferred for smooth skates (i.e., no prohibition). Based on public comments received, the Council reconsidered this issue and agreed that the smooth skate resource is in need of management attention in addition to the protection it is afforded under the Multispecies and other FMPs.

The Council selected prohibitions on possession instead of landing and/or sale because: (1) prohibitions on possession are most conservative and offer the greatest deal of protection to the resource and (2) prohibitions on landing and sale are difficult from the enforcement and compliance perspectives. A prohibition on landing and/or sale completely eliminates opportunity for at-sea enforcement and can complicate dockside enforcement. In addition, discard mortality is likely to increase with increased time that the prohibited species spends on deck. Under such a prohibition, vessels that catch skates incidentally may choose to set their skate catch aside until other species have been sorted since there is no legal requirement for them to return any skates to the water as quickly as possible. This compromises the objective of the management measure.

<u>Possession Limits for the Wing Fishery</u>

- Some commenters supported no possession limits for skate wings because the skate wing fishery is already regulated through the Multispecies FMP, as skate wing fishing occurs under Multispecies DAS.
- Some commenters supported a 10,000-pound possession limit for skate wings. They felt that this limit would be adequate for the majority of vessels that target or catch skate wings incidentally and would help to stabilize the market price for wings. Another commenter supported the 10,000-pound possession limit because it was the most conservative limit proposed for the wing fishery at this time.

Response: The Council ultimately selected a possession limit of 10,000 pounds per day and 20,000 pounds per trip as a way to constrain effort in the skate wing fishery without disproportionately impacting one sector of the industry, especially given the limited fishery information on which these limits are based. The 10,000-lb limit alone would disproportionately impact larger vessels that make multi-day trips, and these are the vessels that tend to target skate wings and depend on them for revenues more so than the smaller vessels that make shorter trips. The analysis found that a 20,000-lb trip limit would impact the larger vessels to some extent, thus providing some conservation benefit. Options 1 and 2, when combined, could result in up to a 14 percent reduction in landings and yet provide income for both nearshore and offshore fishermen.

By discouraging large-scale directed fishing for skate wings, the possession limit is expected to reduce fishing mortality on winter skates. The benefits of a wing possession limit include not only fishing mortality reductions for winter skate, but also long-term benefits to the wing species if the possession limit can discourage expansion of the fishery and/or an influx of new entrants into the fishery. Possession limits at the level which the Council is recommending should reduce landings of skate wings and will eliminate large-scale directed fishing for skate wings.

Baseline Measures in Other Fisheries and Baseline Review Process

Most commenters generally supported the proposed baseline of management measures in other fisheries and the process for reviewing changes to those measures. Two commenters suggested that Multispecies, Monkfish, and Scallop DAS may not be appropriate baseline measures and recommended that the Council instead consider fishing mortality targets and reference points from other FMPs as baseline measures. They also suggested that what is required of a baseline measure is some form of strategic limit on the extent of the area swept by the gears of other fisheries. In addition, they focused on the potential administrative burdens of the proposed baseline review process and the possibility that the process could result in a never-ending cycle of management adjustments. They recommended that any compensatory restrictions required to meet limits on acceptable incidental catches of skates be included in the same management action as that which is "relaxing" the baseline measure.

Response: The baseline approach establishes a concrete link between skates and management measures in other fisheries that impact skates. The philosophy behind this approach is to establish a formal process for considering management strategies as regulations in other fisheries that impact skates are adjusted. The Skate FMP contains precautionary skate management measures and triggers/criteria to determine when additional action may be necessary. However, the long-term impacts of these measures and the acquisition of data necessary to better manage and assess these species will be slow to materialize. In the meantime, this baseline approach serves as another mechanism to ensure that skate rebuilding concerns continue to be addressed.

The comments related to using fishing mortality targets as baseline measures and recommendations for reducing the administrative burdens of this process were received by the Council very late in the process and could not be fully addressed following public hearings. During the development of the Draft FMP/EIS, the Council did not consider using fishing mortality targets from other FMPs as a baseline measure and therefore could not incorporate this approach into the document following public hearings. The Council referred this issue to its Skate Plan Development Team for further consideration and may re-visit this issue in the future through a framework adjustment to the Skate FMP.

The Council did respond to concerns about the administrative burdens associated with this process by streamlining the process and modifying the timeline for response by the Skate PDT. The Council recognizes that the approach, as proposed, was somewhat cumbersome and could result in protracted exchanges between the Council's Committees and the various needs of different fisheries managed through other FMPs. This potential outcome may be mitigated if the Skate PDT conducts the baseline review(s) holistically and in conjunction with the technical group (a species PDT, for example) that is developing the analyses to support the changes to the baseline measures. It may be that adjustments to the baseline measures can be developed in such a way that the action itself addresses and mitigates potential impacts on skates, thereby eliminating the need to initiate a skate-specific action immediately following the action to change the baseline measure. This is the intent of the baseline review process as it is proposed in the Final Skate FMP.

Habitat and EFH Issues

Many fishermen provided interesting information about the ocean habitats in which they tend to catch the majority of their skates. Many commenters noted that skates appear to prefer sandy bottoms that do not contain diverse, complex, or fragile substrates. One commenter felt that the sandy bottoms were quite fluid and responded not only to fishing, but also to strong storms and currents, resulting in very little growth along these bottoms. Another commenter expressed disappointment that consideration of area closures to protect skate habitat was ruled out early in the process.

Response: The comments from fishermen related to skate habitats were very interesting and helpful. At this time, Skate EFH is defined by NMFS survey data. However, in the future, consideration may be given to identifying EFH based on physical characteristics like those described by fishermen during the comment period. This information will be retained for future actions related to Skate EFH.

Currently, there are more than 8,000 square miles of ocean bottom closed to gear capable of catching multispecies (and therefore skates). The Council rejected options to establish additional area closures for skates at this time for several reasons:

- Skates are already benefiting significantly from the numerous area closures implemented in other fisheries. For additional discussion, please see Section 6.1.6 of this document.
- Lack of information precludes an accurate analysis of the biological impacts of any skate-specific closures on the species in need of management attention.
- Lack of information precludes a comprehensive and accurate analysis of the impacts of any skate-specific area closures on skate vessels as well as vessels engaged in other fisheries in the areas proposed for closure.
- Some ports in the Northeast Region are already disproportionately impacted by the numerous groundfish area closures (year-round and seasonal), and the Council does not want to exacerbate difficulties these communities are experiencing as they try to maintain access to some fisheries for some part of the year.

Consideration may be given to skate-specific area closures in the future, as necessary.

Skates as Lobster Bait

Skates are known to be a very important lobster bait, especially in Southern New England. Little skate is the primary species targeted for lobster bait. One commenter was concerned about his ability to continue to fish for skates for his own lobster bait and some local lobster vessels in his community. Another commenter said that he would no longer be able to fish for skates for lobster bait because his DAS have been reduced to the point that fishing for skates is no longer a viable option for using DAS. Another person noted the apparent healthy condition of the little skate resource.

Response: The Council recognizes that the little skate resource is considered to be rebuilt, abundant, and continuing to increase. The measures proposed in this FMP that apply to fishing for skates for lobster bait are more administrative in nature and are intended to collect fishery information rather than restrict the skate bait fishery. No measures proposed in this FMP should compromise fishermen's ability to catch little skates for lobster bait at this time. This FMP establishes processes for evaluating the status of the little skate resource and managing the skate bait fishery in the future, if it becomes necessary.

E.13.0 INDEX

11.0 LIST OF PREPARERS AND CONTRIBUTORS

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In addition to the individuals identified above, several industry members provided fishery information for the Skate SAFE Report (Volume II). The SAFE Report includes a list of individuals who contributed to the development of that document.

12.0 LIST OF ACRONYMS

ACCSP Atlantic Coastal Cooperative Statistics Program

ALWTRP Atlantic Large Whale Take Reduction Plan

ASMFC Atlantic States Marine Fisheries Commission

B Biomass

B_0 Virgin Stock Biomass

B_{MSY} Biomass at MSY-levels

CPUE Catch-Per-Unit-Effort

DAM Dynamic Area Management

DAS Days at Sea

DEIS Draft Environmental Impact Statement

EA Environmental Assessment

EEZ Exclusive Economic Zone

EFH Essential Fish Habitat

EIS Environmental Impact Statement

ESA Endangered Species Act

F Fishing Mortality Rate

FEIS Final Environmental Impact Statement

FMP Fishery Management Plan

F_{MSY} Fishing mortality rate at MSY-levels

FR Federal Register

HPTRP Harbor Porpoise Take Reduction Plan

IWC International Whaling Commission

LOA Letter Of Authorization

M Natural Mortality Rate

MAFMC Mid-Atlantic Fishery Management Council

MEY Maximum Economic Yield

MMPA Marine Mammal Protection Act

MSY Maximum Sustainable Yield

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

NSGs National Standard Guidelines

OY Optimum Yield

PBR Potential Biological Removal

PDT Plan Development Team

PREE Preliminary Regulatory Economic Evaluation

RFA Regulatory Flexibility Act

RIR Regulatory Impact Review

SAFE Stock Assessment and Fishery Evaluation

SAFMC South Atlantic Fishery Management Council

SARC Stock Assessment Review Committee

SAW Stock Assessment Workshop

SFA Sustainable Fisheries Act

SIA Social Impact Assessment

TAC Total Allowable Catch

VTR Vessel Trip Report

WO Weigh Out

13.0 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 " (see below).

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

Biological Reference Points. Specific values for the variables that describe the state of a fishery system which are used to evaluate its status. Reference points are most often specified in terms of fishing mortality rate and/or spawning stock biomass.

B_{MSY}. Long term average exploitable biomass that would be achieved if fishing at a constant fishing mortality 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 $B_{minimum}$.

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.

Control rule. A pre-determined method for determining fishing mortality 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 overfished.

Environmental Impact Statement (EIS). 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 (EEZ). 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.

Exempted Fisheries. Currently, any fishery determined by the Regional Director to have less than a 5% regulated species bycatch, by weight, of total catch according to 50 CFR §648.80 (a)(7).

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.

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 New England Council, the procedure requires at least two Council meetings including at least one public hearing and an evaluation of environmental impacts not already analyzed as part of the FMP.

$F_{threshold}$. 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.

Growth overfishing. Fishing at an exploitation rate or at an age at entry that reduces potential yields from a cohort but does not reduce reproductive output (see recruitment overfishing).

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

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

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."

Overfishing. 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 MSY on a continuing basis."

Reference Points. Values of parameters (ex., B MSY, F MSY, F 0.1) that are useful benchmarks for guiding management decisions. Biological reference points are typically limits that should not be exceeded with significant probability or targets for management.

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).

Surplus production models. A family of analytical models used to describe stock dynamics based on catch in weight and CPUE time series (fishery dependent or survey) to construct stock biomass history. These models do not require catch at age information. Model outputs may include stock biomass history, biomass weighted fishing mortality rates, MSY, F_{MSY}, B_{MSY}, K, (maximum population biomass where stock growth and natural deaths are balanced) and r (intrinsic rate of increase).

Surplus production. Production of new stock biomass defined by recruitment plus somatic growth minus biomass loss due to natural deaths. The rate of surplus production is directly proportional to stock biomass and its relative distance from the maximum stock size at carrying capacity (K). B_{MSY} is often defined as the biomass that maximizes surplus production rate.

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

Additional terms are defined in the Glossary in the Skate SAFE Report (Volume II).

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Additional references are included in the 2000 Skate SAFE Report (Volume II) and the supplemental EFH documents (Volume III).

15.0 LIST OF PUBLIC MEETINGS

Date	**Meeting**	**Location**
July 17, 2000	Skate PDT	Woods Hole, MA
August 18, 2000	Skate PDT	Woods Hole, MA
September 20, 2000	Skate Oversight Committee	Warwick, RI
September 26-28, 2000	Council	Fairhaven, MA
November 30, 2000	Skate Committee and Advisory Panel	Middletown, RI
January 23-25, 2001	Council	Danvers, MA
January 23, 2001	Skate Scoping Hearing	Danvers, MA
February 2, 2001	Skate Scoping Hearing	Provincetown, MA
February 6, 2001	Skate Scoping Hearing	Wilmington, DE
February 12, 2001	Skate Scoping Hearing	Tiverton, RI
February 26, 2001	Skate PDT	Woods Hole, MA
March 13, 2001	Skate Committee and Advisory Panel	New London, CT
March 14-15, 2001	Council	New London, CT
April 11, 2001	Skate PDT	Pocasset, MA
April 26, 2001	Skate Oversight Committee	Warwick, RI
May 2-3, 2001	Council	Peabody, MA
May 14, 2001	Skate PDT	Pocasset, MA
May 30, 2001	Skate Oversight Committee	Warwick, RI
June 13-14, 2001	Council	Providence, RI
October 16, 2001	Skate PDT	Newburyport, MA
November 5, 2001	Skate Oversight Committee	Danvers, MA
December 19-20, 2001	Council	Danvers, MA
February 25, 2002	Skate Committee and Advisory Panel	Danvers, MA
February 26-27, 2002	Council	Danvers, MA
March 26, 2002	Skate PDT	Mansfield, MA
June 13, 2002	Skate Oversight Committee	Danvers, MA
June 24-26, 2002	Council	Rockport, ME
July 8, 2002	Skate PDT	Mansfield, MA
July 22, 2002	Skate Oversight Committee	Danvers, MA
July 23-25, 2002	Council	Portland, ME
September 16, 2002	Skate Public Hearing	New Bedford, MA

September 17, 2002	Skate Public Hearing	Narragansett, RI
September 20, 2002	Skate Public Hearing	Provincetown, MA
September 23, 2002	Skate Public Hearing	Portsmouth, NH
October 1, 2002	Skate Public Hearing	Wilmington, DE
October 10, 2002	Skate Advisory Panel	Mansfield, MA
October 22, 2002	Skate Oversight Committee	Warwick, RI
November 5-7, 2002	Council	Gloucester, MA
January 28-30, 2003	Council	Portsmouth, NH