2012-2013
Northeast Skate Complex Specifications
Supplemental Environmental Assessment
Regulatory Impact Review
and
Initial Regulatory Flexibility Analysis

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NEW ENGLAND FISHERY MANAGEMENT COUNCIL

Prepared by the
New England Fishery Management Council
in cooperation with the
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION · NOAA · U.S. DEPARTMENT OF COMMERCE

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1.0 EXECUTIVE SUMMARY

The proposed action in this document would implement the first planned change in specifications based on updated data and research. These specifications include changes to the Skate Allowable Biological Catch (ABC), the Annual Catch Limit (ACL), the Annual Catch Target (ACT), and Total Allowable Landings (TAL) allocated to the skate wing and skate bait fisheries. The ACL is equal to the ABC and has been set at a risk adverse level, accounting for scientific uncertainty. The ACT is set at 75% of the ACL to account for management uncertainty. The TAL is allocated among the skate bait and wing fisheries, after accounting for expected discards and state water landings. This specification update is described in Section 4.1.1 and the analysis is described in Section 6.1.1.

The specification document also proposes to revise the skate wing and skate bait possession limits. The former is meant to balance the amount of daily landings with the wing TAL, so that the skate wing fishery is likely to stay open throughout the year, minimizing discards. Two possession limit alternatives are proposed, estimated by an equation fitted to new daily landings information through Aug 15, 2011. One alternative is estimated to land 100% of the TAL and the other alternative takes a risk adverse approach to land 85% of the TAL in case the estimated daily landings are lower than actually occur in 2012-2013. The alternative is described in Section 4.3 and the impact analysis is given in Section 6.1.3. Due to the higher daily landings observed in 2011, the skate wing possession limit alternative values are lower than the status quo, despite the TAL being higher. The specification document also proposes to raise the skate bait possession limit from 20,000 to 25,000 lbs., intended mainly to deter derby style fishing behavior if skate bait landing approach seasonal quotas (which would be raised with the proposed 2012-2013 specifications).

The description of alternatives is summarized in the table below and described in Sections 4.1 to 4.4. They include changes to the ACL specifications, revisions to the status determination specifications and clearnose skate overfishing definition to account for the new FSV Bigelow survey, and changes to the skate wing and skate bait possession limits for the 2012-2013 fishing years. Considered and rejected alternatives are described in Section 4.5 and rationale for their rejection is given. These rejected alternatives were discussed during the development of this specifications document and include raising the incidental skate possession limit, allowing vessels to fish for skates while on a Multispecies Category B DAS, allowing retention and landings of barndoor skate, and changes to monitoring that could align annual data with the fishing year. All other management changes are outside the scope of this action.

Table 1. Summary of management alternatives included and analyzed in this document.

Measure	Description	Biological analysis	Other impacts	Intended effect
ACL specifications	Section 4.1	Section 6.1.1	Sections 6.2 to 6.7	Respond to changes in skate biomass, achieve optimum yield, and prevent overfishing
Status determination specifications	Section 4.2	Section 6.1.2???	Sections 6.2 to 6.7	Adjustments needed to accommodate changes in survey methods since 2009

Skate wing fishery possession limits	Section 4.3	Section 6.1.3	Sections 6.2 to 6.7	Limit landings so the directed fishery remains open year around, minimizing discards
Skate bait fishery possession limits	Section 4.4	Section 6.1.4	Sections 6.2 to 6.7	Allow fishermen to land the TAL without encouraging derby style fishing behavior in a quota-managed fishery

Updated or new data about the skate resource and fishery include 2008-2010 fall survey biomass indices (2009-2011 spring biomass indices for little skate). The survey biomass data collected using new trawl gear by the FSV Bigelow have been converted to the FSV Albatross IV units by applying peer reviewed calibration coefficients. And the entire survey biomass time series and biological reference points have been adjusted to be consistent with strata that are sampled by the new research vessel, FSV Bigelow (Section 5.1.2). These data were also used to determine whether skate stocks were overfished as of 2010 (spring 2011 for little skate) or if overfishing was occurring (see Section 5.1.2 for status summary).

Landings data (including newly discovered reports of transfers at sea) and discard estimates for 2008-2010 were also updated with new data (dealer reports and sea sampling data and discard mortality was estimated by applying new research information that indicates that discard mortality of little (0.20) and winter (0.12) skates were lower than previously assumed (0.50) based on the literature from other areas and gears. The lower discard rates were applied only to little and winter skate discards captured by trawls, based on specific skate discard mortality research on trawl vessels conducted since Amendment 3 approval. Skate discard mortality of other species or any skates discarded by non-trawl fishing gear was assumed to be 0.50, as before.

These discard mortality revisions had two effects – they changed the discard rate (discards ÷ total catch) for 2008-2010 (which is projected to remain constant in 2012-2013) and they changed the catch time series and required revision of the median catch/biomass exploitation ratio that Amendment 3 used as the basis for establishing ABC. The first change reduced the discard rate from 52.0 to 36.3% and increased the wing and bait fishery TALs as a proportion of the ACT. The second effect was to reduce the amount of catch in the time series and lower the median catch/biomass exploitation ratio for little and winter skates. This reduced the ABC, compared to what it would be using the Amendment 3 median catch/biomass exploitation ratios.

Finally, the increases in the TAL could allow a greater number of trips targeting skates, or a change in skate fishing effort to fish in areas with higher catch rates (these may be farther offshore, becoming economic with higher possession limits). Since thorny skate is overfished, smooth skate is in danger of becoming overfished (i.e. biomass near the threshold), and barndoor skate is in a rebuilding program, the analysis in this document (Section 5.1.2) evaluates the potential for interactions between vessels using trawls and gillnets to target skate wings and barndoor, smooth, and thorny skates. Due to distinct differences in the distribution of the skate wing fishery effort and the distributions of barndoor, smooth, and thorny skates, the impacts of raising the TALs is expected to be marginal and not impede recovery.

There are however a few notable areas of overlap, possibly raising the possibility of seasonal interactions – primarily for barndoor skate in the spring gillnet fishery for monkfish in Southern New England.

The proposed action is needed to maintain the skate fisheries and achieve optimum yield while adequately minimizing the risk of overfishing the seven skate stocks.

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ABC	Allowable biological catch
ACL	Annual Catch Limit
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
APA	Administrative Procedures Act
ASMFC	Atlantic States Marine Fisheries Commission
CAI	Closed Area I
CAII	Closed Area II
CPUE	catch per unit of effort
DAM	Dynamic Area Management
DAS	days-at-sea

DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DPWG	Data Poor Working Group
DSEIS	Draft Supplemental Environmental Impact Statement
EA	Environmental Assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
F	Fishing mortality rate
FEIS	Final Environmental Impact Statement
FMP	fishery management plan
FW	framework
FY	fishing year
GARM	Groundfish Assessment Review Meeting
GB	Georges Bank
GIS	Geographic Information System
GOM	Gulf of Maine
GRT	gross registered tons/tonnage
HAPC	habitat area of particular concern
HPTRP	Harbor Porpoise Take Reduction Plan
IFQ	individual fishing quota
ITQ	individual transferable quota
IVR	interactive voice response reporting system
IWC	International Whaling Commission
LOA	letter of authorization
LPUE	landings per unit of effort
MA	Mid-Atlantic
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MPA	marine protected area
MRFSS	Marine Recreational Fishery Statistics Survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSMC	Multispecies Monitoring Committee
MSY	maximum sustainable yield
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NLSA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service

NOAA	National Oceanic and Atmospheric Administration
NT	net tonnage
OBDBS	Observer database system
OLE	Office for Law Enforcement (NMFS)
OY	optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area
SAFE	Stock Assessment and Fishery Evaluation
SAP	Special Access Program
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
SIA	Social Impact Assessment
SNE	Southern New England
SNE/MA	Southern New England-Mid-Atlantic
SSB	spawning stock biomass
SSC	Social Science Committee
TAC	Total allowable catch
TAL	Total allowable landings
TED	Turtle excluder device
TEWG	Turtle Expert Working Group
TMS	ten minute square
TRAC	Trans-boundary Resources Assessment Committee
TSB	total stock biomass
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	vessel monitoring system
VPA	virtual population analysis
VTR	Vessel trip report
WGOM	Western Gulf of Maine
YPR	Yield per recruit

3.0 INTRODUCTION AND BACKGROUND

3.1 Purpose and Need for the Action (EA, RFA)

The purpose of this action is to analyze changes in stock condition, update scientific information on skates, and make necessary adjustments to management measures (including catch limits) to 1) set an Annual Catch Limit (ACL) that is consistent with conditions and scientific uncertainty and 2) achieve optimum yield. Following procedures using the median exploitation ratio (catch/survey biomass) as a conservative reference point (biomass tends to increase more frequently when catches are at or below this level) to set the ABC and ACL, the catch limits are expected to prevent overfishing. Overfishing of skates, unlike other stocks, is measured as an outcome, a rate of change in biomass which cannot be predicted with existing skate population models.

Amendment 3 catch limits for 2010-2011 were set using the 2006-2008 survey results. Since then new survey data have been collected, have been properly calibrated to consistent units[1] via a peer review conducted by the SSC, and applied to the ACL framework procedures established in Amendment 3. The Skate PDT analyzed the data and the Council's SSC recommended ABCs that use calibrated and updated survey data through 2010 (spring 2011 for little skate). In addition, the Skate PDT updated and the SSC reviewed the 2010 landings and discard data to set ACL-related management measures (TALs) that require such information. Included in these data are new estimates of discard mortality (see Section ???) for little and winter skates captured by vessels using trawls.

The need for this action is to set the annual catch limit specifications (ABC, ACL, ACT, and TALs) to maintain the skate fisheries while adequately minimizing the risk of overfishing the seven skate stocks. Without these catch limits and management measures, unregulated fishing for skates would increase to the point that could ultimately cause stocks to become overfished and depleted. In addition, two stocks (smooth and thorny skates) are currently overfished or the biomass is very close to the minimum threshold. Since it had been overfished, barndoor skate is in a rebuilding program but has not yet met the target. Annual catch limits (and associated in-season and post-season accountability measures) prevent fishing from increasing to unsustainable levels and enhance prospects for rebuilding of barndoor, smooth, and thorny skates (all landings of these species being prohibited).

This action also proposes to change the skate wing and bait fishery possession limits. In the wing fishery, the Council adopted in Amendment 3 a policy of setting possession limits that was intended to allow the directed skate wing fishery to remain open through the entire fishing year. Amendment 3 also included an in-season accountability measure to reduce the skate wing possession limit when the landings reached 80% of the TAL. Framework Adjustment 1 adjusted these limits, established a split season (May-Aug; Sep-Apr), and raised the TAL trigger to 85% in reaction to the early fishery closure that occurred in 2010. The proposed specifications in this document include an adjustment to the skate wing possession limits to be consistent with the updated ACL and with new estimates of daily landings rates under current fishery conditions (through July 2011).

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[1] In 2009, NMFS began using a new survey vessel and modified gear to conduct shelf-wide surveys of benthic species, like skates. Due to catchability differences, selectivity differences, and modified survey procedures that dropped some survey strata, the data needed to be calibrated and adjusted to be applied to the historic catch/biomass ratios.

The 20,000 lbs. skate bait fishery possession limit was intended as a precautionary measure to reduce the potential for derby style fishing behavior as landings approached the three seasonal quotas established by Amendment 3. Since the skate bait fishery TAL for 2012-2013 is substantially higher than the TAL for 2010-2011, the AP asked the Council to consider raising the skate bait fishery possession limit to 25,000 lbs., expanding the bait fishery's ability to land greater amounts of skates, but preserving the original intent to reduce the incentive to land very large volumes of skates before a pending closure of the bait fishery.

Lastly, the Skate PDT identified an additional source of landings that had not been taken into account in previous skate assessments and in Amendment 3 (2010-2011) specifications. Skates (and other species) may be transferred to other vessels at sea for use as bait (primarily for the lobster trap fishery). Skates are the largest component of these at-sea transfers and are reported in VTRs, but not reported by shoreside dealers, and the at-sea transfers of skates are a significant component of total skate catch (see Table ???). As proposed by this document, these at-sea transfers on VTR reports will count against the skate bait TAL. The exploitation ratio (and hence the ACL) has been increased to account for this additional source of previously unrecognized landings.

3.2 Management Background (EA, RFA)

3.2.1 Management Objectives

The management objectives of the FMP, as modified by Amendment 3 is to set annual catch limits and establish other measures that will end overfishing and promote rebuilding of overfished thorny skate to achieve the biomass target within the mandated rebuilding schedule, or earlier if possible, and to prevent overfishing of all managed skates. This objective is achieved by limiting discards and landings sufficiently to keep catches below the productive capacity of the stocks and thereby promote increases in skate biomass.

Amendment 3 addressed these objectives by implementing ACLs and AMs to comply with new MSA requirements, which are also consistent with National Standard 1 guidelines and account for both scientific and management uncertainty. It also established a process for evaluating the effects on the skate resource and on skate catches from new or pending regulations, alternatives under consideration in amendments or framework adjustments for other FMPs, and structural or economic changes in related fisheries that catch or land skates.

This document and the included Affected Environment section (SAFE Report) addresses these objectives by analyzing and incorporating new data and research that has become available since Amendment 3 implementation. These data and research results form the basis for the proposed changes in specifications described and analyzed herein.

3.2.2 Methods of Analysis

The basic approach adopted in this analysis is an assessment of various management measures to evaluate the potential and probable impacts on the environment. The alternatives are outlined in Table 1???, described in Sections 4.1 to 4.3???, and analyzed in Section 6.0. A summary of impacts is given in Section 6.6.

This specification document serves a dual purpose, as it is a vehicle to convey the Council recommendations to the Regional Administrator. It also serves as a decision document for the Regional Administrator, who reviews the analysis of impacts of the various management alternatives presented here and determines which alternatives achieves the FMP objectives as well as the objectives and statutory requirements under MSA and other applicable law.

This environmental assessment (EA) examines the impacts of each proposed action (management alternative) on the affected environment. The aspects of the affected environment that are likely to be directly or indirectly affected by the actions proposed in this document are described as *valued ecosystem components* (VECs; Beanlands and Duinker 1984). These VECs comprise the affected environment and are specifically defined as the managed resources (skates) and any non-target species, habitat, including EFH for the managed resource and non-target species, endangered and protected resources, and any human communities (social and economic aspects of the environment). The impacts of the alternatives are evaluated with respect to these VECs.

All management alternatives under consisderation for skates were analyzed for 2012-2013 only. A full description of each of these alternatives, including a discussion of a No Action Alternative is given in Section 4.0 of the EA.

The MSA requires each Council to establish an SSC to assist it by providing it with, among other things, ongoing scientific advice for fishery management decisions, including recommendations for ABC, preventing overfishing , and for achieving MSY. The FMP establishes a review process to be conducted by the Skate PDT and provide recommendations regarding annual skate specifications, considering a broad range of relevant information including but not limited to stock status updates from benchmark or update assessments, estimates of fishing mortality (or exploitation rates) and stock biomass, relevant research on skate biology and socio-economic fishery characteristics, landings and catch information, and impacts of specific commercial and recreational fishery regulations, including non-compliance rates for those regulations.

These Skate PDT recommendations are reviewed by the SSC, which provides a mechanism for peer review and provides the information the SSC needs to recommend ABC. A summary of this information with the SSC recommendations was presented to the NEFMC in June 2011, forming the basis of this specifications document. In this case, the SSC provided critical peer review of various survey calibration methods that properly related the catches of the FSV Bigelow to the catches of the FSV Albatross IV that the new vessel replaced (Appendix I of this document). The SSC also provided peer review for the Council to use new data on little and winter skate discard mortality for setting ABC and TALs (Appendix II of this document), pending publication in the literature.

Each Council must then develop ACLs that do not exceed the fishing level (ABC) recommendations of its SSC or its peer review process. The Council also receives advice about potential management alternatives and specifications from its Skate Advisory Panel, comprised of industry members and others knowledgeable about the skate resource and fishery. Based on SSC and Skate PDT recommendations, and advice from the Skate Advisory Panel, the Council makes a recommendation to the NMFS Northeast Regional Administrator. The Regional Administrator reviews the recommendation forwarded through this specifications document and may approve, disapprove, or partially disapprove the proposed action to meet the FMP objectives and statutory requirements.

3.2.3 Skate Fishery Management Plan

Table 2 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 2. Species description for skates in the management unit.

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	*Dipturus 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 the 2008 SAFE Report, Section 7.0 of Amendment 3 (NEFMC 2009).

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 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 5.4.1.

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 and the NMFS SAW assessment process (http://www.nefsc.noaa.gov/nefsc/saw/) have continued to update the status determinations for the skate species based on the biomass reference points used during SAW 30[2]. At the time of the fall 2001 survey, only two species remain in an overfished condition: barndoor and thorny skates. The overfished status of these two species required the Council to develop 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 was not warranted. 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

[2] These biological reference points have since been updated by Amendment 3 and revised to account for strata consistently sampled by the FSV Albatross IV and the newer FSV Henry B. Bigelow.

portion of its range or likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS retained the species on its candidate species list, however.

The development of the FMP in 2002 and a description of issues that the Council encountered is described in Section 3.2 of the Amendment 3 document (NEFMC 2009). Early problems included a lack of information about the biology of skates, population dynamics, and the fishery. The FMP initially set limits on fishing related to the amount of groundfish, scallop, and monkfish DAS and measures in these and other FMPs to control the catch of skates. Initially, it was thought that barndoor, smooth, rosette, and thorny skates were overfished and that overfishing of winter skate was occurring.

Since the 2003 FMP implementation, information about skates has improved and biomass of many species has dramatically improved. The three year moving averages for skate biomass increased for barndoor skate and rosette skate, and but despite declining catch the survey biomass declined for the other five skate species. Barndoor skate is no longer overfished, but biomass has not yet rebuilt to the 1.62 kg/tow target. Thorny skate remained overfished and as of the 2007 survey is experiencing overfishing[3].

As a result of these trends in the survey that changed the status of several skate species, NMFS notified the NEFMC on February 20, 2007 that winter skate had become overfished (Document 1 in Appendix I). At the time, the Magnuson-Stevens Act required the Council to develop a plan amendment to address the overfished condition and initiate rebuilding. In addition, the Skate PDT noted that smooth skate was approaching an overfished condition and that little skate biomass could decline enough that overfishing would be occurring.

3.2.4 Skate FMP Amendment 3

The Council began developing Amendment 3 in April 2007 and held scoping hearings on May 22-24, 2007. During 2007, the Council developed a framework of measures and alternatives to reduce skate catch and landings, particularly for the wing fishery which catches and lands predominantly winter skate. Poor data quality, however, has been a hindrance for developing management measures and predicting their effects throughout the existence of the Skate FMP. In addition to frequently unclassified species composition of landings and discards, the population dynamics of skates were poorly understood. Following the last benchmark skate assessment (NEFSC 2007=7), recently acquired life history information about fecundity, survival, and growth allowed the PDT to estimate maximum rebuilding potential and mean generation times for smooth, thorny, and winter skates.

These rebuilding potential estimates were presented to the Council’s Science and Statistical Committee (SSC) in November 2007, but while the SSC approved of the analysis, they advised the Council that these estimates could not be applied to current conditions to forecast rebuilding and set catch limits accordingly. It was unclear to the SSC whether current rates of exploitation were above or below F_{MSY}, much less whether a particular catch rate would cause rebuilding to occur. The SSC advised the Council that an MSY-based analytical assessment should be attempted, but the Council found that insufficient resources or time were available to begin a new assessment.

In response, the Council prepared a heuristic analysis of changes in skate biomass in response to historic exploitation rates to estimate probabilities of rebuilding biomass based on past history for all seven species. Positive relationships (i.e. increases in biomass with low exploitation rates) were found for

3. During SAW 44 (NEFSC 2007a), NMFS updated these survey results and status determinations with 2008 spring and fall survey data as the Council approved the final alternative and submitted the final Amendment 3 document. The new survey results and the updated biological reference points from the Data Poor Assessment Workshop changed the status determinations for smooth and winter skates.

smooth, thorny, and winter skates. This approach, developed by the Skate PDT, was approved by the SSC in April 2008 (Appendix I, Document 4 in Skate FMP Amendment 3; NEFMC 2009) and forms the basis for catch limits proposed by this specification document.

While Amendment 3 analysis was occurring, the 2007 survey results became available and NMFS evaluated the status of skates with respect to each species overfishing definition. Biomass of smooth skate declined from 0.19 kg/tow to 0.14 kg/tow, below the minimum biomass threshold of 0.16 kg/tow. Biomass of thorny skate declined from 0.55 kg/tow to 0.42 kg/tow, which is more than the maximum 20% decline that defines overfishing. Based on this new information, NMFS informed the Council on July 21, 2008 that smooth skate was considered to be overfished and that thorny skate was experiencing overfishing. Little skate biomass had also declined and was very close to the overfishing threshold (a 20% decline in the three year moving average for survey biomass), but preliminary spring trawl survey biomass had substantially increased (5.04 kg/tow) and overfishing is likely not occurring.

In summary, discards have remained stable to a slight increase and skate wing landings have increased since plan implementation in 2003. During this time skate biomass has declined for five of the seven skate species. Smooth and winter skates were classified as overfished because their biomass declined below the minimum biomass threshold. Thorny skate remains overfished and is now experiencing overfishing. And while little skate came very close to overfishing being declared, the preliminary 2008 data indicates that a change in little skate status may have been averted.

Amendment 3 became effective on July 16, 2010, implementing a new ACL management framework that capped catches at specific levels determined from survey biomass indices and median exploitation ratios. The amendment established a two-year specification cycle and set specifications for the 2010 and 2011 fishing years. After the 2010 fishing year is complete, the amendment tasks the Council and Skate PDT with analyzing the results, updating the indices, and recommending new specifications for the 2012 and 2013 fishing years. These 2012-2013 specifications would also include adjustments to account for prior overages, as accountability measures. This specification document addresses these issues using the process established by Amendment 3.

In addition to the ACL framework and accountability measures, the amendment also included technical measures that reduced the skate wing possession limit from 20,000 (45,400 whole weight) to 5,000 (11,350 whole weight) lbs. of skate wings, established a 20,000 lb. whole skate bait limit for vessels with skate bait letters of authorization, and allocated the skate bait quotas into three seasons proportionally to historic landings.

The ACL specifications for the 2010 and 2011 fishing years were set using a three year (2006-2008) skate biomass average applied to the median exploitation ratio (the length of the time series varies by skate species) to set an ABC, reduced by 25% to an ACT that accounts for scientific and management uncertainty, reduces the ACT by the estimated discard rate in 2006-2008 (2009 discard estimates were not yet available), and allocates the remainder to allowable landings which were split 66.5/33.5% between the skate wing and bait fisheries, respectively. A small amount (3%) was set aside for skate landings by vessels fishing in state waters without a federal skate permit.

3.2.4.1 Fishery and Management Actions in 2010; Framework Adjustment 1

During 2010, the skate wing fishery landings quickly reached the 80% TAL trigger that Amendment 3 established to prevent landings from exceeding the TAL and to reduce the risk that catch would exceed the ACL, triggering AMs and potentially causing overfishing if action were not taken. Since it appeared that without taking action the skate wing fishery would exceed the TAL, the Regional Administrator took action to reduce the skate wing possession limit to 500 lbs. from Sep 3, 2010 to Apr 30, 2011 in accordance with the in-season AM procedure established by Amendment 3.

This action stopped vessels from targeting larger skates for the wing market, but also caused considerable economic dislocation in the fishery. Some fishermen apparently began fishing in state waters by shelving all federal fishing permits for their vessel or began using vessels without federal permits to fish for skates in state waters. Nonetheless, final total skate catches in 2010 were 84% of the ACL, slightly above the 75% ACT, and triggered no AMs to be applied in future fishing years to account for overages of the ACL. The increases in state landings were absorbed by the 25% management buffer.

Due to the economic dislocation caused by the skate wing fishery closure, industry representatives asked the Council to take action to keep the fishery open year around. It was also known that the fall 2009 and spring 2010 survey data had indicated a higher winter and little skate biomass, respectively. These new survey data, however, could not be used to adjust the ABC until peer reviewed calibrations could be completed. The Council took two actions. It initiated Framework Adjustment 1 to change the skate wing possession limit to a level that would be more likely to keep the fishery open year around. It also directed the Skate PDT to evaluate calibration methods for skates and the SSC to peer review the results for the purposes of setting 2012-2013 ABCs.

Framework Adjustment 1 evaluated alternatives for setting a lower skate wing possession limit to keep landings below the 9,209 mt TAL and keep the fishery open year around. Landings and discards for 2009 were however updated and included in the Framework Adjustment 1 analysis. New daily landings data for 2010 were also included to estimate an appropriate possession limit. The industry also advise that a lower limit in May-Aug would enhance economic value in Sep-Apr when prices and skate quality were better. And for various reasons, the skate wing landings in 2010 were higher than projected they would be with both a 20,000 lbs. possession limit before July 16, 2010 and a 5,000 lbs. possession limit after Amendment 3 implementation.

While the 20,000 lb. skate wing possession limit was effective before July 16, 2010 the skate wing landings nearly doubled compared to the same period in 2009. Furthermore, the daily landings of skate wings only declined by 19% when the 5,000 lb. skate wing possession limit was in effect from July 16 to September 3, 2010, compared to the same time period in 2009. Once the 500 lbs. incidental skate wing limit became effective on September 3, 2010 the daily wing landings dropped and it appears that the skate wing TAL will be exceeded only by a small amount, despite the high landings under the 20,000 lb. possession limit early in the fishing year. Discards on some trips have undoubtedly increased, but the reduced possession limit will prevent boats from making trips to target skates, the reduced mortality possibly offsetting most or all of this anticipated increase in discards on trips targeting non-skate species. Therefore the effect on total discards is unknown at this point.

At this time, it appears that skate bait landings have remained stable and slightly higher than in 2009, but not high enough to trigger a reduction in the skate possession limit for vessels with bait letters of authorization. Some vessels that target skates for the wing market may have applied for a bait letter of authorization to target skates, but the landings are limited only to skates less than 23 cm, which yield wings that are too small to be generally marketable. This size limit protects the larger skates, such as winter, thorny, and smooth, as Amendment 3 intended.

As a result of the Framework Adjustment 1 analysis, the Council set a 2,600 lbs. skate wing possession limit from May 1 to Aug 30, 2011 and a 4,100 lbs. skate wing possession limit from Sep 1, 2011 to Apr 30, 2011.

During the end of the 2010 fishing year (Jan – Apr), the Skate PDT developed the analyses needed to update the ABCs with new data, including calibrations of the survey tow data collected by the new FSV Bigelow in 2009-2011 and recent discard mortality research for little and winter skates captured by vessels using trawls.

3.2.4.2 Allowable Biological Catch and Total Allowable Landings in 2011

These analyses were peer reviewed and indicated that the skate ABCs and ACL specifications could be raised for 2012-2013. And since there was no biological justification why the limits could not be raised to the same level in the 2011 fishing year, the Council requested in June 2011 that the Regional Administrator initiate Emergency Action to adjust the 2011 ACL specifications, based on the new analysis and calibrated survey data through spring 2011.

A proposed rule was published on August 30, 2011 (FR 76(168) p53872; http://www.nero.noaa.gov/nero/regs/frdoc/11/11SkatePR.pdf) to raise the ACL specifications to the levels shown in the table below. These new limits coupled with the Framework Adjustment 1 possession limits are expected to allow the skate wing fishery to remain open for most or all of the 2011 fishing year.

Table 3. Revised skate specifications for the 2011 fishing year.

ABC	50,435 mt	Wing fishery possession limit	May-Aug: 2,600 lbs. skate wings Sep-Apr: 4,100 lbs. skate wings
ACT (75% of ABC)	37,826 mt	Wing fishery TAL trigger	85% of wing fishery TAL
TAL (assuming 36.3% discard rate)	21,561 mt	Bait fishery possession limit with a Letter of Authorization	20,000 lbs. whole weight
State waters catch	6.7%	Bait fishery TAL trigger	90% of bait fishery TAL
Wing fishery TAL	14,338 mt	Bait fishery quotas	
Bait fishery TAL	7,223 mt	May 1 – Jul 31	2,225 mt
		Aug 1 – Oct 31	2,680 mt
		Nov 1 – Apr 30	2,318 mt + any remaining from periods 1 & 2

3.3 Maximum Sustainable Yield (MSY) and Optimum Yield (OY)

Principally due to intractable problems with species identification in commercial catches, the Skate FMP did not derive or propose an MSY estimate for skate species or for the skate complex. Catch histories for individual species were unreliable and probably underreported. Furthermore, the population dynamics of skates was largely unknown so measures of carrying capacity or productivity were not available on which to base estimates of MSY.

One of the major purposes of Amendment 3 is to set catch limits which prevent overfishing. If overfishing is defined as an unsustainable level of exploitation, then a suitable candidate for MSY is the catch that when exceeded generally leads to declines in biomass MSY. This value, estimated by the Skate PDT and approved as an ABC by the SSC, is the median exploitation ratio (catch/relative biomass). If and when the biomass of skates is at the target, the maximum catch that would not exceed the median exploitation ratio can serve as a proxy for MSY (Hilborn and Walters 1992).

Due to changes in the median catch/biomass exploitation ratio, the value of MSY, originally estimated in the Amendment 3 FEIS (NEFMC 2009) had to be re-estimated. The estimated catch when skates are at the biomass target and landings of all skates are allowed is 46,192 mt (Table 4). This value should be considered as a provisional estimate of MSY and is probably conservative due to the historic underreporting of skate landings for data that were used to estimate the median exploitation ratio.

Using the 2008-2010 average fall biomass for barndoor, clearnose, rosette, smooth, thorny, and winter skates and the 2009-2011 average spring biomass for little skate, the current yield that does not exceed the median exploitation ratio is 50,435 mt and was approved in June 2011 by the Council's SSC as the allowable biological catch, or ABC. The Amendment 3 FEIS estimate using previous estimates of the median exploitation ratio and 2006-2008 biomass was 41,080 mt.

Table 4. Exploitation ratios and survey values for managed skates, with estimates of annual catch limits, catch targets, and allowable landings that take into account the 2008-2010 discard rate using DPWS catch data using the selectivity ogive method to assign species to catch[4].

	Catch/biomass index (thousand mt catch/kg per tow)		Stratified mean survey weight (kg/tow)			
Species	**Median**	**75% of median**	**2006-2008**	**2008-2010**	**MSY Target**	**Revised MSY target**
Barndoor	2.94	2.20	1.02	1.11	1.62	1.57
Clearnose	5.91	4.43	1.04	0.93	0.77	0.66
Little	2.38	1.79	5.04	7.85	7.03	6.15
Rosette	3.62	2.72	0.05	0.04	0.03	0.03
Smooth	2.39	1.79	0.13	0.16	0.31	0.27
Thorny	2.30	1.73	0.42	0.25	4.41	4.13
Winter	2.26	1.69	5.23	9.68	6.46	5.66
Annual catch limit (ACL/ABC)			41,080	50,435	60,527	46,192
Annual catch target (ACT)			30,810	37,826	47,462	34,644
Total allowable landings (TAL)			14,780	24,088	19,469	22,079

For the reasons that numeric estimates of MSY were unavailable in the Skate FMP, a quantitative estimate of optimum yield was also not previously specified. The Skate FMP defined optimum yield as equating "to the yield of skates that results from effective implementation of the Skate FMP."

Although the Skate FMP had not quantitative estimate of MSY, it defined optimum yield as equating "to the yield of skates that results from effective implementation of the Skate FMP." Amendment 3 changed this circular logic and defined the estimate of optimum yield as 75% of MSY. Thus using the updated catch/biomass exploitation ratios and adjusted survey biomass values, the revised estimate of optimum yield is 34,644 mt. Accounting for the average discard rate in 2008-2010, a landed yield of 22,079 mt can be considered as a suitable amount of skate landings of achieve optimum yield.

At current skate biomass, the ACT will be set at 37,826 mt, allowing a 25% buffer to account for scientific and management uncertainty. Deducting the 2008-2010 discard rate to account for bycatch sets the aggregate TAL at 24,088 mt.

[4] The survey biomass value for little skate is the arithmetic average of the 2006-2008 spring surveys.

3.4 ABC and ACL Specifications

ABC and ACL specifications are derived from the median catch/biomass exploitation ratio for time serios up to 2007 and the three year average stratified mean biomass for skates, using the 2009-2011 spring survey data for little skate and the 2008-2010 fall survey data for other managed skate stocks. For skates, the Council set the ACL to be equal to the ABC because the skate ABC is inherently conservative and the associated exploitation ratio is less than that which is risk neutral (and theoretically be equivalent to F_{msy}). TALs are set according to Amendment 3 procedures that assume that future discards will be equivalent to the average rate from the most recent three years (2008-2010), and that state landings will approximate 3% to the total landings.

The updated specifications are presented in Section 4.1.1 and the analysis of the data is presented in Section 6.0???. The new data include survey biomass tow data collected by the FSV Bigelow, which have been calibrated to the FSV Albatross IV units using peer reviewed methods. The catch data include new estimates of discard mortality for little and winter skates captured by trawl gear and also include recently discovered information about transfers at sea for bait, reported on VTRs.

3.5 Stock Status

Stock status is described in more detail in Section 5.2???. Based on survey data through spring 2011 and catch data through calendar year 2010, winter, little, and clearnose skate biomass are above the target, rosette skate biomass is between the threshold and target, smooth skate biomass is slightly above the threshold, and barndoor skate is rebuilding with biomass between the threshold and target. Thorny skate biomass is well below the threshold and is therefore overfished, a status that has existed since 1987 (if overfishing had been defined at that time). Overfishing is not occurring on any stock.

3.6 Essential Fish Habitat (EFH)

Section 4.6 of the Skate FMP (available at http://www.nefmc.org/skates/fmp/skate_final_fmp_sec3.PDF) described and identified EFH for all seven managed skate species, based on the observed distribution of eggs, juvenile, and adult skates. The section includes maps based on the distribution of juveniles and adults. In general, no information was available on the distribution of eggs and skates do not have a larval life stage, instead hatching (i.e. emerging from egg cases) as juvenile skates.

This specification document proposes no changes to skate EFH descriptions or designations, but Amendment 2 to the Skate FMP will be approved as a part of a developing Omnibus EFH Amendment that will re-evaluate skate EFH.

4.0 DESCRIPTION OF MANAGEMENT ALTERNATIVES AND RATIONALE (EA, RFA)

The following sections describe the proposed adjustments to the skate specifications for the 2012-2013 fishing years. The Council intends for these specifications to become effective on May 1, 2012 and continue until altered by a future specification package or other management action, following the specification process established by Amendment 3 (http://www.nefmc.org/skates/planamen/amend3/final/Skate Amendment 3 FEIS.pdf) to the Northeast Skate FMP.

This specification process allows for adjustments to ACL limits and other management measures to respond to changes in skate biomass, indexed by the annual spring (little skate) and fall (all other skates) bottom trawl surveys. These are stratified random surveys and specific consistently stratified strata have been chosen to best represent the trends in skate biomass. These strata used to index skate biomass were revised to be consistent with the strata that are now surveyed by the FRV Bigelow, a larger vessel operated by NOAA that cannot survey in shallow depths that were accessible using the previous survey vessel, the FSV Albatross IV.

Even without consideration of this change in survey methodology, substantial increases in skate biomass had been observed in 2008-2010 compared with the 2006-2008 period used in Amendment 3 to set 2010-2011 specifications. In particular, the three year average biomass for little skate increased from 5.04 kg/tow (unadjusted strata) to 7.848 kg/tow and for winter skate from 5.230 kg/tow (unadjusted strata) to 9.684 kg/tow (see table below).

The Amendment 3 ACL framework allows the Council to set an aggregate skate ABC that is the product of a three year average stratified mean biomass and the median exploitation ratio (catch/biomass) through 2007. These parameters were chosen to be somewhat conservative and hence take into account scientific uncertainty. From this ABC value, the FMP specification process deducts a 25% buffer to account for management uncertainty to set an ACT and then deducts an assumed discard rate (updated to the 2008-2010 dead discards) to set a TAL, allocated between the skate bait and wing fisheries, according to historic share established by Amendment 3. The re-estimated discard rate also incorporates new discard mortality estimates for little (20%) and winter (12%) skates captured by trawls.

A comparison of the ACL limits in Amendment 3 (column A), changes due to modified survey biomass calculations (column B), and a revised discard rate estimate with a 3% set aside to account for state landings (column C) is shown in the table below. The new discard mortality rate affects the catch/biomass median values and hence the ABC because the estimated total catch (and proportion of catch from dead discards) changes the time series through 2007. It also raises the proportion of the ACT which may be allocated to TAL. The parameters and results in column C represent the updated specifications proposed for the 2012-2013 fishing years.

Table 5. **Existing (column A) and proposed (column C) ACL specifications.**

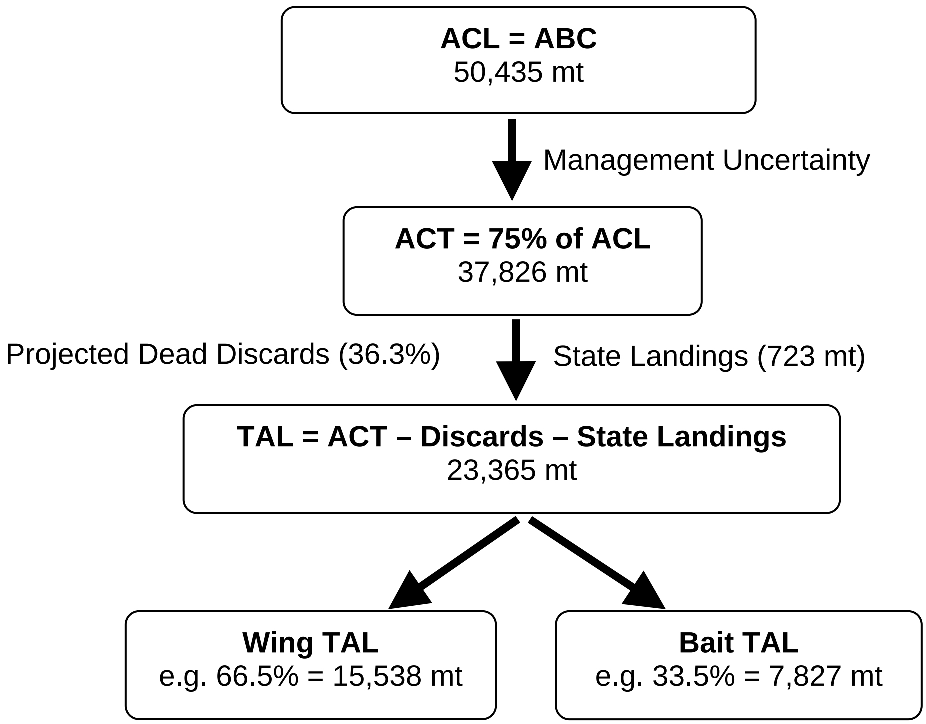
	(A)	(B)	(C)
	Current specifications	**Bigelow strata**	**3% state landings set aside**
	2006-2008 survey, 2007-2009 discards	**2008-2010 survey, 2007-2009 discards**	**2008-2010 survey, 2008-2010 discards**
ACL specifications			
ABC (mt)	41,080	69,215	50,435
ACT (mt)	30,810	51,911	37,826
TAL (mt)	14,780	24,903	24,088
Assumed state landings	924	924	723
Federal TAL	13,856	23,979	23,365
Wing TAL	9,214	15,946	15,538
Percent change 2007	-27.5%	25.5%	23.6%
Bait TAL	4,642	8,033	7,827
Season 1	1,430	2,474	2,411
Season 2	1,722	2,980	2,904
Season 3	1,490	2,579	2,513
C/B medians			
Barndoor	3.230	3.222	2.938
Clearnose	2.440	2.695	5.910
Little	2.390	2.898	2.384
Rosette	2.190	2.090	3.622
Smooth	1.690	1.669	2.388
Thorny	3.140	3.117	2.300
Winter	4.120	4.067	2.256
Survey biomass (mean kg/tow)			
Barndoor	1.020	1.114	1.114
Clearnose	1.037	0.933	0.933
Little	5.040	7.848	7.848
Rosette	0.053	0.040	0.040
Smooth	0.133	0.161	0.161
Thorny	0.420	0.245	0.245
Winter	5.230	9.684	9.684
Discard rate	52.0%	52.0%	36.3%
Discard mortality	50.0%	50.0%	31.0%

4.1 ACL Alternatives

4.1.1 Updated ACL specifications (preferred)

The ABC and ACL specifications would be adjusted to be consistent with new scientific information and the approved ACL framework procedures in Amendment 3. The aggregate skate ABC and ACL would increase from 41,080 to 50,435 mt. The ACL is a limit that would trigger AMs if catches exceed this amount. The ACT would likewise increase from 30,810 to 37,826 mt. It is used to set management measures to produce a target catch. And after deducting amounts for projected dead discards (based on the average 2008-2010 discard rate), the TAL would increase from 14,780 to 23,365 mt. It is used to set limits on landing skates. The TAL is proportionally a larger increase than the ABC and ACT, compared to the 2010-2011 specifications (see Section 4.1.2), because the proportion of dead discards in the catch declines from 52% to 36.3%, primarily due to the application of new science that indicates that discard mortality for little and winter skates captured by trawls is lower than had been assumed in Amendment 3 (see Section **Error! Reference source not found.**).

Although the skates landed from state waters by vessels without federal fishing permits were greater (12.6%) than had been anticipated (3%) in Amendment 3, the Council decided to continue the current 3% state waters TAL set aside, and instead asked the coastal states that have skate landings to consider regulations to bring skate landings in line with previous year's. If the current monitoring procedures had been applied to 2009 landings (before Amendment 3), the analysis would have showed that vessels without federal permits landed 6.7% of total skate landings.



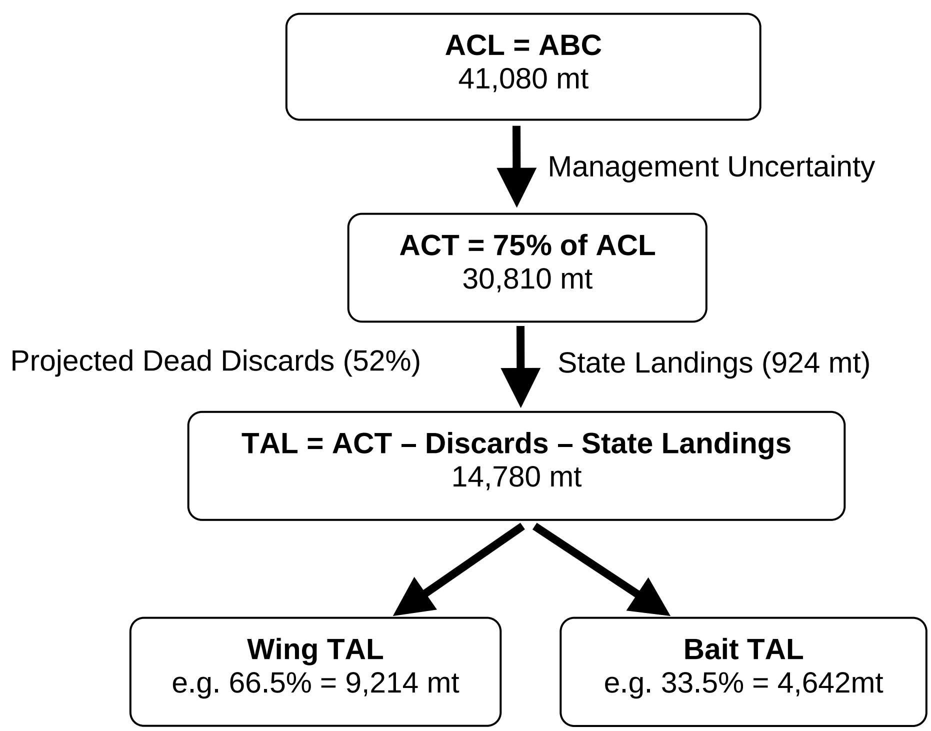
Rationale for alternative: This alternative would make the specifications (catch and landings limits) consistent with the procedures approved in Amendment 3 and with new science that has been analyzed by the Skate PDT and peer reviewed by the SSC. And according to the Amendment 3 procedures, it would allow the fishery to achieve optimum yield, nearly all derived from catches of little and winter skates. Biomass of little and winter skates have increased considerably from the 2006-2008 period and contribute the majority of landings in the skate bait and skate wing fisheries, respectively. Since most of the skate fishing occurs in the waters of Georges Bank, Southern New England, and the Mid-Atlantic region, the higher ACL specifications will not have a minimal impact on thorny and smooth skate (which primarily occur in the Gulf of Maine), and on rebuilding barndoor skate (which occurs primarily on Georges Bank, typically in deeper water than where winter skate occur). This alternative will also have a positive effect of reducing skate discards, compared to No Action, because the skate fishing season will remain open and a greater fraction of skate catches will be landed. It is expected that the higher landings will also increase fishery revenue and related shoreside employment.

The Council decided to continue the assumption that skate landings will be 3% of total skate landings, because 1) the events that occurred in 2010 were probably transitory, caused by the closure of the directed fishery on Sep 3, 2010, and mitigated by the effects of Framework Adjustment 1 and this action. And even though a retrospective analysis of 2009 data indicated that the actual amount of state water skate landings was 6.7% rather than the 3% assumed by Amendment 3 (see Section ???), the difference can easily be absorbed by the 25% management buffer between the ACL and the ACT. Moreover, in August 2011, the Council wrote a letter to coastal states asking them to evaluate the effect that their state water landings could have on the Skate FMP and consider rules to keep state water skate landings in check. If states take action, the proportion of skate landings derived from fishing in state-waters could decline.

4.1.2 No Action

The ACL parameters and limits would remain unchanged from the final ACL specifications for the 2010-2011 fishing years (see diagram below) in the final regulations for Amendment 3 (http://www.nefmc.org/skates/planamen/amend3/final/SkateA3_FinalRule_75FR34049.pdf) and would incorporate no new scientific data and information.

Although considered part of the No Action alternative, Framework Adjustment 1 changed the skate wing possession limit and made other regulatory adjustments, but did not change the ACL specifications as shown in the diagram below. Status quo however refers to adjusted ACL specifications that NMFS implemented via Emergency Action for the 2011 fishing year, responding to the new scientific information reviewed and approved by the Council's SSC in June 2011. Status quo however is not a viable alternative because the Emergency Action applies only to the 2011 fishing year ending on April 30, 2012 and cannot extend for more than 360 days.



Rationale for alternative: The No Action alternative would continue a lower ABC and ACL specifications than those derived from the specifications procedure described in Amendment 3. While it would be inconsistent with the FMP's description of optimum yield, No Action would indirectly increase the buffer for scientific uncertainty that in Amendment 3 is expressed in terms of probability and amount of expected biomass increase (i.e. conservation). And while the yield on species whose biomass is near the target (little and winter skate, for example), the lower ACLs would reduce directed fishing activities and could enhance rebuilding prospects for overfished skates (thorny), skates near the minimum biomass threshold (smooth), and skates in a rebuilding program (barndoor). Possession of all three of the above species is prohibited, but less targeting of skates could reduce discards, depending on where fishing occurs.

Most importantly, No Action would be inconsistent with the Act, with the FMP's optimum yield (Section 3.3), and with the Information Quality Act (Section 8.12). The No Action alternative would thus be illegal.

4.2 Status determination specifications

Adjustments to the skate overfishing definitions are proposed below to account for changes in NMFS trawl survey methods that have been in place since 2009, when NMFS began using the FSV Bigelow.

4.2.1 Revised status determination specifications and adjustments to overfishing definitions using consistent survey strata

The overfishing definition for clearnose skate would be revised as shown below to account for interannual variability in survey tow data collected from strata that are surveyed by the FSV Bigelow. Table ??? includes a revised list of survey strata used to define stock status..

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 ***40% 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 6. Status determination criteria specifications for skates in the management unit.

Species/stock	Bottom Trawl Survey	Selected reference time series[5]	Selected strata used for status determination and setting reference points
Winter	Autumn	1967-2007	1-30, 34-40, and 61-76
Little	Spring	1982-2008	1-30, 34-40, 61-76, and inshore strata 2,5,8,11,14, 17,20,23,26,29,32,35,38,41,44-46, 56, 59-61,64-66
Barndoor[6]	Autumn	1963-1966	1-30 and 34-40
Thorny	Autumn	1963-2007	1-30 and 34-40
Smooth	Autumn	1963-2007	1-30 and 34-40
Clearnose	Autumn	1975-2007	61-76 and inshore strata 17,20,23,26,29,32,35,38,41,44
Rosette	Autumn	1967-2007	61-76

Rationale: The FSV Bigelow surveys fewer inshore strata due to depth considerations using the new vessel. The Skate PDT has examined the historic data and found that normal interannual variability is greater in the survey strata (see Table ???) that are sampled only by the FSV Bigelow.

The SSC reviewed and approved the proposed changes to the overfishing definitions used for stock status determination. No changes to the overfishing definitions for other skates are needed, because the change in the survey methods did not affect the historic indices as much, but Table ??? revises the list of survey strata used to define stock status..

4.2.2 No Action

The existing skate overfishing definitions are listed below and the values for making a status determination are listed in Table 7.

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

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5 The beginning of the selected reference time series was chosen in the Skate FMP based on changes in geographical range of the survey and the seasonal distribution of the species/stock.
6 Unchanged.

*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 7. Status determination criteria specifications for skates in the management unit.

Species/stock	Bottom Trawl Survey	Selected reference time series[7]	Selected strata used for status determination and setting reference points
Winter	Fall	1967-2007	1-30, 33-40, and 61-76
Little	Spring	1982-2008	1-30, 33-40, 61-76, and inshore strata 1-66
Barndoor[8]	Fall	1963-1966	1-30 and 33-40
Thorny	Fall	1963-2007	1-30 and 33-40
Smooth	Fall	1963-2007	1-30 and 33-40
Clearnose	Fall	1975-2007	61-76 and inshore strata 15-44
Rosette	Fall	1967-2007	61-76

4.3 Skate Wing Possession Limit Alternatives

The skate wing possession limits in Amendment 3 and in Framework Adjustment 1 were intended to strike a balance between the skate wing TAL and the amount of directed fishing for skates, so that the skate fishing season remains open for the entire year, or at least as long as possible. Responding to higher than anticipated landings rates and an early fishery closure in 2010, the Council approved in Framework Adjustment 1 a seasonal reduction in the skate wing possession limit. Initially at 5,000 lbs for the entire year, Framework Adjustment 1 lowered the skate wing possession limit to 2,600 lbs. from May 1 to Aug 31 and to 4,100 lbs. from Sep 1 to Apr 30.

The lower possession limit in the summer months was intended to discourage targeting skates for the wing market during a season when prices are typically lower to enhance the economic benefits to the industry. No conservation benefits, other than reducing the potential for skate discarding during a longer fishery closure, were ascribed to the new, lower skate wing possession limits.

The alternatives below follow the same procedure as approved in Framework Adjustment 1, maintaining a 26:41 ratio between the summer and fall/winter skate wing possession limits. Both alternatives (Sections 4.3.1 and 4.3.2) are calculated to balance the updated ACL specifications (Section 4.1.1) with expected landings rates. Updated with new data from the fishery, the limits in the alternatives are estimated to keep the fishery open for the entire year, possibly reaching the 85% trigger toward the end of the fishing year, but not triggering a reduction to the incidental skate possession limit.

The second alternative (Section 4.1.1) was calculated as a more conservative choice in case the analysis is biased low and actual landings exceed expectations. By definition, the analysis will indicate that the

7 The beginning of the selected reference time series was chosen in the Skate FMP based on changes in geographical range of the survey and the seasonal distribution of the species/stock.
8 Unchanged.

fishery will not reach the 85% TAL trigger until the end of the fishing year, but it would also mean that the fishery may not be able to land 100% of the TAL unless effort or targeting increase.

4.3.1 Possession limit adjustments to allow fishery to take 100% of TAL (preferred)

The seasonal skate wing possession limit for May 1 to Aug 31 would decrease from 2,600 lbs. to 2,200 lbs. Likewise, the seasonal skate wing possession limit for Sep 1 to Apr 30 would increase from 4,100 lbs. to 3,600 lbs.

Rationale for alternative: This alternative is calculated to allow the fishery to land the TAL by the end of the fishing year, achieving optimum yield. As in Framework Adjustment 1, the split season is intended to encourage targeted skate fishing during the fall and winter seasons, when skate wing prices tend to be higher.

4.3.2 Possession limit adjustments to allow fishery to take 85% of TAL

The seasonal skate wing possession limit for May 1 to Aug 31 would decrease from 2,600 lbs. to 1,500 lbs. Likewise, the seasonal skate wing possession limit for Sep 1 to Apr 30 would decrease from 4,100 lbs. to 2,400 lbs.

Rationale for alternative: This is a more conservative choice with a greater chance that the skate wing fishery will remain open for the entire fishing year, even if the landings rate and fishing effort increases beyond those estimated here based on historical (2010 and 2011) data (Section ???). Fishermen and processors have indicated that keeping the fishery open for the entire fishing year creates economic stability, retains important foreign markets, and reduces discards. Also, it has a greater chance (than the preferred alternative in Section 4.3.1) that the fishery will remain open through the spring, when fishermen using gillnets target a combined catch of skates and monkfish.

4.3.3 No Action

The No Action alternative would continue the Framework Adjustment 1 skate wing possession limits. These limits begin with a 2,600 lbs. possession limit from May 1 to Aug 31 and then increase to 4,100 lbs. possession limit from Sep 1 to Apr 30, or until the 85% TAL trigger has been met and it appears that without adjustment the fishery will exceed the annual TAL.

Rationale for alternative: This is actually a less conservative limit than proposed in the two alternatives described above, due to the higher daily catch rates observed in 2011. On one hand, the status quo possession limit would be less disruptive to industry allowing vessels that could target skates with the current fishing limits to continue fishing as before. On the other hand, the analysis (Section 6.1.???) suggests that the status quo possession limits will not allow directed skate fishing to continue year around. Seasonal changes in prices, catch rates, and fishing opportunities may however induce different catch rates than have been projected in Section 6.1.???.

4.4 Skate Bait Fishery Alternatives

In Amendment 3, a skate bait possession limit of 20,000 lbs. was approved to discourage derby-style fishing behavior by vessels making trips and landing large amounts of skates when total landings approach the seasonal skate bait quotas. Unlike the skate wing possession limit, the bait possession limit was not intended to balance the daily landings rate with the TAL. Nonetheless, industry advisors indicated that a modest increase in the skate bait possession limit would be consistent with the increase in the skate bait TAL from 4,642 to 7,827 mt.

Also, during the development and analysis of the 2012-2013 specifications, a previously unrecognized source of landings was discovered. Landings that result from transfers at sea for bait, but are not reported by shoreside dealers, are reported by fishermen on VTRs. Skates are the predominant species that are reported as transfers at sea for bait and are a significant fraction of the skate catch (see Table ???). The reported skate transfers at sea have been added to the catch series and raised the catch/biomass median values that are used to set the ACL specifications, but a management alternative to count them against the revised TALs is needed.

4.4.1 Raise the skate bait possession limit to 25,000 lbs. (preferred)

This alternative would raise the skate bait possession limit from 20,000 lbs. to 25,000 lbs. Vessels that obtain a Skate Bait Letter of Authorization from the NMFS Regional Office would be able to retain up to 25,000 lbs. of whole skates provided that they comply with related rules and size limits.

Rationale for alternative: Raising the skate bait possession limit will allow the larger vessels in the fleet to benefit from the higher TAL without increasing the number of trips taken, but without inviting derby style fishing behavior when skate landings approach the seasonal quotas. Most of the larger vessels targeting skates for the bait market work closely with dealers to ensure that the quotas are not exceeded and bait is available year around.

4.4.2 Include skate transfers at sea reported on VTRs in monitored landings and to count against the skate bait fishery TAL (preferred)

Skate landings reported on VTRs as being transferred at sea (signified by dealer code 000002) to another vessel for bait (or any other purpose) will be monitored and added to skate bait landings reported by shoreside dealers. These combined landings will be counted against the Skate Bait TAL for purposes of determining whether accountability measures will be initiated. When and if the skate bait landings reach the TAL trigger (currently 90% of the TAL or seasonal quota) and it appears that without taking action, the Regional Office will suspend the skate bait fishery possession limit. If suspended occurs, vessels will be able to retain skates up to the whole weight equivalent of the skate wing fishery or the incidental skate wing possession limit whichever is in effect for the remainder of the seasonal quota period.

Rationale for alternative: All skate catches should count against the ACL that is derived from an average exploitation ratio (catch/biomass) that includes transfers at sea reported on VTRs. Otherwise, not counting the landings against the skate bait TAL and aggregate skate ACL would increase the risk of exceeding the ACL and triggering accountability measures.

4.4.3 No Action

Only skate landings reported by dealers as destined for the bait market would count against the skate bait TAL and seasonal quotas. The skate bait possession limit would remain at 20,000 lbs.

Rationale for alternative: On one hand, the more conservative possession limit would inhibit expansion of fishing effort on small skates (primarily little skates), particularly by large vessels. It would reduce the risk that landings would trigger an in-season change in the skate bait possession limit. On the other hand, not counting the VTR skate landings transferred at sea for bait would also increase the risk that total catches could exceed the ACL, triggering post-season accountability measures.

4.5 Considered and Rejected Alternatives

The following management issues arose during the development of this specifications package, but were not adopted as alternatives by the Council.

4.5.1 Raising the Incidental Skate Possession Limit

This alternative would raise the incidental skate possession limit from 500 lbs. of skate wings (1,137 lbs. of whole skates). The incidental skate possession limit applies when triggered by landings reaching the TAL triggers and applies to vessels that are not on a Multispecies Category A, Monkfish Category A or B, or Scallop Limited Access DAS.

Rationale for alternative rejection: This alternative was considered (and proposed) as part of Framework Adjustment 1, but was rejected by the Secretary of Commerce because it was estimated to allow landings to exceed the skate wing TAL. Instead of focusing on this measure, the Council chose to focus on setting the skate wing possession limit so that the fishery would remain open throughout the fishing year. As such, the incidental skate possession limit becomes superfluous, except to vessels that are not on a DAS and target species other than skates. The Council felt that the existing incidental skate possession limit is consistent with fishing for other species and would not increase discards, since skates are typically not landed on these trips even without a possession limit.

4.5.2 Allowing vessels to use Multispecies Category B DAS to fish for skates

Vessels must use Multispecies Category A, Monkfish Category A or B, or Scallop Limited Access DAS to fish for skates. This alternative would expand this requirement to include Multispecies Category B DAS when vessels use gillnets to fish for skates.

Rationale for alternative rejection: Before the 2010 fishing year and Amendment 3, vessels using gillnets were allowed to use Multispecies Category B DAS to fish for skates, which at the time were categorized as “healthy stocks”. When winter skate became overfished shortly before the Council developed Amendment 3 to implement ACLs and in response to a rapid increase in skate landings by the gillnet fishery, the Council added a measure to further limit the use of Category B DAS to target skates. Vessels using trawls were already subject to low skate possession limits to discourage skate fishing on a Multispecies Category B DAS, due to concerns about incidental catches of overfished groundfish stocks.

The Council rejected this alternative because it has the potential to substantially increase skate fishing effort by groundfish sector-enrolled vessels that no longer need DAS to fish for groundfish.

4.5.3 Allowing retention and landings of a limited amount of barndoor skate

Some fishermen and advisors have asked the Council to consider allowing fishermen to retain and land barndoor skate, because the stock biomass has increased, fishermen more frequently catch barndoor skate, and the prohibition on retention and landings causes fishermen to discard the skates.

Rationale for alternative rejection: Despite significant increases in biomass, barndoor skate have not yet met the biomass target and therefore are not considered fully rebuilt. The accuracy of the B_{msy} proxy (biomass target) is also uncertain, being chosen during a period of very low stock biomass based on a few years of survey data when survey catches were higher. Since the 1990s, barndoor skate biomass has increased and more biological information could be analyzed. The Skate PDT recommended that the

Council not consider allowing barndoor skate retention and landing until either the stock is fully rebuilt or a formal barndoor skate stock assessment which would re-evaluate MSY proxies can be completed.

4.5.4 Alignment of annual data with fishing year specification cycle

This alternative could include measures or actions that would allow application of discard estimates for the fishing year to be applied to future specifications. These actions could include one or more of the following: adjustments to data processing procedures to make data available on a fishing year rather than a calendar year basis, changes to the specification development cycle to align with data availability, and making the fishing year consistent with the calendar year.

Rationale for alternative rejection: Changes such as the ones identified above would have broad implications for New England fisheries management and should be developed in that context. Data processing is not under the Council's purview, although NMFS works with the Council to make necessary data available in a timely fashion. However the data needed to estimate discards is generated once a year on a calendar year basis after the input data for a calendar year has become final.

5.0 AFFECTED ENVIRONMENT (EA)

This document serves two purposes: an update of the Stock Assessment and Fishery Evaluation Report (SAFE) and a Description of the Affected Environment (Section 7) for the Environmental Assessment (EA) for the 2012-2013. Since the document serves as Section 7 of the EA in Amendment 3, it is numbered beginning with Section 7 in this stand-alone SAFE Report to reduce confusion. There is therefore no Sections 1-6 in the stand-alone SAFE Report.

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 Stock Assessment and Fishery Evaluation (SAFE) Report was prepared by the New England Fishery Management Council's Skate Plan Development Team (PDT). It presents available biological, physical, and socioeconomic information for the northeast's region skate complex and its associated fisheries. It also serves as the Affected Environment description for the Environmental Assessment associated with the 2012-2013 specifications package.

Table 8 presents the seven species in the northeast region's skate complex, including each species common name(s), scientific name, size at maturity (total length, TL), and general distribution.

Table 8. Skate Species Identification for Northeast Complex

SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	GENERAL DISTRIBUTION	SIZE AT MATURITY cm (TL)	OTHER COMMON NAMES
Winter Skate	*Leucoraja ocellata*	Inshore and offshore Georges Bank (GB) and Southern New England (SNE) with lesser amounts in Gulf of Maine (GOM) or Mid Atlantic (MA)	Females: 76 cm Males: 73 cm 85 cm	Big Skate Spotted Skate Eyed Skate
Barndoor Skate	*Dipturus laevis*	Offshore GOM (Canadian waters), offshore GB and SNE (very few inshore or in MA region)	Males (GB): 108cm Females (GB): 116 cm	
Thorny Skate	*Amblyraja radiata*	Inshore and offshore GOM, along the 100 fm edge of GB (very few in SNE or MA)	Males (GOM): 87 cm Females (GOM): 88 cm 84 cm	Starry Skate
Smooth Skate	*Malacoraja senta*	Inshore and offshore GOM, along the 100 fm edge of GB (very few in SNE or MA)	56 cm	Smooth-tailed Skate Prickly Skate
Little Skate	*Leucoraja erinacea*	Inshore and offshore GB, SNE and MA (very few in GOM)	40-50 cm	Common Skate Summer Skate Hedgehog Skate Tobacco Box Skate
Clearnose Skate	*Raja eglanteria*	Inshore and offshore MA	61 cm	Brier Skate
Rosette Skate	*Leucoraja garmani*	Offshore MA	34 – 44 cm; 46 cm	Leopard Skate

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

5.1 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 at http://www.nefsc.noaa.gov/nefsc/habitat/efh/:

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

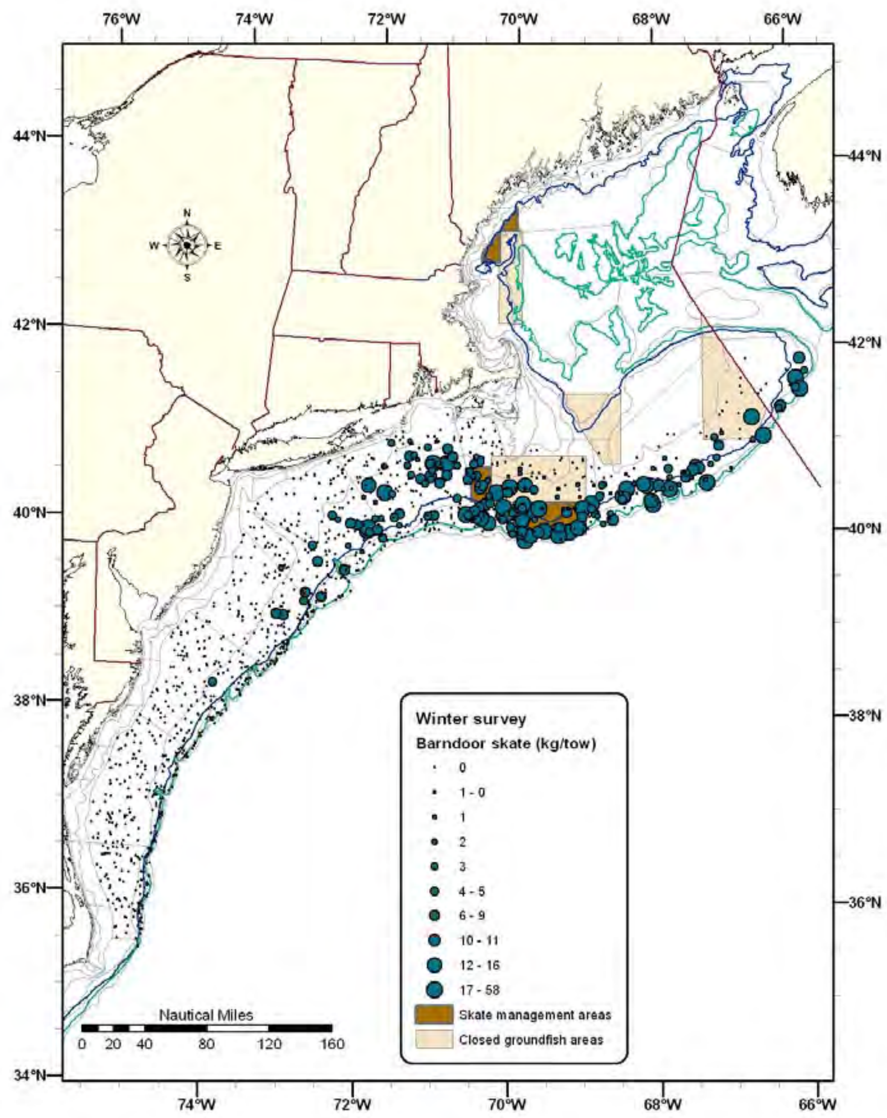
5.1.1 Species Distribution

In general, barndoor skate are found along the deeper portions of the Southern New England continental shelf and the southern portion of Georges Bank (Map 1), extending into Canadian waters. They are also caught by the survey as far south as NJ during the spring. Clearnose skates are caught by the NMFS surveys in shallower water along the Mid-Atlantic coastline (Map 2), but are known to extend into unsurveyed shallower areas and into the estuaries, particularly in Chesapeake and Delaware Bays. These inshore areas are surveyed by state surveys and the Mid-Atlantic NEAMap Survey (http://www.vims.edu/research/departments/fisheries/programs/multispecies_fisheries_research/neamap/index.php). The Skate PDT examined the relationship between the trends in abundance and biomass in the NMFS spring and fall surveys with available state and NEAMap surveys (see Appendix I of this document). It is difficult to relate the NEAMap to the NMFS survey due to the relatively short NEAMap time series (2007-2010), particularly since it mostly overlaps the FSV Bigelow survey (2009-present) which does not sample as many inshore strata as its predecessor, the FSV Albatross IV.

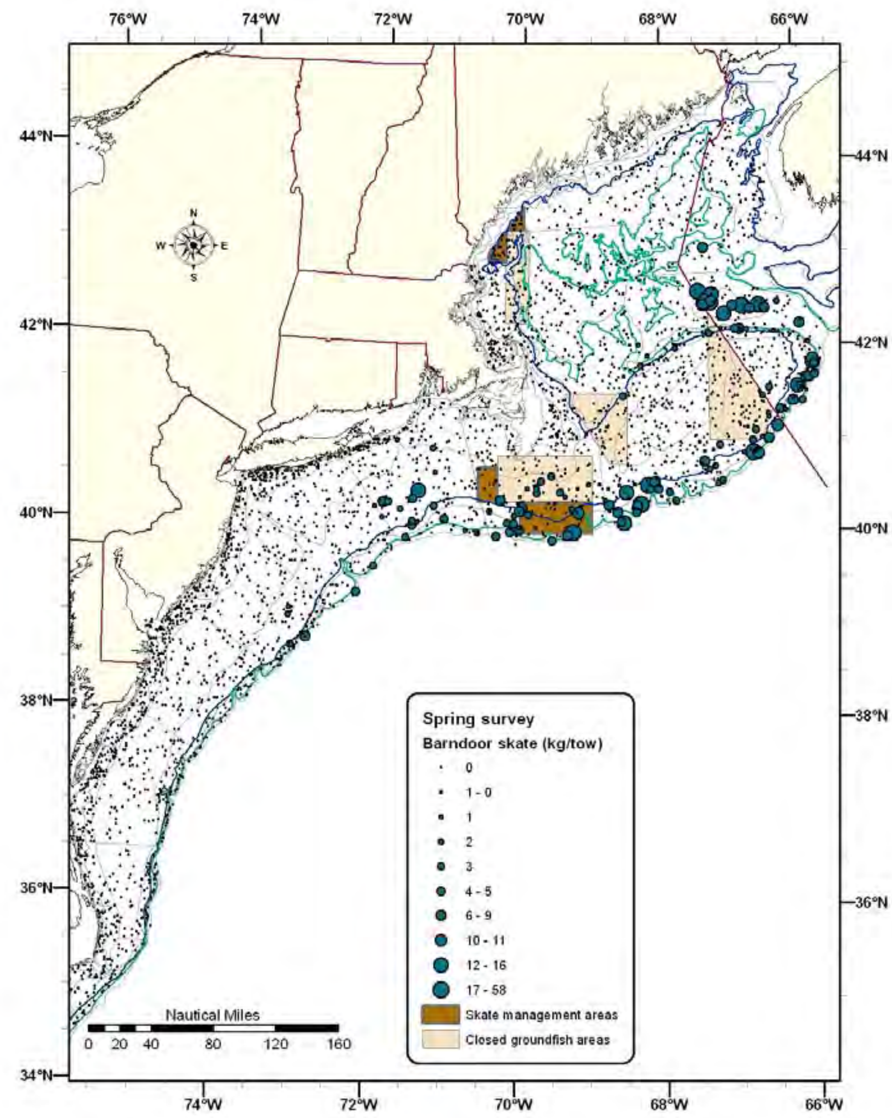
Little skate are found along the Mid-Atlantic, Southern New England, and Gulf of Maine coastline (Map 3), in shallower waters than barndoor, rosette, smooth, thorny, and winter skates. Rosette, smooth, and thorny are typically deepwater species. The survey catches rosette skate along the shelf edge in the Mid-Atlantic region (Map 4), while smooth and thorny are found in the Gulf of Maine and along the northern edge of Georges Bank (Map 5 and Map 6). Winter skate are found on the continental shelf of the Mid-Atlantic and Southern New England regions, as well as Georges Bank (Map 7) and into Canadian waters. Winter skate are typically caught in deeper waters than little skate, but partially overlap the distributions of little and barndoor skates.

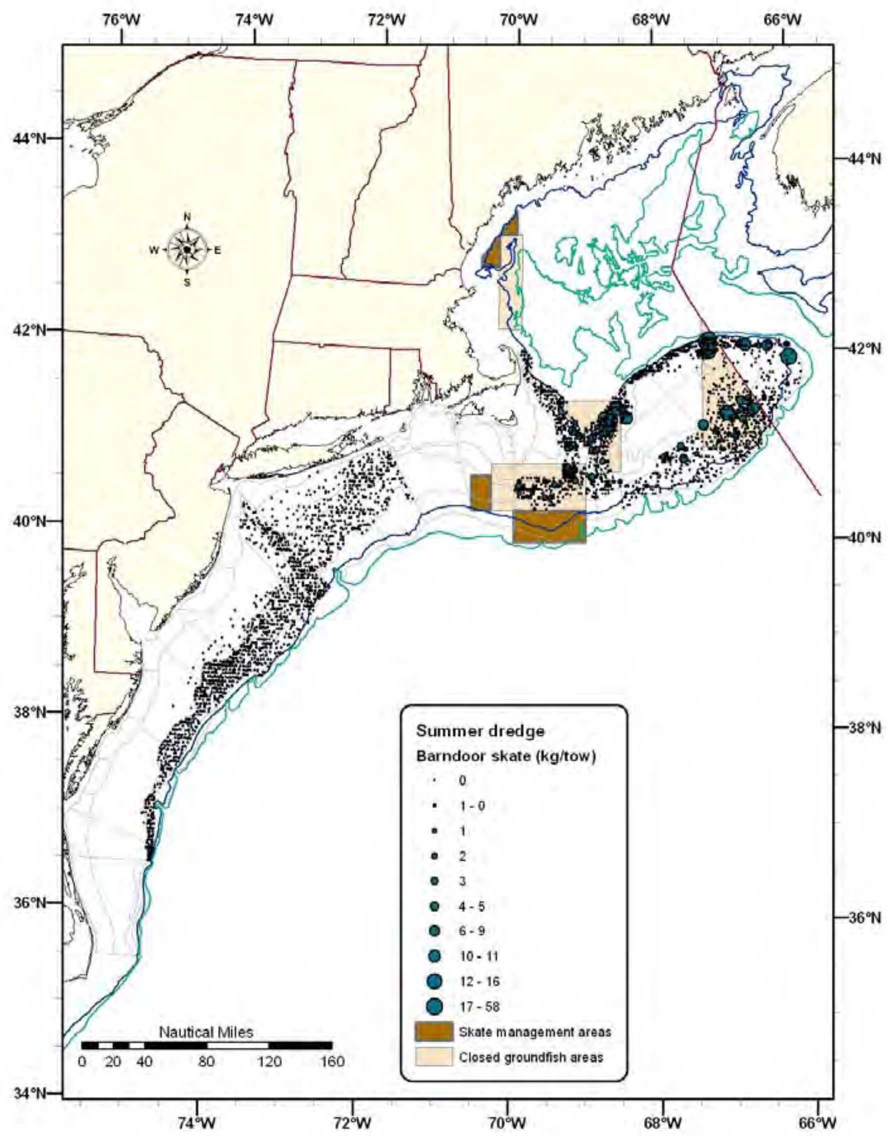
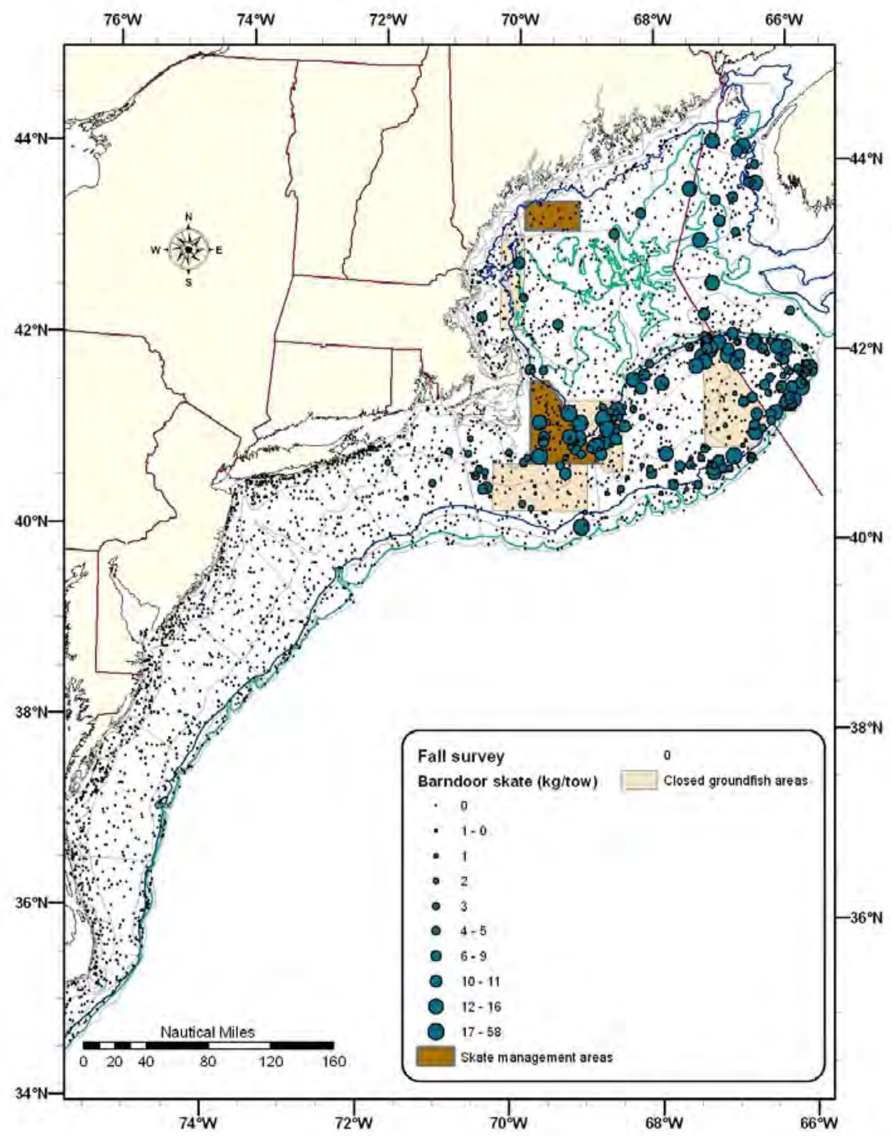
Map 1. Barndoor skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys.

Winter (Feb/Mar)



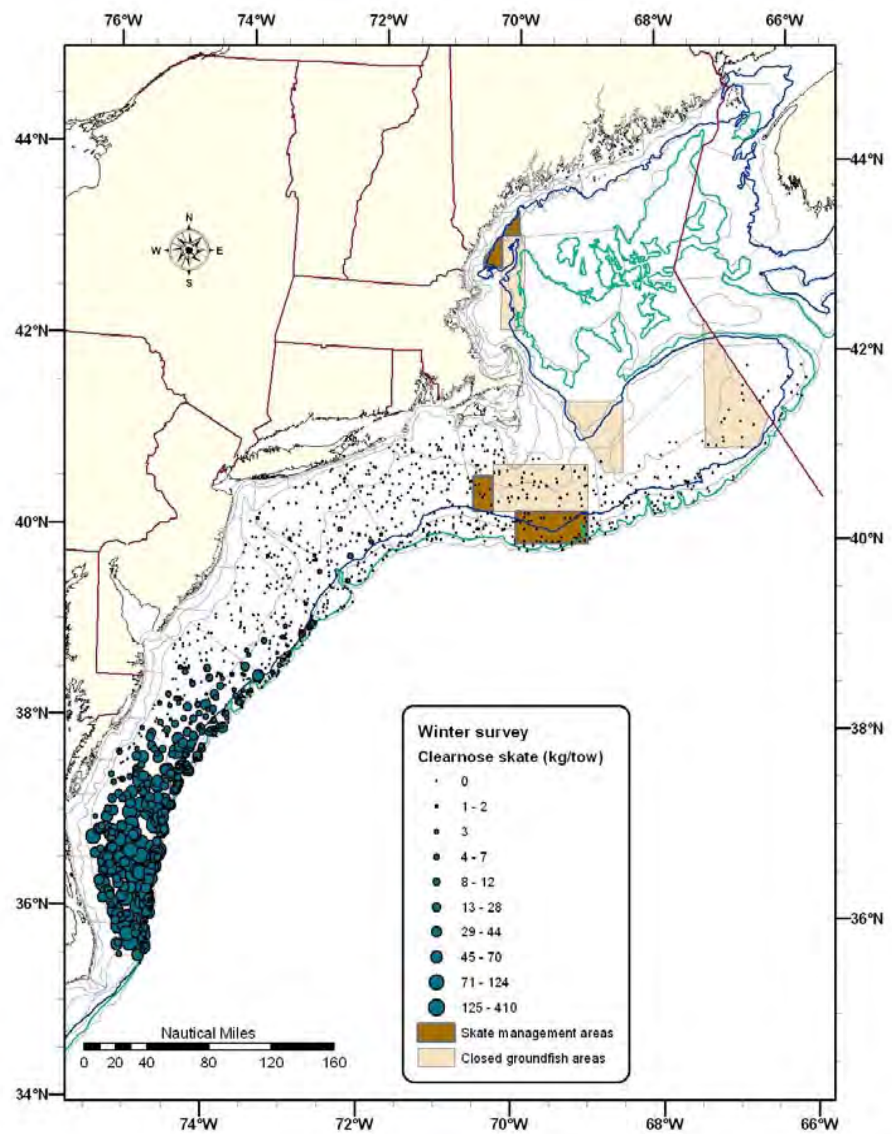
Spring (Apr/May)

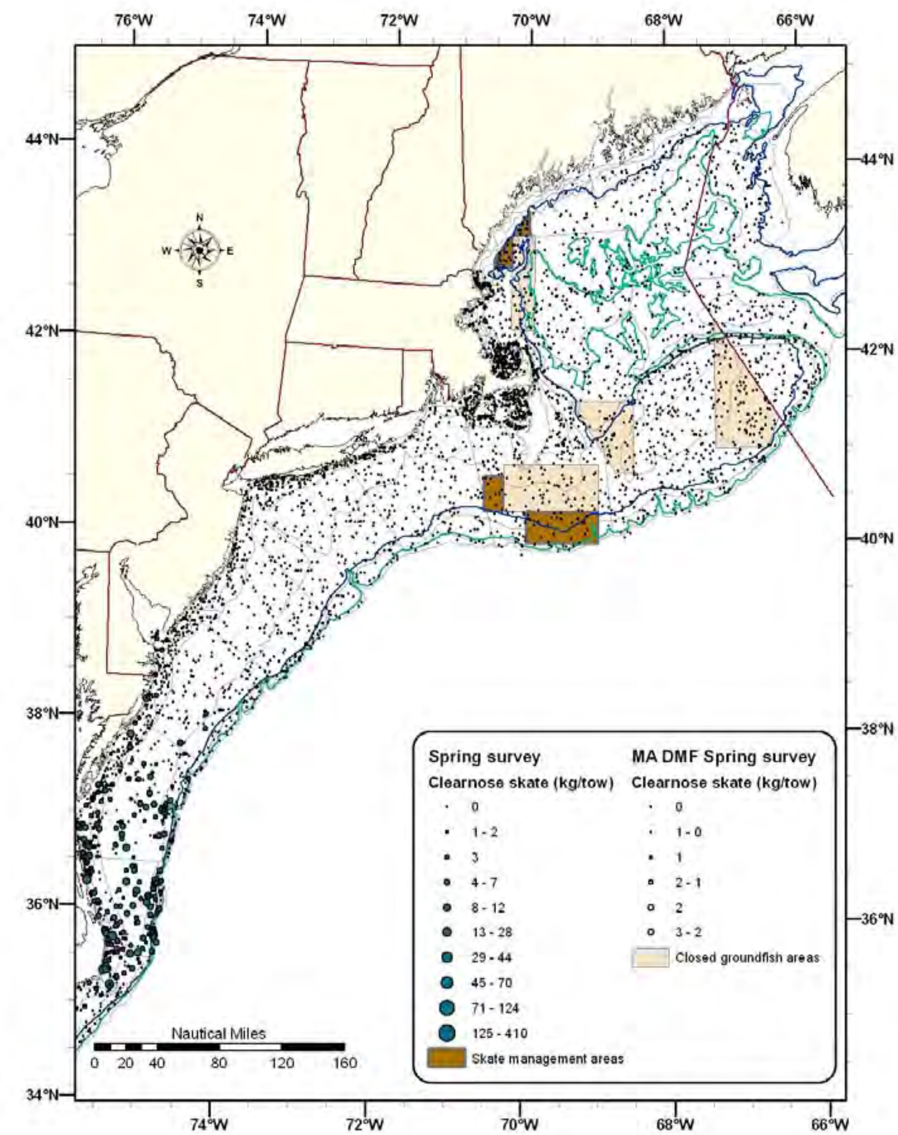


Summer (Jul/Aug)	Autumn (Sep/Oct)
	

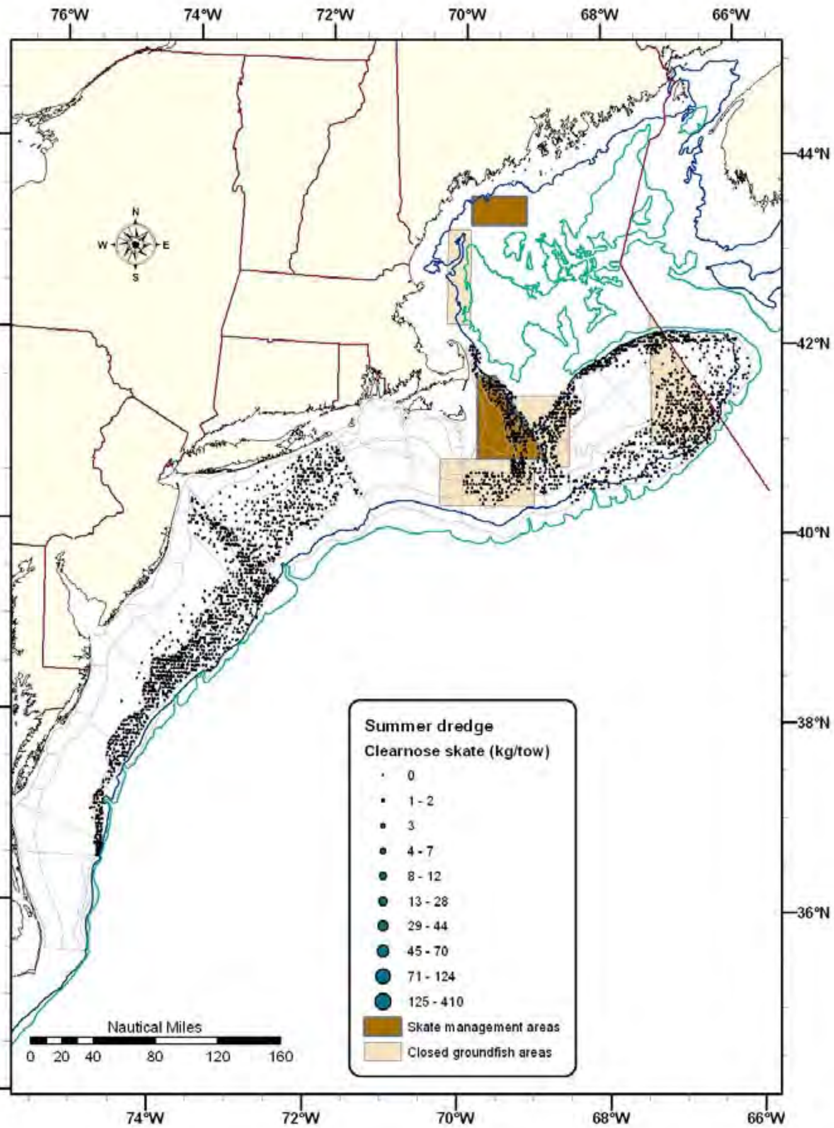
Map 2. Clearnose skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys.

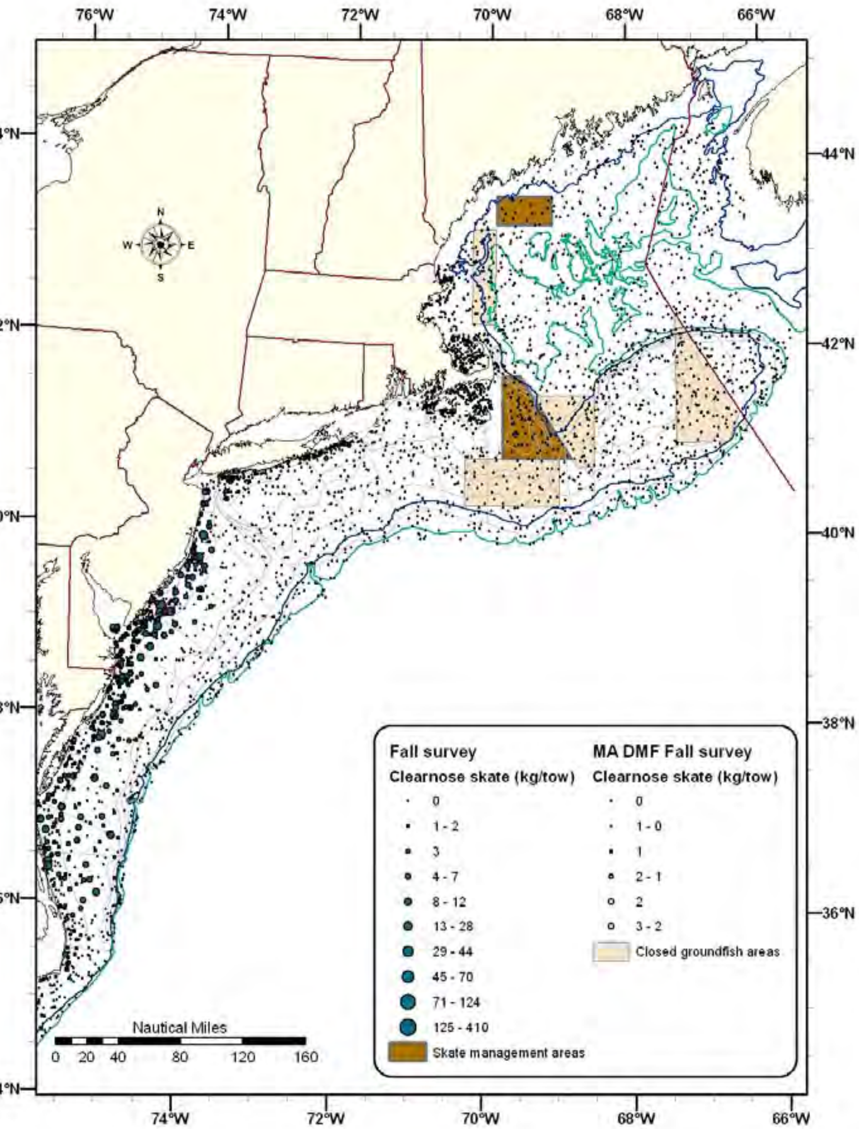
Winter (Feb/Mar)	Spring (Apr/May)





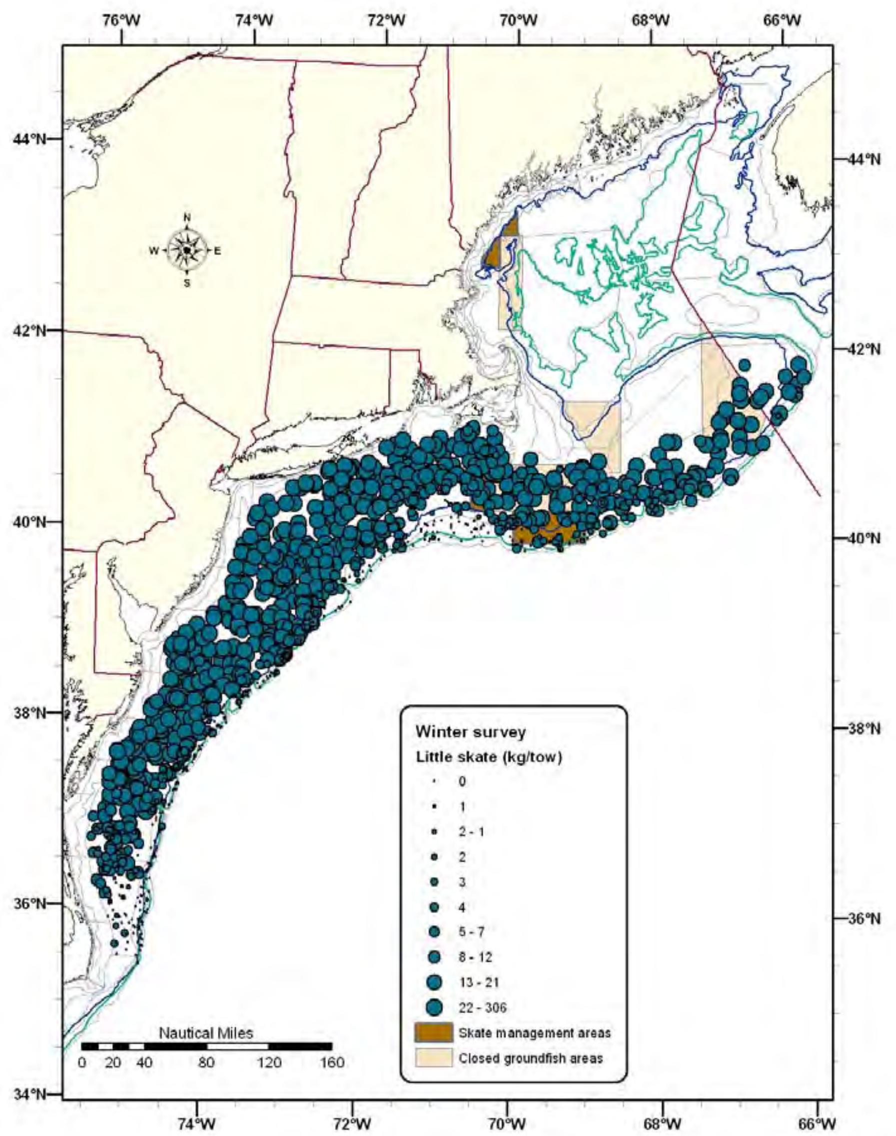
Summer (Jul/Aug)	Autumn (Sep/Oct)

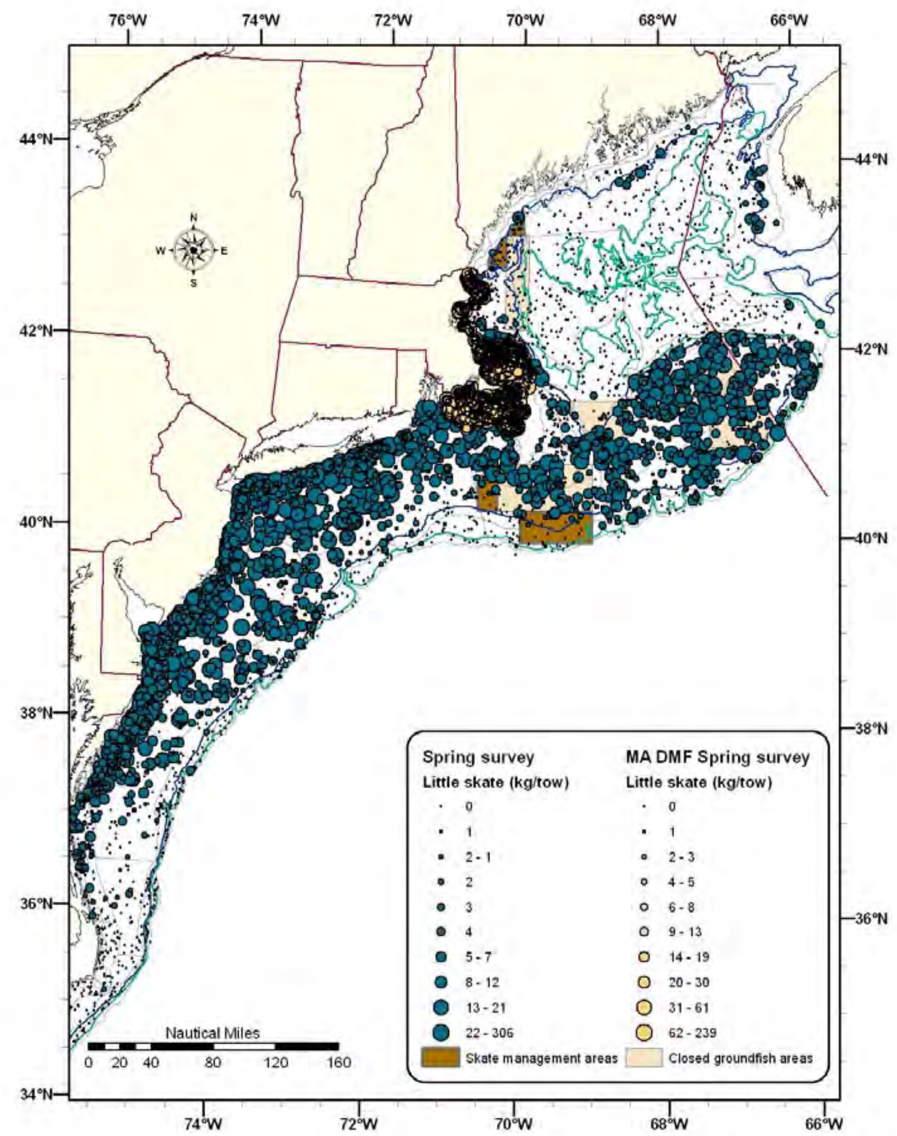




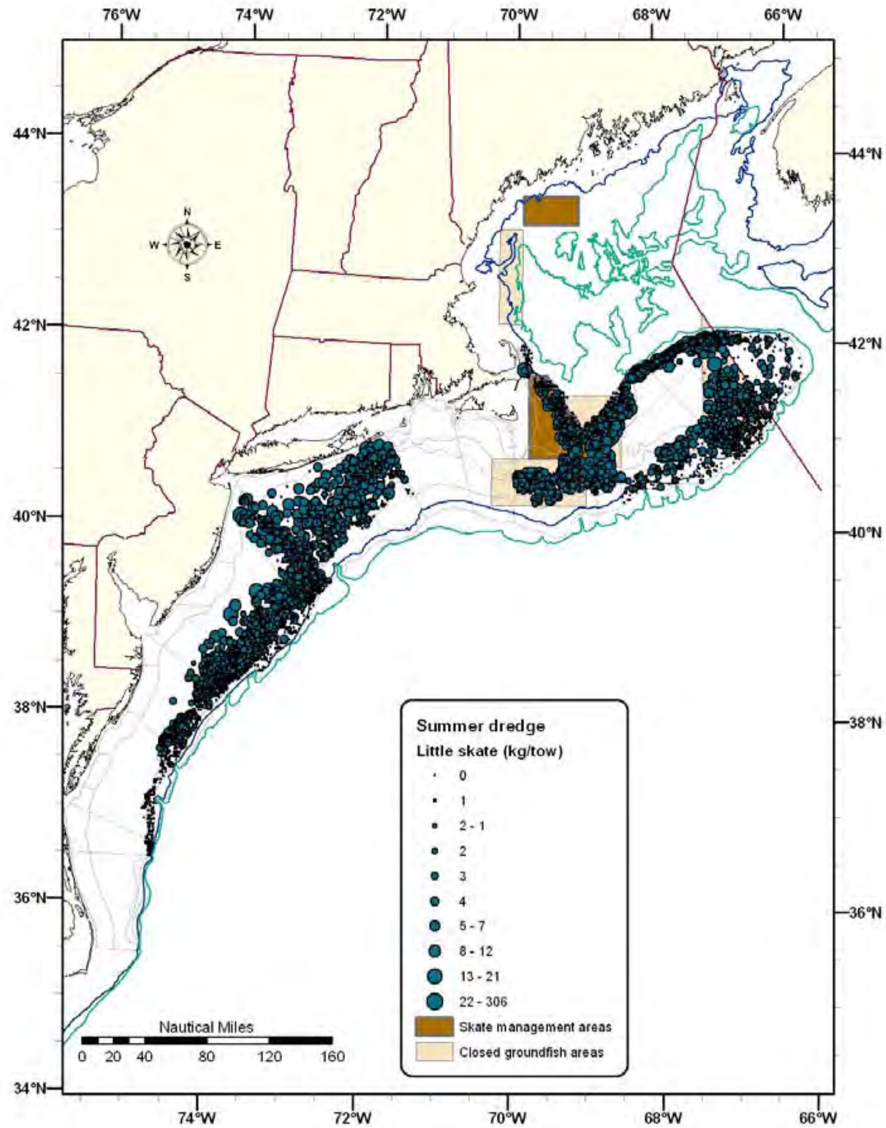
Map 3. Little skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys.

Winter (Feb/Mar)	Spring (Apr/May)

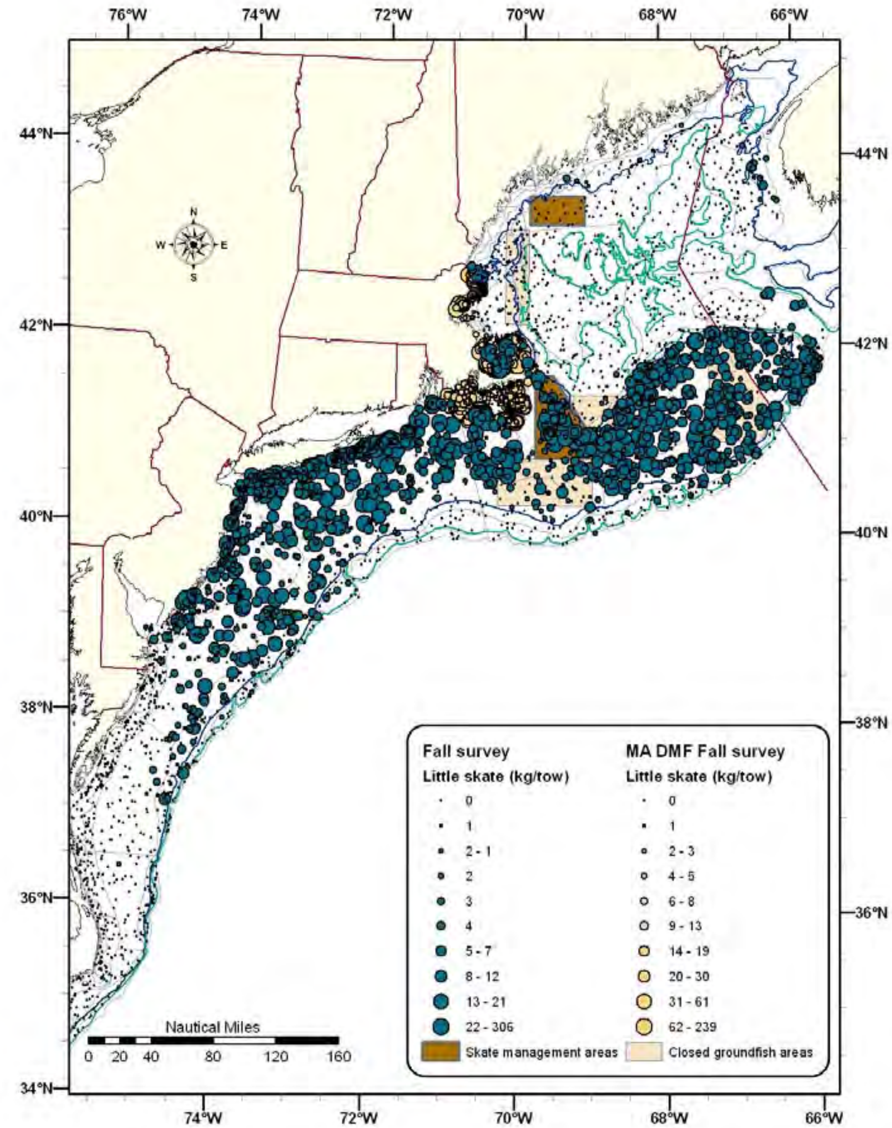




Summer (Jul/Aug)

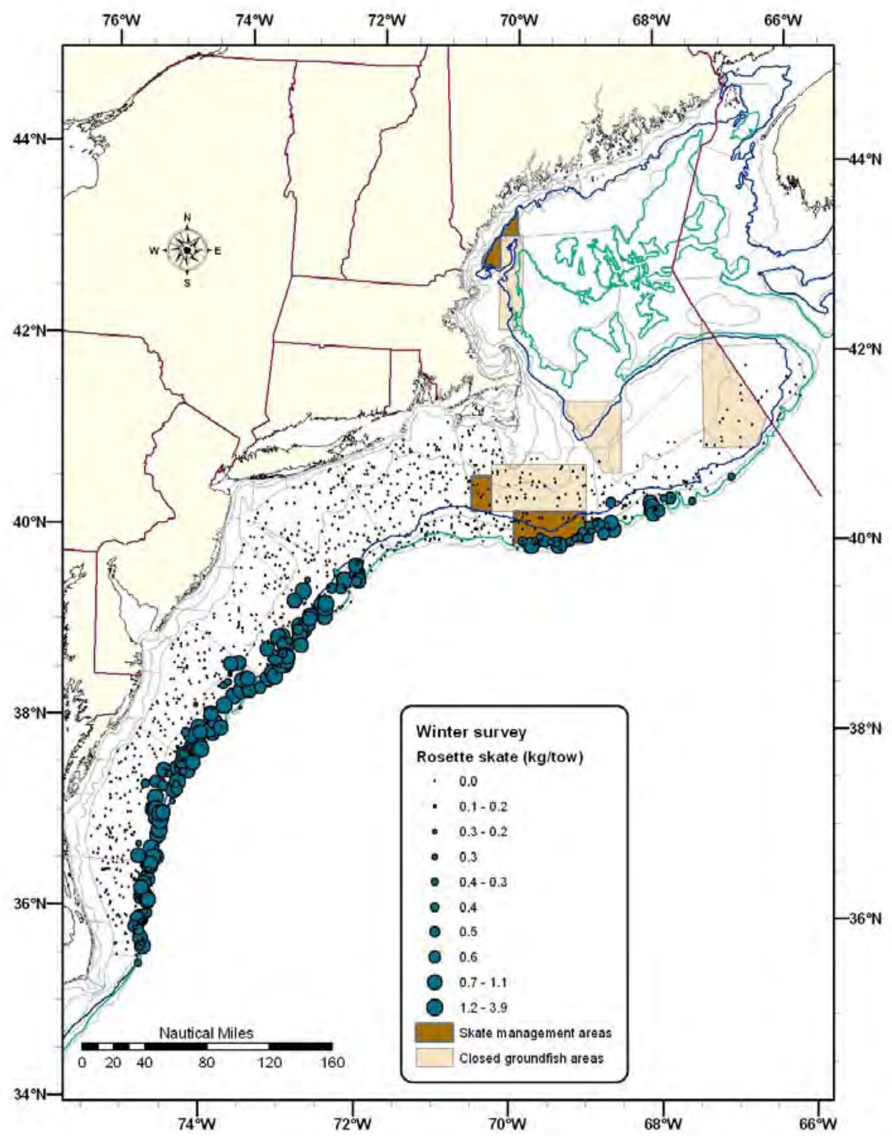


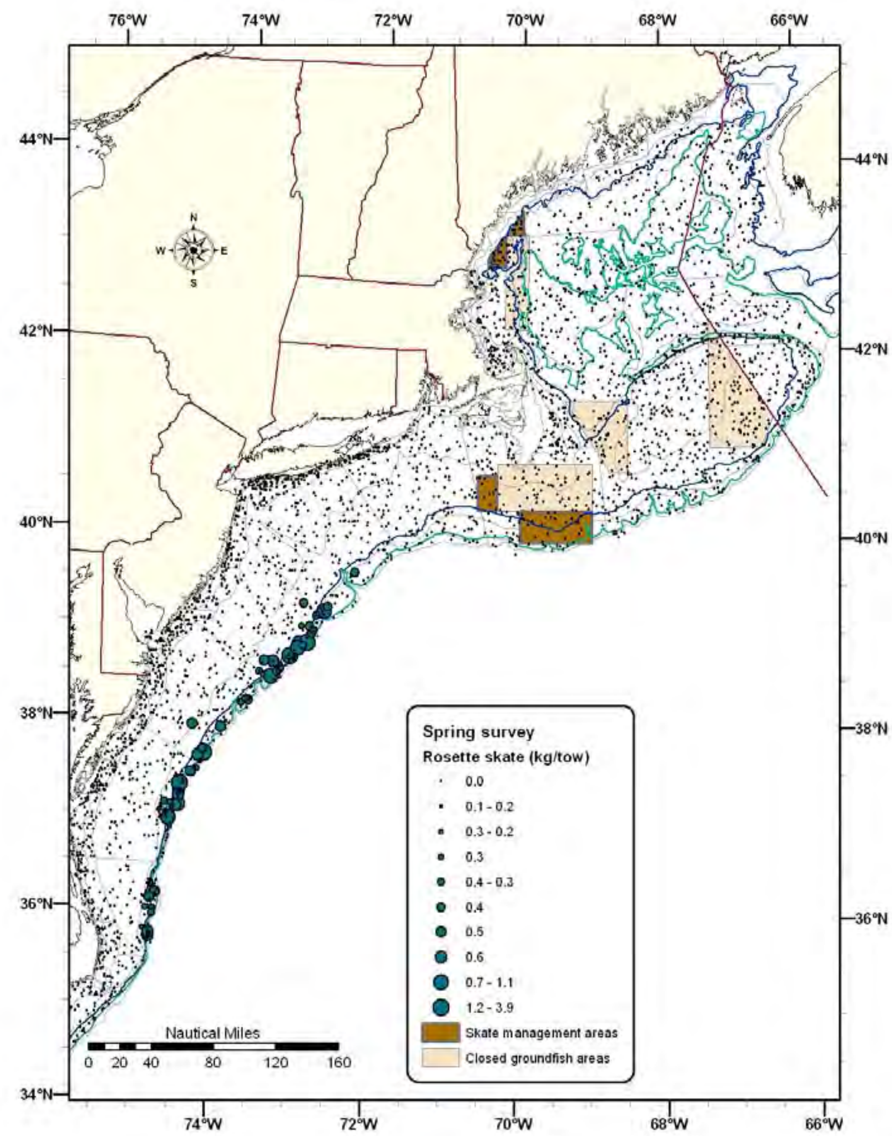
Autumn (Sep/Oct)

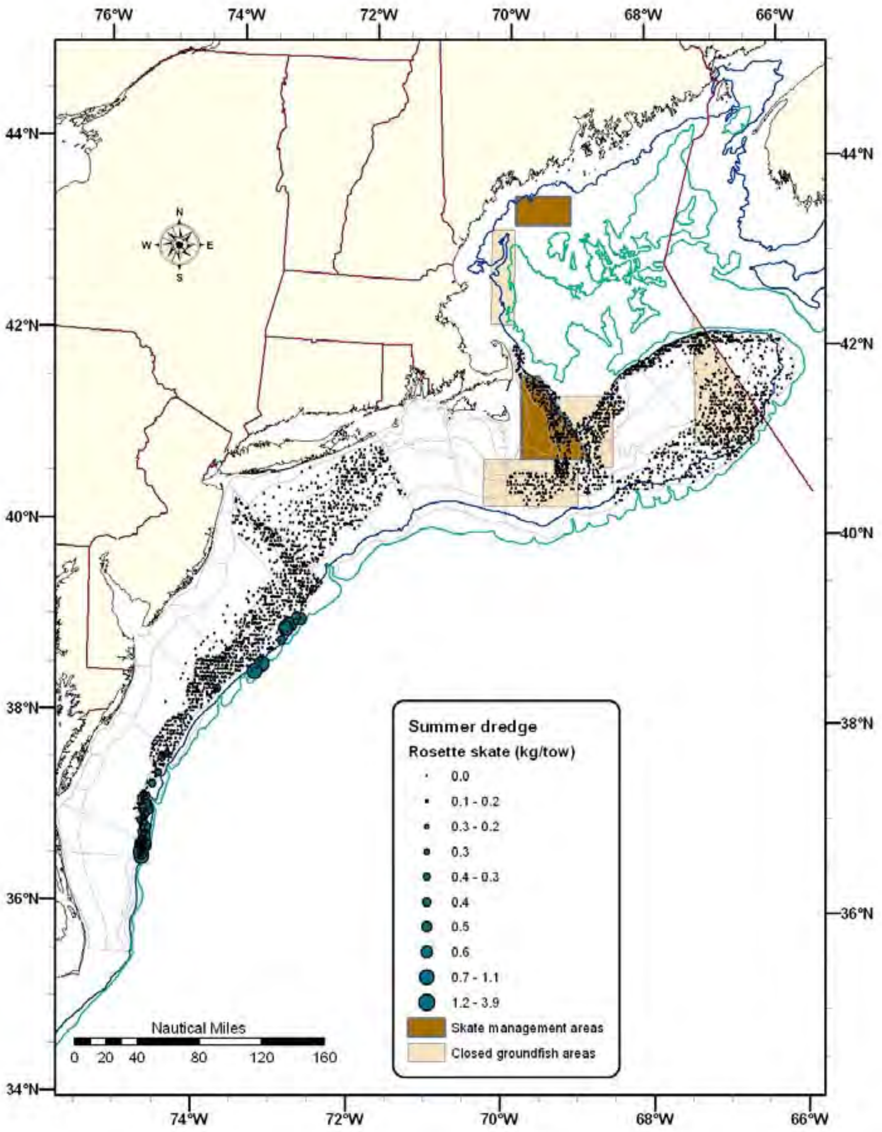
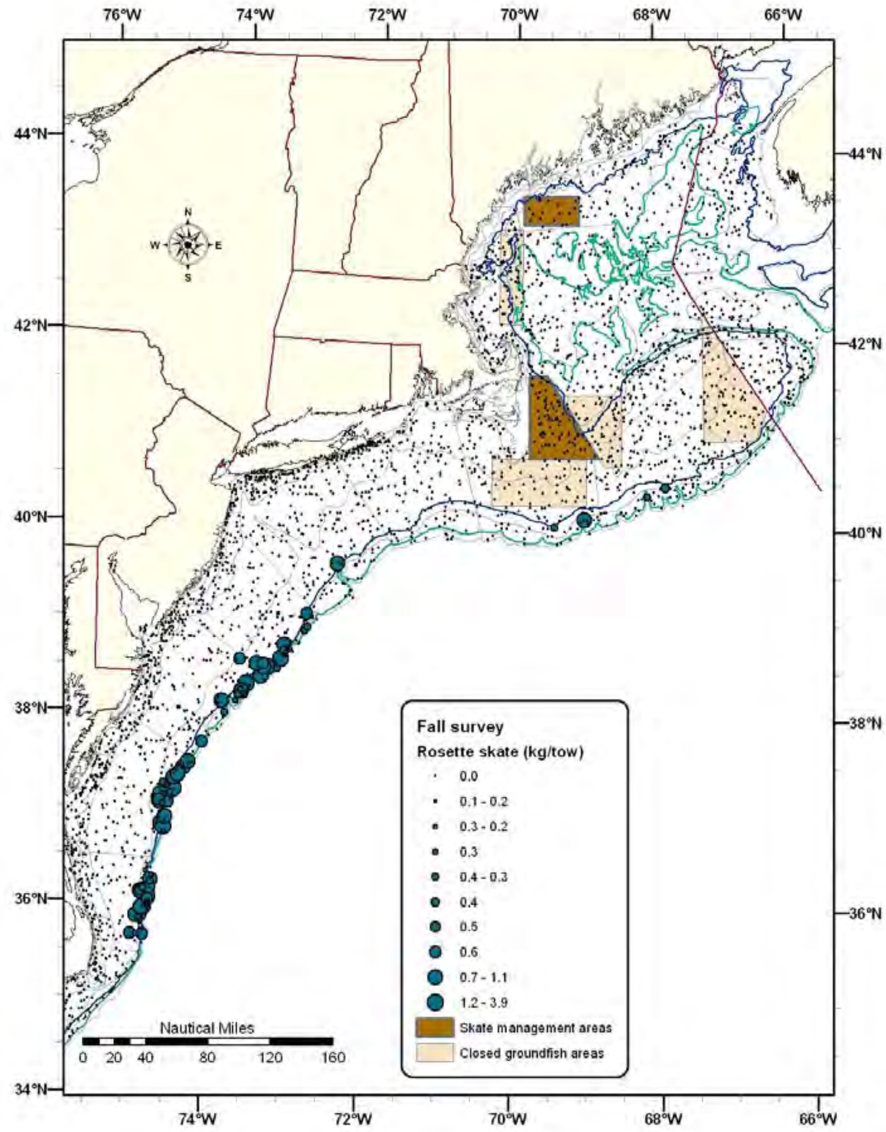


Map 4. Rosette skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys.

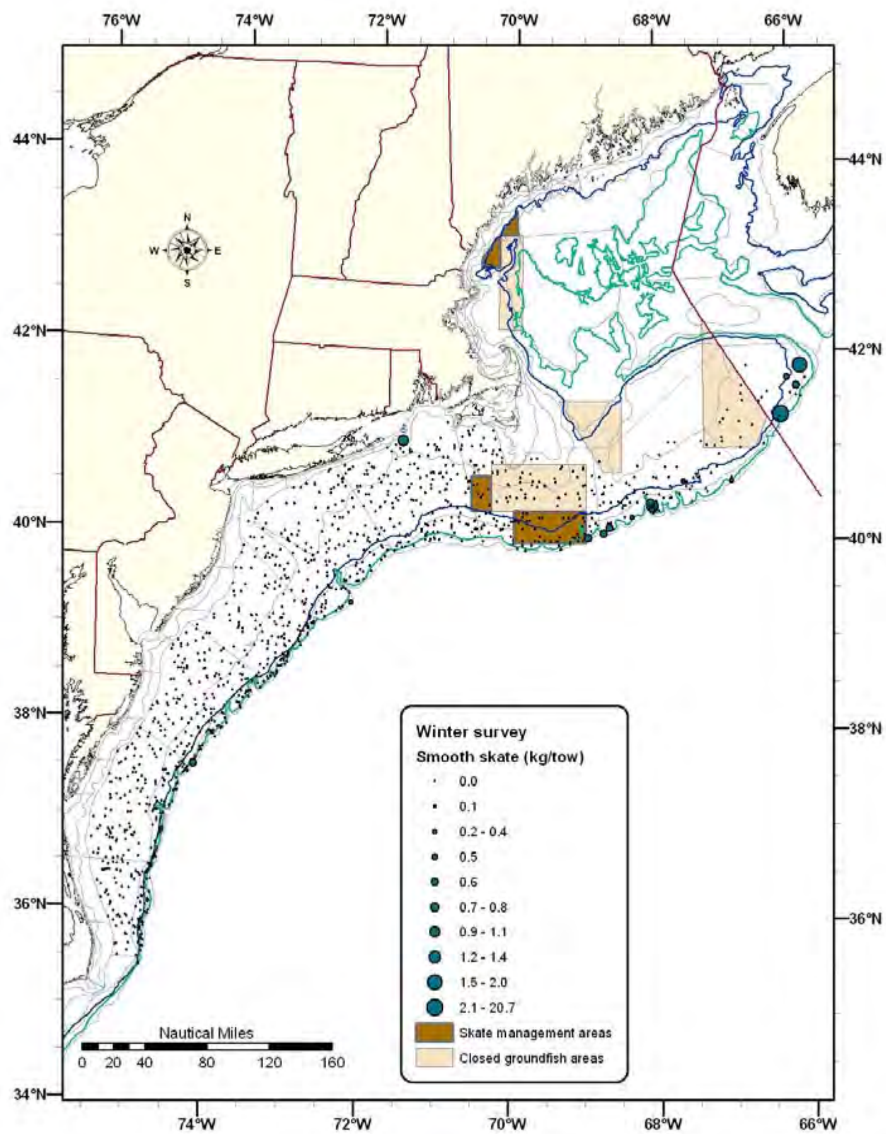
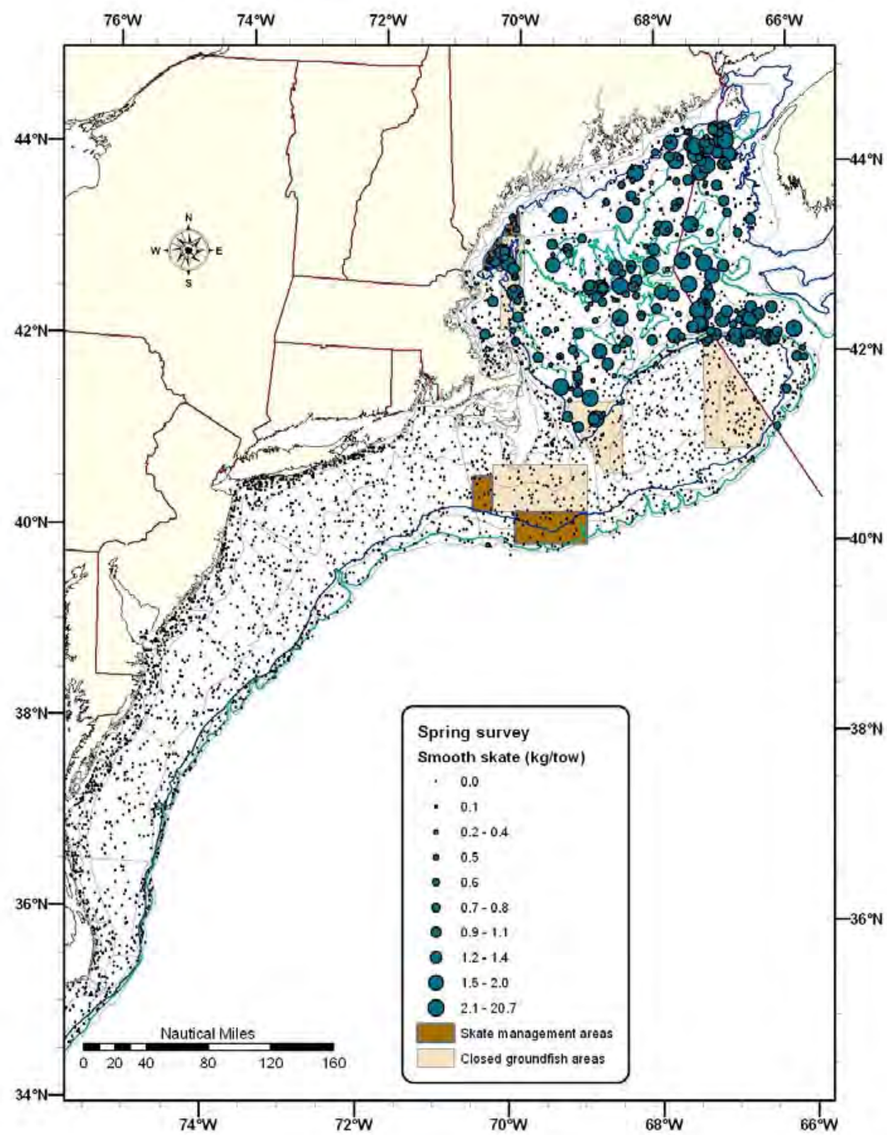
Winter (Feb/Mar)	Spring (Apr/May)



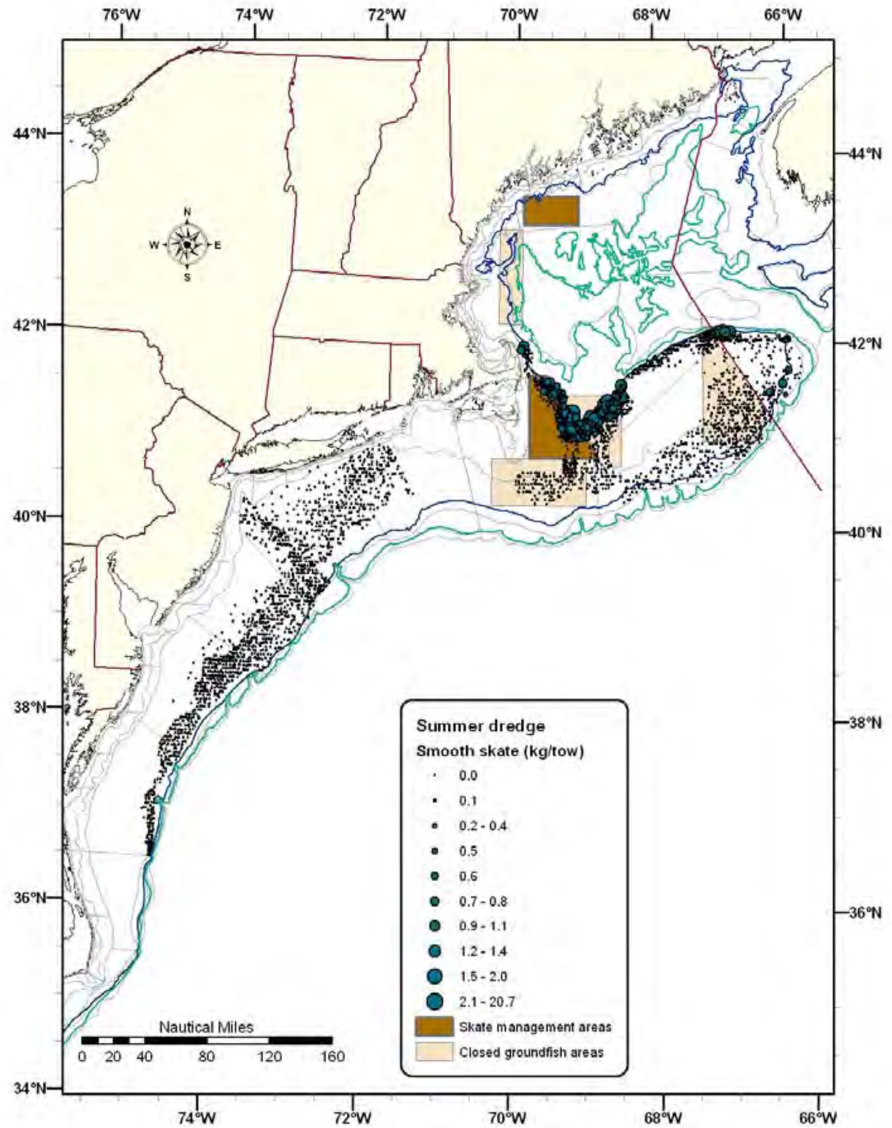


Summer (Jul/Aug)	Autumn (Sep/Oct)
	

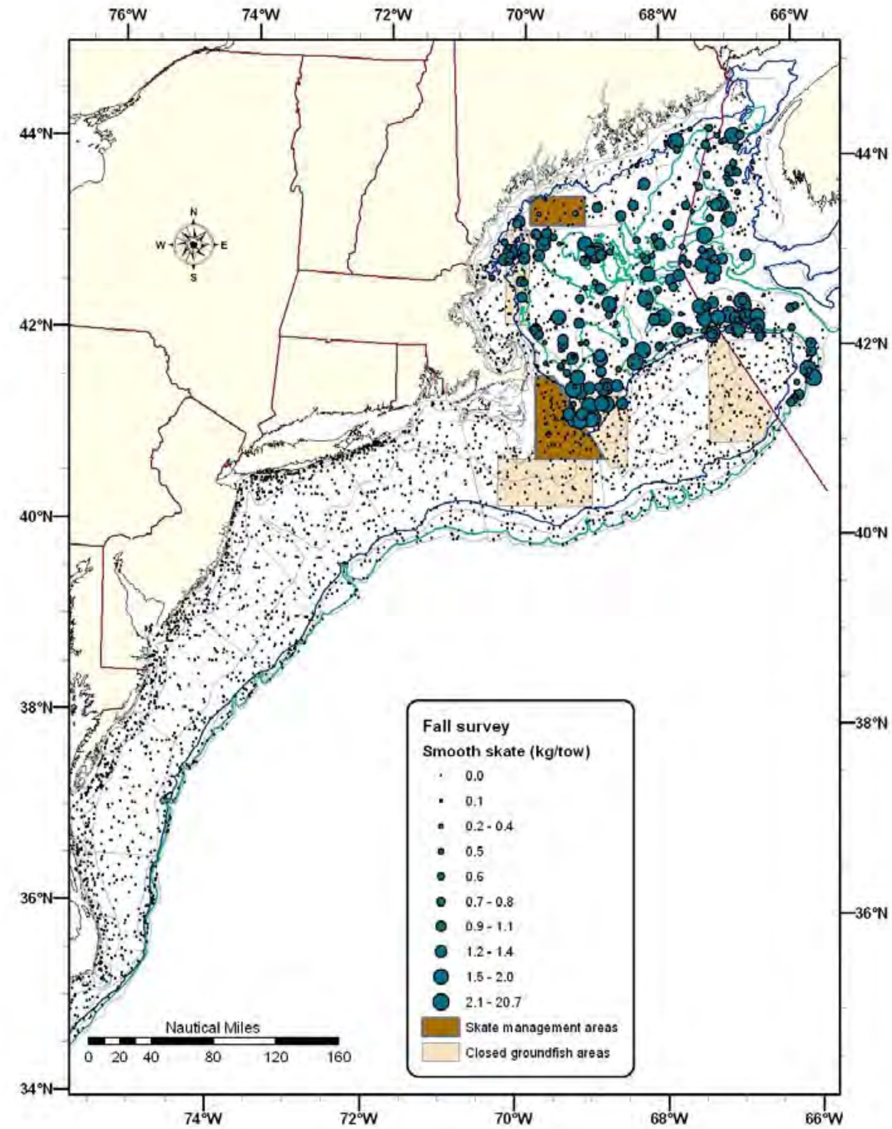
Map 5. Smooth skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys.

Winter (Feb/Mar)	Spring (Apr/May)
	

Summer (Jul/Aug)

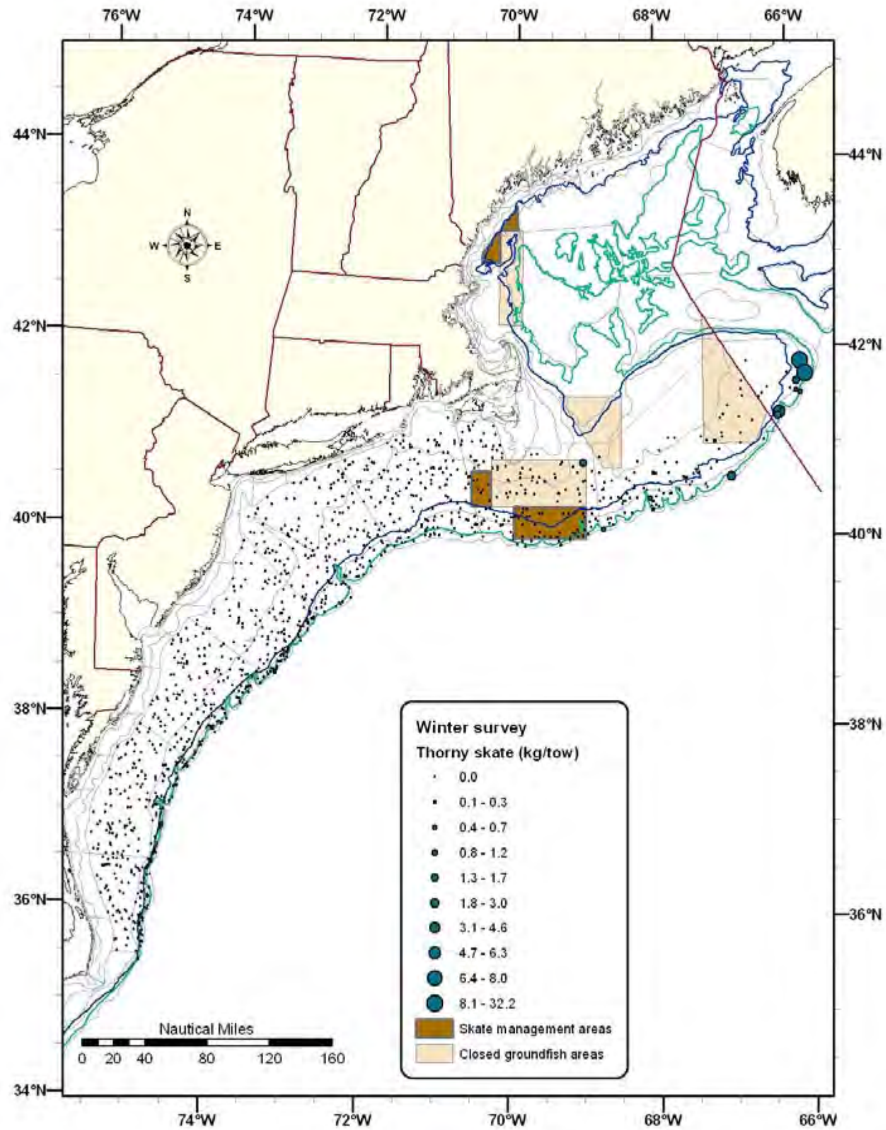


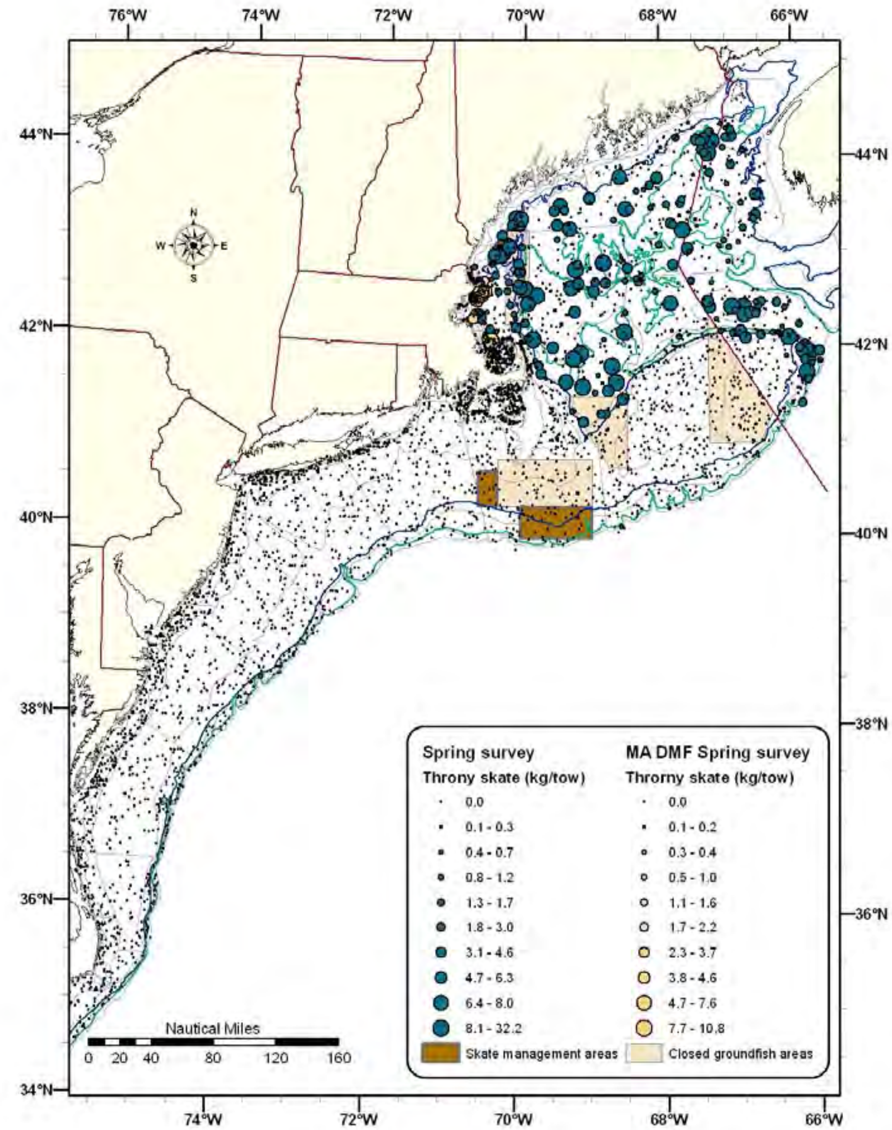
Autumn (Sep/Oct)



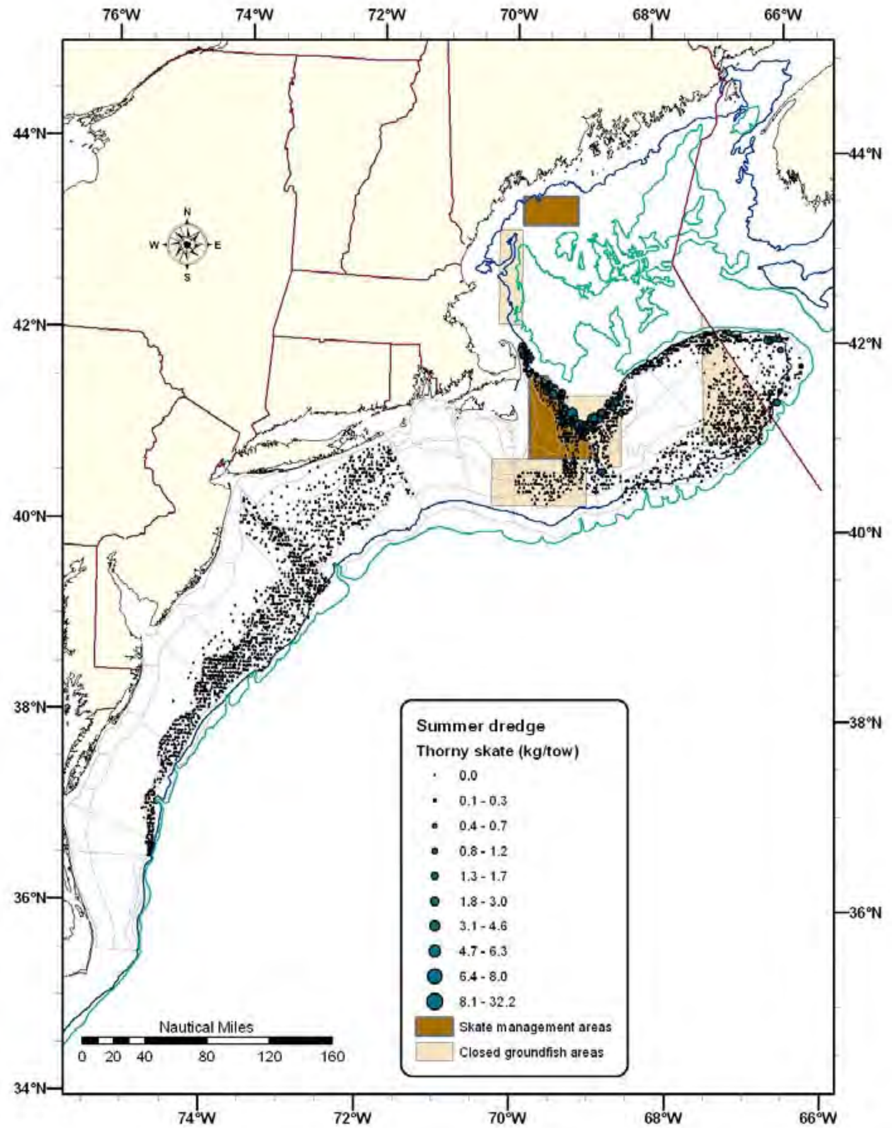
Map 6. Thorny skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys.

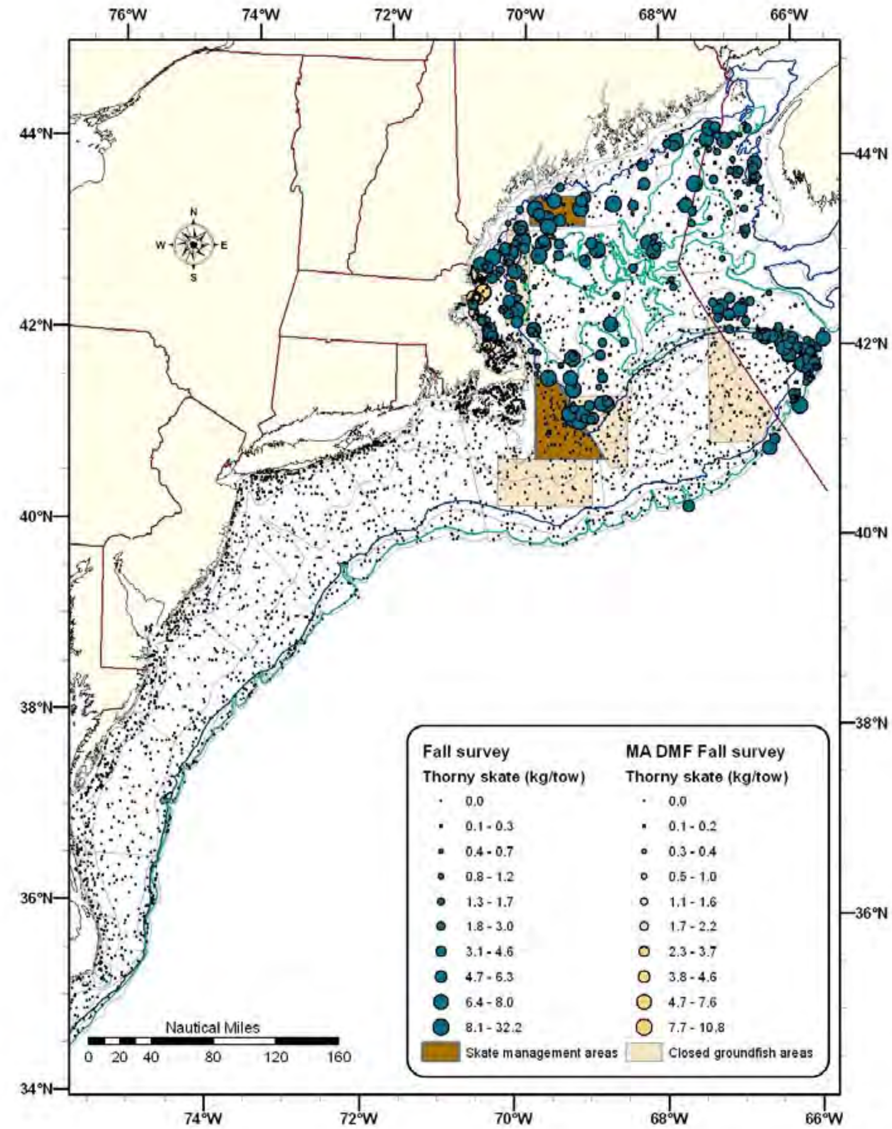
Winter (Feb/Mar)	**Spring (Apr/May)**



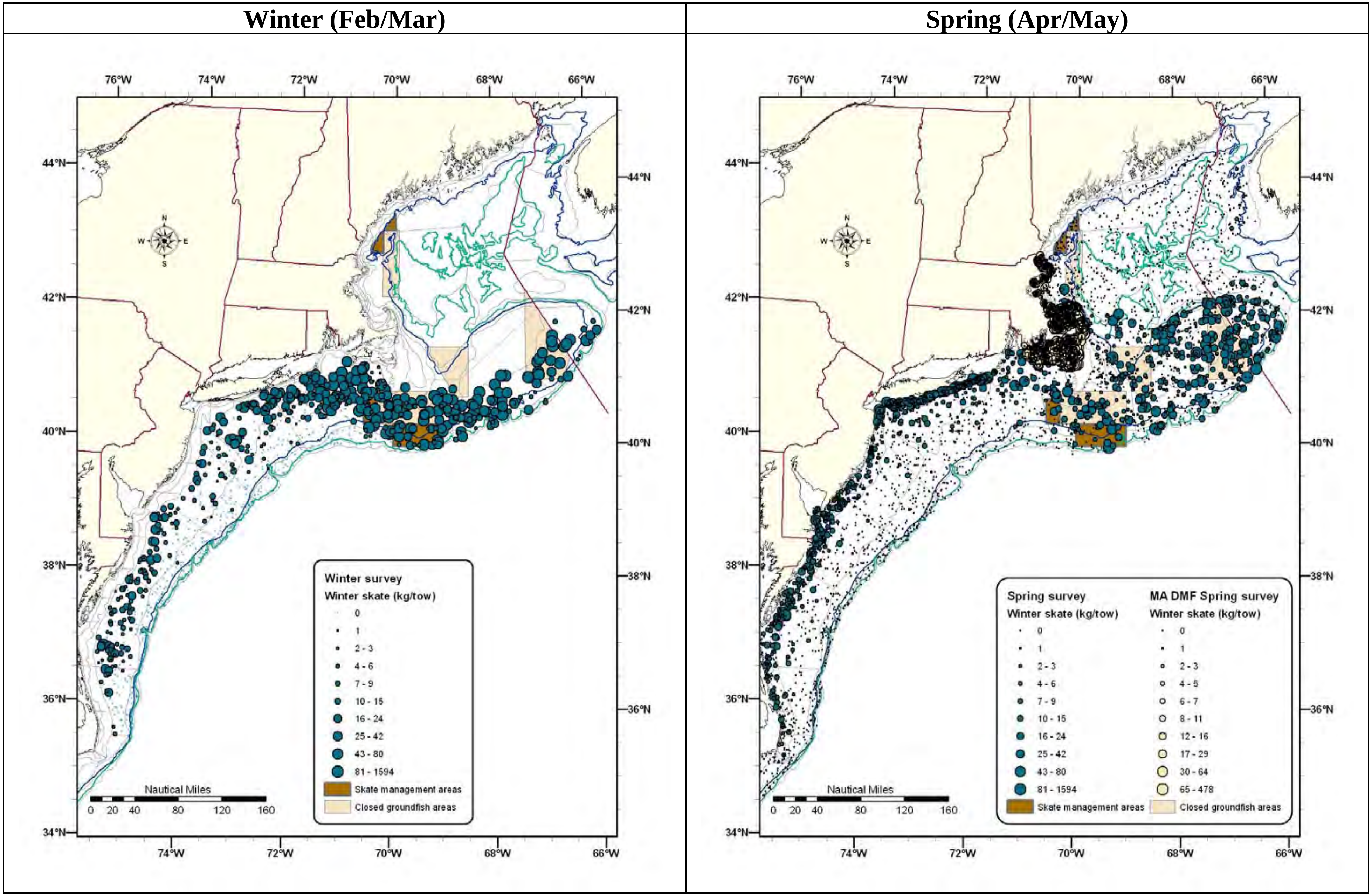


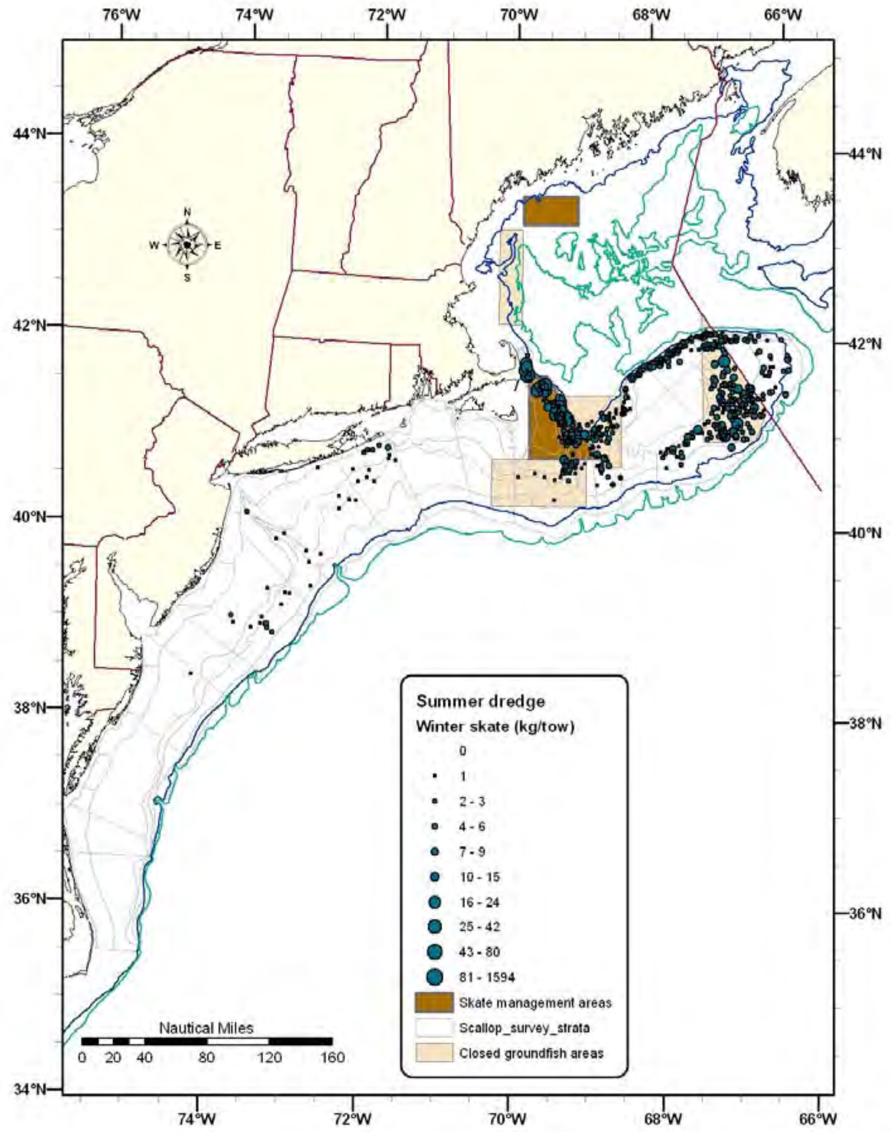
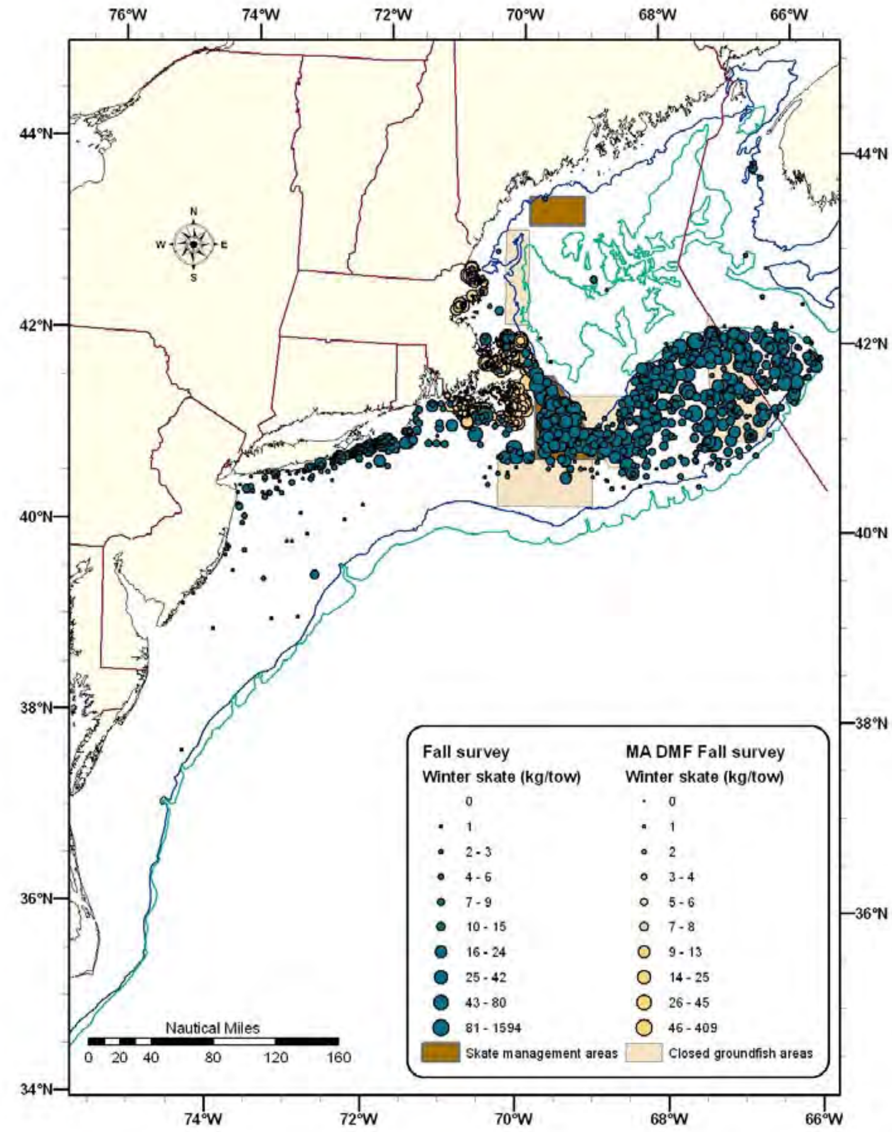
Summer (Jul/Aug)	Autumn (Sep/Oct)





Map 7. Winter skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys.



Summer (Jul/Aug)	Autumn (Sep/Oct)
	

5.1.2 Stock assessment and status (SAW 44)

The Stock Assessment Review Committee (SARC) meeting of the 44th Northeast Regional SAW was held in the Aquarium Conference Room of the Northeast Fisheries Science Center's (NEFSC) Woods Hole Laboratory in Woods Hole, Massachusetts from October 24 – 26, 2006. The SARC Chairman was Dr. Paul Rago, Northeast Fisheries Science Center, NOAA, Woods Hole, Massachusetts. Members of the SARC included scientists from the NEFSC, NMFS Northeast Regional Office (NERO), NMFS Headquarters, the Mid-Atlantic Fishery Management Council (MAFMC), Atlantic States Marine Fisheries Commission (ASMFC), the States of Rhode Island and Massachusetts, DFO-Canada, and the Virginia Institute of Marine Sciences. The 44th SAW was held in Woods Hole in December 2007 and reviewed the SARC results. The SAW rejected the analytic assessment models that were presented by the SARC because they had not been adequately tested using simulated populations. The SAW recommended using the existing status determination criteria for determining whether skates were overfished or whether overfishing had occurred, as a proxy for MSY-based reference points. Preliminary results from SAW 44 were presented to the Council at its February 2007 meeting and the final results were published in May 2007 (http://www.nefsc.noaa.gov/nefsc/saw/).

The following Terms of Reference were provided by the SAW Steering Committee as the context for the assessment of the northeast region skate complex reviewed by SARC 44 in October 2006:

- Characterize the commercial and recreational catch including landings and discards.
- Estimate fishing mortality, spawning stock biomass, and total stock biomass for the current year and characterize the uncertainty of those estimates. If possible, also include estimates for earlier years.
- Either update or redefine biological reference points (BRPs; proxies for B_{MSY} and F_{MSY}).
- Evaluate current stock status with respect to the existing BRPs, as well as with respect to updated or redefined BRPs (from TOR 3).
- Review, evaluate and report on the status of the SARC/Working Group Research Recommendations offered in recent SARC-reviewed assessments.
- Examine the NEFSC Food Habits Database to estimate diet composition and annual consumptive demand for seven species of skates for as many years as feasible.

The stock status relies entirely on the annual NMFS trawl survey. Except for little skates, the abundance and biomass trends are best represented by the fall survey, which has been updated through 2010. Little skate abundance and biomass trends are best represented by the spring survey, which has been updated through 2011. Details about long term trends in abundance and biomass are given in the SAW 44 Report (NEFSC 2007a) and in the Amendment 3 FEIS (Section 6.1.3???). These descriptions are not repeated here, but are updated in Table 2??? And in Figure 2???.

Table 9. Summary by species of recent survey indices, survey strata used and biomass reference points. Green cells represent biomass that is above the BMSY proxy (target). Red cells indicate stock biomass that is below the threshold and is (or was) considered overfished, or overfishing was occurring.

	BARNDOOR	**CLEARNOSE**	**LITTLE**	**ROSETTE**	**SMOOTH**	**THORNY**	**WINTER**
Survey (kg/tow) Time series basis Strata Set	**Autumn 1963 – 1966 Offshore 1 – 30, 33-40**	**Autumn 1975-1998 Offshore 61-76, Inshore 15-44**	**Spring 1982-1999 Offshore 1-30, 33-40, 61-76, Inshore 1-66**	**Autumn 1967-1998 Offshore 61-76**	**Autumn 1963-1998 Offshore 1-30, 33-40**	**Autumn 1963-1998 Offshore 1-30, 33-40**	**Autumn 1967-1998 Offshore 1-30, 33-40, 61-76**
1999	0.30	1.05	9.98	0.07	0.07	0.48	5.09
2000	0.29	1.03	8.60	0.03	0.15	0.83	4.38
2001	0.54	1.61	6.84	0.12	0.29	0.33	3.89
2002	0.78	0.89	6.44	0.05	0.11	0.44	5.60
2003	0.55	0.66	6.49	0.03	0.19	0.74	3.39
2004	1.30	0.71	7.22	0.05	0.21	0.71	4.03
2005	1.04	0.52	3.24	0.07	0.13	0.22	2.62
2006	1.17	0.53	3.32	0.06	0.21	0.73	2.48
2007	0.80	0.85	4.46	0.07	0.09	0.32	3.71
2008	1.09	1.73	7.34	0.03	0.10	0.21	9.50
2009 prelim	1.13	0.89	6.55	0.06	0.21	0.25	11.33
2010 prelim	1.10	0.68	10.56	0.03	0.18	0.28	8.09
2005-2007 3-year average	1.00	0.64	3.67	0.06	0.14	0.42	2.93
2006-2008 3-year average	1.02	1.04	5.04	0.05	0.13	0.42	5.23
2007-2009, prelim. 3-year average	1.01	1.16	6.12	0.05	0.13	0.26	8.18
2008-2010, prelim. 3-year average	1.11	1.10	8.15	0.04	0.16	0.25	9.64
Percent change 2006-2008 compared to 2005-2007	2	63	37	-19	-8	-1	78
Percent change 2007-2009 compared to 2006-2008, prelim.	-1	12	21	4	-1	-38	56
Percent change 2008-2010 compared to 2007-2009, prelim.	10	-5	33	-24	23	-5	18
Percent change for overfishing status determination in FMP	-30	-40	-20	-60	-30	-20	-20
Biomass Target	1.570	0.660	6.150	0.048	0.270	4.130	5.660
Biomass Threshold	0.785	0.330	3.075	0.024	0.135	2.065	2.830
CURRENT STATUS	Not Overfished; Not Rebuilt; Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished; Not Rebuilt; Overfishing is Not Occurring	Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring

5.1.3 Biological and Life History Characteristics

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. Any updated information will be provided below. These technical documents are available at http://www.nefsc.noaa.gov/nefsc/habitat/efh/ 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 (http://www.nefsc.noaa.gov/nefsc/habitat/efh/) for more detailed information on the above topics. All additional biological information is presented below.

The seven species of the northeast skate complex follow a similar life history strategy but differ in their biological characteristics. This section describes any information made available after the publication of the EFH documents. And a detailed summary of the biological and life history characteristics was included in the FEIS for Amendment 3 (NEFMC 2009).

Barndoor Skate

Barndoor skates have been reported to reach a maximum size of 152 cm and 20 kb weight (Bigelow & Schroeder, 1953). The maximum observed length in the NEFSC trawl survey was 136 cm total length. In a study conducted in Georges Bank Closed Area II the largest individual observed was 133.5 cm, with total lengths ranging from 20.0 to 133.5 cm.

Gedamke et al. (2005) examined barndoor skates in the southern section of Georges Bank Closed Area II. Length at 50% maturity was 116.3 cm TL and 107.9 cm TL for females and males, respectively. The oldest age observed was 11 years. Age at maturity was estimated to be 6.5 years and 5.8 years for females and males, respectively. The von Bertalanffy parameters were also determined: L_∞ = 166.3 cm TL; k = 0.1414 yr^{-1}; t_o = -1.2912 yr. Based on the predictive equations from Frisk *et al*. (2001) and the Northeast Fisheries Science Center (NEFSC) survey maximum observed length of 136 cm TL, L_{mat} is estimated at 102 cm TL and A_{mat} is estimated at 8 years (Northeast Fisheries Science Center 2000). In another study, clasper length measurements on males from Georges Bank show that male sexual maturity occurs at approximately 100 cm TL.

Sosebee (2005) used body morphometry to determine the size of maturity (females: 96 to 105 cm TL; males: 100 cm TL) on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras. Egg production is estimated to range between 69 – 85 eggs/female/year (Parent et al. 2008). As part of a captive breeding program, the egg incubation was determined to range from 342 –

494 days. As part of the same study, successful hatch rate was 73% (Parent et al. 2008). Previous fecundity estimates were 47 eggs per year (Packer et al. 2003a). Hatchlings range in size from 193 mm TL, 128 mm disk width and 32 g body mass.

Barndoor skates are benthivorous and piscivorous, a large portion of the diet formed by forage fishes. Overall, the diet of barndoor skates was dominated by herrings Pandalid shrimps and *Cancer* crabs. Up to 8,000 mt of a particular prey item can be removed by this skate in any given year. The amount of food consumed was related to the size of the skate. Immature skates (<60 cm TL) consumed approximately 5 kg per year of prey items, while mature skates (>100 cm TL) consumed approximately 10 to 20 kg per year. The total consumptive demand for this species is estimated to range between 4,000 and 16,000 mt per year, with total consumption dominated by mature skates.

Clearnose Skate

Gelsleichter (1998) examined the vertebral centra of clearnose skates that were collected from Chesapeake Bay and the northwest Atlantic Ocean. The oldest male was aged at 5+ years, with the oldest female being 7+ years. This study suggests that clearnose skate experience rapid growth over during a relatively short life span.

Sosebee (2005) used body morphometry to determine size at maturity (females: 59 to 65 cm TL; males: 56 cm TL) on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras. Fecundity was estimated to be 35 eggs/year (Packer et al. 2003b).

Clearnose skates are benthivorous, a large portion of the diet comprised of benthic megafauna (crabs and miscellaneous crustaceans). Overall, the diet of clearnose skates was dominated by other crabs, *Cancer* crabs and squids. Up to 8,000 – 10,000 mt of a particular prey item can be removed by this skate in any given year, but values are typically on the order of 2,000 to 4,000 mt. Immature skates (45 - 50 cm TL consumed approximately 1 - 2 kg per year of prey items, while mature skates (60 - 65 cm TL) consumed approximately 5 kg per year. The total consumptive demand for this species is estimated to range between 2,000 and 18,000 mt per year, with total consumption dominated by mature skates.

Little Skate

Frisk and Miller (2006) examined vertebral samples of little skate to identify any latitudinal patterns in the northwestern Atlantic. Maximum observed age was 12.5 years. The oldest aged little skate from the mid-Atlantic was 11 years. The oldest individuals from the Gulf of Maine and Southern New England – Georges Bank were 11 years or older. Von Bertalanffy curves were fit for the northwestern Atlantic ($k = 0.19$, $L_\infty = 56.1$ cm TL, $t_o = -1.77$, $p < 0.0001$, $n = 236$) and for individual regions (GOM: $k = 0.18$, $L_\infty = 59.31$ cm TL, $t_o = -1.15$, $p < 0.0001$; SNE-GB: $k = 0.20$, $L_\infty = 54.34$ cm TL, $t_o = -1.22$, $p < 0.0001$; mid-Atlantic: $k = 0.22$, $L_\infty = 53.26$ cm, $t_o = -1.04$, $p < 0.0001$).

Sosebee (2005) used body morphometry to determine size at maturity (male – 39 cm TL; females – 40 – 48 cm TL) on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras. Fecundity was estimated to be 30 eggs per year (Packer et al. 2003 c).

Little skates are benthivorous which was reflected by the large portion of the diet that benthic macrofauna (polychaetes and amphipods) and benthic megafauna (crabs and bivalves) comprised. Overall, the diet of little skates was dominated by benthic invertebrates. Up to 8,000 mt of a particular prey item can be removed by this skate in any given year. This diet may overlap but not necessarily compete directly with flounders.

The amount of food consumed was related to the size of the skate. Immature skates consumed approximately 500 g per year of prey items, while mature skates consumed approximately 2.5 kg per year. The total consumptive demand for this species is estimated to range between 100,000 and 350,000 mt per year, with total consumption dominated by mature skates.

Smooth Skate

Natanson et al. (2007) aged smooth skate from New Hampshire and Massachusetts waters. Maximum ages were estimated to be 14 and 15 years for females and males respectively. Longevity was estimated to be 23 years for females and 24 years for males. Male and females exhibited significantly different growth rates. Accordingly different growth models were required to fit the male and female growth data. Parameters for the von Bertalanffy equation for the males were determined to be k = 0.12, L_∞ = 75.4 cm TL, with L_o required to be set at 11 cm TL (Natanson et al. 2007). Growth models applied to females overestimated the size at birth thus requiring the use of back-calculated data resulting in von Bertalanffy parameters of: k = 0.12, L_∞ = 69.6 cm TL, L_o = 10 TL (Natanson et al. 2007). Sulikowski et al. (2007) determined, in a study conducted in the Gulf of Maine that in their sample mature females ranged in size from 508 to 630 mm TL and for males 550 to 660 mm TL. Based on morphological characteristics in females (ovary weight, shell gland weight, diameter of largest follicles, and pattern of ovarian follicle development) and histological analysis of males (mature spermatocysts in testes) Sulikowski et al. (2007) determined that in the Gulf of Maine smooth skate are capable of reproducing year round.

The reproductive cycles of the two sexes are thought to be synchronous (Sulikowski et al. 2007). Kneebone et al. (2007) examined hormonal concentrations of male and female smooth skate in the Gulf of Maine further confirming the ability of this species to reproduce throughout the year. Information is needed on the fecundity and egg survival of this species.

Sosebee (2005) used body morphometry to determine size at maturity to be approximately 33 – 49 cm TL for females and 49 cm TL for males on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras.

Smooth skates are benthivorous, a large portion of the diet comprised of benthic megafauna (pandalids and euphausiids). Overall, the diet of smooth skates was dominated by pandalid shrimp and euphausiids. Up to 2,000 mt of a particular prey item can be removed by this skate in any given year, but values are typically on the order of 500 to 1,000 mt. The amount of food consumed was related to the size of the skate. Immature skates (20-25 cm TL) consumed approximately 0.5 - 1 kg per year of prey items, while mature skates (50 cm TL) consumed approximately 2 - 3 kg per year. The total consumptive demand for this species is estimated to range between 1,000 and 5,000 mt per year, with total consumption dominated by mature skates.

Rosette Skate

Sosebee (2005) used body morphometry to determine size at maturity (males = 33 cm TL; females = 33 – 35 cm TL) on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras. Age and growth data are currently unavailable for rosette skate, as is information on the fecundity and egg survival.

Rosette skates are benthivorous, a large portion of the diet comprised of benthic macrofauna (amphipods and polychaetes) and benthic megafauna (crabs and shrimps). Overall, the diet of rosette skates was dominated by benthic macrofauna and to a lesser extent pandalid shrimps, squids and *Cancer* crabs. Up to 70 mt of a particular prey item can be removed by this skate in any given year, but more typically 10 – 30 mt. Immature skates (22 cm TL) consumed approximately 200 g per year of prey items, while mature skates (38 cm TL) consumed approximately 800 g per year. The total consumptive demand for this species is estimated to range between 50 and 500 mt per year, with total consumption dominated by mature skates.

Thorny Skate

Sulikowski et al (2005a) aged thorny skate in western Gulf of Maine and found oldest age estimated to be 16 years for both females and males (corresponding length – 105 cm and 103 cm). Von Bertalanffy Growth parameters for male thorny skates were calculated to be k = 0.11, L_∞ = 127 cm TL, t_o = -0.37; calculated estimates for female thorny skates were: k = 0.13, L_∞ = 120 cm TL, t_o = -0.4 (Sulikowski et al. 2005a). The maximum observed length from the NEFSC trawl survey is 111cm TL. Maximum sizes examined in the Gulf of Maine were 103 cm TL and 105 cm TL for males and females, respectively (Sulikowski et al. 2005a).

Sulikowski et al. (2006) used morphological and hormonal criteria to determine the age and size at sexual maturity in the western Gulf of Maine. For females, 50% maturity occurred at approximately 11 years and 875 mm TL; while for males approximately 10.90 years and 865 mm TL. This species is capable of reproducing year round (Sulikowski et al. 2005a) based on morphological characteristics.

Sosebee (2005) used body morphometry to determine size at maturity to be approximately 36 - 38 cm TL for females and 49 cm TL for males on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras.

Parent et al. (2008) estimated mean annual fecundity to be 40.5 eggs per year based on 2 captive females producing 81 eggs in 1 year. The observed hatching success is 37.5% (Parent et al. 2008).

Thorny skates are benthivorous and their piscivorous, a large portion of the diet formed by forage fishes. Overall, the diet of thorny skates was dominated by herrings, squid, polychaetes, silver hake and other fish. Up to 80,000 mt of a particular prey item can be removed by this skate in any given year. The amount of food consumed was related to the size of the skate. Small skates (20 cm TL) consumed approximately 500 g per year of prey items, while medium (45 cm TL) and large skates (80 cm TL) consumed approximately 1.5 kg and 12 kg per year, respectively. The total consumptive demand for this species is estimated to range between 10,000 and 40,000 mt per year.

Winter Skate

Sulikowski et al. (2003) aged winter skate in western Gulf of Maine and determined the oldest age estimated to be 18 and 19 years for females and males, respectively (corresponding length – 94.0 cm and 93.2 cm). Verification of the periodicity of the vertebral bands was determined to be annual with the opaque band being formed in June - July using marginal increment analysis. Von Bertalanffy Growth parameters for male winter skates were calculated to be k = 0.074, L_∞ = 121.8 cm TL, t_o = -1.418; calculated estimates for female winter skates were: k = 0.059, L_∞ = 137.4 cm, t_o = -1.609 (Sulikowski et al. 2003). Growth curves fit to data from this study were found to overestimate maximum total length compared to observed lengths. This may result from a low representation of maximum sized individuals. The maximum reported length is 150 cm TL. Maximum sizes examined in the Gulf of Maine were 93.2 cm total length and 94.0 cm total length for males and females, respectively (Sulikowski et al. 2003).

Winter skates are capable of reproducing year-round but exhibit one peak in the annual cycle (Sulikowski et al. 2004). Peak reproductive activity occurs during June – August. Size at maturity has been shown to vary with latitude. Size at maturity is 76cm for females and 73 cm for males (Sulikowski et al. 2005b).

Sosebee (2005) used body morphometry to determine size at maturity to be approximately 65 - 73 cm TL for females and 49 - 60 cm TL for males on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras.

Winter skates are benthivorous and piscivorous, a large portion of the diet formed by forage fishes. Overall, the diet of winter skates was dominated by forage fish, squid and benthic macrofauna. Up to 80,000 mt of a particular prey item can be removed by this skate in any given year. The amount of food consumed was related to the size of the skate. Medium sized (~45 cm TL) skates consumed approximately 2 kg per year of prey items, while large skates (~80 cm TL) consumed approximately 9 kg per year. The total consumptive demand for this species is estimated to range between 20,000 and 180,000 mt per year.

5.1.4 Discards and discard mortality

Since the Council adopted a 50% discard mortality assumption for setting ABCs in Amendment 3, based on literature review by the Skate PDT and advice from the Council's SSC, more relevant research data and analysis has been collected on skate mortality by trawl vessels in the Gulf of Maine. When Amendment 3 was developed, this discard mortality assumption was largely derived from published studies, most of which were for species and locations different from those covered in the FMP because no other data existed.

While data are still being collected and the research will not become final until 2012, the Council's SSC reviewed the methodology of the new discard mortality research and found the sample sizes, experimental design and analyses to be comparable or superior to the available published studies. And because these estimates were for species and areas covered in the FMP, the new discard mortality values for little skate (0.20) and winter skate (0.12) were estimated with sufficient precision to reject the previous literature values, the new research data were determined to be the best scientific information available to be applied to little and winter skates captured by trawls and discarded under normal commercial practices.

These new data were applied to estimate total discard mortality by gear and species (see Appendix II) and the last three years of data were used to project a 36.3% dead discard mortality rate (dead discards divided by total catch) for the 2012-2013 specification cycle. The following discussion presents the information that was available for the SSC review in June 2011.

Data on immediate- and delayed (i.e. post-release) mortality rates of discarded skates and rays is extremely limited. Only five published studies have estimated discard mortality rates in these species (Table 10), and only one examined a skate from the Northeast Skate Complex (winter skate, Benoit 2006). Based largely upon the results of this study, which estimated acute discard mortality rates of winter skates caught in Canadian bottom trawl surveys, the SSC in 2009 decided to use a 50% discard mortality rate assumption for all skates and gears for the purposes of setting the Skate ABC.

Since skate discards are high across many fisheries, the estimates of total skate catch are sensitive to the discard mortality rate assumption, and have direct implications for allowable landings in the skate fisheries. Therefore, the PDT reviewed the best available scientific information on skate discard mortality rates to determine if the 50% assumption is still appropriate. The review included summarizing old and new published data (Table 11), as well as receiving a report on the preliminary findings of a focused skate discard mortality study being carried out in the Gulf of Maine by Drs. John Mandelman (New England Aquarium) and James Sulikowski (University of New England). The preliminary results are summarized below, but more complete information and analysis will become available when the results are formally published.

Sample sizes for other skate species, i.e. smooth and thorny skates, were at the time thought to be insufficient to estimate discard mortality, but more data is being collected in 2011 to make reliable estimates for these species. There are probably differences in physiology that would make discard mortality for these skates to differ from those estimated for little and winter skates. By the same token, discard mortality may be less than the Council's 50% mortality assumption, which would make discarding less of a problem in the skate fishery than if the discard mortality were higher.

5.1.4.1 Literature Review

Table 10 summarizes the results of the five studies on skate/ray discard mortality rates. The study locations, fisheries, species, and gears varied across these studies, however most used some type of trawl gear. Only one study (Benoit 2010) estimated the skate discard mortality rate in scallop dredge gear (10% for winter skate). Discard mortality rates for skates have not been estimated in any other gear types (e.g., gillnet, hook gear). Due to the differences in study objectives, methods, and sample sizes across these investigations, it is difficult to directly compare these results, but they may inform the range of reasonable mortality rate assumptions for the Northeast Skate Complex.

Overall, discard mortality rates of skates and rays in trawl gears ranged from 10-100%. Mortality rates varied greatly between species. However, across this broad range of species, the mean discard mortality rate was approximately 50% (±1 standard deviation = 24%). While there are some significant assumptions associated with applying this information to the Northeast Skate Complex, it appears that the current scientific literature supports the use of an assumed 50% discard mortality rate for skates in trawl gear. However, more research is clearly needed on this subject area.

Despite the Benoit (2010) estimate of winter skate discard mortality rates in scallop dredge gear (10%), the Skate PDT determined that this 10% discard mortality estimate is not applicable to the Northeast Skate Complex. The Benoit study was conducted in the Gulf of St. Lawrence using at-sea observer data, and the dredge gear (small bucket scallop dredges) are not considered comparable to the New Bedford style dredges used in the New England scallop fishery. Given the magnitude of skate discards by scallop dredge vessels (Table 6), research on discard mortality rates in this gear should be a high priority.

Table 10. Summary of published skate and ray discard mortality rate studies.

Source	Location	Gear Type	Skate/Ray Species	Discard Mortality Rate (%Dead)
Stobutzki et al. (2002)	N. Australia	Prawn Trawl	56 elasmo species	**56% (range = 10-82%)**
			All rays	**61%**
			Dasyatidae	**59%**
			Gymnuridae	**41%**
			Rhynchobatidae	**10%**
Laptikhovsky (2004)	Falkland Islands	Squid Trawl	*Bathyraja albomaculata*	**28.6%**
			B. brachiurops	**45.4%**
			B. griseocauda	**100%**
			B. macloviana	**100%**
			B. magellanica	**40%**
			Bathyraja sp.	**25%**
			Psammobatis sp.	**40%**
Benoit (2006)	Gulf of St. Lawrence	Bottom Trawl	*Leucoraja ocellata*	**50%**
Enever et al. (2009)	Bristol Channel, UK	Bottom Trawl	4 skate species	**mean = 45%**
			Leucoraja naevus	**67%**
			Raja microocellata	**49%**
			Raja brachyura	**45%**
			Raja clavata	**41%**
Benoit (2010)	Gulf of St. Lawrence	Scallop Dredge	*Leucoraja ocellata*	**10%**
			MEAN TRAWL	**50%**

5.1.4.2 Skate Discard Mortality Research in the Gulf of Maine

Drs. John Mandelman (New England Aquarium, Boston, MA) and James Sulikowski (University of New England, Portland and Biddeford, ME) received NOAA funding in 2009 (Saltonstall-Kennedy Grant Program) to investigate the immediate and short-term discard mortality rates of skates in the Gulf of Maine. Their study is investigating mortality rates of winter, little, thorny, and smooth skates captured by otter trawl gear. The research is ongoing, but preliminary data were presented to the PDT on discard mortality rates of little and winter skates, which dominate the skate catch in the region.

Since a variety of factors contribute to discard mortality rates (e.g., tow duration, temperature differentials, fish size and sex, tow weight, deck time and handling, etc.), the researchers are attempting to account for each of these variables. Trials were done with tow durations of 20-30 minutes (controls), 2 hours, and 3-4 hours, accounting for the range typical of industry practices in this region. The distribution of the estimated catch biomass load per tow in the study, a factor previously shown to positively correlate with the mortality of discarded finfish bycatch, was also reported as broad, and included heavily packed tows. Skates were sampled from the catch and given a standardized condition index of 1-3 based on the extent of visible injuries and general condition (i.e. energy levels). They were then placed in specially-designed cylindrical mesh cages (with sea lice resistant bottoms), and returned to the water for a period of 72 hours. The biomass of skates in each cage was kept relatively constant between trials. The cages were then retrieved and sampled for the numbers of dead and alive skates.

So far, over 650 individual skates have been sampled for immediate and delayed mortality, including 243 little skates (18-60 cm TL) and 203 winter skates (23-95 cm TL) on 37 tows (the number of specimens assessed for immediately mortality only exceeds 2000). Initial results indicate that immediate at-vessel mortality of trawl-caught skates (all species) is near zero. Excluding skates from the shorter control tows (to more closely approximate commercial tow durations), pooled mortality rates after the 72-hour cage trials were 20% for little skate and 12% for winter skate (see table below). Significant predictors of mortality included condition index (more injuries resulted in higher mortality) and sex (males had higher mortality than females). Other variables were not significant, however, but Drs. Mandelman and Sulikowski acknowledge that sample size is still relatively low at this time to detect significant differences in potential secondary factors.

Table 11. Preliminary estimates of Gulf of Maine little and winter skate delayed (72-h) discard mortality rates in trawl gear.

Tow Duration	**2h**			**3-4 hr**			**Total**		**Pooled**
	N tows	Dead	Alive	*N tows*	Dead	Alive	Dead	Alive	**%Mortality**
Little	6	18	61	4	17	79	35	140	**20%**
Winter	11	3	47	11	21	124	24	171	**12%**

Data collections is expected to be completed in 2011. Laboratory-based experiments on the physiological effects of aerial exposure stress on little and thorny skates are also ongoing. The final study results are anticipated to be finished in 2012, including mortality rate estimates for thorny and smooth skates, and a complete analysis of mortality predictor variables (which may help refine the discard mortality estimates and projections).

5.1.5 Observed discards by gear and area

Another way to evaluate the potential interactions between skate fishing and barndoor, smooth, and thorny skate distributions is to examine sea sampling data, which can be split into 'fleets' based on gear use and directivity using SBRM methods. Although these sea sampling data include only include sub-sampled trips, they can be more informative about actual catches and interactions on trips than overlaps in effort and species distributions. Observed tows shown on the following maps are not however unbiased representations of the distribution of fishing effort, due to uneven sampling of the fishing fleets

The following maps show the distribution of skate discards to kept of all species (D/Kall) on observed trawl tows and gillnet hauls. Map 8 shows the distribution of skate discards to kept for large mesh trawls and for the Ruhle & Separator trawls, which are more selective and used to target certain groundfish.

Most of the higher levels of skate discarding occur on Georges Bank and on the continental shelf of Southern New England. Overall, median skate discards were about 1.1-1.2 pounds per pound of landings but half of the observed tows were less than 0.2 (Table 12). Discard rates did not change very much since 2010 when Amendment 3 was implemented.

On Georges Bank and in Southern New England fishing areas as well as the coastal areas of the Gulf of Maine, the discard rates were considerably above 1.0 (Map 8). These areas are where catches of little and winter skate are common. Discard rates appear to be much lower in the deeper portions of the Gulf of Maine, where smooth and thorny skates are more common. Smooth skate discard to kept ratios for observed tows were generally low throughout the range, except for the area north and northwest of Closed Area I (Map 9). Higher rates of thorny skate discard were more widely distributed than those for smooth skates, but were highest on the NE corner of Closed Area II, east and north of the Western Gulf of Maine closed area and on Jeffries Bank (Map 10).

Discard rates for vessels using Ruhle and separator trawls were not very different than those for vessels using standard large mesh trawls (Table 12), although the distribution of tows by vessels using these gears is different, mostly along the margins of Georges Bank and along the western side of Closed Area II (Map 8). The observer data do not suggest that the Ruhle and separator trawls are any more selective for barndoor, smooth, and thorny skates than the standard trawl. To do a proper comparison, however, would require the analysis to filter the large mesh trawls to exclude areas and seasons where Ruhle and separator trawl tows were not observed.

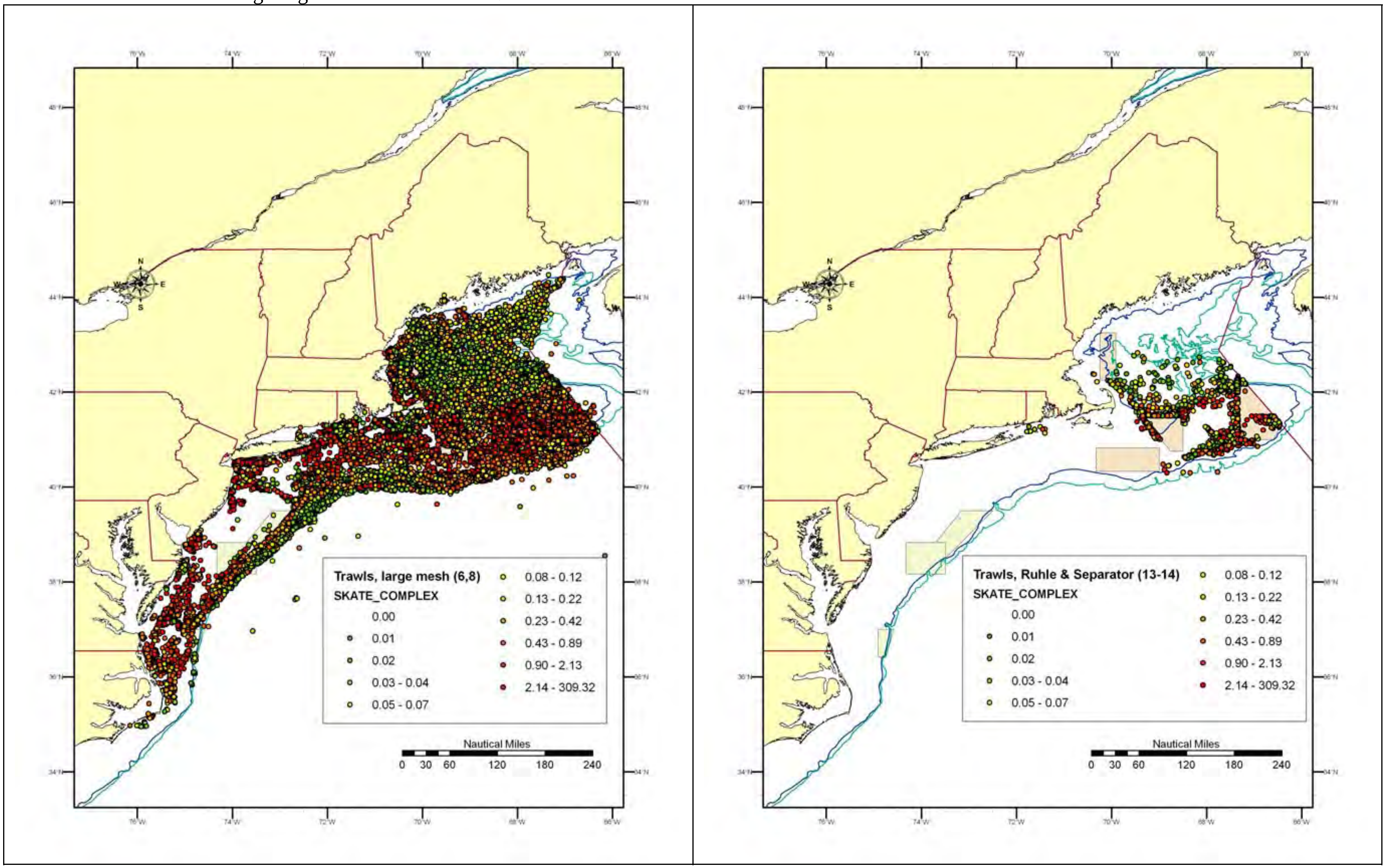
Sink gillnets are used to target skates, monkfish, and other species mostly in four areas: inshore Gulf of Maine, along outer Cape Cod, the Southern New England continental shelf, and along the coast of northern NJ (Map 11).

Discard rates were mostly lower than those for trawls, 0.12-0.46 (Table 12). Discards were highest off of Southern New England (Map 11) and discard rates were higher since 2010 when Amendment 3 was implemented. This increase in skate complex and barndoor skate discard rates is more related to the observed increases in barndoor and winter skate biomass than it is related to Amendment 3 measures. Except for an area along the SW corner of the Western Gulf of Maine area and Platts Bank (Map 12), discards of thorny skate by vessels using gillnets are rare. Smooth skate are rarely caught because gillnets are seldom used in the deeper portions of the Gulf of Maine.

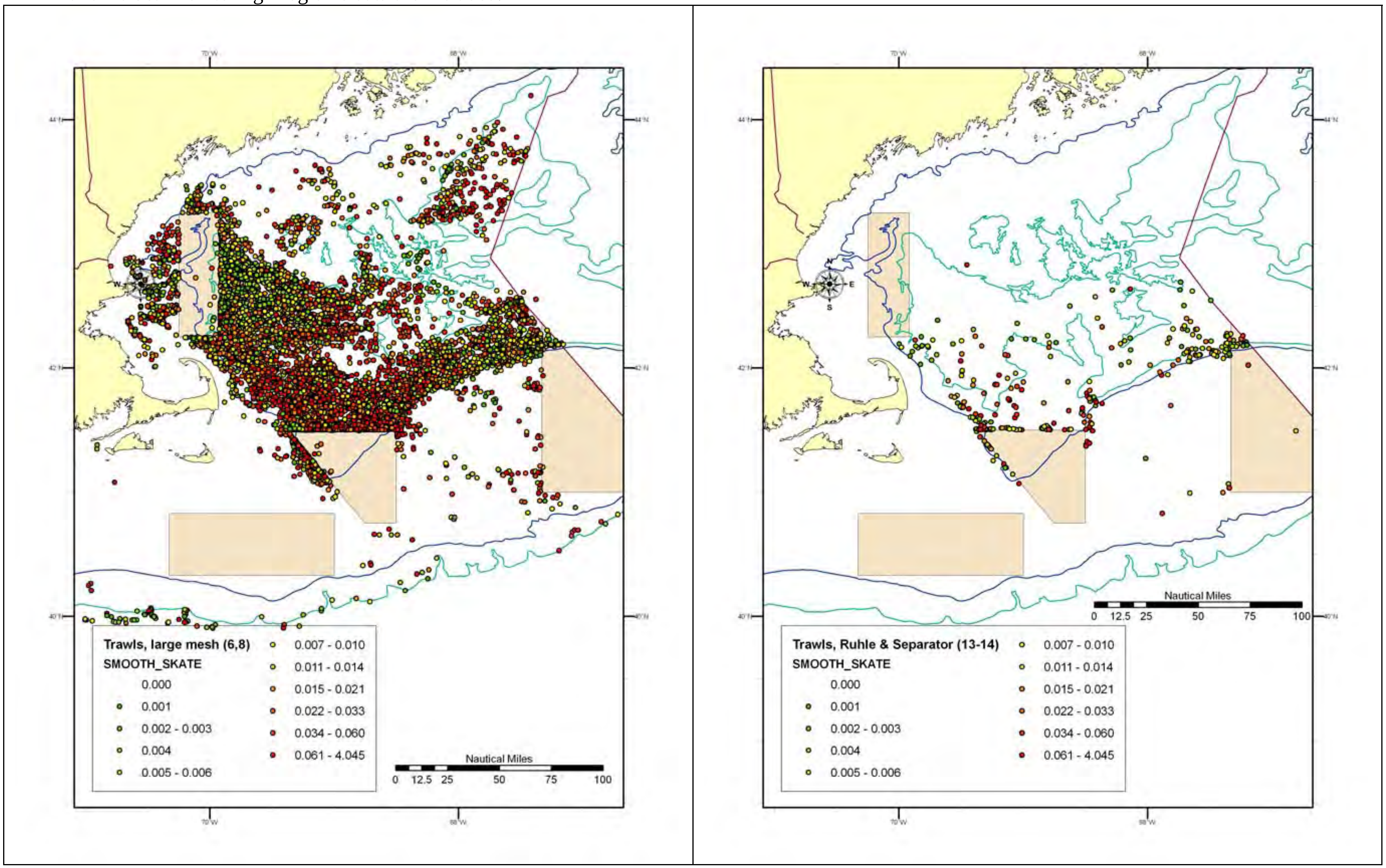
Table 12. Skate discard rates on observed tows for vessels using large mesh trawl, Ruhle & separator trawl, and gillnets. Source: Sea Sampling Observer Program data.

		1989-2009				2010-2011			
		Skate complex	Barndoor skate	Smooth skate	Thorny skate	Skate complex	Barndoor skate	Smooth skate	Thorny skate
Large mesh trawl (Fleets 6,8)	No. observed tows	N=79700 tows				N=29006 tows			
	Mean	1.084	0.028	0.006	0.012	1.194	0.054	0.010	0.020
	Median	0.215	0.031	0.016	0.026	0.115	0.025	0.009	0.016
	90th percentile	2.313	0.236	0.108	0.163	2.185	0.226	0.062	0.132
Ruhle & Separator trawl (Fleets 13,14)	No. observed tows	N=2131				N=244			
	Mean	0.941	0.042	0.005	0.008	0.868	0.072	0.007	0.019
	Median	0.133	0.017	0.006	0.009	0.172	0.031	0.008	0.025
	90th percentile	2.015	0.194	0.091	0.070	2.214	0.251	0.060	0.561
Sink gillnets (Fleets 21,24)	No. observed tows	N=8132				N=2344			
	Mean	0.118	0.016	0.000	0.006	0.459	0.091	0.000	0.009
	Median	0.037	0.029	0.010	0.028	0.062	0.054	0.010	0.025
	90th percentile	0.249	0.215	0.051	0.135	0.941	0.547	0.043	0.149

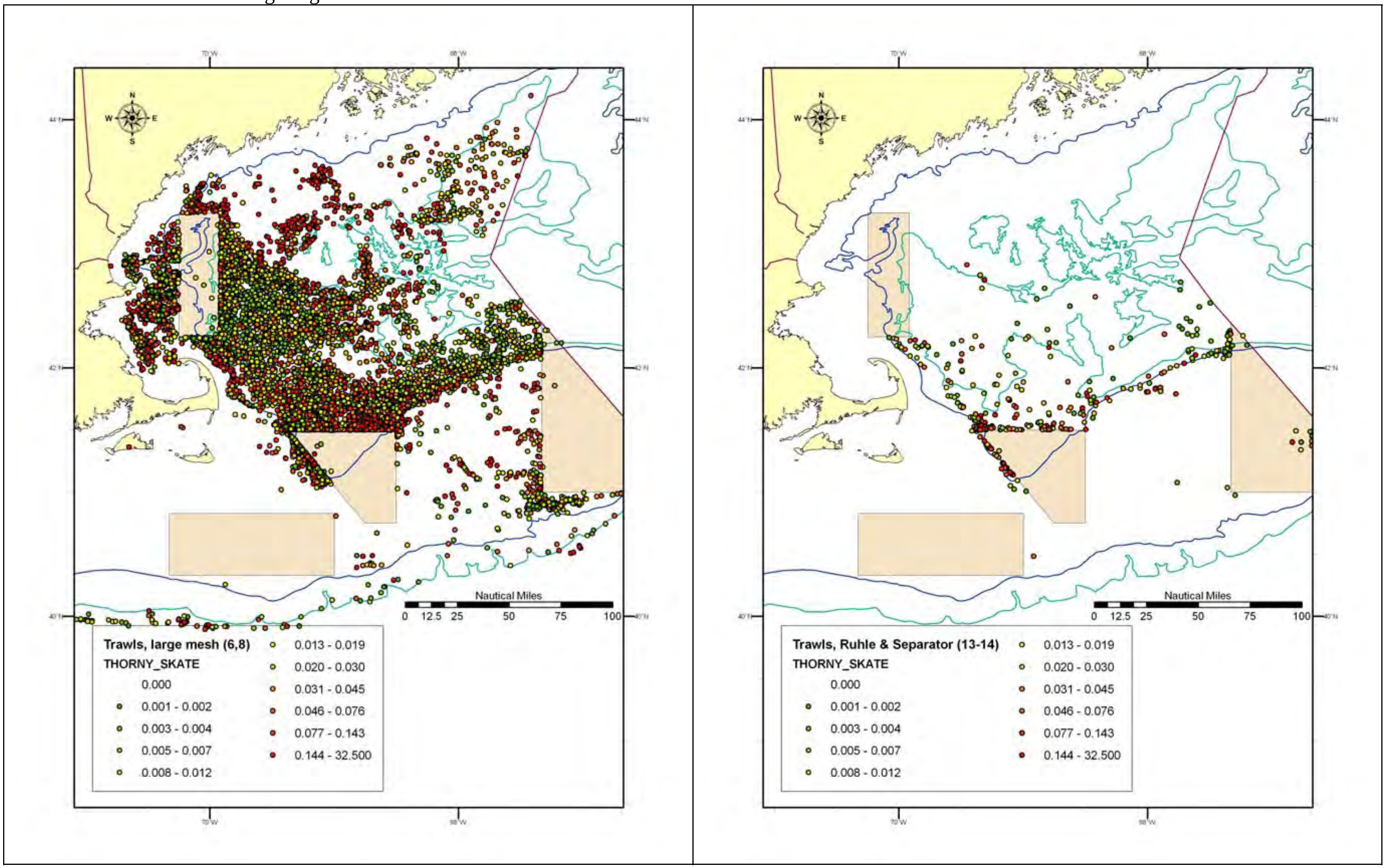
Map 8. 1989-2010 distribution of observed skate complex discards to kept_all for large mesh (>= 5.5") trawls (left) and separator trawls (right). Sea Sampling Observer and At-Sea Monitoring Programs data are included.



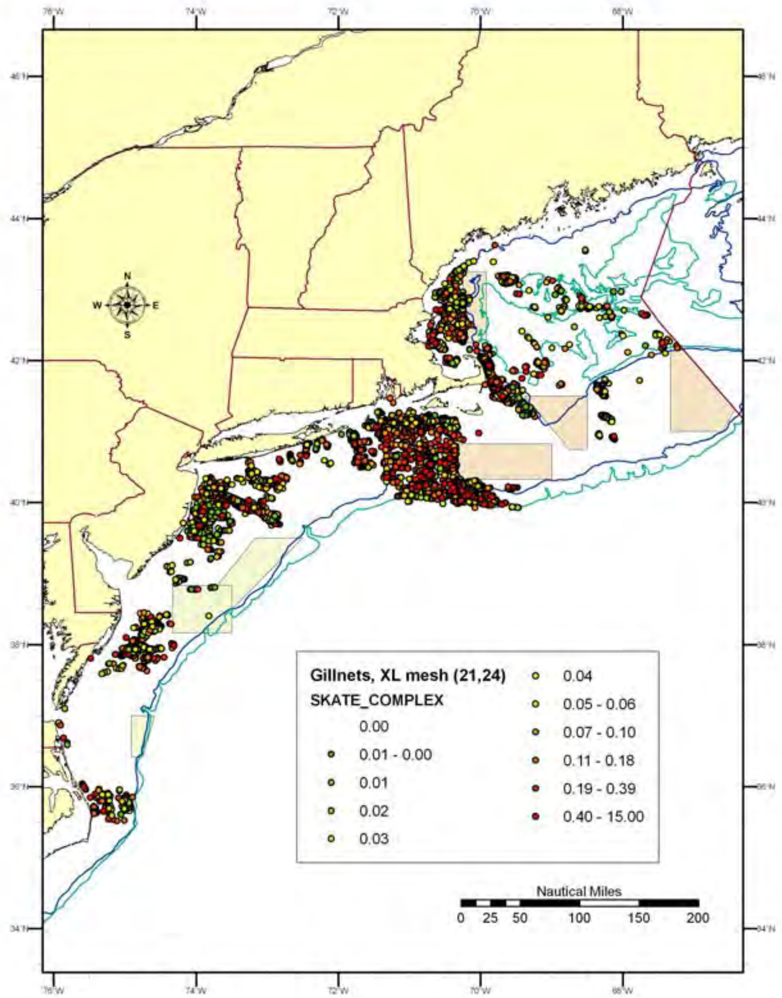
Map 9. 1995-2010 distribution of observed smooth skate discards to kept_all for large mesh (>= 5.5") trawls (left) and separator trawls (right). Sea Sampling Observer and At-Sea Monitoring Programs data are included.



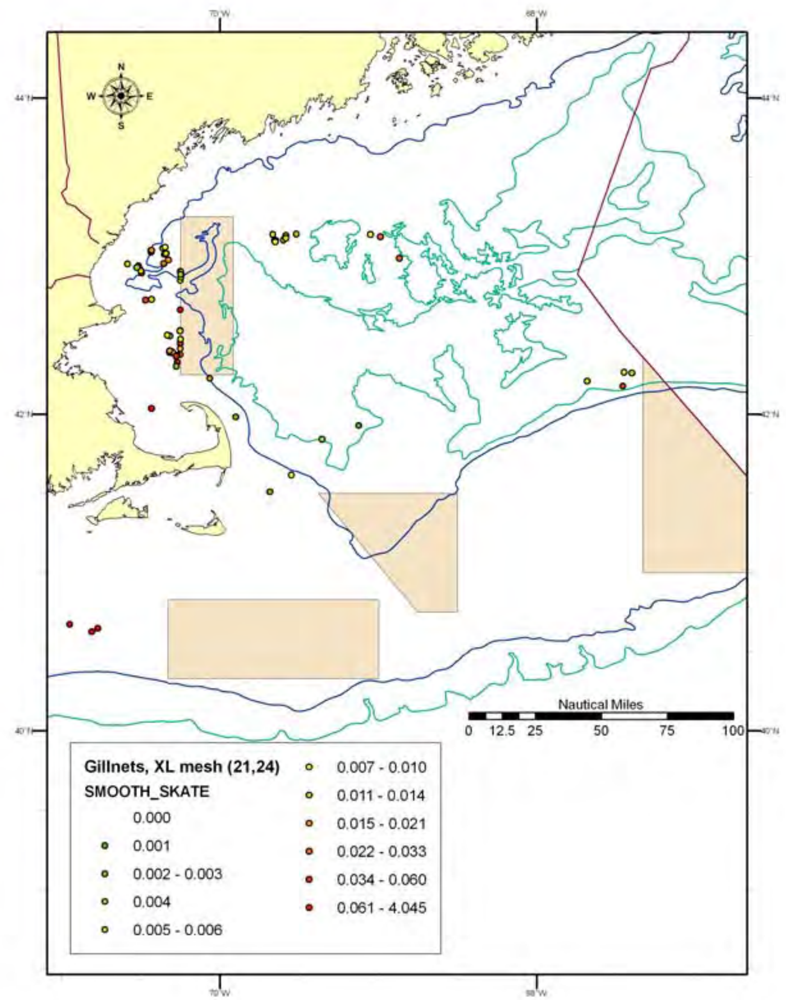
Map 10. 1995-2010 distribution of observed thorny skate discards to kept_all for large mesh (>= 5.5") trawls (left) and separator trawls (right). Sea Sampling Observer and At-Sea Monitoring Programs data are included.

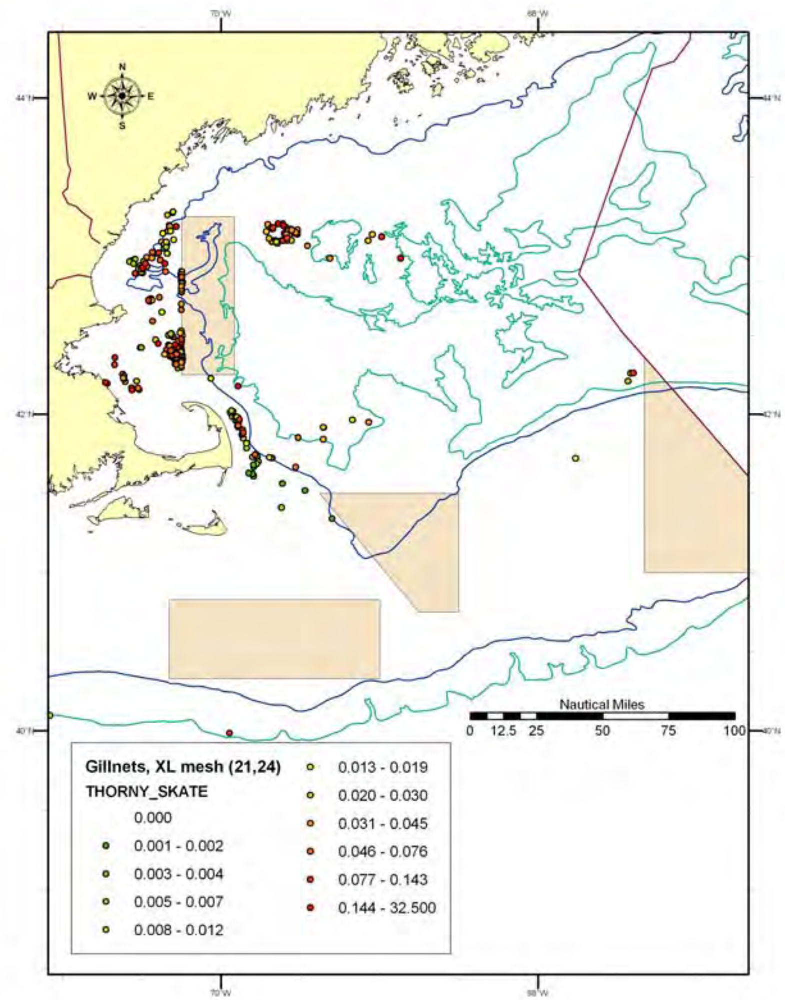


Map 11. 1989-2010 distribution of observed skate complex discards to kept_all for extra large mesh (>= 8") gillnets (left). Sea Sampling Observer and At-Sea Monitoring Programs data are included.



Map 12. 1995-2010 distribution of observed smooth skate (left) and thorny skate (right) discards to kept_all for extra large mesh (>= 8") gillnets. Sea Sampling Observer and At-Sea Monitoring Programs data are included.





5.1.6 Evaluation of Fishing Mortality and Stock Abundance

Benchmark assessment results from SAW 44 are given in NEFSC 2007a and 2007b. Because the analytic models that were attempted did not produce reliable results, the status of skate overfishing is determined based on a rate of change in the three year moving average for survey biomass. These thresholds vary by species due to normal inter-annual survey variability. Details about the overfishing reference points and how they were chosen are given in NEFSC 2000.

The latest results for 2010 (2011 spring survey for little skate) are given in Table 9. At this time, overfishing is not occurring on any skate species.

5.1.7 Marine Mammals and Protected Species

The following protected species are found in the environment utilized by the skate fishery. A number of them are listed under the Endangered Species Act of 1973 (ESA) as "endangered" or "threatened", while others are identified as protected under the Marine Mammal Protection Act of 1972 (MMPA). Actions taken to minimize the interaction of the fishery with protected species are described in Section 4.1.1 of Skate Amendment 3. Monthly reports of observed incidental takes are available on the NEFSC website at http://www.nefsc.noaa.gov/femad/fishsamp/fsb/.

Cetaceans	***Status***
Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
Long-finned pilot whale (*Globicephala melas*)	Protected
Short-finned pilot whale (*Globicephala macrorhynchus*)	Protected
Spotted dolphin (*Stenella frontalis*)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Bottlenose dolphin: coastal stock (*Tursiops truncatus*)	Protected
Bottlenose dolphin: offshore stock (*Tursiops truncatus*)	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected

Seals	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Phoca groenlandica*)	Protected
Hooded seal (*Crystophora cristata*)	Protected

Sea Turtles

Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered*
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Fish	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered

**Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered.*

Although salmon belonging to the Gulf of Maine distinct population segment (DPS) of Atlantic salmon occur within the general geographical area covered by the Northeast Multispecies FMP, they are unlikely to occur in the area where the fishery is prosecuted given their numbers and distribution. Therefore, the DPS is not likely to be affected by the skate fishery.

It is expected that all of the remaining species identified have the potential to be affected by the operation of the skate fishery. However, given differences in abundance, distribution and migratory patterns, it is likely that any effects that may occur, as well as the magnitude of effects when they do occur, will vary among the species. Summary information is provided here that describes the general distribution of cetaceans, pinnipeds, and sea turtles within the management area for the Skate FMP as well as the known interactions of gear used in the skate fishery with these protected species. Additional background information on the range-wide status of marine mammal and sea turtle species that occur in the area can be found in a number of published documents. These include sea turtle status reviews and biological reports (NMFS and USFWS 2007; Hirth 1997; USFWS 1997; Marine Turtle Expert Working Group (TEWG) 1998 & 2000), recovery plans for Endangered Species Act-listed sea turtles and marine mammals (NMFS 1991; NMFS and USFWS 1991a; NMFS and USFWS 1991b; NMFS and USFWS 1992; NMFS 1998; USFWS and NMFS 1992; NMFS 2005), the marine mammal stock assessment reports (*e.g.*, Waring *et al*. 2006,2007 and 2008), and other publications (*e.g.*, Clapham *et al.* 1999; Perry *et al.* 1999; Wynne and Schwartz 1999; Best *et al.* 2001; Perrin *et al*. 2002). Additionally, the Center for Biological Diversity and the Turtle Island Restoration Network has recently filed a petition to reclassify loggerhead turtles in the North Pacific Ocean as a distinct population segment (DPS) with endangered status and designate critical habitat under the ESA (72 *Federal Register* 64585; November 16, 2007). While this petition is geared toward the North Pacific, the possibility exists that it could affect status in other areas. NMFS has found that the petition presents substantial scientific information that the petition action may be warranted, and has published a notice and request for comments, available at: http://www.nmfs.noaa.gov/pr/pdfs/fr/fr72-64585.pdf.

5.1.7.1 Sea Turtles

Loggerhead, leatherback, Kemp's ridley, and green sea turtles occur seasonally in southern New England and Mid-Atlantic continental shelf waters north of Cape Hatteras. In general, turtles move up the coast from southern wintering areas as water temperatures warm in the spring (James *et al*. 2005; Morreale and Standora 2005; Braun-McNeill and Epperly 2004; Morreale and Standora 1998; Musick and Limpus 1997; Shoop and Kenney 1992; Keinath *et al.* 1987). The trend is reversed in the fall as water temperatures cool. By December, turtles have passed Cape Hatteras, returning to more southern waters for the winter (James *et al*. 2005; Morreale and Standora 2005; Braun-McNeill and Epperly 2004; Morreale and Standora 1998; Musick and Limpus 1997; Shoop and Kenney 1992; Keinath *et al.* 1987). Hard-shelled species are typically observed as far north as Cape Cod whereas the more cold-tolerant leatherbacks are observed in more northern Gulf of Maine waters in the summer and fall (Shoop and Kenney 1992; STSSN database).

Sea turtles are known to be captured in gillnet and trawl gear; gear types that are used in the skate fishery. According to the monthly reports on the NEFSC website for March 2006 – February 2008, one loggerhead turtle was taken in observed groundfish trips by a bottom trawl, and none were observed in sink gillnets.

5.1.7.2 Large Cetaceans (Baleen Whales and Sperm Whale)

The western North Atlantic baleen whale species (Northern right, humpback, fin, sei, and minke) follow a general annual pattern of migration from high latitude summer foraging grounds, including the Gulf of Maine and Georges Bank, and low latitude winter calving grounds (Perry *et al.* 1999; Kenney 2002). However, this is an oversimplification of species movements, and the complete winter distribution of most species is unclear (Perry et al. 1999; Waring et al. *2008*). Studies of some of the large baleen whales (right, humpback, and fin) have demonstrated the presence of each species in higher latitude waters even in the winter (Swingle *et al*. 1993; Wiley *et al*. 1995; Perry *et al*. 1999; Brown *et al*. 2002).

In comparison to the baleen whales, sperm whale distribution occurs more on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring *et al*. 2005). However, sperm whales distribution in U.S. EEZ waters also occurs in a distinct seasonal cycle (Waring *et al*. *2008*). Typically, sperm whale distribution is concentrated east-northeast of Cape Hatteras in winter and shifts northward in spring when whales are found throughout the Mid-Atlantic Bight (Waring *et al*. 2005). 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.* 1999).

Right whales and sei whales feed on copepods (Horwood 2002; Kenney 2002). The groundfish fishery will not affect the availability of copepods for foraging right and sei whales because copepods are very small organisms that will pass through skate fishing gear rather than being captured in it. Blue whales feed on euphausiids (krill) (Sears 2002) which, likewise, are too small to be captured in skate fishing gear. Humpback whales and fin whales also feed on krill as well as small schooling fish (e.g., sand lance, herring, mackerel) (Aguilar 2002; Clapham 2002). Fish species caught in skate gear are species that live in benthic habitat (on or very near the bottom) such as flounders versus schooling fish such as herring and mackerel that occur within the water column. Sperm whales feed on larger organisms that inhabit the deeper ocean regions (Whitehead 2002). The skate fishery does not operate in these deep water areas.

The skate fishery does not operate in low latitude waters where calving and nursing occurs for these large cetacean species (Aguilar 2002; Clapham 2002; Horwood 2002; Kenney 2002; Sears 2002; Whitehead 2002).

Gillnet gear is known to pose a risk of entanglement causing injury and death to large cetaceans. Right whale, humpback whale, and minke whale entanglements in gillnet gear have been documented (Johnson *et al*. 2005; Waring *et al*. *2008*). However, it is often not possible to attribute the gear to a specific fishery. For the period March 2006 – December 2008, five incidents of whale takes were observed on trips targeting groundfish, all of which were taken in bottom trawl trips. Of those five takes, four were of whales that were in various states of decomposition, while one pilot whale was deemed “fresh”. In July 2008, a humback whale was observed alive and entangled in gillnet gear used to target cod. Also, a fresh dead minke whale was observed in bottom trawl gear used to target winter flounder.

5.1.7.3 Small Cetaceans (Dolphins, Harbor Porpoise and Pilot Whale)

Numerous small cetacean species (dolphins, pilot whales, harbor porpoise) occur within the area from Cape Hatteras through the Gulf of Maine. Seasonal abundance and distribution of each species in Mid-Atlantic, Georges Bank, and/or Gulf of Maine waters varies with respect to life history characteristics. Some species primarily occupy continental shelf waters (e.g., white sided dolphins, harbor porpoise), while others are found primarily in continental shelf edge and slope waters (e.g., Risso's dolphin), and still others occupy all three habitats (e.g., common dolphin, spotted dolphins). Information on the western North Atlantic stocks of each species is summarized in Waring *et al*. (*2008*). Small cetaceans are known be captured in gillnet and trawl gear, although the rate of bycatch of harbor porpoise in trawl gear may be low. In recent data, there were six observed (fresh dead) takes of harbor porpoise in NE bottom trawl gear from 2003-2006.

With respect to harbor porpoise specifically, the most recent Stock Assessment Reports show that the estimated number of harbor porpoise takes is increasing, moving closer to the Potential Biological Removal level calculated for this species rather than declining toward the long-term Zero Mortality Rate Goal (ZMRG), which is 10 percent of PBR (approximately 75 animals). The most recent stock assessment report states that the average annual estimated harbor porpoise mortality and serious injury in the Northeast sink gillnet fishery during 1994-1998, before the Harbor Porpoise Take Reduction Plan (HPTRP), was 1,163, and from 2000 to 2005 was 480 (Waring *et al.*, 2008). The assessment also states that the total annual estimated average human-caused mortality is 734 harbor porpoises per year, including 77 from Canadian fisheries and 5 from unknown fisheries using strandings data. This is an increase from 575 in the previous assessment. The Harbor Porpoise Take Reduction Team is currently developing options to reduce takes.

5.1.7.4 Pinnipeds

Of the four species of seals expected to occur in the area, harbor seals have the most extensive distribution with sightings occurring as far south as 30° N (Katona *et al*. 1993). Grey seals are the second most common seal species in U.S. EEZ waters, occurring primarily in New England (Katona *et al.* 1993; Waring *et al*. *2008*). Pupping colonies for both species are also present in New England, although the majority of pupping occurs in Canada. Harp and hooded seals are less commonly observed in U.S. EEZ waters. Both species form aggregations for pupping and breeding off of eastern Canada in the late winter/early spring, and then travel to more northern latitudes for molting and summer feeding (Waring *et al*. *2008*). However, individuals of both species are also known to travel south into U.S. EEZ waters and sightings as well as strandings of each species have been recorded for both New England and Mid-Atlantic waters (Waring *et al*. *2008*). All four species of seals are known to be captured in gillnet and/or trawl gear (Waring *et al*. *2008*).

5.2 Physical Environment

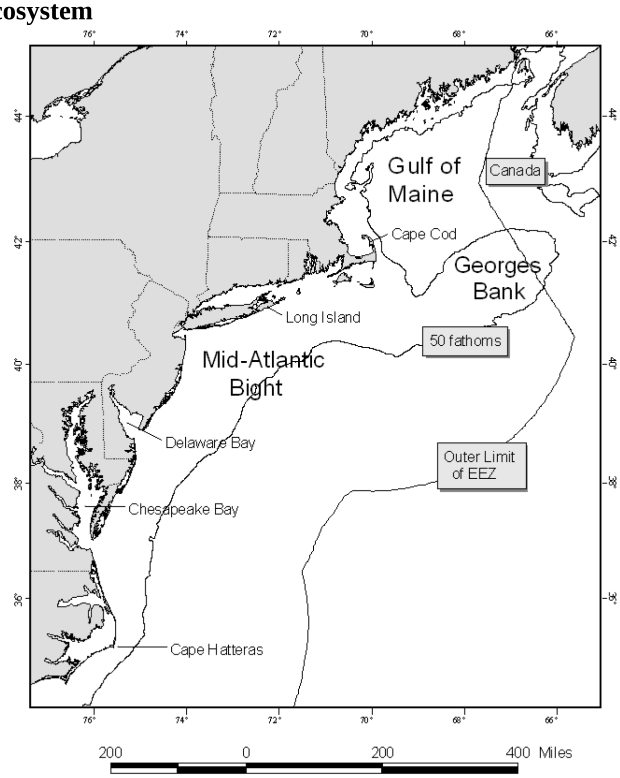
The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. The continental slope includes the area east of the shelf, out to a depth of 2000 m. Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope (see Map 13 and Map 14).

The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge.

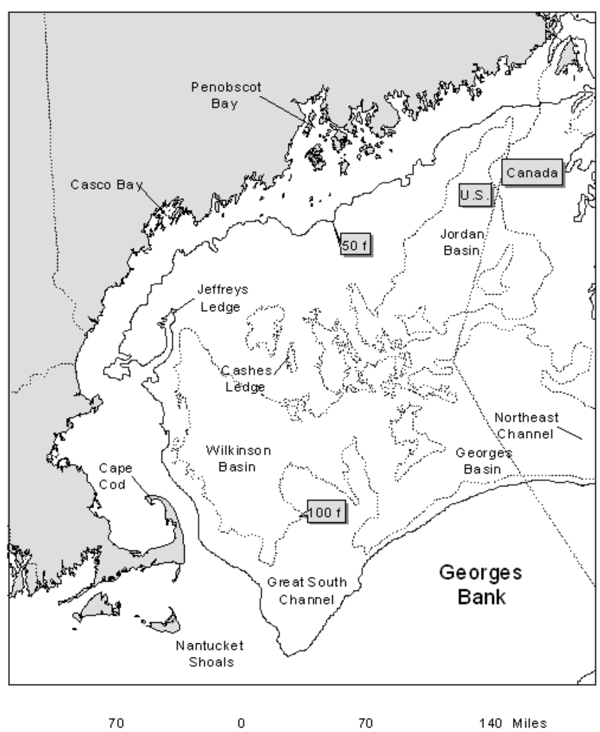
It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

Pertinent physical characteristics of the sub-regions that could potentially be affected by this action are described in this section. Information included in this document was extracted from Stevenson et al. (2004).

Map 13. Northeast shelf ecosystem



Map 14. Gulf of Maine.



Gulf of Maine

Although not obvious in appearance, the Gulf of Maine (GOM) is actually an enclosed coastal sea, bounded on the east by Browns Bank, on the north by the Nova Scotian (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank. The GOM was glacially derived, and is characterized by a system of deep basins, moraines and rocky protrusions with limited access to the open ocean. This geomorphology influences complex oceanographic processes that result in a rich biological community.

The GOM is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The GOM's geologic features, when coupled with the vertical variation in water properties, result in a great diversity of habitat types. It contains twenty-one distinct basins separated by ridges, banks, and swells. The three largest basins are Wilkinson, Georges, and Jordan. Depths in the basins exceed 250 meters (m), with a maximum depth of 350 m in Georges Basin, just north of Georges Bank. The Northeast Channel between Georges Bank and Browns Bank leads into Georges Basin, and is one of the primary avenues for exchange of water between the GOM and the North Atlantic Ocean.

High points within the Gulf include irregular ridges, such as Cashes Ledge, which peaks at 9 m below the surface, as well as lower flat topped banks and gentle swells. Some of these rises are remnants of the sedimentary shelf that was left after most of it was removed by the glaciers. Others are glacial moraines and a few, like Cashes Ledge, are outcroppings of bedrock. Very fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the GOM, particularly in its deep basins. These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains. Some shallower basins are covered with mud as well, including some in coastal waters. In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, as on Sewell Ridge to the north of Georges Basin and on Truxton Swell to the south of Jordan Basin. Sand predominates on some high areas and gravel, sometimes with boulders, predominates on others.

Coastal sediments exhibit a high degree of small-scale variability. Bedrock is the predominant substrate along the western edge of the GOM north of Cape Cod in a narrow band out to a depth of about 60 m. Rocky areas become less common with increasing depth, but some rock outcrops poke through the mud covering the deeper sea floor. Mud is the second most common substrate on the inner continental shelf. Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Many of these basins extend without interruption into deeper water. Gravel, often mixed with shell, is common adjacent to bedrock outcrops and in fractures in the rock. Large expanses of gravel are not common, but do occur near reworked glacial moraines and in areas where the seabed has been scoured by bottom currents. Gravel is most abundant at depths of 20 - 40 m, except in eastern Maine where a gravel-covered plain exists to depths of at least 100 m. Bottom currents are stronger in eastern Maine where the mean tidal range exceeds 5 m. Sandy areas are relatively rare along the inner shelf of the western GOM, but are more common south of Casco Bay, especially offshore of sandy beaches.

Georges Bank

Georges Bank is a shallow (3 - 150 m depth), elongate (161 km wide by 322 km long) extension of the continental shelf that was formed by the Wisconsinian glacial episode. It is characterized by a steep slope on its northern edge and a broad, flat, gently sloping southern flank. The Great South Channel lies to the west. Natural processes continue to erode and rework the sediments on Georges Bank. It is anticipated that erosion and reworking of sediments will reduce the amount of sand available to the sand sheets, and cause an overall coarsening of the bottom sediments (Valentine and Lough 1991).

Glacial retreat during the late Pleistocene deposited the bottom sediments currently observed on the eastern section of Georges Bank, and the sediments have been continuously reworked and redistributed by the action of rising sea level, and by tidal, storm and other currents. The strong, erosive currents affect the character of the biological community. Bottom topography on eastern Georges Bank is characterized by linear ridges in the western shoal areas; a relatively smooth, gently dipping sea floor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 m high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin.

The central region of the Bank is shallow, and the bottom is characterized by shoals and troughs, with sand dunes superimposed upon them. The two most prominent elevations on the ridge and trough area are Cultivator and Georges Shoals. This shoal and trough area is a region of strong currents, with average flood and ebb tidal currents greater than 4 km/h, and as high as 7 km/h. The dunes migrate at variable rates, and the ridges may also move. In an area that lies between the central part and Northeast Peak, Almeida *et al.* (2000) identified high-energy areas as between 35 - 65 m deep, where sand is transported on a daily basis by tidal currents, and a low-energy area at depths > 65 m that is affected only by storm currents.

The area west of the Great South Channel, known as Nantucket Shoals, is similar in nature to the central region of the Bank. Currents in these areas are strongest where water depth is shallower than 50 m. This type of traveling dune and swale morphology is also found in the Mid-Atlantic Bight, and further described in that section of the document. The Great South Channel separates the main part of Georges Bank from Nantucket Shoals. Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm generated ripples, and scattered shell and mussel beds. Tidal and storm currents range from moderate to strong, depending upon location and storm activity (Valentine, pers. comm.).

<u>Mid-Atlantic Bight</u>

The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank south to Cape Hatteras, and east to the Gulf Stream. Like the rest of the continental shelf, the topography of the Mid-Atlantic Bight was shaped largely by sea level fluctuations caused by past ice ages. The shelf's basic morphology and sediments derive from the retreat of the last ice sheet, and the subsequent rise in sea level. Since that time, currents and waves have modified this basic structure.

Shelf and slope waters of the Mid-Atlantic Bight have a slow southwestward flow that is occasionally interrupted by warm core rings or meanders from the Gulf Stream. On average, shelf water moves parallel to bathymetry isobars at speeds of 5 - 10 cm/s at the surface and 2 cm/s or less at the bottom. Storm events can cause much more energetic variations in flow. Tidal currents on the inner shelf have a higher flow rate of 20 cm/s that increases to 100 cm/s near inlets.

The shelf slopes gently from shore out to between 100 and 200 km offshore where it transforms to the slope (100 - 200 m water depth) at the shelf break. In both the Mid-Atlantic and on Georges Bank, numerous canyons incise the slope, and some cut up onto the shelf itself. The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales. Most of these structures are relic except for some sand ridges and smaller sand-formed features. Shelf valleys and slope canyons were formed by rivers of glacier outwash that deposited sediments on the outer shelf edge as they entered the ocean. Most valleys cut about 10 m into the shelf, with the exception of the Hudson Shelf Valley that is about 35 m deep. The valleys were partially filled as the glacier melted and retreated across the shelf. The glacier also left behind a lengthy scarp near the shelf break from Chesapeake Bay north to the eastern end of Long Island. Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

Some sand ridges are more modern in origin than the shelf's glaciated morphology. Their formation is not well understood; however, they appear to develop from the sediments that erode from the shore face. They maintain their shape, so it is assumed that they are in equilibrium with modern current and storm regimes. They are usually grouped, with heights of about 10 m, lengths of 10 - 50 km and spacing of 2 km. Ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. The seaward face usually has the steepest slope. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Swales occur between sand ridges. Since ridges are higher than the adjacent swales, they are exposed to more energy from water currents, and experience more sediment mobility than swales. Ridges tend to contain less fine sand, silt and clay while relatively sheltered swales contain more of the finer particles. Swales have greater benthic macrofaunal density, species richness and biomass, due in part to the increased abundance of detrital food and the physically less rigorous conditions.

Sand waves are usually found in patches of 5 - 10 with heights of about 2 m, lengths of 50 - 100 m and 1 - 2 km between patches. Sand waves are primarily found on the inner shelf, and often observed on sides of sand ridges. They may remain intact over several seasons. Megaripples occur on sand waves or separately on the inner or central shelf. During the winter storm season, they may cover as much as 15% of the inner shelf. They tend to form in large patches and usually have lengths of 3 - 5 m with heights of 0.5 - 1 m. Megaripples tend to survive for less than a season. They can form during a storm and reshape the upper 50 - 100 cm of the sediments within a few hours. Ripples are also found everywhere on the shelf, and appear or disappear within hours or days, depending upon storms and currents. Ripples usually have lengths of about 1 - 150 cm and heights of a few centimeters.

Sediments are uniformly distributed over the shelf in this region. A sheet of sand and gravel varying in thickness from 0 - 10 m covers most of the shelf. The mean bottom flow from the constant southwesterly current is not fast enough to move sand, so sediment transport must be episodic. Net sediment movement is in the same southwesterly direction as the current. The sands are mostly medium to coarse grains, with finer sand in the Hudson Shelf Valley and on the outer shelf. Mud is rare over most of the shelf, but is common in the Hudson Shelf Valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges. Fine sediment content increases rapidly at the shelf break, which is sometimes called the "mud line," and sediments are 70 - 100% fines on the slope. On the slope, silty sand, silt, and clay predominate.

The northern portion of the Mid-Atlantic Bight is sometimes referred to as southern New England. Most of this area was discussed under Georges Bank; however, one other formation of this region deserves note. The mud patch is located just southwest of Nantucket Shoals and southeast of Long Island and Rhode Island. Tidal currents in this area slow significantly, which allows silts and clays to settle out. The mud is mixed with sand, and is occasionally resuspended by large storms. This habitat is an anomaly of the outer continental shelf.

Artificial reefs are another significant Mid-Atlantic habitat, formed much more recently on the geologic time scale than other regional habitat types. These localized areas of hard structure have been formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle and Zetlin 2000). While some of materials have been deposited specifically for use as fish habitat, most have an alternative primary purpose; however, they have all become an integral part of the coastal and shelf ecosystem. It is expected that the increase in these materials has had an impact on living marine resources and fisheries, but these effects are not well known. In general, reefs are important for attachment sites, shelter, and food for many species, and fish predators such as tunas may be attracted by prey aggregations, or may be behaviorally attracted to the reef structure.

5.3 Essential Fish Habitat

EFH descriptions and maps for the skate species can be found in the FMP for the Skate Complex and for the other NEFMC-managed species in the NEFMC's 1998 Omnibus EFH amendment. Skate EFH maps are also available for viewing via the Essential Fish Habitat Mapper: http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx. The current EFH text descriptions are linked from this location.

A more detailed discussion of habitat types, as well as biological and physical effects of fishing by various gears in the skate fishery is provided in the 2008 SAFE Report, or Section 7.4.6 of Skate Amendment 3 (NEFMC 2009). An up-dated summary of gear effects research studies that are relevant to the NE region will be included in the revised gear effects section of the NEFMC Omnibus EFH Amendment 2 (Phase 2), which is currently being developed.

5.4 Economic Environment

The purpose of this section is to describe and characterize the various fisheries in which skates are caught. It is meant to supplement and update sections of the 2000 Stock Assessment and Fishery Evaluation (SAFE) Report for the Northeast Skate Complex (NEFMC 2001), completed as part of the FEIS for the original Skate FMP (NEFMC 2003). Descriptive information on the fisheries is included, and where possible, quantitative commercial fishery and economic information is presented.

5.4.1 Description of Directed Skate Fisheries

5.4.1.1 The Skate Bait Fishery

One of the primary markets for skate products in the northeast U.S. is for bait. Small, whole skates are among the preferred baits for the regional American lobster (*Homarus americanus*) fishery. Most of the skate bait fishery occurs in southern New England waters, and is largely comprised of little skate (>90%), with a smaller percentage of winter skate occurring seasonally. The following sections describe the major ports and other aspects of the skate bait fishery.

5.4.1.1.1 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 are little skates, with a small percentage of winter skates. 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.

The directed skate 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. The vast majority of the landings are caught south of Block Island in federal waters. 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 20 - 30 Rhode Island otter trawl vessels ranging from 50 – 70 feet dominate the bait market. Approximately eight 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 5,000 – 20,000 pounds of skates per trip, while trip boats fishing (>24 hours) generally 2 days, land approximately 40,000 – 50,000 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 500 – 2,000 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 decreased so has the demand for skates. Trap reductions in both the inshore and offshore fisheries as well as the collapse of the LI sound fishery have contributed to the decreased demand. Vessels that used to fish 3,500 traps now fish approximately 1,800. 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. Although there is an overall decrease in demand maintaining a supply is still very difficult for a variety of reasons. As DAS are adjusted via the Multispecies FMP, fewer days or hours can be allocated to fishing for low value species such as skates. These DAS will be reserved for groundfish or leased to other vessels. Many vessels run out of DAS by December also limiting supply and multispecies vessels are forced to take a 20 day block between March and May, prohibiting the use of a DAS which is a requirement of the directed skate fishery. More recently, high fuel prices are causing vessels to work on more profitable species. Rather than fishing an area where it is known to be largely skate, vessels now need to land a mixed trip (skate & groundfish) in order to justify the DAS usage.

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. There has also been a tremendous increase in crabbing during these winter months (avg. $0.65/lb). 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 $0.08 - $0.10 per pound. 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 100 lobster businesses located in Point Judith, Wickford, Newport, Westerly, and Jamestown, RI, along with businesses scattered throughout Connecticut and Massachusetts. The company buys from 12- 15 vessels throughout the year, and ten 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 - 4 crewmembers per vessel. The other major skate dealer in Rhode Island supplies local Newport, Sakonnet, and New Bedford vessels and numerous offshore lobster vessels fishing in the Gulf of Maine. Skates are supplied to this dealer from draggers working out of Newport and Tiverton, RI and New Bedford, MA.

Approximately eighty percent of the skates landed for bait are sold as strung bait, at about $1.04 for a string of three skates, usually 120 strings (of three) per barrel for $121.00. Under current lobster pot limitations, the minimum bait costs for inshore areas limited to 800 pots is estimated at $832 per trip and $2,000 per trip for offshore lobster vessels limited to 1800 pots. Offshore vessels reported carrying between 15 – 30 barrels of bait per trip, which could reflect different baiting patterns. Skates are also sold by the barrel unsalted and unstrung ($50 - $60) or by the barrel unstrung and salted ($65). 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 400 – 500 pounds. Menhaden bait (pogies) prices vary between $50 – $70 per barrel ($56 per 30gl barrel), depending upon the port and the weight.

Due to direct, independent contracts between draggers and lobster vessels landings of skates are estimated to be under-documented. While bait skates are always landed (rather than transferred at sea) they are not always reported because they can be sold directly to lobster vessels by non federally permitted vessels, which are not required to report as dealers.

5.4.1.1.2 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. Refer to Section 5.4.1.3.6 for a description of skate bait landings by port.

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 Acadian redfish in their pots. Some offshore boats have indicated they will use soft bait during the summer months when their soak time is shorter. Skates used by the Gulf of Maine vessels are caught by vessels fishing in the southern New England area.

5.4.1.1.3 The Southern New England Sink Gillnet Fishery

The southern New England sink gillnet fishery targets winter skates 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 monkfish. Little skates are also caught incidentally year-round in 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 incidental skate catch due to cutbacks in their fishery mandated by both the Monkfish and Multispecies FMPs. Gillnet vessels use 12-inch mesh when monkfishing, catching larger skates. Southern New England fishermen have reported increased catches of barndoor skates in the last few years.

5.4.1.1.4 Regulatory Issues for the Bait Fishery

Two existing and significant regulatory limitations on the directed bait skate fishery include lobster regulations which mandate a decrease in pot limits and groundfish DAS requirements. A majority of directed skate fishermen fish in federal waters, possess multispecies permits, and fish for skates with gear capable of catching multispecies. This, in turn, means that they must use a DAS when fishing for skates unless fishing in an exempted fishery. There are currently two exempted skate fisheries in the Southern New England Exemption Area; one gillnet fishery and one deepwater trawl fishery.

Effort in the skate fishery is reduced during the winter months because it becomes more difficult to budget DAS usage, especially for vessels that fish for groundfish either seasonally or year-round (in addition to directing on skates). Due to effort reductions in the multispecies fishery (e.g., Amendment 13, Framework 42), the majority of full-time skate vessels are presently limited to less than 50 DAS per fishing year.

Since the implementation of the Skate FMP in 2003, vessels fishing in the skate bait fishery that wish to be exempt from the skate possession limits must acquire a Letter of Authorization (LOA) from the Regional Administrator. A number of vessels remain under the mistaken impression that this LOA also exempts them from DAS requirements. However, these vessels must still be fishing in an exempted fishery to be exempt from DAS.

5.4.1.2 The Skate Wing Fishery

The other primary market for skates in the region is the wing market. Larger skates, mostly captured by trawl gear, have their pectoral flaps, or wings, cut off and sold into this market. Attempts to develop domestic markets were short-lived, and the bulk of the skate wing market remains overseas. Winter, thorny, and barndoor skates are considered sufficient in size for processing of wings, but due to their overfished status, possession and landing of thorny and barndoor skates has been prohibited since 2003. Winter skate is therefore the dominant component of the wing fishery, but illegal thorny and barndoor wings still occasionally occur in landings (Table 13).

Table 13. Skate wing fishery species composition[9] (% total) in sampled landings. Source: Skate wing dockside sampling by port agents, NMFS Fisheries Statistics Office.

	Percent of Total						
Species	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Mean/Year**
Winter	84.11%	90.77%	97.97%	99.22%	99.12%	95.31%	**94.41%**
Thorny	5.99%	9.22%	1.54%	0.13%	0.43%	0.61%	**2.99%**
Barndoor	1.12%	0.00%	0.49%	0.00%	0.00%	0.00%	**0.27%**
Little*	8.62%	0.01%	0.00%	0.66%	0.45%	4.08%	**2.30%**
N	1784	7442	12640	11095	11444	15474	**59879**

Only in recent years have skate wing landings been identified separately from general skate landings. Landed skate wings are seldom identified to species by dealers. Skate processors buy whole, hand-cut, and/or onboard machine-cut skates from vessels primarily out of Massachusetts and Rhode Island. Because of the need to cut the wings, it is relatively labor-intensive to fish for skates. Participation in the skate wing fishery, however, has recently grown due to increasing restrictions on other, more profitable groundfish species. It is assumed that more vessels land skate wings as an incidental catch in mixed fisheries than as a targeted species.

Notable is that 85% or more of the skates being landed for the wing market are winter skates, so regulations for the wing fishery primarily have an impact on that species. It is also notable that only a

[9] Some winter skates may have been mis-identified as little skates, or vessels catching skates for the wing market may land some large little skates incidentally.

little over 3 percent of landed skates were identified by port agents as a prohibited species. And this proportion declined with time, averaging around 0.5% since 2008.

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. 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. Refer to Section 5.4.1.3.6 for a description of skate wing landings by port.

The current market for skate wings remains primarily an export market. France, Korea, and Greece are the leading importers. 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. Fishermen indicate that dealers prefer large-sized winter skates for the wing market (over three pounds live weight).

5.4.1.3 Commercial Fishery Landings

This section presents available commercial landings information for the northeast region skate complex from 2000-2007. This includes total annual landings; landings by market category; landings by state, gear type, port, and area fished; Canadian skate landings; and recreational skate landings. For data previous to 2000, refer to the 2000 SAFE Report (NEFMC 2001).

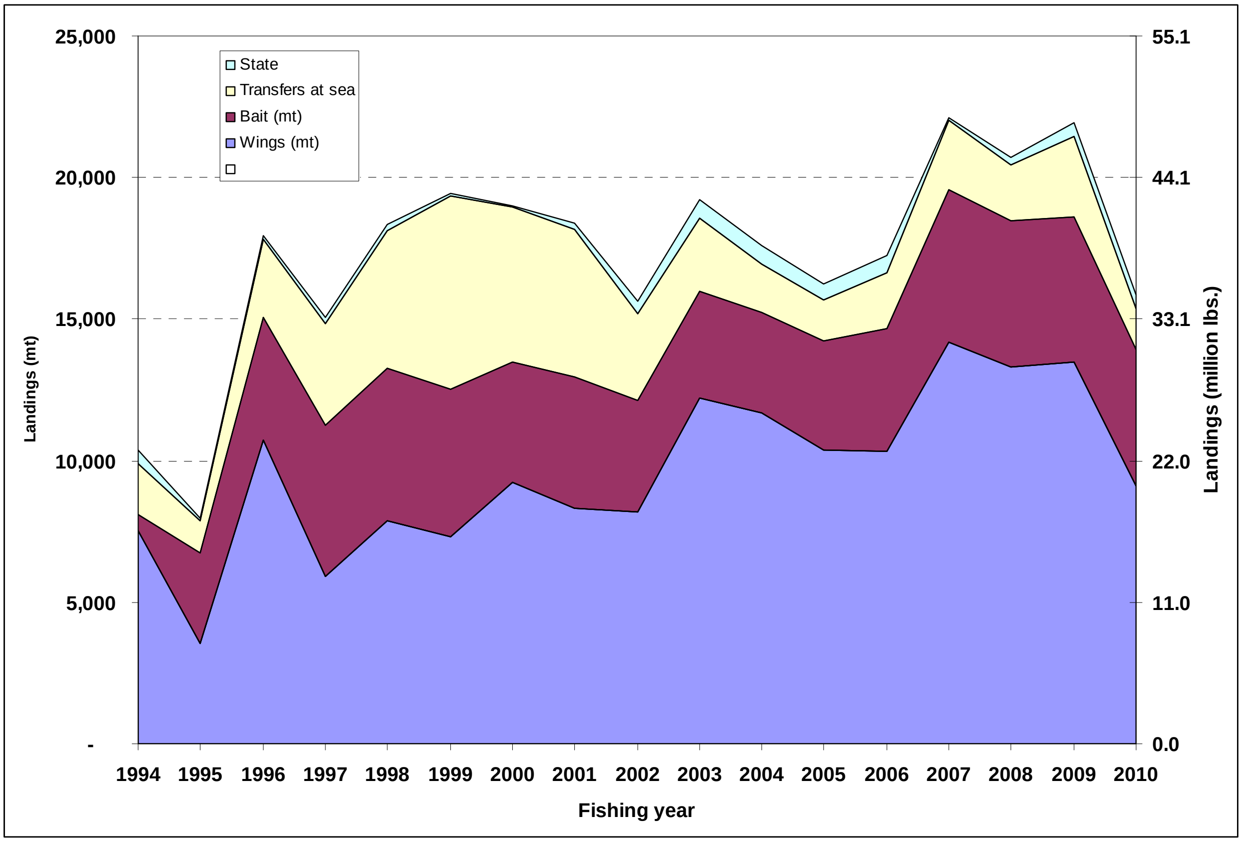
Note that NMFS estimates commercial skate landings from the dealer weighout database and reports total skate landings according to *live weight* (i.e., the weight of the whole skate). This means that a conversion factor is applied to all wing landings so that the estimated weight of the entire skate 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).

5.4.1.3.1 Total Commercial Landings

Due to the relative absence of recreational skate fisheries, virtually all skate landings are derived from regional commercial fisheries. Skates have been reported in New England fishery landings since the late 1800s. However, commercial fishery landings never exceeded several hundred metric tons until the advent of distant-water fleets during the 1960s. Skate landings reached 9,500 mt in 1969, but declined quickly during the 1970s, falling to 800 mt in 1981 (Figure 1). Landings have since increased substantially, partially in response to increased demand for lobster bait and the increased export market for skate wings. In 2007, skate landings were the highest ever recorded, exceeding 19,000 mt. The increased demand for skate products since the mid-1980s has concurrently resulted in declining discard rates for skates (Figure 1).

Amendment 3 was implemented on June 16, 2010, near the beginning of the 2010 fishing year. Landings from 2009 to 2010 decline by 28% to 15,836 mt, largely from reductions in the wing fishery. Skate transfers at sea for bait, reported on VTRs, also declined by 50% to 1,427 mt. State landings in the figure below include landings reports by dealers which have no or aggregate federal permit numbers, but for actual monitoring purposes, the NE Regional Office determines whether the vessel has a federal permit at the time of landing. State landings in the figure below are henceforth underestimated, compared to TAL monitoring data.

Figure 1. Annual U.S. skate landings (mt), 1994 – 2010 fishing years. The Skate Complex FMP was implemented in 2003.



5.4.1.3.2 Landings by fishery

Federal permitted seafood dealers report skate landings by intended market, recorded with either a disposition or utility code. Although slight differences occur (and the disposition code began in 1996), nearly all of the skate landings are recorded as ‘bait’ or ‘food or unknown’ and the two codes agree in the vast majority of cases. In addition, vessel operators report landings and transfers at sea (dealer=000002) by vessel trip reports (VTR) since 1994.

Skate landings reported for the food market began at least as early as 1963, with 26,000 lbs. of landings (Table 14). Wing landings rose to 35 million pounds in 2003 and then varied between 24.5 and 32.5 million pounds since then, before declining to 22.2 million pounds in 2010. Over the period 1995-2006 (the period used in Amendment 3 to allocate landings to wing and bait fisheries), wing landings averaged 73.2% of total skate landings. From 1995-2009, before Amendment 3 implementation, wing landings averaged 72.5% of total landings.

Reported bait landings increased rapidly from the first reports in 1983 to 12.2 million pounds in 1992, before declining to relatively low levels from 1995-2003. During this time, it appeared that reported transfers at sea of skates for bait replaced the bait landings reported to dealers, peaking at 15 million pounds in 2000. Bait landings reported by dealers increase by about 10% to 10.0 million pounds during fishing year 2010. Bait landings reported by dealers accounted for 6.7 of total skate landings during 1995-2006 and 9.8% of landings during 1995-2009. Transfers of sea of skates for bait averaged 20.1 %

of total skate landings during 1995-2006 and 17.7% of total skate landings during 1995-2009. Taken together, the bait landings sold to dealers or transferred at sea averaged 26.8% of total skate landings during 1995-2006 and 27.5% during 1995-2009.

On a price per whole pound basis[10], skate prices for wings were two to two and half times those paid by dealers for bait (Table 14). In 2010, however, bait prices increased to $0.25 per pound, while prices for wings increased slightly to $0.23 per whole pound (or $0.52 for wings). It should be noted that in 2010, skate wing prices varied considerably as the supply of skate wings changed in response to skate possession limit changes.

Table 14. Fishing year landings and price per live pound by fishery. Source NMFS dealer SAFIS and VTR files.

	Bait			Transfers at sea		Wings			Total Landings,
Fishing year	Landings, lbs live wt	Percent	Price per lb.	Landings, lbs live wt	Percent	Landings, lbs live wt	Percent	Price per lb.	lbs live wt
1963		0%				26	100%	$0.04	26
1964		0%				89	100%	$0.04	89
1965		0%				76	100%	$0.04	76
1966		0%				127	100%	$0.04	127
1967		0%				87	100%	$0.04	87
1968		0%				84	100%	$0.05	84
1969		0%				136	100%	$0.05	136
1970		0%				132	100%	$0.06	132
1971		0%				162	100%	$0.07	162
1972		0%				180	100%	$0.07	180
1973		0%				176	100%	$0.08	176
1974		0%				223	100%	$0.08	223
1975		0%				277	100%	$0.10	277
1976		0%				291	100%	$0.13	291
1977		0%				331	100%	$0.12	331
1978		0%				821	100%	$0.12	821
1979		0%				1,562	100%	$0.14	1,562
1980		0%				854	100%	$0.13	854
1981		0%				733	100%	$0.14	733
1982		0%				1,506	100%	$0.08	1,506
1983	92	4%	$0.59			1,988	96%	$0.06	2,080
1984	18	1%	$0.06			1,801	99%	$0.06	1,818
1985	114	7%	$0.05			1,612	93%	$0.07	1,725
1986	277	11%	$0.05			2,221	89%	$0.08	2,498
1987	81	2%	$0.06			4,525	98%	$0.08	4,606
1988	9,019	67%	$0.05			4,343	33%	$0.08	13,362
1989	9,105	57%	$0.05			7,007	43%	$0.10	16,112
1990	10,554	41%	$0.05			15,421	59%	$0.10	25,976
1991	12,195	46%	$0.05			14,140	54%	$0.09	26,335
1992	12,068	44%	$0.06			15,182	56%	$0.13	27,250
1993	1,923	11%	$0.07			15,370	89%	$0.16	17,293
1994	1,019	5%	$0.06			17,864	95%	$0.28	18,883
1995	3,883	20%	$0.21	3,980	21%	11,197	59%	$0.22	19,060
1996	23	0%	$0.12	2,525	7%	33,451	93%	$0.19	35,999
1997	97	0%	$0.06	6,115	19%	25,255	80%	$0.14	31,467
1998	654	2%	$0.06	7,890	21%	29,033	77%	$0.13	37,578
1999	145	0%	$0.10	10,752	28%	27,716	72%	$0.12	38,613
2000	50	0%	$0.12	15,040	33%	29,832	66%	$0.13	44,922
2001	1,184	3%	$0.16	12,050	29%	27,832	68%	$0.11	41,066
2002	665	2%	$0.21	11,564	29%	27,091	69%	$0.13	39,319
2003	865	2%	$0.08	6,753	16%	35,736	82%	$0.13	43,353
2004	7,417	18%	$0.08	5,717	14%	27,616	68%	$0.17	40,750
2005	8,086	22%	$0.10	3,777	10%	24,546	67%	$0.20	36,409
2006	6,870	19%	$0.09	3,158	9%	26,711	73%	$0.25	36,739
2007	9,247	19%	$0.09	4,256	9%	33,979	72%	$0.22	47,482
2008	9,130	20%	$0.10	5,448	12%	30,739	68%	$0.20	45,317
2009	9,050	20%	$0.11	4,350	9%	32,486	71%	$0.20	45,886
2010	10,012	26%	$0.25	6,280	16%	22,247	58%	$0.23	38,539
1995-2006		6.7%			20.1%		73.2%		
1995-2009		9.8%			17.7%		72.5%		

Nearly all skate bait landings are landed in whole form (Table 15). Some dealers have reported landings of wings for the bait market, but these reports may either be inaccurate or represent landings of wings that cannot be marketed for food. On the other hand, since 1995 a significant amount of landings for the skate wing market (reported as 'food or unknown' on dealer reports were landed in whole form, presumably cut shoreside with the carcasses either sold as bait or disposed as unmarketable. This practice (landing whole skates for the wing market) seemed to be more prevalent from 1995 to 2003, but it appears to coincide with a period of low landings reports by dealers. Thus some of these landings of whole skates for the wing market were probably really destined for the skate market and not reported or coded accurately on the dealer reports. It would be difficult to distinguish the difference in the dealer report data without making assumptions.

[10] Skate landings reported as wing landings are converted using an accepted ratio of 2.27.

Table 15. Skate landings by fishery and product form.

	Bait		Bait Total	Food or unknown		Food or unknown Total
FISHING_YEAR	Whole	Wings		Whole	Wings	
1963				26		26
1964				89		89
1965				76		76
1966				127		127
1967				87		87
1968				84		84
1969				136		136
1970				132		132
1971				162		162
1972				180		180
1973				176		176
1974				223		223
1975				277		277
1976				291		291
1977				331		331
1978				821		821
1979				1,562		1,562
1980				854		854
1981				733		733
1982				392	1,113	1,506
1983	92		92	242	1,746	1,988
1984	18		18	83	1,717	1,801
1985	114		114	177	1,435	1,612
1986	277		277	197	2,024	2,221
1987	81		81	86	4,439	4,525
1988	9,019		9,019	168	4,175	4,343
1989	9,102	3	9,105	674	6,333	7,007
1990	10,554		10,554	370	15,052	15,421
1991	12,061	134	12,195	657	13,483	14,140
1992	11,945	123	12,068	378	14,805	15,182
1993	1,906	17	1,923	684	14,686	15,370
1994	1,017	3	1,019	560	17,304	17,864
1995	3,843	40	3,883	3,172	8,025	11,197
1996	23		23	9,587	23,864	33,451
1997	97		97	11,812	13,443	25,255
1998	654	0	654	11,293	17,740	29,033
1999	113	32	145	11,504	16,213	27,716
2000	50		50	9,338	20,495	29,832
2001	1,183	1	1,184	9,159	18,673	27,832
2002	638	27	665	8,589	18,501	27,091
2003	865		865	8,345	27,391	35,736
2004	7,412	5	7,417	1,182	26,433	27,616
2005	8,003	84	8,086	1,222	23,324	24,546
2006	6,853	17	6,870	2,970	23,741	26,711
2007	9,246	0	9,247	2,603	31,376	33,979
2008	9,130		9,130	2,358	28,381	30,739
2009	9,050	0	9,050	2,590	29,897	32,486
2010	9,417	595	10,012	1,014	21,233	22,247

5.4.1.3.3 Landings by State

Table 16 presents commercial landings of skates by individual states from 2003 – 2010. Massachusetts and Rhode Island continue to dominate the skate fishery, averaging about 20 – 30 million lb annually across the time series. Skate landings from Massachusetts and Rhode Island comprised 80-94% of the total reported annual skate landings during this period. Rhode Island landings have remained fairly consistent but declined in 2009 and 2010, while Massachusetts landings have increased significantly since 2000, before dropping in 2010. New Jersey, New York, Connecticut, Maine, New Hampshire, and Virginia land relatively small amounts of skates. Reported skate landings from Maine and New Hampshire have decreased in recent years. Very few skates are landed in Maryland and North Carolina, and Delaware (no listed due to confidentiality) reported minimal skate landings for the time series.

From 2009 to 2010, bait landings increased by 7 percent, mostly from increases in RI where bait landings increased by 10%. Wing landings, on the other hand, declined by 33% to 22 million pounds, mostly in MA. Wing landings in RI were about the same as they were in 2009, but less than half of the amounts in 2003 to 2010. It may be that the utility code reported by dealers for landings in RI (where most bait landings occur) were misclassified before 2009. Skate wing landings in NJ and NY increased by 22 and 42 percent, respectively.

Table 16. U.S. skate landings (thousands lbs) by state, 2003-2010. *Source: NMFS Dealer reports.*

		Fishing year								
Fishery	**State**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Change**
Bait	CT	690	6	620	413	419			320	
	MA			1	32	129	592	2,043	1,603	-22%
	MD	45	0	5	10			0	8	4755%
	NJ	129	5	16			60	349	511	46%
	RI	0	17	33	57	301	1,943	6,594	7,246	10%
	VA	1	0	6		15	13	64	9	-85%
Bait Total		865	28	682	512	864	2,608	9,050	9,697	7%
Wing	CT	292	905	153	151	126	1,455	956	224	-77%
	MA	20,054	23,766	20,523	23,511	29,868	26,134	23,541	12,075	-49%
	MD	15	10	22	17	53	107	173	52	-70%
	ME	103	26	4	7	68	9	6	10	72%
	NC	1	1	0	0	1	11	4	17	366%
	NH	25	24	20	26	11	12	15	7	-50%
	NJ	855	776	794	963	1,326	1,579	2,174	2,661	22%
	NY	767	420	375	515	776	942	1,458	2,076	42%
	RI	13,582	9,003	10,024	8,036	10,111	8,323	4,349	4,341	0%
	VA	82	71	65	24	122	137	366	584	59%
Wing Total		35,776	35,003	31,981	33,251	42,461	38,708	33,041	22,048	-33%
Grand Total		36,640	35,031	32,663	33,763	43,325	41,316	42,090	31,745	-25%

5.4.1.3.4 Landings by Market Category

The Skate FMP implemented new reporting requirements for skates beginning in 2003. A list of the available skate codes in the dealer weighout database is included in Table 17. Federally permitted dealers report most of the skate wings they purchase by two separate market categories: unclassified wings (code 3651) or "big skate" (code 3671). They mostly report whole/bait skate landings as little skate (code 3660) or unclassified whole skates (code 3650). Landings reported as little skate are known to include amounts of juvenile winter skate. Although reporting of skate landings by species has been encouraged, species identification by vessels and dealers remains problematic, and most landings continue to be unclassified or misrepresented (Figure 2). This mis-identification in the landings declined in 2010 but still remains problematic.

While the landings by market category from the dealer weighout data may not be entirely complete, 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.

According to Table 18, more pounds of skates are caught for the wing market than for the bait market. For the time series, skate wing landings (*live weight*) accounted for 68-75% of the total landings. In general, the proportion of skate landings reported as wings has increased since 2000, which is also apparent in landings data for the state of Massachusetts, presented in Table 16, but declined in 2010 mostly from Amendment 3 regulations.

Revenues from wing landings are generated from *landed weight*. Wing landings receive a significantly higher ex-vessel price than bait landings, as fewer landed pounds of wings generated substantially higher revenues than the larger amounts of whole skates landed. Based on the data summarized in Table 18, the price for whole skates averaged $0.07-0.12 per lb, and the price for skate wings averaged $0.33-0.60 per lb. The price (unadjusted) for whole skates has remained relatively constant, whereas the price for skate wings has been increasing since 2001, but leveled off since 2006. Prices for wings in 2010 averaged $0.52 and the wing landings were 68% of the total.

Table 17. List of skate species and market codes used in the dealer weighout database since 2003. Note: Big skate is an alternative common name for winter skate (Leucoraja ocellata), and does not indicate the Pacific big skate (Raja binoculata).

Species Code (NESPP4)	Common Name	Grade Description	Market Description
3650	SKATES	ROUND	MIXED OR UNSIZED
3650	SKATES	ROUND	UNKNOWN
3670	SKATE, BIG	ROUND	UNKNOWN
3720	SKATE, CLEARNOSE	ROUND	UNKNOWN
3660	SKATE,LITTLE	ROUND	UNKNOWN
3640	SKATE, ROSETTE	ROUND	UNKNOWN
3680	SKATE,BARNDOOR	ROUND	UNKNOWN
3670	SKATE, WINTER	ROUND	UNKNOWN
3700	SKATE, THORNY	ROUND	UNKNOWN
3690	SKATE, SMOOTH	ROUND	UNKNOWN
3651	SKATES	WINGS	MIXED OR UNSIZED
3651	SKATES	WINGS	UNKNOWN
3671	SKATE, BIG	WINGS	UNKNOWN
3721	SKATE, CLEARNOSE	WINGS	UNKNOWN
3661	SKATE,LITTLE	WINGS	UNKNOWN
3641	SKATE, ROSETTE	WINGS	UNKNOWN
3681	SKATE,BARNDOOR	WINGS	UNKNOWN
3671	SKATE, WINTER	WINGS	UNKNOWN
3701	SKATE, THORNY	WINGS	UNKNOWN
3691	SKATE, SMOOTH	WINGS	UNKNOWN

Figure 2. Total live weight of skate landings by reported species code in the dealer SAFIS database, 2007 v 2010.

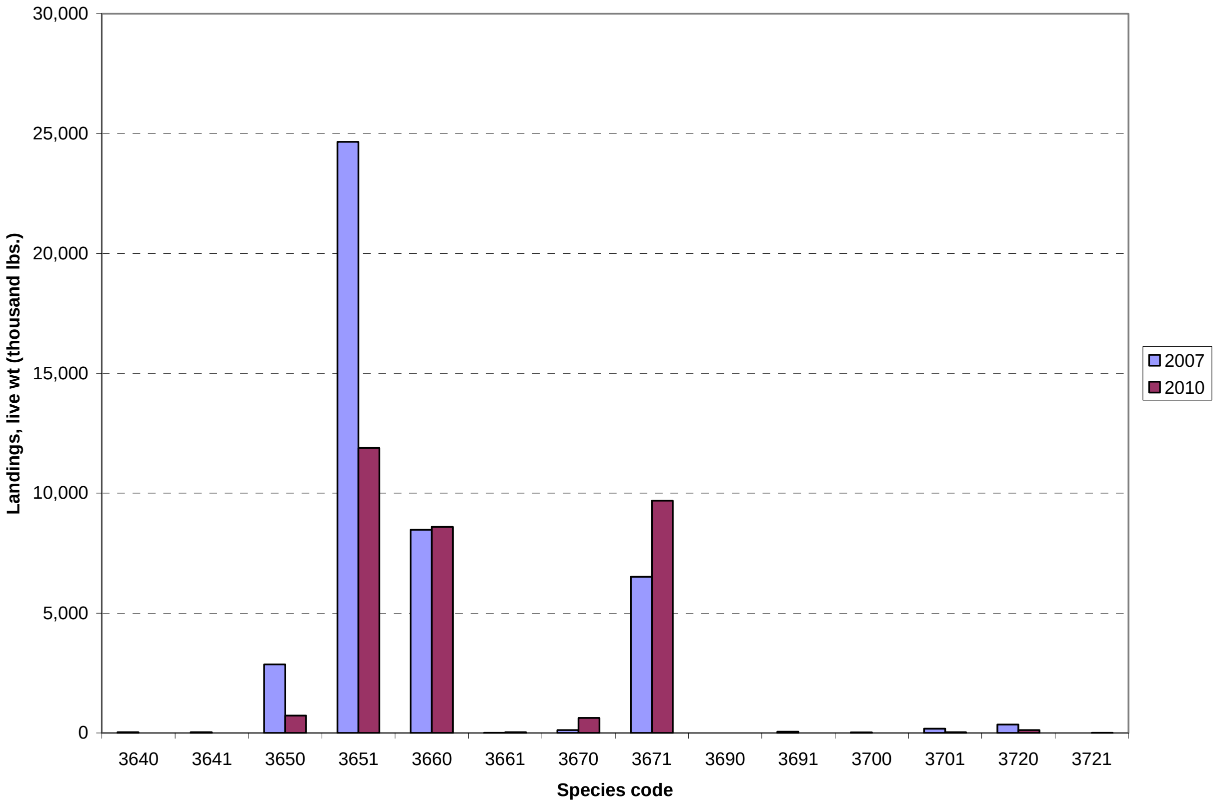


Table 18. Annual skate landings and revenue by landed form (2003-2010). *Source: Dealer SAFIS Database, NMFS*

Fishing year	Landed form	Landed weight (lb)	Live weight (lb)	Revenue (thousands)
2003	Whole	9,206,764	9,206,764	$687
	Wings	12,085,113	27,433,455	$3,928
2003 Total		21,291,877	36,640,219	$4,615
2004	Whole	8,598,935	8,598,935	$696
	Wings	11,643,823	26,431,730	$4,602
2004 Total		20,242,758	35,030,665	$5,298
2005	Whole	9,249,365	9,249,365	$993
	Wings	10,314,129	23,413,404	$4,793
2005 Total		19,563,494	32,662,769	$5,786
2006	Whole	10,054,924	10,054,924	$981
	Wings	10,444,049	23,708,338	$6,258
2006 Total		20,498,973	33,763,262	$7,240
2007	Whole	11,866,957	11,866,957	$1,129
	Wings	13,858,174	31,458,515	$7,230
2007 Total		25,725,131	43,325,472	$8,360
2008	Whole	11,488,141	11,488,141	$1,137
	Wings	13,139,784	29,827,729	$6,013
2008 Total		24,627,925	41,315,870	$7,150
2009	Whole	11,653,816	11,653,816	$1,213
	Wings	13,408,047	30,436,670	$6,305
2009 Total		25,061,863	42,090,486	$7,518
2010	Whole	10,076,697	10,076,697	$1,233
	Wings	9,545,274	21,668,234	$4,926
2010 Total		19,621,971	31,744,931	$6,159

5.4.1.3.5 Landings by Gear

Table 19 presents annual skate landings (2003-2010) from the dealer SAFIS database by gear type and by market category as a percentage of the annual total. Otter trawl is the primary gear used to land skates. Approximately 43-73% of the total skate landings during this period were captured by trawl gear. About 25-30% of the skates caught with otter trawls are landed for the lobster bait market, with the other 70-75% landed for the wing market (Table 19). Almost all skates caught for the lobster bait fishery are caught with a trawl. Gillnets are the secondary gear used to land skates. Almost all skates that are caught with gillnets are landed as wings. Between 2003 and 2010, 95-98% of the total gillnet landings of skates were wings (Table 19). Gillnet landings of skates increased over the time series, representing 25% of the total landings in 2003, but up to 47% of the total in 2010.

Other gears in which skates are consistently caught include traps, hook gear (including longlines), and scallop dredges. The overall contribution of skate landings from gears other than trawl and gillnets is relatively insignificant.

Table 19. Annual (fishing year) skate landings (live weight, thousands lbs) by gear type and market category as a percentage of total skate landings. *Source: Dealer SAFIS Database, NMFS*

Gear type	Landed form	Data	2003	2004	2005	2006	2007	2008	2009	2010
Trawls	Whole	Landings live wt (thousand lbs)	8,799	8,341	8,547	9,674	11,389	10,719	10,506	9,191
		Percent	24%	24%	26%	29%	26%	26%	25%	29%
	Wings	Landings live wt (thousand lbs)	18,072	15,105	13,708	11,904	17,494	14,018	12,799	4,311
		Percent	49%	43%	42%	35%	40%	34%	31%	14%
Trawls Landings live wt (thousand lbs)			26,871	23,446	22,255	21,578	28,883	24,737	23,305	13,502
Trawls Percent			73%	67%	68%	64%	67%	60%	56%	43%
Gill nets	Whole	Landings live wt (thousand lbs)	406	163	371	293	310	582	903	837
		Percent	1%	0%	1%	1%	1%	1%	2%	3%
	Wings	Landings live wt (thousand lbs)	9,216	9,252	7,855	10,830	13,434	13,687	15,847	15,050
		Percent	25%	27%	24%	32%	31%	33%	38%	47%
Gill nets Landings live wt (thousand lbs)			9,622	9,416	8,226	11,124	13,744	14,269	16,749	15,887
Gill nets Percent			26%	27%	25%	33%	32%	35%	40%	50%
Unknown	Whole	Landings live wt (thousand lbs)	0	31	193	40	151	144	232	21
		Percent	0%	0%	1%	0%	0%	0%	1%	0%
	Wings	Landings live wt (thousand lbs)	6	665	760	466	440	1,997	1,597	2,221
		Percent	0%	2%	2%	1%	1%	5%	4%	7%
Unknown Landings live wt (thousand lbs)			7	696	953	506	592	2,141	1,829	2,242
Unknown Percent			0%	2%	3%	2%	1%	5%	4%	7%
Dredges	Whole	Landings live wt (thousand lbs)	0	22	124	28	13	8	1	1
		Percent	0%	0%	0%	0%	0%	0%	0%	0%
	Wings	Landings live wt (thousand lbs)	18	300	971	460	67	45	36	27
		Percent	0%	1%	3%	1%	0%	0%	0%	0%
Dredges Landings live wt (thousand lbs)			18	322	1,095	488	80	52	37	28
Dredges Percent			0%	1%	3%	1%	0%	0%	0%	0%
Other nets	Whole	Landings live wt (thousand lbs)	1	0	7	0		29	8	6
		Percent	0%	0%	0%	0%	0%	0%	0%	0%
	Wings	Landings live wt (thousand lbs)	8	613	25	1	1	0	1	0
		Percent	0%	2%	0%	0%	0%	0%	0%	0%
Other nets Landings live wt (thousand lbs)			9	613	32	1	1	29	10	7
Other nets Percent			0%	2%	0%	0%	0%	0%	0%	0%
Longlines	Whole	Landings live wt (thousand lbs)		0	1	2	3	3	2	4
		Percent	0%	0%	0%	0%	0%	0%	0%	0%
	Wings	Landings live wt (thousand lbs)	79	378	54	29	11	13	25	24
		Percent	0%	1%	0%	0%	0%	0%	0%	0%
Longlines Landings live wt (thousand lbs)			79	378	54	32	14	16	27	28
Longlines Percent			0%	1%	0%	0%	0%	0%	0%	0%

5.4.1.3.6 Landings by port

Table 20 present annual skate wing landings (from the dealer SAFIS database) by port for 2003-2010. The top 15 ports in 2003-2009 represented over 93% of the total skate landings in the region. In 2010, the top 15 ports contributed to only 88% of skate wing landings, suggesting that the top ports may have been impacted more by the Amendment 3 regulations than ports with lower skate wing landings. New Bedford suffered a 72% decline in reported landings for the skate wing market.

Currently, the top ports landing whole skates for lobster bait are:

2003-2010	2010
1. Point Judith	1. Point Judith
2. Tiverton	2. Newport
3. New Bedford	3. Fall River
4. Newport	4. Chatham
5. Stonington	5. Belford

Currently, the top ports landing skate wings are:

2003-2010	2010
1. New Bedford	1. Chatham
2. Chatham	2. New Bedford
3. Point Judith	3. Point Judith
4. Boston	4. Gloucester
5. Barnegat Light	5. Barnegat Light

New Bedford, MA and Chatham still dominate skate landings, averaging over 43% of the total skate landings in 2010. New Bedford and Chatham dominate skate wing landings, and Point Judith dominates skate bait landings. Between 2003-2010, an average of 97% of New Bedford's skate landings were classified as wings. All of New Bedford's 2010 landings were classified as wings. An average of 78% of Point Judith's skate landings were classified as whole skates (Table 20). Wing landings as a percentage in Point Judith increased to 33% in 2009 and 2010. Since 2000, skate wing landings in Provincetown, MA have declined, while landings in Chatham, MA have increased substantially.

Table 20. Annual skate landings (live weight, thousands lbs) for top 15 ports by market category and as a percentage of total skate landings (2003-2010). *Source: Dealer SAFIS Database, NEFSC*

Port	State		2003	2004	2005	2006	2007	2008	2009	2010	Change
NEW BEDFORD	MA	Landings live wt (thousand lbs)	13,611	16,001	14,583	15,025	20,406	16,948	15,207	4,193	-72%
		Percent	38%	46%	46%	45%	48%	44%	46%	19%	
CHATHAM	MA	Landings live wt (thousand lbs)	4,757	5,997	4,522	6,212	7,334	6,675	5,884	5,261	-11%
		Percent	13%	17%	14%	19%	17%	17%	18%	24%	
POINT JUDITH	RI	Landings live wt (thousand lbs)	10,111	5,779	5,540	5,100	5,663	4,864	2,140	2,694	26%
		Percent	28%	17%	17%	15%	13%	13%	6%	12%	
TIVERTON	RI	Landings live wt (thousand lbs)	2,381	2,383	2,884	1,658	2,540	995	120	121	1%
		Percent	7%	7%	9%	5%	6%	3%	0%	1%	
NEWPORT	RI	Landings live wt (thousand lbs)	299	319	1,078	1,022	1,597	1,488	694	624	-10%
		Percent	1%	1%	3%	3%	4%	4%	2%	3%	
BARNEGAT LIGHT/LONG BEACH	NJ	Landings live wt (thousand lbs)	383	313	375	244	489	536	1,258	1,639	30%
		Percent	1%	1%	1%	1%	1%	1%	4%	7%	
GLOUCESTER	MA	Landings live wt (thousand lbs)	534	360	326	347	455	561	772	1,859	141%
		Percent	1%	1%	1%	1%	1%	1%	2%	8%	
LITTLE COMPTON	RI	Landings live wt (thousand lbs)	752	510	258	221	302	798	1,241	713	-43%
		Percent	2%	1%	1%	1%	1%	2%	4%	3%	
BOSTON	MA	Landings live wt (thousand lbs)	441	680	538	709	781	697	525	344	-34%
		Percent	1%	2%	2%	2%	2%	2%	2%	2%	
HAMPTON BAYS	NY	Landings live wt (thousand lbs)	303	155	84	175	362	377	508	522	3%
		Percent	1%	0%	0%	1%	1%	1%	2%	2%	
POINT PLEASANT	NJ	Landings live wt (thousand lbs)	235	138	143	158	227	286	483	696	44%
		Percent	1%	0%	0%	0%	1%	1%	1%	3%	
OTHER CONNECTICUT	CT	Landings live wt (thousand lbs)		0			19	1,366	737	62	-92%
		Percent	0%	0%	0%	0%	0%	4%	2%	0%	
MONTAUK	NY	Landings live wt (thousand lbs)	169	103	102	150	234	202	541	644	19%
		Percent	0%	0%	0%	0%	1%	1%	2%	3%	
FALL RIVER	MA	Landings live wt (thousand lbs)	194	246	22	520	299	741	30	4	-87%
		Percent	1%	1%	0%	2%	1%	2%	0%	0%	
WESTPORT	MA	Landings live wt (thousand lbs)	209	172	182	84	111	190	463	44	-91%
		Percent	1%	0%	1%	0%	0%	0%	1%	0%	

5.4.1.3.7 Landings by Day-at-Sea Program

This section has not been updated since the Amendment 3 FEIS, due to difficulties using the revised DAS data, but is retained as background. The requirement, described below, for vessels to use a DAS remains as a deterrent to derby-style fishing behavior in the skate wing fishery and as an input control on vessel capacity. As of Amendment 3 implementation, vessels were limited to possession no more than 500 lbs./day when on a Category B Multispecies DAS, so the amount of landings in this category is expected to have been much less in 2010.

Upon implementation of the Skate FMP in 2003, vessels were required to fish on a Multispecies, Monkfish, or Scallop Day-at-Sea (DAS) to possess skates, unless fishing in an exempted fishery. This management measure was an indirect method to control effort in the skate fishery, which has a great deal of overlap with these fisheries. The tables and figures below characterize the skate landings in each of these DAS programs.

The vast majority (73-84%) of skate landings from a DAS program are landed on Multispecies A DAS (Table 21). During the time series, 15.3 – 22.2 million lb of skates were landed in this program. This program represents the majority of effort in the northeast groundfish fleet. Landings by vessels fishing on Monkfish DAS have been relatively stable at 0.6 – 1.9 million lb per year. Vessels fishing on combination Monkfish/Multispecies A DAS landed 2.0 – 5.6 million lb annually. Skate landings by vessels fishing on Scallop DAS have been relatively negligible. Skates captured by scallop dredge vessels tend to be discarded.

Landings in the Multispecies B DAS program have increased since its implementation in 2004 (Table 21). This program was designed to allow vessels to target healthy groundfish stocks, primarily haddock, in specific areas using certain gears without using their A DAS. Since B DAS vessels fishing with trawl gear may only possess up to 500 lb of skates, the increase in skate landings observed in 2007 in this program was mainly attributed to vessels fishing with gillnets (Figure 5). Virtually all of the skate landings in the Multispecies B DAS program are landed for the wing market (Figure 3).

Table 21. Total skate landings (lb live weight) by DAS program, 2000-2007.

Calender Year	MUL A	MUL B	MNK	MNK/MUL	SC
2000	16,673,711	NA	1,037,993	2,817,080	66,012
2001	15,320,262	NA	764,437	3,037,382	6,405
2002	17,538,086	NA	665,661	3,845,897	2,796
2003	22,205,726	NA	601,063	4,123,343	63
2004	19,760,823	547,717	1,271,352	1,991,829	0
2005	17,715,403	967,069	1,911,588	2,754,418	10,835
2006	19,083,200	64,956	1,358,881	5,652,650	4,629
2007	20,349,972	1,715,633	1,087,857	2,571,196	0

Source: NMFS, Fisheries Statistics Office

In the earlier parts of this time series, skate wing landings by trawl vessels far exceeded the landings of other gears on A DAS. Since 2003, however, gillnets have become the dominant gear landing skate wings on A DAS (Figure 4). As noted above, gillnets are also the primary gear for skate wings in the B DAS program.

Figure 3. Skate Bait and Wing landings by Multispecies A and B vessels, 2000-2007.

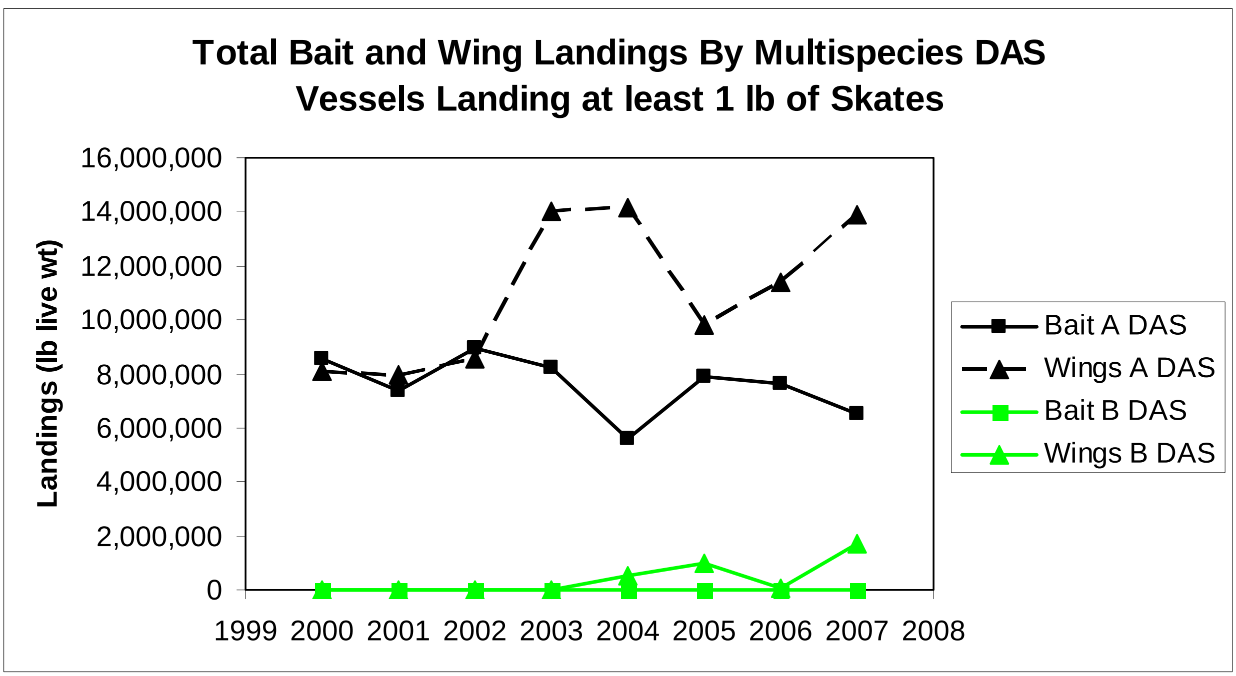


Figure 4. Skate Wing landings by gear type on Multispecies A DAS, 2000-2007

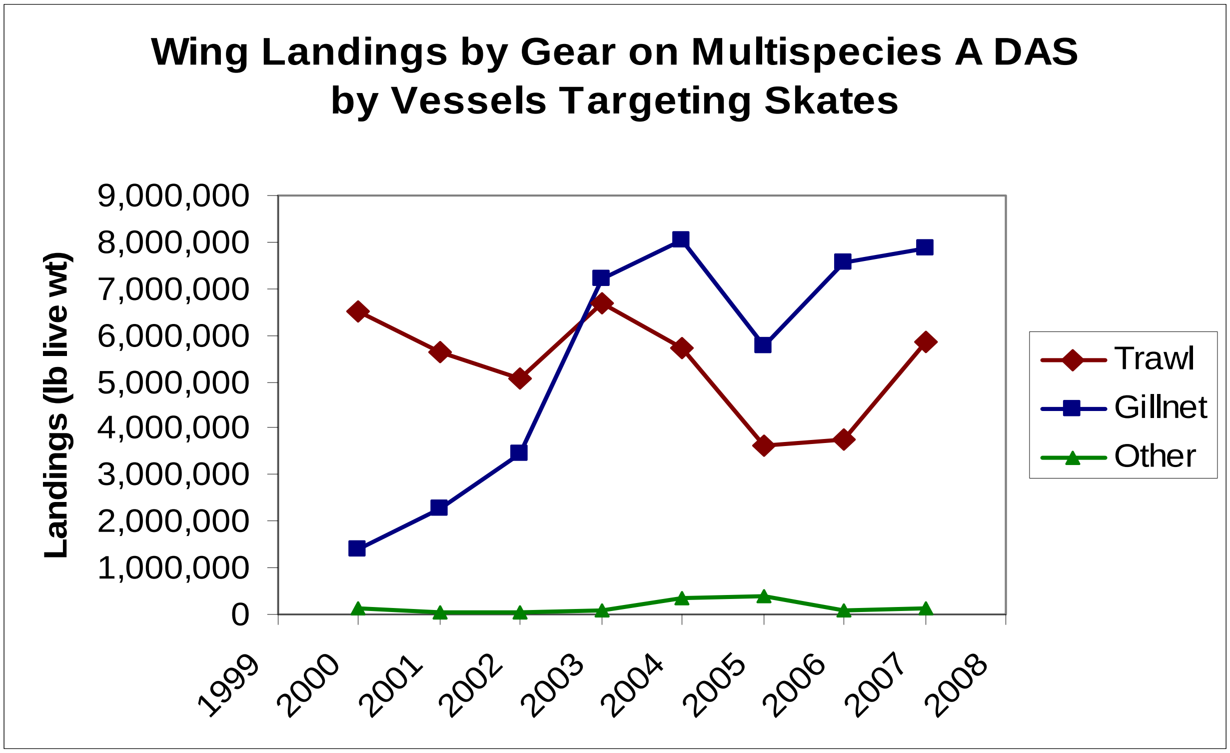
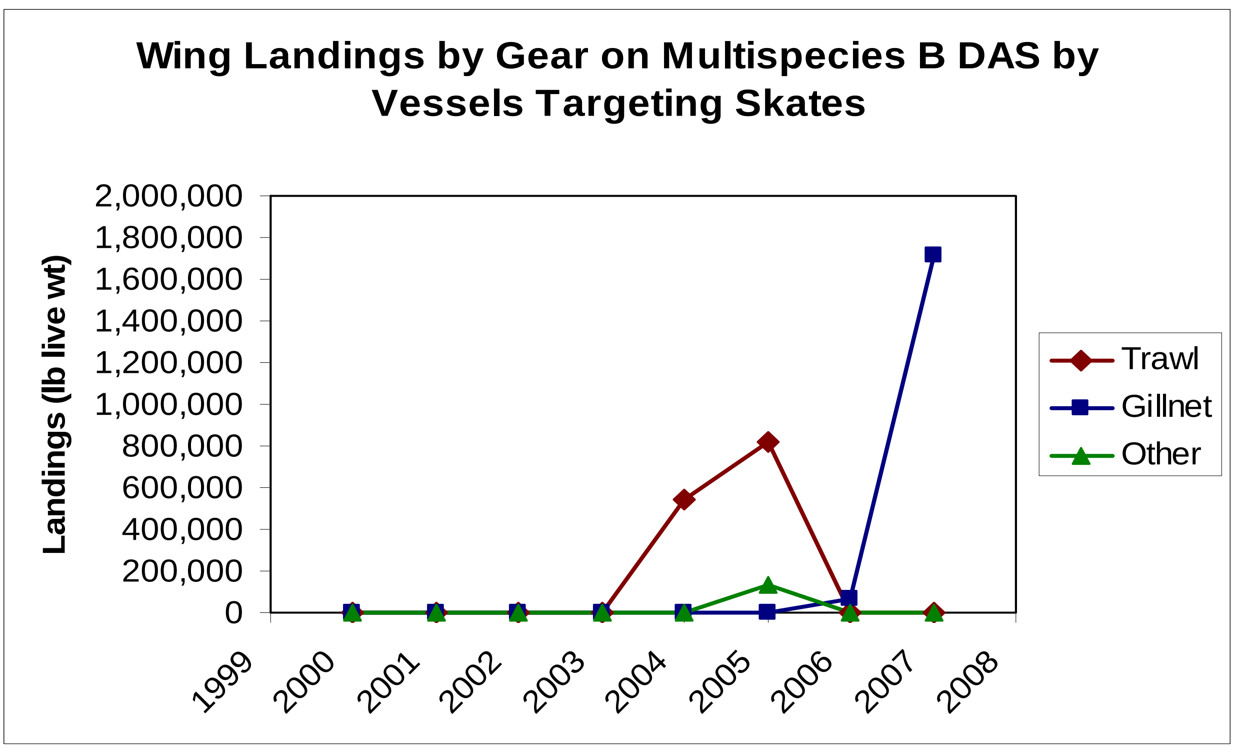


Figure 5. Skate Wing landings by gear type on Multispecies B DAS, 2000-2007.



5.4.1.4 Fishing Areas

Vessels landing skates for the wing market either target skates on Georges Bank, in the Great South Channel near Cape Cod, MA, or west of the Nantucket Lightship Area in Southern New England waters. Maps of effort distributions are presented in Section 6.1.1, which analyzes the effect of skate management areas on skate fishing. Vessels using gillnets often target skates to supply the wing market by fishing east of Cape Cod, MA.

Other vessels land skates for the wing market while fishing for other species. Vessels fishing for groundfish and in particularly flounders often land an incidental catch of skates. These vessels often fish in Massachusetts Bay and on Georges Bank. Some vessels fishing for scallops using dredges also land skates, but in particular scallop vessels with general category permits that fished in the Great South Channel often land skates. There is also a mixed monkfish/skate fishery that occurs west of the Nantucket Lightship Area and off Northern NJ, near Point Pleasant.

A skate fishery in RI and to a lesser extent in New Bedford supplies a lobster bait market, by landing whole skates while fishing inshore waters of Southern New England. Most of these vessels use trawls and often fish in an exempted fishery.

According to landings data, assigned to statistical fishing area with matching VTR reports, the majority of skate wing landings from vessels using trawls are caught on Georges Bank and landed in MA (Table 22). These wing landings fell off dramatically in 2010, much more than in other states or other areas, possibly related to new skate and groundfish rules. Nearly all of the skate wing landings decrease occurred in New Bedford by vessels using trawls, a pattern not reflected nearly as dramatically in other ports in MA or elsewhere.

Skate wing landings in MA by vessels using gillnets were more evenly split, 60% from Georges Bank and 30% from Southern New England (Table 22). And despite the reduced possession limit for vessels using a gillnet while using a Category B Multispecies DAS[11] and the Amendment 3 skate possession limits, the landings by vessels using gillnets declined relatively little in 2010. In fact significant landings in RI and NY from Southern New England waters remained nearly steady and in NJ from the Mid-Atlantic waters actually increased in 2010.

Some whole skate landings in MA from the Gulf of Maine and RI from Southern New England waters were reported for vessels using gillnets (Table 23). These landings were either relatively stable in 2010 or increased by about 200,000 lbs and most of these landings were probably landed in whole form for the wing market, with carcasses being sold for bait. Most of the whole skate landings for the bait market come from Southern New England waters (Table 40??) and are caught by vessels using trawls. MA landings primarily come from Southern New England waters and dropped by about 2/3rds in 2010. The majority of whole skate landings by trawl vessels occurred in RI from Southern New England waters and declined by about 15% from fishing year 2009 to 2010.

[11] Amendment 3 reduced the possession limit for gillnet vessels on a Category B DAS from 20,000 lbs. to 220 lbs. of skate wings.

Table 22. Skate wing landings (live wt, thousand lbs.) for vessels using trawls and gillnets by fishing year, state, and area.

		Trawls								Trawls Total	Gill nets								Gill nets Total
STATEABB	REGION	2003	2004	2005	2006	2007	2008	2009	2010		2003	2004	2005	2006	2007	2008	2009	2010	
CT	Georges Bank	52				2	1	6	0	62									
	Gulf of Maine							0		0			1				13	25	39
	Mid-Atlantic			1			0	0	0	1						2	1	1	4
	Southern New England	84	90	114	23	21	60	48	37	477	112	43	38	74	4	26	194	109	601
	Unknown				53	47	1		5	107				2	32	11	99	28	172
CT Total		136	90	114	76	71	62	55	43	647	112	43	39	76	36	38	307	163	815
MA	Georges Bank	11,489	12,567	10,399	10,240	14,909	11,473	10,452	2,052	83,581	4,509	5,486	4,057	6,482	9,192	7,505	6,399	5,581	49,211
	Gulf of Maine	663	310	386	356	311	442	626	210	3,305	243	123	179	277	230	135	441	920	2,548
	Mid-Atlantic	1	30	0		4	85	31	1	151	4	7	27	90	25	6	53		212
	Southern New England	1,031	988	1,458	250	597	530	74	48	4,976	1,914	1,372	1,904	1,931	1,899	2,871	3,150	2,213	17,254
	Unknown	1	364	108	76	25	31	12	539	1,156	15	291	148	509	59	197	275	323	1,816
MA Total		13,185	14,259	12,351	10,922	15,846	12,562	11,194	2,851	93,169	6,686	7,278	6,316	9,288	11,405	10,713	10,318	9,037	71,041
MD	Mid-Atlantic	5	4	14	7	14	23	107	18	191	5	5	3	6	12	6	22	24	84
	Unknown								0	0					0	1	0	12	12
MD Total		5	4	14	7	14	23	107	19	192	5	5	3	6	12	7	23	36	96
ME	Georges Bank	19	18	2	6	64	8		5	124	3								3
	Gulf of Maine	76	7	1	1	3	0	6	0	94	4	0	1	0	0		0		5
	Southern New England														0				0
	Unknown					0			5	5		1							1
ME Total		95	25	3	7	68	9	6	10	223	8	1	1	0	0		0		10
NC	Mid-Atlantic															0			0
	Unknown						3		5	8	1	1	0		0	8	4	10	25
NC Total							3		5	8	1	1	0		0	9	4	10	25
NH	Georges Bank	3			0	0				3	0		0		0				0
	Gulf of Maine	9	9	5	11	7	8	5	2	55	10	14	15	11	4	3	9	4	71
	Mid-Atlantic													0			0		1
	Unknown	0	0	0	0		0		0	1	2	1	0	1	0	0	0	0	5
NH Total		12	9	5	11	7	8	5	2	59	12	15	15	12	4	3	9	4	76
NJ	Gulf of Maine			0					0	0		1			1	5	7		14
	Mid-Atlantic	82	70	35	60	115	102	169	192	825	534	397	474	409	721	845	1,563	1,770	6,713
	Southern New England	2	2	1	1	0	5	1	1	13	24	4	7	9	5	7	106	32	196
	Unknown	0	0	0	0	0		1	128	130	47	54	4	1	6	1	11	396	520
NJ Total		84	72	36	61	116	107	171	322	968	606	456	485	419	733	858	1,688	2,198	7,442
NY	Georges Bank	0	0			1		3	1	5					0		0		0
	Gulf of Maine	1			1		8		0	10					16	0	3	6	25
	Mid-Atlantic	11	3	6	7	14	8	19	4	73	98	50	54	51	40	53	79	44	467
	Southern New England	210	62	62	133	178	211	234	240	1,329	400	58	75	126	395	297	738	697	2,785
	Unknown	0	13	4	2	12	14	17	142	204	16	137	24	95	16	217	58	186	749
NY Total		223	79	72	142	204	242	274	387	1,622	513	244	153	271	467	568	878	932	4,026
RI	Georges Bank	215	142	301	149	400	237	411	57	1,911	0	2		1			0	8	11
	Gulf of Maine		2	0	1		0	2	0	5					1	0	1	0	2
	Mid-Atlantic			2	2	16	2	3	2	27		0	0	0		7	2		9
	Southern New England	4,099	424	810	524	752	753	562	301	8,225	1,219	1,128	754	695	663	1,384	2,062	1,986	9,891
	Unknown		0	0	1	0	0	2	295	299	0	18	24	54	1		211	106	414
RI Total		4,314	568	1,113	676	1,169	992	980	655	10,467	1,220	1,148	778	750	665	1,391	2,276	2,100	10,328
VA	Gulf of Maine																	2	2
	Mid-Atlantic	18	0	0	1	0	11	7	7	45	54	55	60	9	106	96	344	426	1,148
	Southern New England						0	1		1									
	Unknown								10	10		5	6	0	6	5		140	162
VA Total		18	0	0	1	0	11	8	17	56	54	59	66	9	111	100	344	568	1,312

Table 23. skate landings (live wt, thousand lbs.) for vessels using trawls and gillnets by fishing year, state, and area

		Trawls								Trawls Total	Gill nets								Gill nets Total
STATEABB	REGION	2003	2004	2005	2006	2007	2008	2009	2010		2003	2004	2005	2006	2007	2008	2009	2010	
CT	Georges Bank		0	1	2			0	0	3									
	Mid-Atlantic			0						0	0								0
	Southern New England	690	772	601	394	23			335	2,814	43	5	17	6	0				71
	Unknown				11	379	0		2	392					18				18
CT Total		690	772	602	407	401	0	0	337	3,210	43	5	17	6	18				89
MA	Georges Bank	55	30	46	197	48	55	17		449	23	0	6	55	1	5	4	1	95
	Gulf of Maine	7	6	53	66	8	29	44	3	216	1	0	6	2	28	240	262	566	1,104
	Mid-Atlantic						4			4							3	0	3
	Southern New England	1	226	24	2,172	2,258	2,749	3,178	701	11,308		2	97	82	59	84	9		332
	Unknown		20	2	40	127	89	152	300	729		6	42	49	20	31	157	19	323
MA Total		62	283	124	2,476	2,441	2,926	3,391	1,003	12,706	24	8	150	187	108	360	435	585	1,858
MD	Mid-Atlantic	5	1	9	14	1			4	33	0	0	0	0					0
	Unknown	45				19	22		1	86	0				1	3			4
MD Total		50	1	9	14	19	22		4	119	0	0	0	0	1	3			4
ME	Gulf of Maine										0								0
	Unknown											0							0
ME Total											0	0							0
NC	Unknown								2	2				0	1				1
NC Total									2	2				0	1				1
NH	Gulf of Maine											0					0	0	0
	Unknown																0		0
NH Total												0					0	0	0
NJ	Georges Bank				3					3									
	Mid-Atlantic	163	233	67	423	455	650	616	496	3,104	0	0	13	1		0	0	0	14
	Southern New England	0		3		2	1	0	0	7									
	Unknown	129	0						103	233			0						0
NJ Total		293	234	70	427	457	651	616	599	3,347	0	0	13	1		0	0	0	15
NY	Georges Bank		0				0	1	0	1					2				2
	Gulf of Maine								0	0					0				0
	Mid-Atlantic		0		1	1	2	1	0	6		1	7	0	5	0	3		16
	Southern New England	3	5	31	34	26	13	12	23	147	4	11	53	32	38	19	7	5	168
	Unknown				0	1	0	19	6	26		31				2	0	1	34
NY Total		3	6	31	35	28	16	33	29	180	4	42	60	32	44	21	10	6	220
RI	Georges Bank	131	15	57	124	16	22	142	0	506	17								17
	Gulf of Maine								4	4									
	Mid-Atlantic				6	4		37	11	57									
	Southern New England	7,560	7,023	7,651	6,172	8,007	7,054	6,183	5,280	54,929	317	104	130	68	136	197	433	224	1,609
	Unknown		0		2	7	16	33	1,916	1,974		3	0		2		20	22	47
RI Total		7,691	7,038	7,708	6,303	8,034	7,091	6,394	7,211	57,470	334	107	130	68	139	197	452	246	1,673
VA	Mid-Atlantic	10	8	2	13	9	13	72	6	132		0			0	1	4		6
	Unknown	1								1					1				1
VA Total		10	8	2	13	9	13	72	6	133		0			1	1	4		6
DE	Mid-Atlantic											0							0
DE Total												0							0

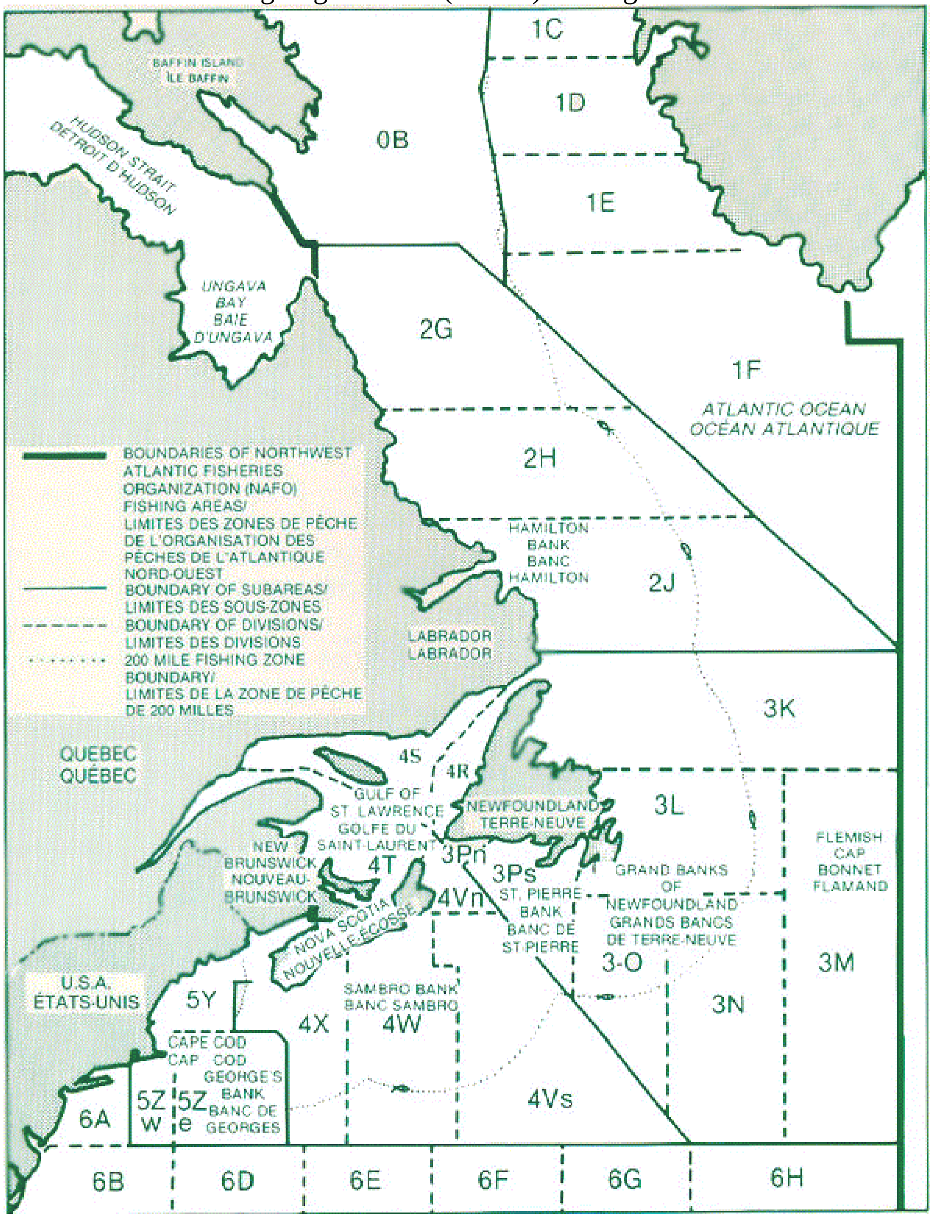
5.4.1.5 Canadian skate landings

Historical information on Canadian skate fisheries and management was described in the 2000 SAFE Report for skates, and can also be found in Swain et al. (2006) and Kulka et al. (2007). Prior to 1994, skates were only caught incidentally in Canadian fisheries like those for groundfish. However, a Canadian directed skate fishery was initiated in 1994 as a response to closures in the traditional Canadian groundfish fishery and an increasing international market for skate wings. Canadian skate catches have declined from 4200 mt in 1994, to 1100 mt in 2006 (Kulka et al. 2007).

The directed skate fishery evolved on the eastern Scotian Shelf, in NAFO Divisions 4Vs and 4W (Map 15) and targets primarily winter skate (~90%) with a small bycatch of thorny skate (less than 10%) (NEFMC 2001). A Total Allowable Catch (TAC) for the directed skate fishery in 4VsW was set in 1994 and every year thereafter to ensure that the fishery would not expand beyond sustainable levels. The TAC has been lowered almost every year since 1994 in response to interim assessments, concerns over the response of winter skate to directed fishing, and decreasing participation in the fishery. In 1994, winter skate landings exceeded 2000 mt, but as the quota has been progressively reduced, landings have fallen to less than 300 mt since 2001 (Swain et al. 2006) (Table 24). In 2005, winter skate in the southern Gulf of St. Lawrence was designated as endangered by the Committee on the Status of Endangered Wildlife in Canada. Winter skate on the eastern Scotian Shelf was also designated as threatened (Swain et al. 2006). In addition to fishing mortality, observed winter skate population declines may be influenced by natural mortality, specifically increased predation by seals (Swain et al. 2006).

While winter skate range from south of Georges Bank to the Gulf of St. Lawrence, they are near their northern limit of distribution on the offshore banks of the eastern Scotian Shelf. From observations of discontinuities in distribution, Canadian scientists believe that the winter skates in Division 4VsW are probably part of a separate stock (although very little work has been completed on skate stock delineation). Frisk et al. (2008), however, hypothesize that population connectivity exists between winter skates on the Scotian Shelf and on Georges Bank, based on trends in U.S. and Canadian trawl survey data.

Map 15. Northwest Atlantic Fishing Organization (NAFO) Fishing Areas



Map Source: Nova Scotia Department of Fisheries and Aquaculture, http://www.gov.ns.ca/fish/

Table 24. Estimated winter skate removals (tons) from NAFO Areas 4VsW, 1999-2004 (Swain et al. 2006).

Calendar year	Skate catch (mt)
1999	592
2000	358
2001	235
2002	278
2003	39
2004	233

In addition to the directed winter skate fishery in Division 4VsW, there is a fishery for thorny skates in the Grand Banks, Divisions 3L, 3N, 3O, and 3Ps depicted in Map 15. Table 25 summarizes the skate landings from these areas. Since 1998, the gears used in this fishery have been evenly distributed between gillnet, longline, and otter trawl.

Thorny skate range from Greenland to South Carolina in the northwest Atlantic, with a center of abundance on the Grand Banks. It is not presently known if the population comprises a single stock, or if there is structure between U.S., Canada, and other regional populations. Canadian assessments indicate that the thorny skate population in Areas 3LNOPs has been near historic low levels for the last 14 years, and there is evidence of hyper-aggregation (Kulka et al. 2007). The current TACs for thorny skate in Canada exceed the recommended level of exploitation to rebuild the stock.

Table 25. Canadian skate landings (tons) from NAFO Areas 3LNOPs, 1999-2006.

	NAFO Areas			
Year	**3L**	**3N**	**3O**	**3Ps**
1999	74	85	1,166	1,284
2000	139	156	620	1,053
2001	273	270	644	2,007
2002	245	385	1,175	1,503
2003	80	404	1,032	2,014
2004	50	209	536	1,200
2005	40	294	798	963
2006	23	0	246	1,149

Source: Kulka et al. (2007)

Total Canadian landings had a similar trend as described above, but since 1997 most of the landings happened in Newfoundland and Labrador. Total skate landings (see table below) since last updated in Kulka et al. (2007) remained relatively stable, between 1,000 and 1,500 mt, nearly all in the Newfoundland and Labrador province, probably having little in common with the skate stocks along the US coastline. Skate landings in the contiguous Nova Scotia province and in particularly from the Scotia/Fundy region declined from 250 – 800 mt during 1998-2007 to negligible amounts in 2008 and 2009.

Table 26. Canadian skate landings (mt, whole) by calendar year, province, and region. Source: Canada Dept. of Fisheries and Oceans: http://www.dfo-mpo.gc.ca/stats/commercial/sea-maritimes-eng.htm.

	NS			NB			PE	QC	NL	Atlantic
	S-F	Gulf	Total	S-F	Gulf	Total	Total	Total	Total	Total
1990	112	1	113	-	-	-	-	1	12	125
1991	1,109	3	1,112	-	-	-	-	1	22	1,135
1992	377	1	378	0	-	0	0	1	117	496
1993	238	-	238	-	1	1	8	0	76	323
1994	2,704	29	2,733	-	1	1	14	15	3,630	6,393
1995	1,797	0	1,797	0	1	1	27	4	4,419	6,249
1996	2,090	0	2,090	0	0	0	19	14	1,777	3,901
1997	1,497	0	1,497	0	-	0	5	10	2,862	4,373
1998	678	0	678	0	0	0	0	11	2,297	2,986
1999	765	0	765	0	0	0	4	8	2,325	3,101
2000	479	0	479	0	0	0	0	6	1,580	2,065
2001	453	0	453	0	0	0	0	4	2,171	2,628
2002	490	0	490	0	0	0	0	6	2,488	2,984
2003	380	0	380	0	0	0	0	11	2,210	2,601
2004	503	0	503	0	0	0	0	26	1,402	1,931
2005	257	0	257	0	0	0	0	22	1,510	1,789
2006	105	0	106	0	0	0	0	6	1,162	1,274
2007	254	0	254	0	0	0	0	5	1,278	1,538
2008	64	0	64	0	0	0	0	4	995	1,063
2009	36	0	37	0	0	0	0	8	1,085	1,129
2010	Not yet available									

Provinces
NS = Nova Scotia
NB = New Brunswick
PE = Prince Edward
QC= Quebec
NL = Newfoundland and Labrador

Regions
S-F = Scotia-Fundy
Gulf = Gulf of St. Laurence

5.4.1.6 Recreational skate catches

In general, skates have little to no recreational value and are not intentionally pursued in any recreational fisheries. Catch information for Atlantic coast skates from the Marine Recreational Fishery Statistics Survey (MRFSS) is presented in Table 27 and Table 30. Recreational skate catches between 2000 and 2009 ranged from 1.4 million fish in 2001 to 3.3 million fish in 2003 (Table 27). Recreational skate catch estimates have declined since 2006 to 1.8 million fish.

Recreational *harvest* of skates (MRFSS A+B1 data), where skates were retained and/or killed by the angler, represent only 0.4 – 3.0% of the estimated total catch during this time period Table 29. The vast majority of skates caught by recreational anglers are therefore considered released alive, but do not account for post-release mortality caused by hooking and handling.

New Jersey, New York, North Carolina, Massachusetts, and Virginia reported the largest recreational skate catches over the time series, but the annual catch estimates for each of those states appear to be rather inconsistent and do not illustrate any clear trends. Recreational fishers in Maine did not report catching any skates in 2004, 2006 to 2009. Catch estimates from Delaware, Maryland, Virginia, and

North Carolina suggest that some of the skates caught recreationally are either clearnose or rosette skate, or other species of skates that are not included in the northeast complex (Table 30).

Reliability of skate recreational catch estimates from MRFSS is a concern. Many summaries given in the table below include estimates with a proportional standard error (PSE) of 0.2 or more, indicating that they are not well estimated. In particular, this applies to landings and dead discards (A+B1), even for coastwide annual summaries. PSEs provide a measure of precision and represent another way to express error associated with a point estimate. Estimates with a PSE of 0.2 or less are considered to be more reliable than those with higher PSEs, and generally, PSEs of 0.2 or less are considered acceptable for fisheries data. Total catch estimates (A+B1+B2), however, appear to be more reliable than harvest estimates (A+B1 only). Since skates are not valuable and heavily-fished recreational species, the number of MRFSS intercepts from which these estimates are derived is likely to have been very low. The fewer intercepts from which to extrapolate total catch estimates there are, the less reliable the total catch estimates will be.

Table 27. Recreational skate (Family Rajidae) catch (A+B1+B2; thousand fish) on Atlantic Coast, 1981-2009. Type A catch is fish that are landed in a form that can be identified by trained interviewers. Type B1 catch is fish that are used for bait, released dead, or filleted - they are killed, but identification is by individual anglers rather than trained interviewers. Type B2 catch are fish that are released alive. Source NMFS Marine Recreational Fisheries Statistics (MRFSS): http://www.st.nmfs.noaa.gov/pls/webpls/MR_HELP.SPECIES. Estimates with proportional standard error (PSE) of 0.20 or less (available via the above website) are considered more reliable than those with higher PSEs.

Year	PRIVATE/RENTAL	SHORE	BEACH/BANK	MAN MADE	PARTY/CHARTER	CHARTER	PARTY	Grand Total
1981	150	0	24	39	15	0	0	229
1982	193	0	17	24	46	0	0	279
1983	359	0	153	26	17	0	0	555
1984	316	0	24	32	32	0	0	404
1985	883	0	11	34	12	0	0	940
1986	331	222	0	0	18	0	0	572
1987	738	39	42	3	14	0	0	837
1988	604	90	9	4	20	0	0	726
1989	266	58	51	3	29	0	0	407
1990	521	115	2	5	33	0	0	675
1991	494	58	3	7	35	0	0	597
1992	344	96	10	31	43	0	0	524
1993	642	190	20	40	39	0	0	931
1994	902	190	77	144	43	0	0	1,355
1995	481	116	62	48	59	0	0	767
1996	625	235	75	76	14	0	0	1,025
1997	804	181	88	98	46	0	0	1,217
1998	451	120	36	67	31	0	0	705
1999	344	112	181	69	7	0	0	712
2000	977	114	207	323	20	0	0	1,641
2001	937	193	126	121	45	0	0	1,422
2002	1,408	287	104	117	50	0	0	1,965
2003	2,267	507	150	242	99	0	0	3,265
2004	1,693	379	370	116	65	0	0	2,624
2005	1,557	652	173	252	0	74	24	2,732
2006	2,067	385	92	141	0	149	31	2,864
2007	1,616	427	111	84	0	48	17	2,303
2008	1,402	281	65	70	0	50	12	1,881
2009	1,268	294	215	48	0	56	4	1,886
Grand Total	24,640	5,342	2,498	2,262	832	378	87	36,039

Table 28. Recreational catch (A+B1+B2; thousand fish) by state, 2003-2009.

STATE	2003	2004	2005	2006	2007	2008	2009	Grand Total
CONNECTICUT	125	39	35	70	57	182	45	553
DELAWARE	137	150	160	166	78	116	86	893
EAST FLORIDA	1	1	5	4	2	3	2	17
GEORGIA	3	0	3	0	1	1	2	10
MAINE	1	0	3	0	0	0	0	3
MARYLAND	65	25	27	56	20	55	32	279
MASSACHUSETTS	175	347	126	149	162	146	214	1,319
NEW HAMPSHIRE	12	15	19	13	82	8	0	150
NEW JERSEY	1,482	761	731	1,032	677	651	782	6,117
NEW YORK	629	442	613	806	708	352	292	3,843
NORTH CAROLINA	440	566	528	287	235	164	288	2,508
RHODE ISLAND	53	86	66	67	112	156	51	591
SOUTH CAROLINA	28	20	4	5	18	3	5	84
VIRGINIA	115	172	413	207	151	44	85	1,186
Grand Total	3,265	2,624	2,732	2,864	2,303	1,881	1,886	17,554

Table 29. Recreational catch (total, 2007-2009) by species, mode, and distance from shore. Type A catch is fish that are landed in a form that can be identified by trained interviewers. Type B1 catch is fish that are used for bait, released dead, or filleted - they are killed, but identification is by individual anglers rather than trained interviewers. Type B2 catch are fish that are released alive.

STATE	A+B1	B2		A+B1	B2		A+B1	B2		
CONNECTICUT	6	278	284	0	0	0	0	0	0	284
DELAWARE	1	151	152	0	99	99	0	30	30	280
EAST FLORIDA	0	5	5	0	2	2	0	0	0	7
GEORGIA	0	3	3	0	1	1	0	0	0	4
MARYLAND	0	68	68	4	31	35	0	5	5	107
MASSACHUSETTS	31	277	308	2	189	191	0	23	23	522
NEW HAMPSHIRE	0	1	1	0	90	90	0	0	0	91
NEW JERSEY	2	710	712	0	1,134	1,134	0	264	264	2,110
NEW YORK	27	419	447	0	789	789	0	118	118	1,353
NORTH CAROLINA	0	75	75	0	608	608	0	4	4	687
RHODE ISLAND	10	98	108	4	199	204	0	7	7	319
SOUTH CAROLINA	1	14	15	0	12	12	0	0	0	27
VIRGINIA	3	236	239	2	38	40	0	1	1	280
Grand Total	81	2,334	2,415	13	3,192	3,204	0	451	451	6,070

Table 30. Recreational catch **(A+B1+B2; thousand fish)** by species, mode, and distance from shore. The "All" category includes catches identified by species.

STATE	Clearnose	Little	Smooth	Thorny	Winter	All	Grand Total
CONNECTICUT	0	0	0	0	0	284	284
DELAWARE	171	0	0	0	0	280	451
EAST FLORIDA	32	0	0	0	0	7	39
GEORGIA	0	0	0	0	0	4	4
MARYLAND	97	0	0	0	0	107	204
MASSACHUSETTS	0	60	0	0	0	522	582
NEW HAMPSHIRE	0	5	0	0	2	91	97
NEW JERSEY	1,005	312	0	0	27	2,110	3,454
NEW YORK	60	106	48	0	41	1,353	1,608
NORTH CAROLINA	5	0	0	0	0	687	692
RHODE ISLAND	0	14	0	0	1	319	335
SOUTH CAROLINA	3	0	0	0	0	27	30
VIRGINIA	392	0	0	0	0	280	672
Grand Total	1,764	497	48	0	71	6,070	8,450

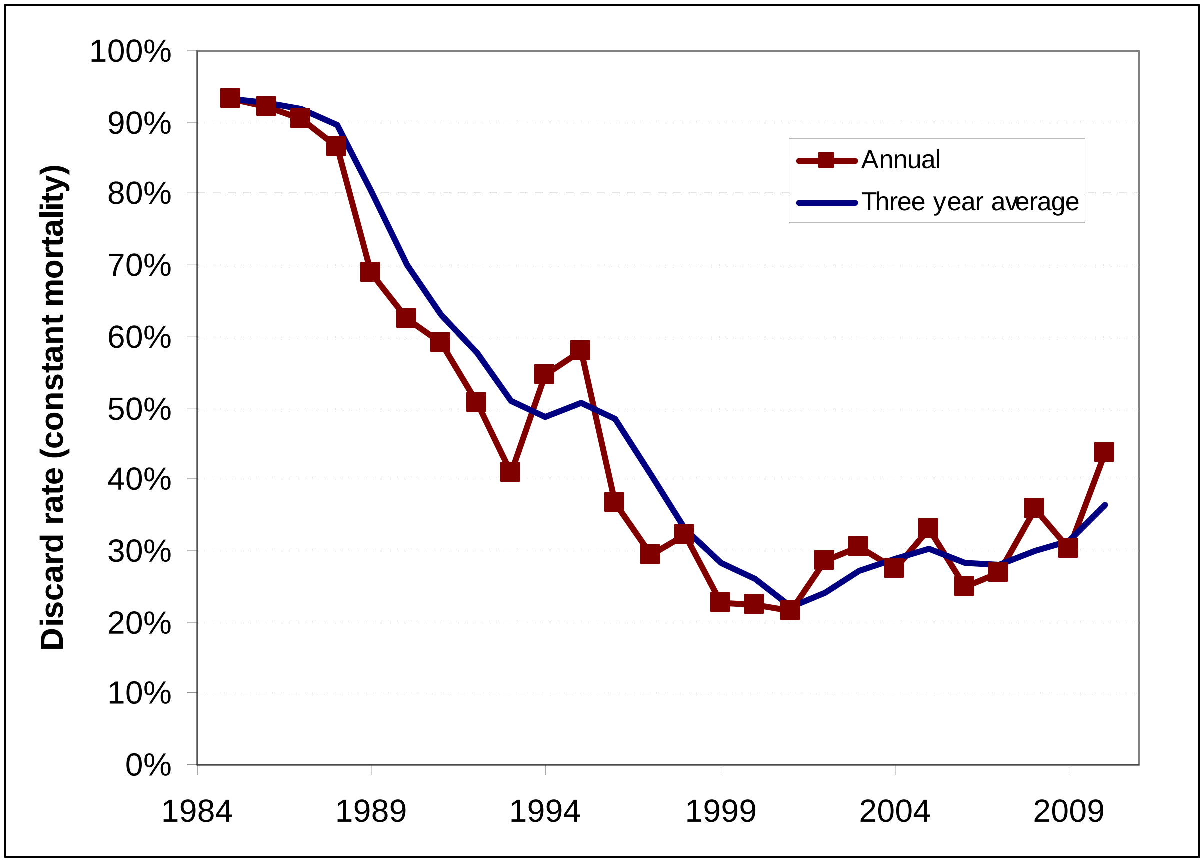
5.4.1.7 Discards

Skate discards were estimated to reconstruct the time series, estimate the median catch/biomass exploitation ratio, and analyze alternative ABCs. This work was largely required by new research data indicating that little and winter skate discard mortality (see Section 5.1.4) was less than had been assumed in the Amendment 3 FEIS.

Discards are estimated from sea sampling data based on the fraction of discarded skates to total kept (landed). This D/Kall ratio is stratified by gear, region, and half year, then applied to dealer-reported landings to estimate total skate discards. Mortality is assumed to be 50% of discards for all skates and gears, except for little (0.20) and winter (0.12) skates captured by vessels using trawls. Details about these estimates are given in Appendix II of this document.

Discard proportions declined from 1985 to 2001 (Figure 6) as landings of skates increased in response to demand. Since 2001, the discard proportion has increased from 21% to over 40% in 2010. The 2008-2010 average discard rate is used to set the Federal TAL. The reasons for discarding are varied, but discards in 2010 can be explained by increasing skate biomass and by possession limit restrictions. In particular, the skate wing fishery closed on Sep 3, 2010 when the Regional Administrator reduced the skate possession limit to 500 lbs. of wings. This action to keep catches below the ACL undoubtedly contributed to higher discards and lower skate landings, although discards are estimated on a calendar year basis. The lower skate wing fishery possession limits implemented by Framework Adjustment 1 are expected to reduce discards in the 2011 fishing year because the skate wing fishery is expected to remain open through most of the fishing year. Vessels that land skates as an incidental or targeted catch will therefore be less likely to discard skates.

Figure 6. Trend in calendar year skate discard rate with updated discard estimates and discard mortality=0.20 for little skate and 0.12 for winter skate caught by vessels using trawls.



5.4.2 Description of the Skate Processing Sector (???needs updating???)

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.

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.

5.4.3 Domestic and International Markets for Skates

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 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. There is also a market for skate wings in Portugal. The Portuguese market is reported to prefer barndoor skates over winter and thorny skates because they are the least stringy, most tender and flavorful of the wing skates. Interestingly, barndoor skates are said to 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.

5.4.4 Economic information

This section presents available economic information on the skate fishery. This includes a brief summary of the economic frameworks (supply and demand) for both the lobster bait market and the wing market; information about dockside prices for skates; trends in revenues from skate landings; and information about skate vessels, dealers, processors, and trade.

5.4.4.1 Dockside Prices for Skates (???needs updating???)

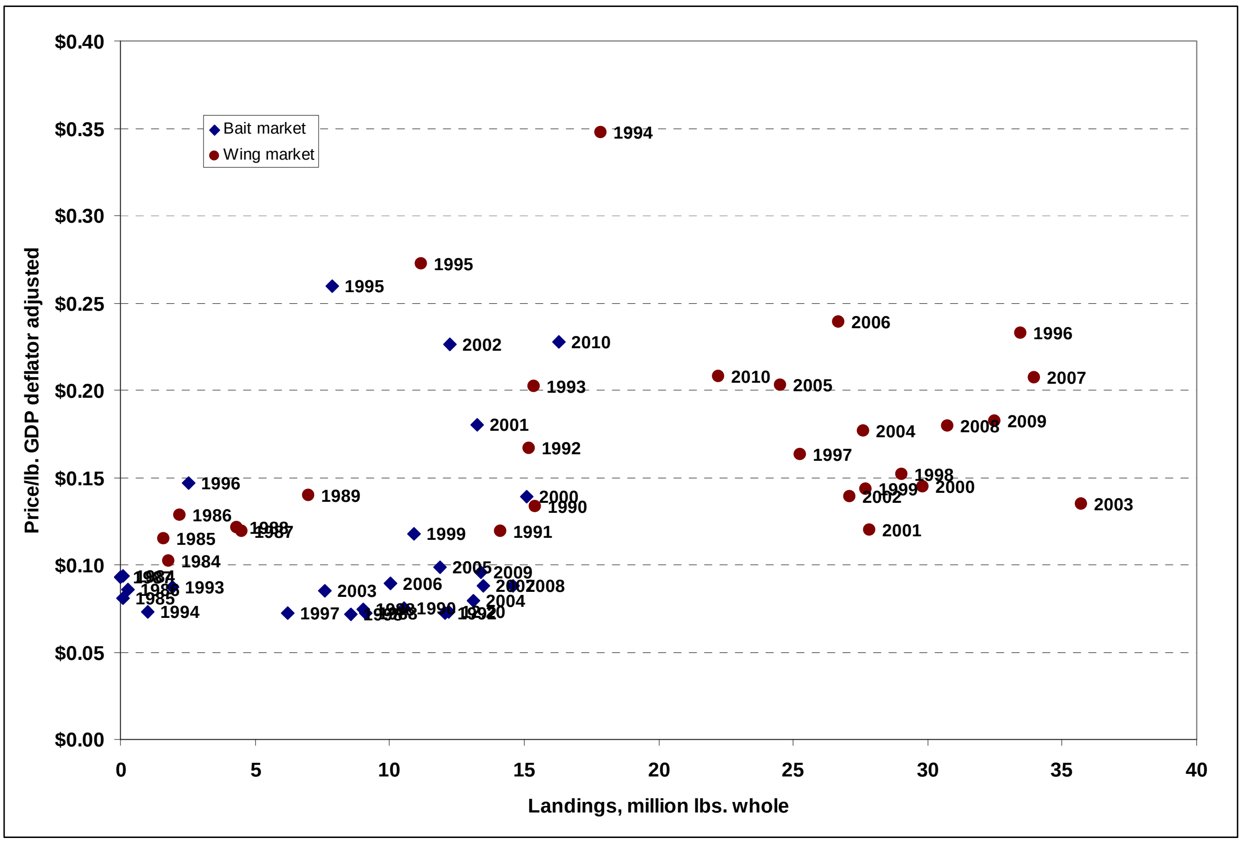
Prices reveal important information about the economic benefits and costs of fishery regulations. More recently and until 2010, PPI-adjusted prices for skate wings have risen (Figure 7) and landings have risen, partially as a result of the higher prices but also because vessels with DAS allocations have been subject to greater groundfish fishing restrictions. Generally, the prices paid for skate wings has been higher than those paid for whole skates (presumably product quality is better for a food market) and since 2004, prices have been above $0.17 per pound.12 Average skate wing prices in 2007 rose to nearly $0.21 per pound and the 2007 skate wing landings were the 2nd highest on record. Quantities of skate wing landings and prices in 2008 and 2009 were nearly the same as in 2007. But in 2010, the quantity of skate wings declined, but inflation adjusted prices increased to near $0.21 per pound, from $0.18 to $0.19 per pound in 2008-2009. And although there were seasonal price spikes related to short-term supply and changes in skate possession limits, the ex-vessel price was not very responsive to decreases in supply. Most of the skate wing landings are sent to foreign markets where the US product competes with other

12 Prices for skate wings are actually higher by a factor of 2.27, but these wing prices have been converted to a whole-weight equivalent to be on the same metric as prices for whole skate landings.

sources and substitute goods. With respect to skate wing prices, the US may be more of a price-taker for a foreign market whose prices is determined by other seafood supply.

PPI-adjusted prices for whole skates, most of which are landed to supply bait to the lobster fishery, have been relatively stable, except for 1995, 2001, and 2002. Except for three years13, whole skate prices have been generally less than $0.15 per pound and annual landings in recent years have been around 10-15 million lbs. Including transfers at sea (for all years since 1994), skate bait landings in 2010 increase to a record 16.3 million pounds. Inflation adjusted prices however was the second highest on record, nearly $0.23 per pound. And unlike previous years, the price per whole pound of skates was actually higher for skates destined for the bait market than for skates destined for the wing market, whereas the ratio since 2004 has been about 2:1 in favor of wing prices.

Figure 7. GDP deflator adjusted annual prices for skate wing and bait landings compared to quantity landed (whole weight).



5.4.4.2 Skate prices

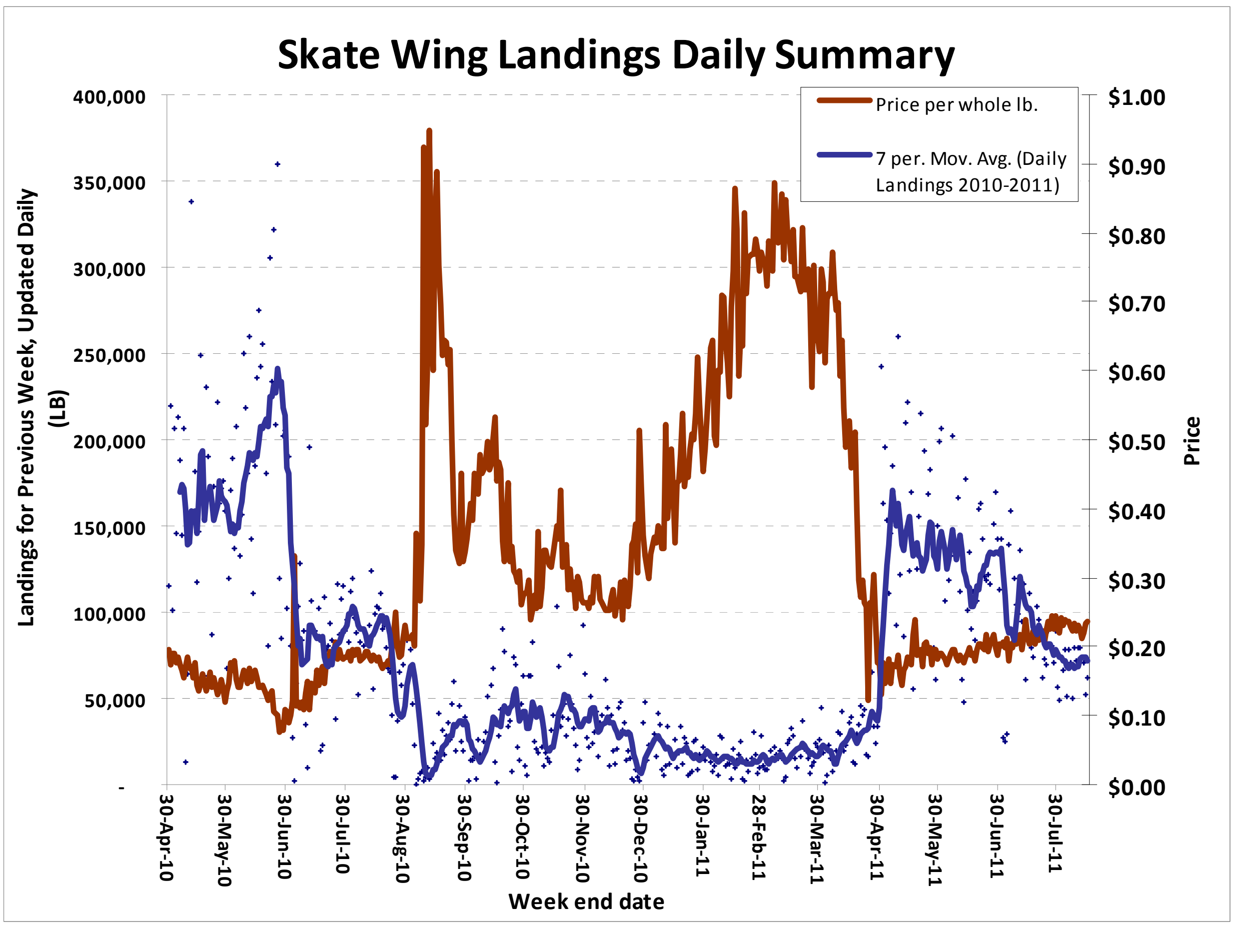
Section 8.7 of the Amendment 3 FEIS provides an analysis of trends in skate prices in relationship to market supply and demand. These analyses were used to estimate producer and consumer surplus expected from the various Amendment 3 alternatives. In general, skate prices in the bait market are set domestically depending on supply of bait and there are alternative sources, such as herring. The wing market is primarily an export market, which competes with other sources worldwide, although US skate

13 The higher prices in 1995 and 1996 may have been influenced by mis-reported (or erroneously recorded) landings of skate wings.

wings are often preferred. Prices during 2010 responded to changes in supply which was highly influenced by the skate wing possession limit.

Prices started out the 2010 fishing year around $0.17/lb and declined through the end of June, responding to high landings when the possession limit was 20,000 lbs. of wings. After Amendment 3 implementation, landings dropped to under 100,000 lbs./day and prices began rising to near $0.20/lb. Wing prices spiked to over $0.90/lb. (near $3/lb. of wings) after the possession limit was reduced to 500 lbs. on Sep 3, 2010. Prices declined through most of the winter to about $0.30, and then increase to nearly $0.90/lb. in the spring. Prices dropped at the end of the 2010 fishing year in anticipation to new supply when the 5,000 lbs. possession limit became effective on May 1, 2011, then gradually increased to over $0.20/lb. through Jul and Aug 2011. During this period, there is an obvious inverse relationship between domestic supply of wings and price, as would be expected with an elastic supply and demand response.

Figure 8. Relationship between skate wing prices and landings since May 1, 2010. Prices for skate wings were 2.27 times the converted whole skate prices shown in the figure.



5.4.4.3 Revenues from Skate Landings

Fishermen in the northeast region earned $3.178 million from skate landings in 1999. Skate wings returned $2.461 million, and revenues in the dealer “unclassified” market category – nearly all skate bait – were $0.717 million. Dockside skate revenues contributed less than 0.3 percent to total fisheries revenues in the northeast region in 1999.

Revenues from skate landings are reported by state in Figure 9. Rhode Island was the leading skate bait state where fishermen grossed $571 thousand for skate bait, more than all other states combined. Fishermen from Connecticut and New Jersey received an order of magnitude less revenue from skate bait landings – $59 thousand and $50 thousand, respectively. Skate bait revenues were less than $8 thousand in all other states. In contrast, Massachusetts lead all states in skate wings dockside revenues with more than $1.8 million, followed distantly by RI ($196 thousand), NJ ($187 thousand), NY ($129 thousand), and ME ($105 thousand) (Figure 9). Skate wings revenues were less than $25 thousand in all other states.

Figure 9 also reports the relative contribution of skate dockside revenues to total state fishery revenues in 1999. In Rhode Island, the leading skate bait state, total skate revenues (bait and wings) was not quite one percent of total fisheries earnings. In Massachusetts, the leading skate wings state, total skate returns were 0.7 percent of total dockside revenues. Revenues from skate landings amounted to less than 0.25 percent of total fisheries revenues in all other states.

Figure 10 reports the contribution of skate landings to total dockside revenues during 1999 by gear type. Otter trawl fishermen received $2.644 million from skate wings and bait landings – 83 percent of total skate revenues in the region – which amounted to 1.5 percent of total gross returns for this gear. Sink gillnet fishermen were paid $447 thousand for skate landings – 14 percent of total skate revenues – which amounted to one percent of the gear’s total earnings in the region. Skate landings contributed less than 0.25 percent to returns from other gear sectors.

The state and gear data were cross-tabulated to more closely examine dependence on skate earnings. Figure 11 shows results for combinations of states and gear types with at least 0.5 percent dependence on skates. Sink gillnet fishermen in New Jersey received 4.3 percent of their total annual revenues from skate landings, followed by line trawl fishermen with 3.9 percent. All other combinations were less than 3 percent dependent on skates landings during 1999, including otter trawl and sink gillnet fishermen in Massachusetts and Rhode Island.

Finally, skate dockside revenues were also investigated by port (Figure 12). Provincetown, Massachusetts received 6.1 percent of its total $3.5 million in dockside revenues from skate landings, followed by Tiverton, Rhode Island with 4.2 percent out of $3.8 million for the entire port. The principal skate ports – Point Judith, RI for bait and New Bedford, MA for wings – obtained 1.1 percent of total fisheries revenues from skate landings.

Figure 9 Contribution of Skate Landings to Total State Fisheries Revenue, 1999

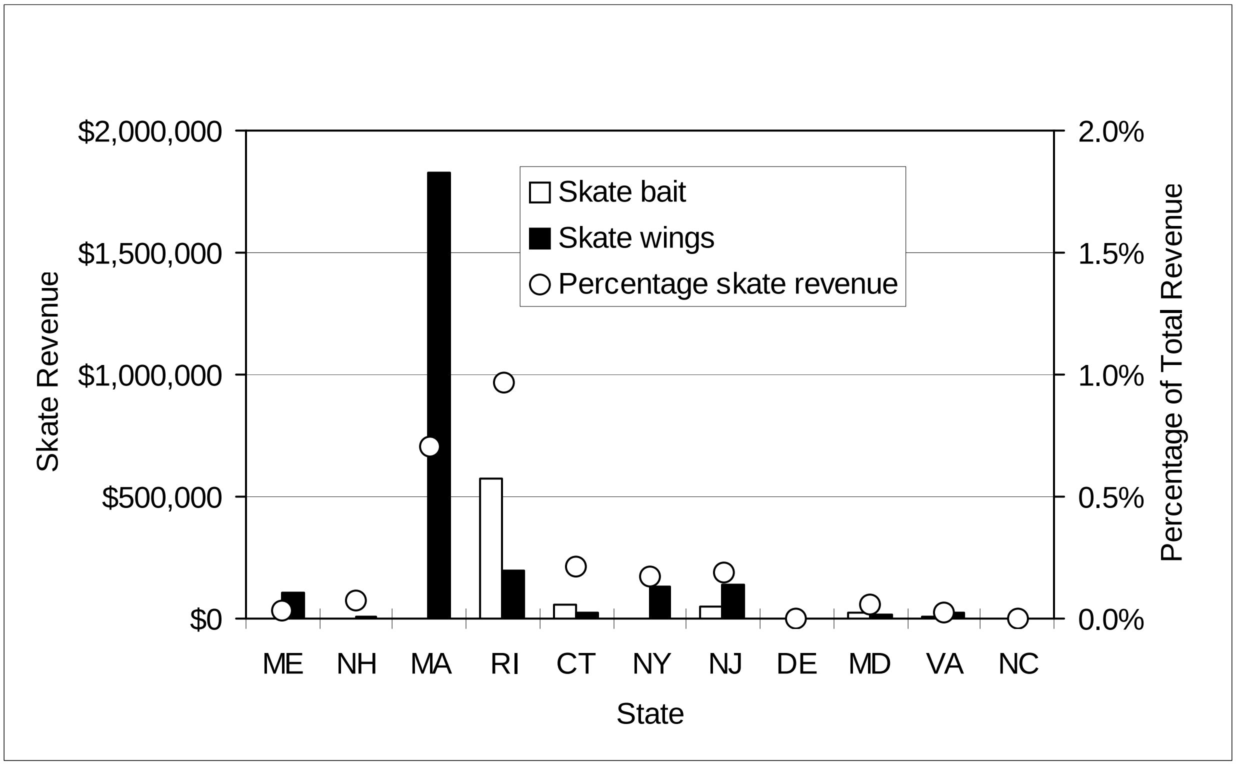


Figure 10 Contribution of Skate Landings to Total Gear Revenue, 1999

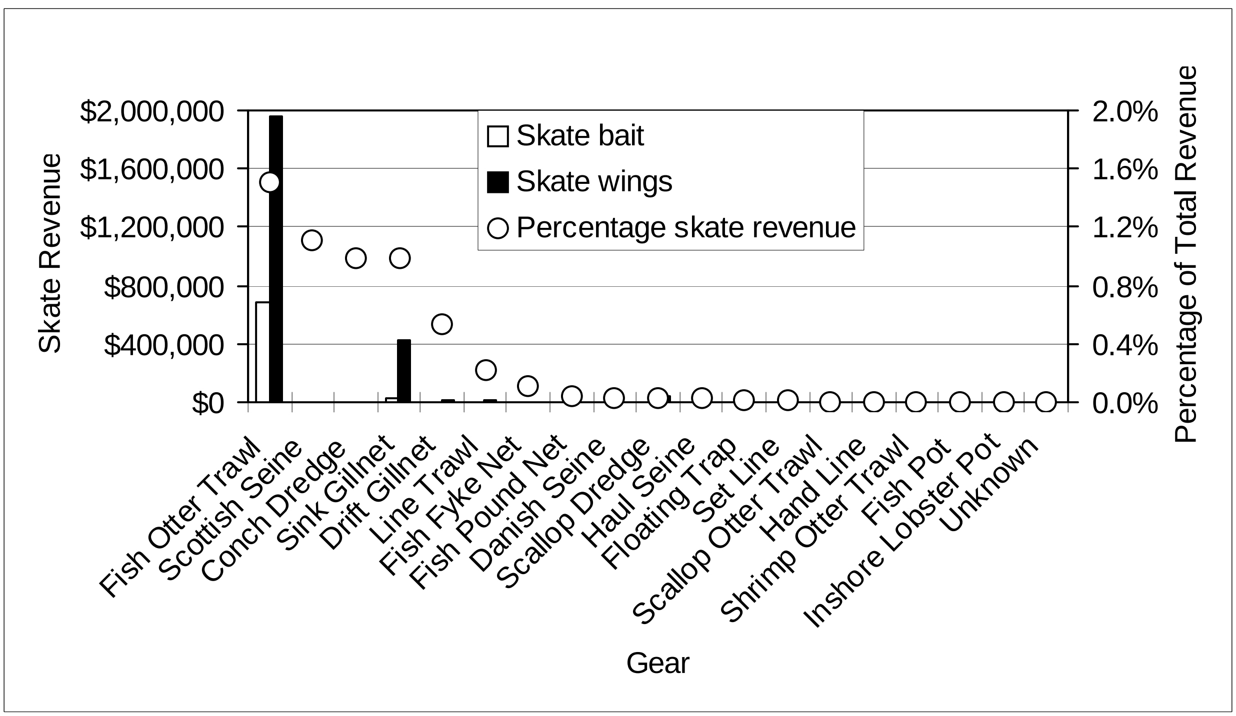


Figure 11 Contribution of Skate Revenues (0.5% or more) to Combinations of Gear and State, 1999

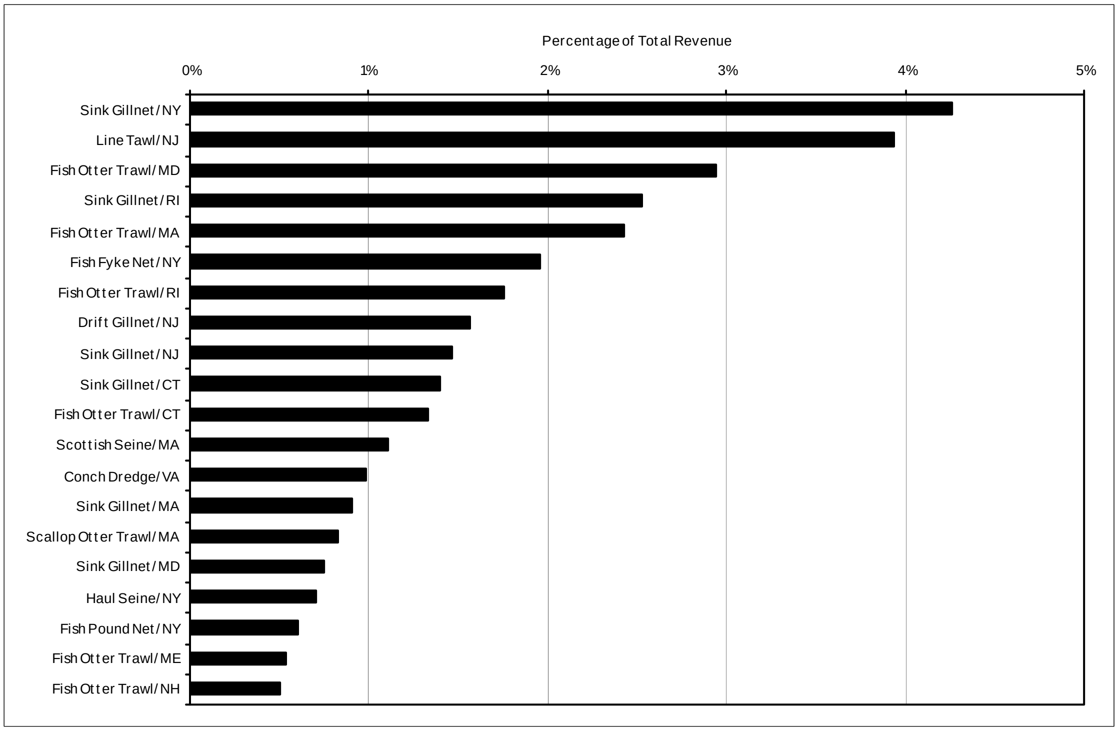
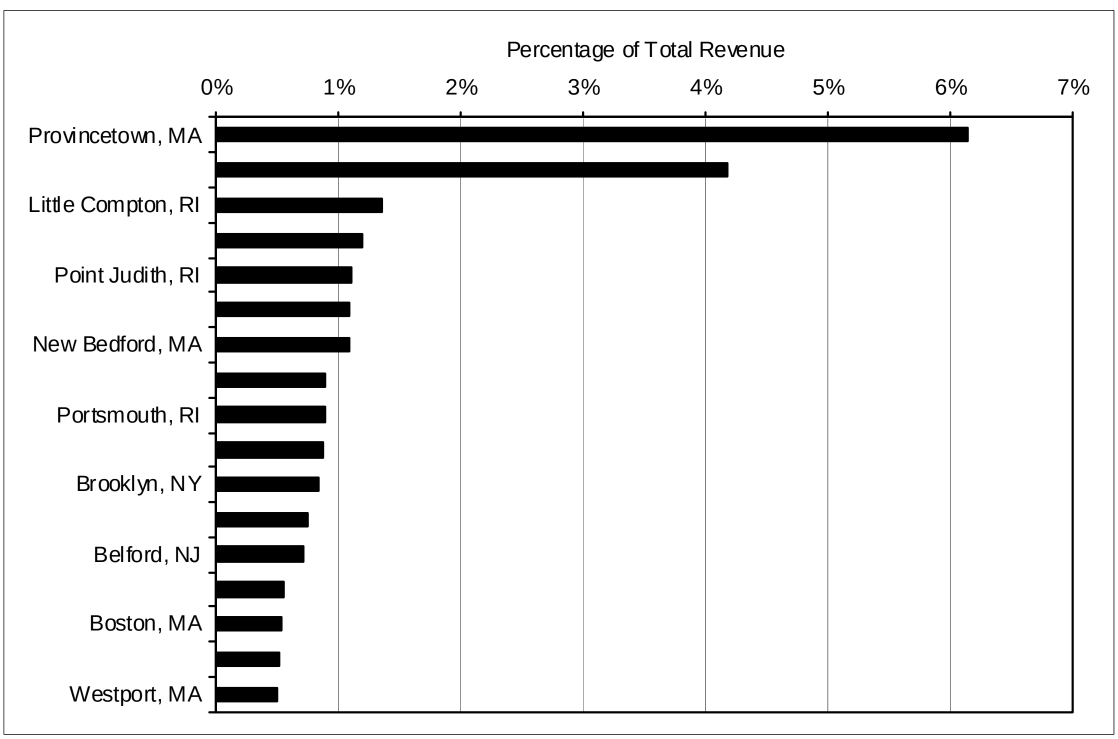


Figure 12 Contribution of Skate Revenues (0.5% or more) to Ports



5.4.5 Skate Vessels

Fishery landings data were investigated for skate landings at the vessel level during 1999. According to the fishermen's logbook source, 817 vessels reported skate landings on 15,500 fishing trips in 1999. The dealer report (so-called "weighout") figures were similar – 802 vessels landing skates on 14,508 trips. The difference between these two sources - 15 vessels and 992 trips - is due to information missing from state General Canvas data at the vessel and trip levels, especially from CT, NY, and NJ.

Vessel and trip counts from dealer data were also made by market category. "Unclassified skates" (primarily skate bait) was landed by 120 vessels on 1,304 trips, and 775 vessels landed skate wings on 13,614 trips. A comparison of these market category results with the combined results reported above indicate that 93 vessels landed both skate bait and wings on 410 trips. As above, vessels aggregated in the state General Canvas reports could not be included.

The vessel and trip counts from 1999 dealer data are separated by ton class in Table 31. About 56 percent of the vessels that landed skate bait or skate wings during 1999 were of ton class 2 size, and these vessels made the most trips. Ton class 3 vessels were also common, especially among vessels that landed skate bait where they comprised 40 percent of both the vessel population and trips. The 72 ton class 4 vessels that landed skate wings comprised over nine percent of the vessel population and less than five percent of trips. Ton class 2 and 3 vessels which landed skate bait averaged 11 trips. In contrast, ton class 2 and 3 vessels which landed skate wings averaged 20 trips and 16 trips, respectively.

Table 31 also contains information related to vessel gross performance (landings and gross revenues before costs). Although ton class 2 vessels were most numerous and took most trips, ton class 3 vessels landed two (wings) to three (bait) times more skates in 1999. Total dockside revenues were likewise greater. In addition, ton class 2 vessels were less productive than ton class 3 vessels. For example, ton class 3 vessels averaged 14.3 thousand pounds of skate bait per trip and $875 per trip compared to 3.3 thousand pounds and $210 by ton class 2 vessels. Similarly, ton class 4 vessels averaged $650 per trip from skate wing landings compared to $350 and $65 by ton class 3 and 2 vessels, respectively. Average revenues per trip were at least 2.5 times greater for skate bait landings than for skate wing landings.

Information in Table 31 also highlights the contribution of skate revenues to total trip and annual revenues. Skate bait landings comprised about 21 percent and 30 percent of total trip revenues for the ton class 2 and 3 vessels, respectively. When total annual fishing activity is considered (all fisheries), the contribution of skate bait drops to about three percent or less for these vessels. From a different standpoint, revenues earned from all trips that landed skate bait (all species on these trips) contributed about ten percent of annual gross returns from all fisheries for both ton classes.

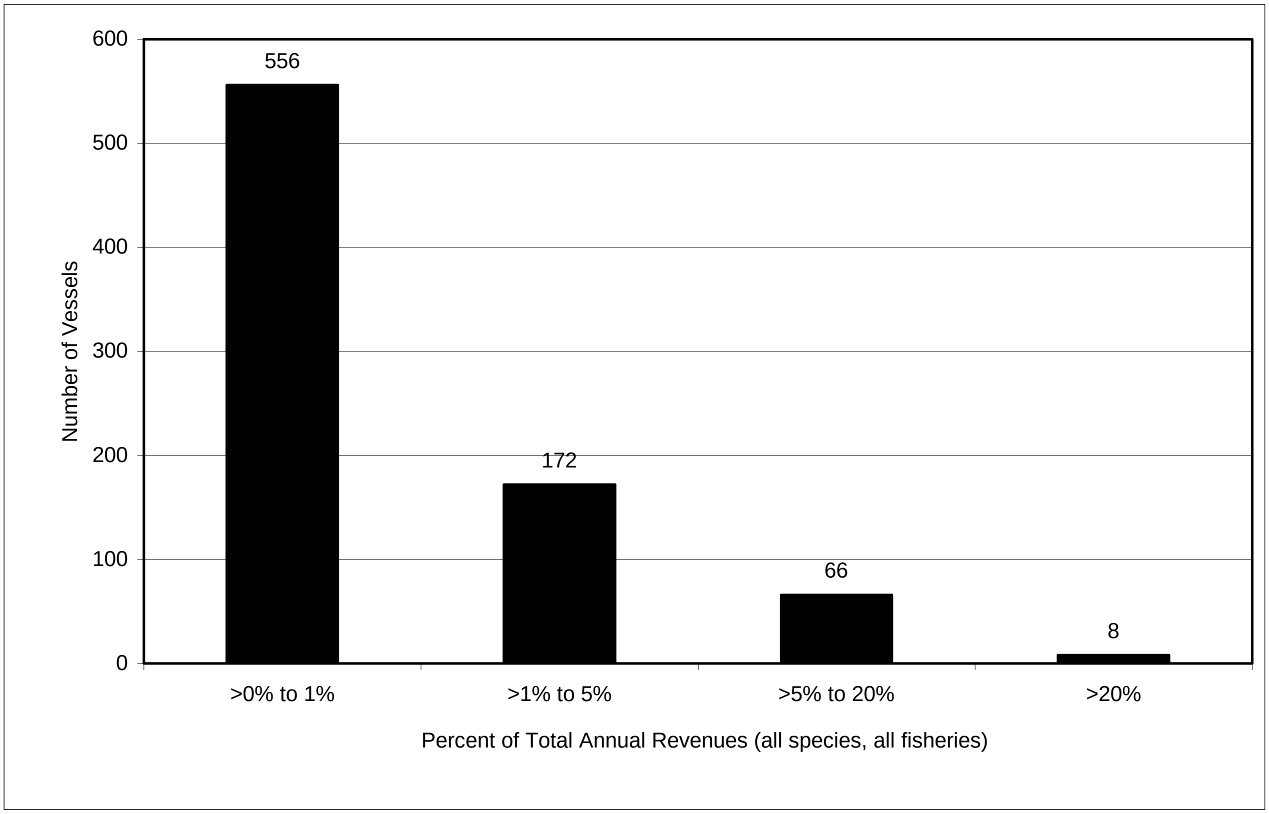
Overall, vessels that land skate wings are less dependent on skate resources for annual revenues (Table 31). Ton class 3 vessels derived 5.5 percent of trip revenues from skate wings compared to about three percent by the ton class 2 and 4 vessels. Once all species are included for the year, the dependence on skate wings drops to less than two percent for each tonnage class. Total revenues from trips that landed skate wings amounted to 28 percent or more of total annual revenues for each ton class.

Figure 13 groups the 802 vessels from the 1999 dealer reports into categories depending on the relative importance of skate revenues to total annual revenues from all species. Nearly 70 percent of these vessels earned one percent or less of total annual revenues from skate bait and wings landings during 1999. In contrast, eight vessels – one percent of total vessels landing skates in 1999 – derived at least 20 percent of gross revenues from skates.

Table 31 Vessel Counts, Trip Counts, and Measures of Economic Importance
**Trips Were Limited To Vessels Identified In The Weighout Data*

Categories	Measure	Tonnage Class			
		1	2	3	4
Trips Landing Bait	Number of vessels	1	68	48	3
	Number of trips	1	766	524	13
	Trips per vessel	-	11	11	4
	Landed weight (M lbs)	-	2.496	7.477	0.021
	Landings per trip (lbs)	-	3260	14,270	1600
	Dockside revenue ($K)	-	$162	$459	$2.5
	Revenue per trip ($)	-	$210	$875	$190
	Revenue per vessel ($)	-	$2380	$9560	$830
	Total trip revenue (all species caught) ($K)	-	$786	$1539	$36
	Skate revenue (% of trip revenues)	-	20.6%	29.8%	6.9%
	Vessels' total annual revenue ($K)	-	$8041	$14,727	$1,568
	Skate revenue (% of annual revenue)	-	2.0%	3.1%	0.2%
	Trip revenues (% of annual revenue)	-	9.8%	10.4%	2.3%
Trips Landing Wings	Number of vessels	1	437	265	72
	Number of trips	1	8838	4137	638
	Trips per vessel	-	20	16	9
	Landed weight (M lbs)	-	1.693	3.636	1.018
	Landings per trip (lbs)	-	190	880	1600
	Dockside revenue ($K)	-	$570	$1437	$414
	Revenue per trip ($)	-	$65	$350	$650
	Revenue per vessel ($)	-	$1300	$5420	$5750
	Total trip revenue (all species caught) ($K)	-	$18,329	$25,968	$14,325
	Skate revenue (% of trip revenues)	-	3.1%	5.5%	2.9%
	Vessels' total annual revenue ($K)	-	$51,443	$87,363	$51,515
	Skate revenue (% of annual revenue)	-	1.1%	1.6%	0.8%
	Skate trip revenue (% of annual revenue)	-	35.6%	29.7%	27.8%
Trips Landing Bait and/or Wings	Number of vessels	1	455	272	74
	Number of trips	1	9446	4410	650
	Landed weight (M lbs)	-	4.189	11.113	1.039
	Dockside revenue ($K)	-	$732	$1896	$416
	Total trip revenue (all species caught) ($K)	-	$18,834	$26,473	$14,357
	Skate revenue (% of trip revenues)	-	3.8%	7.2%	2.9%
	Skate trip revenue (% of annual revenue)	-	1.4%	2.1%	0.8%

Figure 13 Dependence of Individual Vessels (N=802) on Skate Revenues in 1999: Percent of Total Annual Revenues



The results in Table 31 suggest that there is a skate bait fishery but that skate wings are caught primarily in mixed-species fisheries. These possibilities were explored by looking at only a subset of vessels that met the following two arbitrary criteria: (1) landed skate bait (wings) on at least four trips; and (2) skate revenues amounted to at least 25 percent of total trip revenues. These criteria resulted in 21 vessels (mostly ton class 2) that landed skate bait on 699 trips, and 37 different vessels (mostly ton class 3) that landed skate wings on 598 trips. Nineteen of the skate bait vessels used otter trawl gear, and the other two vessels used sink gillnets. Regarding skate wings, 31 vessels used otter trawls, five vessels used gillnets, and one vessel used a sea scallop dredge.

The 21 vessels that presumably targeted skates for bait landed 7.8 million pounds of skates in 1999, or 80 percent of the total skate bait landings by vessels identified in the dealer weighout data. These vessels averaged 33 trips in 1999 (three times more than the total population average). Skate landings (11.1 thousand pounds) and revenues ($680) per trip averaged more than three times more than the population average for ton class 3. (These results are influenced somewhat by the inclusion of six ton class 4 vessels). Skate revenues averaged nearly 50 percent of total trip revenues and 15 percent of total annual revenues for these vessels.

The 37 vessels that presumably targeted skates for wings landed 2.0 million pounds of skate wings, or nearly a third of the total skate bait landings by vessels identified in the dealer weighout data. The average of 16 trips a year did not differ from the population of ton class 2 and 3 vessels, but average skate landings (3.3 thousand pounds) and revenues ($1300) per trip were considerably greater. Skate revenues averaged 44 percent of total trip revenues and six percent of total annual revenues for these vessels.

Other species harvested while on presumed skate trips are summarized in Table 32. In this case, a targeted trip (vis-à-vis vessels that target skates during the year as addressed above) was arbitrarily defined as follows: (1) skate bait landings >=10,000 pounds; and (2) skate wing landings >=4,000 pounds (9,000 pounds live weight). This selection resulted in 317 skate bait trips by 15 vessels, and 304 skate wing trips by 80 vessels.

Skates amounted to 93 percent of total landings, by weight, on the skate bait trips but only 47 percent of trip revenues. Groundfish, monkfish, and summer flounder comprised 49 percent of total revenues one these trips. Skates amounted to 58 percent of total landings on skate wing trips (live-weight basis), but only 17 percent of total trip revenues. Groundfish was the most important source of revenues (69 percent), but monkfish (7 percent) and lobster (6 percent) were also important to the profit margin.

Table 32 Other Species Landed While Targeting Skates
Trips were selected if the following criteria were met: (1) skate bait landings >=10,000 pounds; and (2) skate wing landings >=4,000 pounds (9,000 pounds live weight). This selection resulted in 317 skate bait trips by 15 vessels, and 304 skate wing trips by 80 vessels. Landings are on a live weight basis in thousands of pounds. Revenues are in thousand of dollars.

Species/FMP	Skate Bait Trips		Skate Wings Trips	
	Landings	Revenues	Landings	Revenues
Skates	7773	$479	6266	$1074
Groundfish (10 large mesh species)	191	$215	3890	$4445
Groundfish (3 small mesh species)	35	$8.3	0.1	$0.07
Monkfish	251	$186	535	$466
Summer flounder	41	$97	22	$46
Squid/Mackerel/Butterfish	19	$14	1.7	$1.6
Scup/Black sea bass	6.8	$8.6	0	0
Sea scallop (General Category)	0.8	$0.5	20	15
Lobster	0.4	$1.6	85	$391
Spiny dogfish	0	0	0.01	$0.004
Other	23	$9.7	65	$15

Table 33 provides additional preliminary information on the economic performance of skate bait vessels in Rhode Island. This information was taken from the 1999 vessel logbook data instead of dealer reports because logbooks are the only source of data on crew size and trip length. In order to single out directed trips, the analysis was restricted to trips that landed at least 10,000 pounds of skates (captain's hail weight on logbooks) and were no more than four days long. Revenues were calculated using a $0.06 price per pound.

The (non-random) sample of directed bait trips was partitioned by tonnage class and trip length (Table 33). Day-trips by tonnage class 2 and 3 vessels each averaged 0.5 days, but the larger vessels used one more crew and had greater horsepower. As a consequence, skate landings and revenues were greater on overnight trips which averaged at least two days. However, catch and revenues per unit effort were at least twice as large on day-trips. Trip expenses such as fuel need to be factored in before the profitability of trip lengths can be assessed.

The data summarized in Table 33 were also used to estimate a preliminary trip production function for vessels targeting skate bait. The Cobb-Douglas algebraic form – i.e.,
$Q = aL^bK^c$, where L is labor, K is capital, and lower case letters are parameters that need to be estimated – was selected because of its familiarity. This form is linear in the parameters when transformed by natural logarithms. Trip landings were regressed on fishing effort, crew, and horsepower. Know that crew size

was increased by one for all records because the natural logarithm of crew size when crew is equal to one is undefined. These data were from only 1999, but a longer time series would also require specification of skate stock size (i.e., natural capital).

Table 33 Vessel Characteristics and Gross Performance of RI Vessels that Targeted Skate Bait During 1999
Data are from vessel logbooks. Values other than number of vessels and trips are averages. CPUE is skate landings per unit effort (i.e., day-at-sea), and RPUE is skate revenue per unit effort.

Variable	Tonnage Class 2 (5-50 GRT)		Tonnage Class 3 (51-150 GRT)	
	Trip <=1 Day	Trip >1 to 4 Days	Trip <=1 Day	Trip >1 to 4 Days
Number of vessels	6	5	6	7
Number of trips	185	33	239	115
Effort (days-at-sea)	0.5	2.4	0.5	2.0
Landings (hail weight in pounds)	8166	13,492	16,091	33,110
CPUE	15,457	6055	34,892	16,919
Revenues	$491	$810	$965	$1987
RPUE	$927	$363	$2094	$1015
Skate as percentage of total trip landings	97%	93%	96%	93%
Crew size	1.9	1.7	2.7	2.9
Horsepower	271	293	545	425
Gross registered tons	26	21	93	93

The estimated skate bait trip production model is reported in Table 34. More than 50 percent of the variation in trip landings is explained by this model (R^2=0.53). Much of the remaining variation probably could be explained by captain skill and within year changes in stock size and fish size. Each input is a significant determinant of landings. There appear to be diminishing returns to effort. That is, a one percent change in effort results in less than a one percent change in landings. In contrast, the crew size and horsepower parameters are about equal to one, which suggests that landings change in equal proportions. The potential effects of multicollinearity on parameter estimates should be investigated before this model is used to predict the effects of these inputs on landings, however.

Similar production functions were not estimated for mixed species trips that landed skate bait or wings because this requires specifying more complex models with joint outputs. That is, substantial quantities of species other than skates are landed on other trips.

5.4.5.1 Skate Dealers

Nearly three-quarters of the 522 dealers who bought raw fish from fishermen in the northeast region in 1999 did not purchase skate landings. Skates amounted to one percent or less of total expenditures for raw fish by 104 dealers (Figure 14). In contrast, payments for skate landings amounted to at least five percent of total dockside purchases for 11 dealers from MA (8), RI (2) and NY (1). Three of these dealers were at least 20% dependent on skates for their total dockside purchases in 1999. Dealers that are not specifically identified in the General Canvas reports from some states (e.g., CT) are not included in these totals.

Table 34 Preliminary Regression Model of Skate Bait Landings on Targeted Trips by RI Trawl Vessels, 1999

The regression (F-statistic) and parameters (t-statistic) are significant at the 99 percent level of confidence. The dependent (landings) and independent (production inputs) are natural log transformed. Some trips had only one crew which has an undefined logarithm; there, 1 was added to all values of crew. The regression (F-statistic) and parameters (t-statistic) are significant at the 99 percent level of confidence.

Regressor	Parameter Estimate	t-statistic	N	F-statistic	R^2
Intercept	3.012	7.067	572	214.22	0.53
Effort (days-at-sea)	0.574	15.58			
Crew (value plus 1)	1.157	7.26			
Horsepower	0.868	9.93			

5.4.5.2 Processors

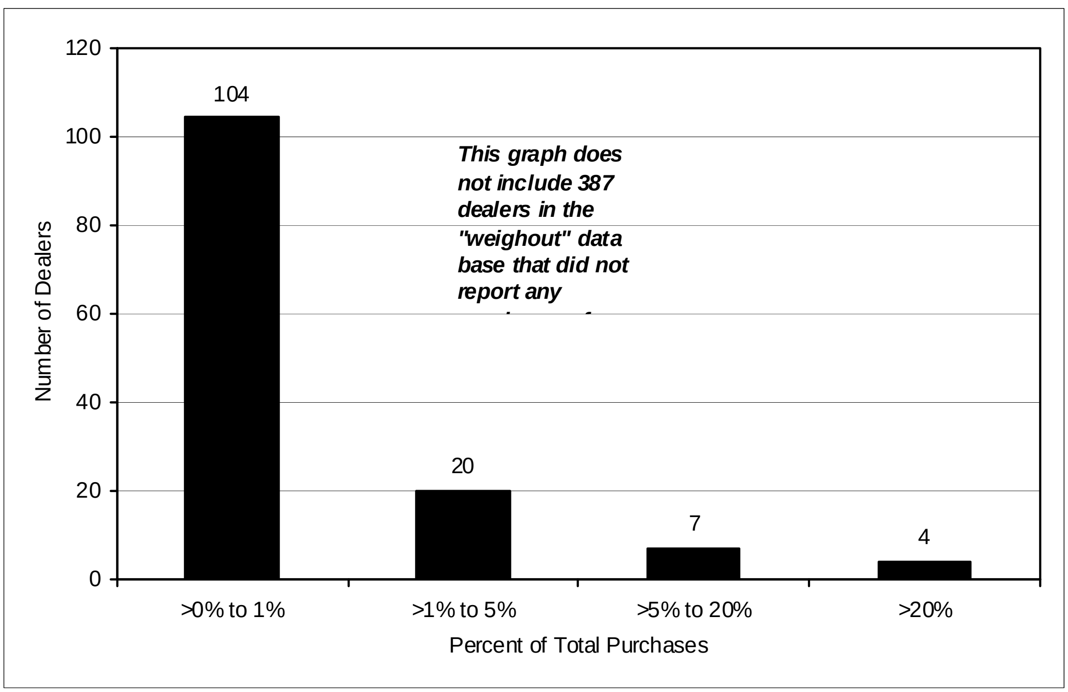
Current information about skate processors is presented in Section 5.4.2 of this document.

Nine processors from MA, RI, NY, and NH reported processing 3.9 million pounds of unspecified skate wings in 1999. 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 approximately 514 workers.

5.4.5.3 International Trade

The U.S. Customs Bureau and U.S. Census do not report separate trade statistics for skate products.

Figure 14 Dependence of Individual Dealers on Skate Landings: Percent of Total Purchases of Raw Fish



5.5 Social Environment

5.5.1 Vessels by Homeport and Owner's Residence

When applying for a permit the vessel owner must identify a "Homeport" for the vessel, theoretically the port where their vessel is primarily docked when not at sea. Further, the vessel owner must his or her home address. There are 62 towns with 10 or more permits in one or both of these categories. Of these, 14 towns (in italics) have 30 or more permits listing it as either homeport or town of owner's residence. Only 9 (also in bold) have 50 or more permits. These are, in descending order of number of permits, New Bedford (261 & 207) and Gloucester (210 & 152), MA; Cape May, NJ (170 & 89); Point Judith/Narragansett, RI (124 & 27); Montauk, NY (111 & 72); Chatham, MA (85 & 29); Barnegat Light/Long Beach, NJ (75 & 36); Portland, ME (63 & 31); Point Pleasant/Point Pleasant Beach, NJ (55 & 20); and Ocean City/West Ocean City (50 & 6).

When examined as a percent of all skate permits only these nine plus Hampton Bays/Shinnecock have at least 2% of all skate permits either as homeport or as residence. Only four ports have at least 5%: New Bedford and Gloucester, MA; Cape May, NJ and Point Judith/Narragansett, RI. It is interesting that Cape May has so many permits, as it has a relatively low level of landings (see Table below). Ocean City also has a very low level of landings.

Table 35. All Towns listed on 10 or more Northeast Skate Permits as Homeport or Owner's Residence for 2007

ST	CITY	HOMEPORT	RESIDENCE	% HOMEPRT of ALL SKT Permits	% RESIDENCE OF ALL SKT PERMITS
MA	**New Bedford**	**261**	**207**	***9.72%***	***7.71%***
MA	**Gloucester**	**210**	**152**	***7.82%***	***5.66%***
NJ	**Cape May**	**170**	**89**	***6.33%***	***3.31%***
RI	**Point Judith/Narragansett**	**124**	**27**	***4.62%***	***1.01%***
NY	**Montauk**	**111**	**72**	***4.13%***	***2.68%***
MA	**Chatham**	**85**	**29**	***3.17%***	***1.08%***
NJ	**Barnegat Light/Long Beach**	**75**	**36**	***2.79%***	***1.34%***
ME	**Portland**	**63**	**31**	***2.35%***	***1.15%***
NJ	**Point Pleasant/Point Pleasant Beach**	**55**	**20**	***2.05%***	***0.74%***
MD	**Ocean City/West Ocean City**	**50**	**6**	***1.86%***	***0.22%***
NY	*Hampton Bays/Shinnecock*	*41*	*23*	*1.53%*	*0.86%*
MA	Boston	38		1.42%	0.00%
NH	Portsmouth	37	11	1.38%	0.41%
VA	Newport News	34	12	1.27%	0.45%
MA	Scituate	30	23	1.12%	0.86%
NC	Wanchese	29	17	1.08%	0.63%
RI	Newport	28	16	1.04%	0.60%
NH	Seabrook	27	21	1.01%	0.78%
MA	Plymouth	27	18	1.01%	0.67%
NJ	Belford/Middletown	27	7	1.01%	0.26%
MA	Fairhaven	26	36	0.97%	1.34%
MA	Provincetown	22	11	0.82%	0.41%
MA	Newburyport	21	8	0.78%	0.30%
NH	Rye	20	16	0.74%	0.60%
MA	Harwich	19	22	0.71%	0.82%
CT	New London	19	0	0.71%	0.00%
VA	Chincoteague	18	6	0.67%	0.22%
VA	Hampton	17	15	0.63%	0.56%
NC	Beaufort	17	8	0.63%	0.30%
NJ	Port Norris	16	8	0.60%	0.30%
NJ	Sea Isle City	16	5	0.60%	0.19%
NJ	Atlantic Beach	16		0.60%	0.00%
NC	Oriental	14	16	0.52%	0.60%
NH	Hampton	14	16	0.52%	0.60%
NC	New Bern	14	14	0.52%	0.52%
MA	Marshfield	14	11	0.52%	0.41%
NY	New York	14		0.52%	0.00%
ME	Harpswell	13	20	0.48%	0.74%
VA	Virginia Beach	13	14	0.48%	0.52%
NY	Freeport	13	10	0.48%	0.37%
MA	Green Harbor	13		0.48%	0.00%
MA	Rockport	12	13	0.45%	0.48%

ST	CITY	HOMEPORT	RESIDENCE	% HOMEPRT of ALL SKT Permits	% RESIDENCE OF ALL SKT PERMITS
VA	Seaford	12	13	0.45%	0.48%
MA	Westport	11	14	0.41%	0.52%
NH	Newington	11	12	0.41%	0.45%
NC	Lowland	11	11	0.41%	0.41%
MA	South Bristol	11	10	0.41%	0.37%
MA	Sandwich	11		0.41%	0.00%
ME	Bremen	10	9	0.37%	0.34%
CT	Noank	10		0.37%	0.00%
NC	Engelhard	10		0.37%	0.00%
RI	Little Compton	7	13	0.26%	0.48%
RI	Wakefield		55	0.00%	2.05%
RI	Charlestown		20	0.00%	0.74%
NJ	Cape May Courthouse		17	0.00%	0.63%
MA	Manchester		15	0.00%	0.56%
MA	West Chatham		15	0.00%	0.56%
MD	Berlin		15	0.00%	0.56%
MA	South Chatham		14	0.00%	0.52%
NJ	West Creek		13	0.00%	0.48%
NJ	Brick		12	0.00%	0.45%
NJ	North Cape May		11	0.00%	0.41%

5.5.2 Other Permits Held by Skate Permit Holders

In 2007 there were 2,685 vessels with a Skate Permit. Of these, most held permits in a variety of other Northeast fisheries. This is actually a common pattern for all Northeast vessels, which typically hold permits even in fisheries in which they are not active. The most common other permits held were Bluefish, Multispecies, Dogfish and Monkfish.

Bluefish were solidly category 1 (2,123) - Commercial. Most lobster permits (1002) were in category 1 – Commercial, Non-Trap. Multispecies permits were primarily in category A (992) - DAS - and category HB (704) – Open Access Handgear. There is only one dogfish category – General. Monkfish were 75% in category E (1,691) – Incidental Catch. Looking at other permits held, Scallop permits were primarily in categories 1A (1102) – General Category with no VMS and 1B (786) General Category with VMS. SMB permits were primarily in the Atlantic Mackerel (2,066 permits) and Squid/Butterfish Incidental Catch (1,829 permits) categories. Two thirds of Summer Flounder permits were in category 1 (881) – Commercial Moratorium. Black Sea Bass were primarily in category 1 (740) – Commercial Moratorium, as were Scup (744). Over 80% of Herring permits were in category 2 (1,688) – Open Access, will catch under 500mt. For Skate, 99% were category D (2019) Incidental Catch. Red Crab were almost entirely category A (1,603) – Open Access.

Table 36. Other Permits Held by the 2,685 Vessels with Skate Permits in 2007

Multi-species	Monk fish	Dog fish	Blue fish	Squid/ Mackerel/ Butter fish	Scallop	Skate	Red Crab	Lobster	Summe r Flounde r	Blac k Sea Bass	Scu p	Her-ring
2438	**2413**	**2443**	**2530**	**2401**	**2208**	**2041**	**1605**	**1445**	**1279**	**1101**	**1102**	**2072**

5.5.3 Commercial Ports of Landing

There are a total of 88 ports where skate was landed in 2007. They include ports from all states in the Northeast plus North Carolina.

Table 37. All Ports Landing Skates in 2007

ST	CNTY	PORT
CT	MIDDLESEX	OLD SAYBROOK
CT	NEW HAVEN	BRANFORD
CT	NEW HAVEN	GUILFORD
CT	NEW LONDON	EAST LYME
CT	NEW LONDON	NEW LONDON
CT	NEW LONDON	NOANK
CT	NEW LONDON	STONINGTON
CT	NEW LONDON	WATERFORD
DE	SUSSEX	INDIAN RIVER
DE	SUSSEX	MISPILLION
MA	BARNSTABLE	CHATHAM
MA	BARNSTABLE	DENNIS
MA	BARNSTABLE	FALMOUTH
MA	BARNSTABLE	HARWICHPORT
MA	BARNSTABLE	HYANNISPORT
MA	BARNSTABLE	ORLEANS
MA	BARNSTABLE	OTHER BARNSTABLE
MA	BARNSTABLE	PROVINCETOWN
MA	BARNSTABLE	SANDWICH
MA	BARNSTABLE	WOODS HOLE
MA	BRISTOL	FAIRHAVEN
MA	BRISTOL	FALL RIVER
MA	BRISTOL	NEW BEDFORD
MA	BRISTOL	WESTPORT
MA	ESSEX	GLOUCESTER
MA	ESSEX	NEWBURYPORT
MA	ESSEX	ROCKPORT
MA	MIDDLESEX	CAMBRIDGE
MA	PLYMOUTH	MARSHFIELD
MA	PLYMOUTH	OTHER PLYMOUTH
MA	PLYMOUTH	PLYMOUTH
MA	PLYMOUTH	SCITUATE
MA	SUFFOLK	BOSTON
MD	NOT-SPECIFIED	OTHER MARYLAND
MD	WORCESTER	OCEAN CITY
ME	CUMBERLAND	PORTLAND

ST	CNTY	PORT
NC	CARTERET	BEAUFORT
NC	DARE	HATTERAS
NC	DARE	WANCHESE
NC	HYDE	ENGELHARD
NC	HYDE	OCRACOKE
NC	PAMLICO	ORIENTAL
NH	ROCKINGHAM	PORTSMOUTH
NH	ROCKINGHAM	RYE
NH	ROCKINGHAM	SEABROOK
NJ	CAPE MAY	AVALON
NJ	CAPE MAY	CAPE MAY
NJ	CAPE MAY	SEA ISLE CITY
NJ	MONMOUTH	BELFORD
NJ	OCEAN	BARNEGAT
NJ	OCEAN	BARNEGAT LIGHT/LONG BEACH
NJ	OCEAN	POINT PLEASANT
NJ	OCEAN	WARETOWN
NY	NASSAU	FREEPORT
NY	NASSAU	POINT LOOKOUT
NY	SUFFOLK	AMAGANSETT
NY	SUFFOLK	CENTER MORICHES
NY	SUFFOLK	GREENPORT
NY	SUFFOLK	HAMPTON BAYS
NY	SUFFOLK	ISLIP
NY	SUFFOLK	MATTITUCK
NY	SUFFOLK	MONTAUK
NY	SUFFOLK	OTHER SUFFOLK
NY	SUFFOLK	SHINNECOCK
NY	SUFFOLK	WAINSCOTT
RI	NEWPORT	LITTLE COMPTON
RI	NEWPORT	NEWPORT
RI	NEWPORT	OTHER NEWPORT
RI	NEWPORT	TIVERTON
RI	WASHINGTON	CHARLESTOWN
RI	WASHINGTON	POINT JUDITH
RI	WASHINGTON	SOUTH KINGSTOWN
RI	WASHINGTON	WESTERLEY
VA	ACCOMACK	ACCOMAC
VA	ACCOMACK	CHINCOTEAGUE
VA	ACCOMACK	WACHAPREAGUE
VA	CITY OF HAMPTON	HAMPTON
VA	CITY OF HAMPTON	OTHER CITY OF HAMPTON
VA	CITY OF NEWPORT NEWS	NEWPORT NEWS
VA	CITY OF NORFOLK	NORFOLK
VA	CITY OF VIRGINIA BEACH	VIRGINIA BEACH/LYNNHAVEN
VA	GLOUCESTER	OTHER GLOUCESTER
VA	LANCASTER	OTHER LANCASTER

ST	CNTY	PORT
VA	MATHEWS	MATHEWS
VA	MIDDLESEX	OTHER MIDDLESEX
VA	NORTHAMPTON	CAPE CHARLES
VA	NORTHAMPTON	OTHER NORTHAMPTON
VA	NORTHUMBERLAND	OTHER NORTHUMBERLAND

There are several ways to present landings data to show different kinds of importance of skate to communities. Three tables below illustrate importance due to total levels of revenue and landings versus importance due to percent of skate revenue and landings relative to all commercial revenue and landings by port.

Only 31 ports (32 if you include the port of "Other Suffolk, NY") receive at least $10,000 per year from skate; only 9 ports receive at least $100,000 per year. In descending order of revenue received these are: New Bedford, MA; Chatham, MA; Point Judith, RI; Boston, MA; Tiverton, RI; Newport, RI; Barnegat Light/Long Beach, NJ; Gloucester, MA and Provincetown, MA (in bold).

There are 34 ports (37 if you include the three "Other something" ports) that landed at least 10,000lbs of skate; 15 ports landed at least 100,000lbs. In descending order of pounds landed they are: New Bedford, MA; Point Judith, RI; Chatham, MA; Tiverton, RI; Newport, RI; Boston, MA; Stonington, CT; Sea Isle City, NJ; Barnegat Light/Long Beach, NJ; Gloucester, MA; Hampton Bays, NY; Provincetown, MA; Fall River, MA; Belford, NJ and Montauk, NY (in italics).

Table 38. Top skate ports by value and pounds: Ports with at least $10,000 or 10,000lbs of skate in 2007

ST	CNTY	PORT	SKTVAL	SKLBS
MA	***BRISTOL***	***NEW BEDFORD***	***$4,869,521***	***10,179,163***
MA	***BARNSTABLE***	***CHATHAM***	***$1,550,200***	***3,101,339***
RI	***WASHINGTON***	***POINT JUDITH***	***$658,754***	***4,841,657***
MA	***SUFFOLK***	***BOSTON***	***$294,610***	***497,194***
RI	***NEWPORT***	***TIVERTON***	***$239,485***	***2,632,083***
RI	***NEWPORT***	***NEWPORT***	***$179,018***	***925,977***
NJ	***OCEAN***	***BARNEGAT LIGHT/LONG BEACH***	***$158,096***	***210,091***
MA	***ESSEX***	***GLOUCESTER***	***$107,764***	***205,707***
MA	***BARNSTABLE***	***PROVINCETOWN***	***$103,502***	***166,160***
NY	*SUFFOLK*	*HAMPTON BAYS*	*$92,426*	*167,340*
NJ	OCEAN	POINT PLEASANT	$59,587	97,608
NJ	*MONMOUTH*	*BELFORD*	*$57,748*	*106,536*
NY	*SUFFOLK*	*MONTAUK*	*$56,364*	*101,295*
MA	PLYMOUTH	SCITUATE	$47,130	82,957
CT	*NEW LONDON*	*STONINGTON*	*$46,406*	*441,302*
NJ	*CAPE MAY*	*SEA ISLE CITY*	*$36,357*	*300,445*
RI	NEWPORT	LITTLE COMPTON	$36,267	75,243
VA	ACCOMACK	ACCOMAC	$31,389	24,128
VA	CITY OF VIRGINIA BEACH	VIRGINIA BEACH/LYNNHAVEN	$20,023	12,537
VA	ACCOMACK	CHINCOTEAGUE	$18,078	45,794
MA	BARNSTABLE	SANDWICH	$17,557	42,644
ME	CUMBERLAND	PORTLAND	$16,794	28,990
NY	SUFFOLK	CENTER MORICHES	$16,721	33,883

ST	CNTY	PORT	SKTVAL	SKLBS
NJ	CAPE MAY	CAPE MAY	$14,960	91,715
MA	BRISTOL	WESTPORT	$14,388	32,515
MA	PLYMOUTH	OTHER PLYMOUTH	$13,897	24,425
NJ	CAPE MAY	AVALON	$13,733	17,459
NY	SUFFOLK	ISLIP	$13,376	18,278
MA	PLYMOUTH	PLYMOUTH	$11,943	35,952
MA	*BRISTOL*	*FALL RIVER*	*$11,270*	*124,220*
NY	SUFFOLK	OTHER SUFFOLK	$10,657	18,259
NY	SUFFOLK	SHINNECOCK	$8,598	16,578
CT	NEW LONDON	NEW LONDON	$7,872	44,808
MD	NOT-SPECIFIED	OTHER MARYLAND	$7,758	19,872
RI	NEWPORT	OTHER NEWPORT	$6,937	10,005
VA	CITY OF HAMPTON	HAMPTON*	$5,665	3,793
VA	ACCOMACK	WACHAPREAGUE	$5,264	20,712
MD	WORCESTER	OCEAN CITY	$5,027	10,309

*Included because it is noted in the economic analyses, even though it does not reach either $10,000 or 10,000lbs.

In terms of actual value or pound dependence, a slightly different picture emerges. Some of the ports with the highest levels of skate landings also have very high levels of other landings and so are only minimally dependent on skate in terms of their importance relative to total landed pounds or revenue. Only 3 ports depend on skate for at least 10% of their revenue. Here Center Moriches, NY - which has low total skate landings and low landings overall – appears as more dependent on skate than some of the larger landings ports. Only 9 ports depend on skate for at least 10% of their pounds landed. Here Center Moriches appears again, as well as Cambridge, MA – which lands under 100lbs of skate and under 500 lbs of any fish and thus is technically highly dependent but in actual fact does not rely on skate to maintain its economy.

However, it is interesting to note that Chatham and Tiverton, which are among the top skate ports by actual revenue and pounds are also among the highly dependent ports. And Point Judith, Newport and Provincetown which have high levels of landings and revenue are dependent by pounds landed. This means, too, that the counties of Barnstable, MA and Washington, RI each have 2 dependent ports. For RI the addition of neighboring Newport County is also notable.

Table 39. Top skate ports by value dependence

ST	CNTY	PORT	SKTVAL/TOTVAL	SKTLBS/TOTLBS
RI	NEWPORT	TIVERTON	33%	89%
MA	BARNSTABLE	CHATHAM	11%	37%
NY	SUFFOLK	CENTER MORICHES	10%	26%

Table 40. Top skate ports by pounds landed dependence

ST	CNTY	PORT	SKTVAL/TOTVAL	SKTLBS/TOTLBS
RI	NEWPORT	TIVERTON	33%	89%
MA	BARNSTABLE	CHATHAM	11%	37%
NJ	CAPE MAY	SEA ISLE CITY	2%	36%
NY	SUFFOLK	CENTER MORICHES	10%	26%
CT	NEW LONDON	STONINGTON	1%	16%
MA	MIDDLESEX	CAMBRIDGE	2%	14%

RI	WASHINGTON	POINT JUDITH	2%	14%
MA	BARNSTABLE	PROVINCETOWN	3%	12%
RI	NEWPORT	NEWPORT	1%	11%

5.5.4 Census Data for Top Skate Ports

The communities, then, for which profiles will be provided in Appendix I, Document 15 are: Boston, New Bedford, Gloucester, Provincetown, Chatham and Fall River, MA; Stonington, CT; Tiverton, Point Judith, Little Compton and Newport, RI; Montauk and Hampton Bays/Shinnecock, NY; Belford/Middleton, Barnegat Light/Long Beach, Sea Isle City, Cape May, and Point Pleasant/Point Pleasant Beach, NJ and Portland, ME. In addition, a profile will be added for Virginia Beach, VA as a result of the Economic analysis. As can be seen in Table 41, levels of occupations in fishing farming and forestry vary widely, as do levels of families in poverty and of education. Communities with higher dependence on fishing, higher poverty and lower educational level are generally more at risk, though these factors must also be considered in relation to relative dependence specifically on skate.

These and other census data can be found in the port profiles in Appendix I, Document 15, where they are placed in greater context. Here they are order by descending percentage of occupations in farming, fishing and forestry relative to all occupations. It should be kept in mind, however, that fishermen may be undercounted due to being listed as self-employed. The top three communities for percent occupations in farming, fishing and forestry are Long Beach/Barnegat Light, NJ; Montauk, NY and Chatham, MA. These are, of course, all species and gears and cannot be broken out to show skate only. The three communities with the highest percentages of families in poverty are New Bedford, Boston and Fall River, MA. The three communities with the lowest total population are Chatham, MA; Sea Isle City, NJ and Provincetown, MA. The three communities with the lowest percentage of persons age 25 or over who have graduated at least high school are Fall River and Boston, MA and Tiverton, RI. The three communities with the highest unemployment levels are Montauk and Hampton Bays/Shinnecock, NY and Gloucester, MA.

Of the top three ports by total landings and pounds (New Bedford, Chatham and Point Judith), Chatham has the highest level of occupational dependence, while New Bedford has the highest poverty level and lowest level of education. Of the three top ports by pounds and dollar dependence (Tiverton, Chatham and Sea Isle City), Chatham has the highest level of occupational dependence while Sea Isle City has the highest level of poverty and Tiverton has the lowest level of education.

Table 41. Selected census variables for profiled communities

ST	Port Community	Median cost of a home	Occupations in farming, fishing and forestry*	Median household income	Families in poverty	Total pop.	Median Age	Pop. (25 or over) High School Graduate or Higher	% Pop. Over 16 In Labor Force and Unemployed
ME	*Portland*	$121,200	7.10%	$48,763	9.20%	64,257	35.7	88.30%	3.30%
NJ	*Long Beach/ Barnegat Light*	$334,400/ $299,400	None*/ 6.50%	$48,697/ $52,361	3.8%/ 2.60%	3,329/ 764	57.3/ 54.9	92.0%/ 92.10%	2.3%/ 1.20%
NY	*Montauk*	$290,400	6.10%	$42,329	8.30%	3,851	39.3	84.00%	7.70%
MA	*Chatham*	$372,900	3.60%	$47,037	0.90%	1,667	53.3	89.90%	2.00%

ST	Port Community	Median cost of a home	Occupations in farming, fishing and forestry*	Median household income	Families in poverty	Total pop.	Median Age	Pop. (25 or over) High School Graduate or Higher	% Pop. Over 16 In Labor Force and Unemployed
NJ	*Point Pleasant/ Point Pleasant Beach*	$160,100/ $223,600	0.3%/ 2.60%	$55,987/ $51,105	2.00%/ 5.00%	19,366/ 5,112	39.4/ 42.6	88.50%/ 87.10%	2.50%/ 3.10%
NJ	*Belford/ Middletown*+	$146,000/ $210,700	2.3%/ 0.20%	$66,964/ $75,566	1.3%/ 1.90%	1,340/ 66,327	35.8/ 38.8	89.7%/ 90.70%	2.20% 2.20%
RI	*Little Compton*	$228,200	2.10%	$55,368	3.70%	3,593	43.5	91.00%	2.00%
MA	*Gloucester*	$204,600	2.00%	$47,722	7.10%	30,273	40.2	85.70%	3.20%
NY	*Hampton Bays/ Shinnecock*#	$178,000	1.70%	$50,161	6.70%	12,236	38.8	86.60%	3.40%
RI	*Point Judith/ Narragansett*#	$195,500	1.60%	$39,918	8.80%	3,671	44.5	87.50%	2.20%
MA	*Provincetown*	$333,100	1.00%	$32,731	8.70%	3,192	45.4	85.10%	13.10%
MA	*New Bedford*	$113,500	1.00%	$27,569	17.30%	93,768	35.9	57.60%	5.00%
RI	*Newport*	$161,700	0.60%	$40,669	12.90%	26,475	34.9	87.00%	4.70%
RI	*Tiverton*	$144,400	0.60%	$49,977	2.90%	15,260	40.8	79.50%	3.40%
NJ	*Cape May*	$212,900	0.40%	$33,462	7.70%	4,668	47.4	87.60%	3.80%
ME	*Portland*	$121.20	0.40%	$48,763	9.20%	64,257	35.7	88.30%	3.30%
CT	*Stonington*	$168,200	0.30%	$52,437	2.90%	17,906	41.7	88.20%	2.00%
MA	*Fall River*	$132,900	0.30%	$29,014	14.00%	91,938	35.7	56.60%	4.10%
VA	*Hampton*	$91,100	0.30%	$39,532	8.80%	146,437	34	85.50%	3.70%
MA	*Boston*	$190,600	0.10%	$39,629	15.30%	589,141	31.1	78.90%	4.60%
NJ	*Sea Isle City*	$280,100	None*	$45,708	6.40%	2,835	51.3	85.20%	3.70%

***** The census is known to undercount those employed in fishing. Further, fishing data are unavailable as a unique category due to confidentiality issues. Finally, those who fish out of this community may not live there.
+ These communities have two sets of census data, though socially and in terms of fishing they are best treated as a single community. For example, in some cases fish are landed in one area but fishermen live in the other, or sometimes one houses the majority of the recreational fishing and the other the majority of commercial fishing.
# These communities include a port of landing for which no census data are available plus census data for the smallest census unit which encompasses the port.

5.5.5 Skate Dealers

There were 195 skate dealers in 2007. The vast majority (156) depended on skate for only 0-5% of the ex-vessel value of all species they bought, though there were 4 dealers that depended on skate for 95-100% of this value. The absolute amount of this percentage varied widely, however, with the largest group of dealers (56) reporting an ex-vessel value of $100,000 to $500,000 for skate and groups of 20-30 vessels reporting anywhere from $1,000 to $10,000 and $1,000,000 to $5,000,000.

Table 42. Federally permitted dealer dependence on skate in 2007

Percentage Level of Dependence	Number of Dealers	Absolute Level of Dependence	Number of Dealers
0-5%	156	$0-100	0
6-10%	12	$101-1000	4
11-15%	7	$1001-10,000	25
16-20%	4	$10,001-50,000	21
21-25%	3	$50,001-$100,000	30
26-30%	1	$100,001-500,000	56
31-35%	0	$500,001-1,000,000	17
36-40%	1	$1,000,001-5,000,000	28
41-45%	0	$5,000,001-$10,000,000	5
46-50%	0		
51-55%	2		
56-60%	1		
61-65%	1		
66-70%	2		
71-75%	0		
76-80%	0		
81-85%	1		
86-90%	0		
91-95%	0		
96-100%	4		
TOTAL	195		186

There were 55 ports where dealers bought skate (57 if you count the “Other something” ports). Of these only 4 had 10 or more dealers: Hampton Bays/Shinnecock, NY (20), Montauk, NY (17), Point Judith, RI (15), and New Bedford, MA (12). An additional 7 had at least 5 dealers: Chatham, Provincetown and Gloucester, MA; Little Compton and Newport, RI (6 each), Scituate, MA and Mattituck, NY (5 each). Here the total number of dealers may exceed 195, as some dealers buy in multiple ports. On factor to note in regard to the large number of dealers in Montauk is that many individual vessel owners have acquired dealers permits in order to sell skate as bait to local lobster and whelk fishermen14.

Table 43. Federally permitted dealer dependence on skate in 2007 – by port*

State	Port	Number of Federal Skate Dealers	Percentage Dependence on Skate of These Dealers	Number of Federal Skate Dealers	Absolute Dependence on Skate of These Dealers
Massachusetts	Chatham	6	0-100%	6	$1k-5M
	Cambridge	1			
	New Bedford	12	0-5% (6), 10-60% (6)	9	$1k-5M
	Fall River	2			
	Westport	4			
	Fairhaven	1			

14 Pers. Comm.. from Victor Vecchio, NMFS Port Agent in East Hampton, NY.

State	Port	Number of Federal Skate Dealers	Percentage Dependence on Skate of These Dealers	Number of Federal Skate Dealers	Absolute Dependence on Skate of These Dealers
	Gloucester	6	0-10%	4	$10k-1M
	Boston	4	0-10%	4	$500k-1M
	Newburyport	1			
	Orleans	1			
	Other Barnstable	2			
	Other Plymouth	1			
	Provincetown	6	0-10%	6	$10k-5M
	Rockport	1			
	Sandwich	2			
	Scituate	5	0-15%	5	$10k-5M
	Westport	4	0-70%	4	$10-100k
	Woods Hole	1			
	Dennis	1			
	Falmouth	2			
	Harwichport	1			
	Hyannisport	1			
	Marshfield	2			
Maryland	Ocean City	2			
Maine	Portland	1			
North Carolina	Wanchese	1			
New Hampshire	Portsmouth	2			
New Jersey	Avalon	2			
	Barnegat	1			
	Belford/Middleton	3			
	Cape May	4	0-5%	2	
	Point Pleasant	2			
	Long Beach/ Barnegat Light	3			
	Sea Isle City	3			
	Waretown	1			
New York	Amagansett	4	0-5%	4	$50-500k
	Center Moriches	2			
	Freeport	1			
	Montauk	17	0-10%	17	$0-100k (5), $500k (6), $1-5M (6)
	Hampton Bays/ Shinnecock	20	0-5% (19)	20	$1-10k (5), $50-100k (5), $500k (5), $1-5M (5)
	Mattituck	5	0-5%	5	$10-500k
	Greenport	3			
	Islip	3			
	Other Suffolk	3			

State	Port	Number of Federal Skate Dealers	Percentage Dependence on Skate of These Dealers	Number of Federal Skate Dealers	Absolute Dependence on Skate of These Dealers
	Point Lookout	2			
	Wainscott	3			
Rhode Island	Charlestown	1			
	Little Compton	6	0-15%	6	$10k-5M
	Newport	6	0-5% (4)		$10k-5M
	Other Newport	1			
	Point Judith	15	0-5% (12)	15	$10-100k (6), $5000k-1M (4), $5-10M (5)
	South Kingstown	1			
	Tiverton	3			
	Westerley	1			
Virginia	Cape Charles	1			
	Chincoteague	1			
	Wachapreague	1			

* Data on ports with 3 or fewer dealers not reported for reasons of confidentiality.

5.5.6 Skate Processors

Skate processors include: AML International (about 90 employees), Bergie's Seafood (about 35 employees), Sea Trade (about 75 employees), and the Whaling City Auction (about 30 employees) in New Bedford, MA; Sea Fresh in Portland, ME and Point Judith, RI (about 50 employees total); Zeus Packing (about 200 employees) in Gloucester, MA; Ideal Seafood in Boston, MA; Agger Company in Brooklyn, NY.

Old Point Packing in Newport News, VA and Amory Seafood in Hampton, VA previously worked a lot with skate, but not at present.

Table 44. All ports for which profiles are provided in Appendix I, Document 15.

CT	Stonington
MA	Boston
MA	Chatham
MA	Fall River
MA	Gloucester
MA	New Bedford
MA	Provincetown
MD	Ocean City/West Ocean City
ME	Portland
NJ	Barnegat Light/Long Beach
NJ	Belford/Middletown
NJ	Cape May
NJ	Point Pleasant/Point Pleasant Beach
NJ	Sea Isle City
NY	Hampton Bays/Shinnecock
NY	Montauk
RI	Little Compton
RI	Newport
RI	Point Judith/Narragansett
RI	Tiverton
VA	Hampton

Bait Skate versus Food Skate and Targeted Skate versus Bycatch Skate

Among the top ports listed above, ports which heavily land skate for bait include: Point Judith, Tiverton, Newport, New Bedford and Stonington (CT) Secondarily, bait skate is landed in, Chatham and Provincetown. Point Judith's landings have accounted for 39-67% of bait landings between 2000-2007. Point Judith landings have declined somewhat in recent years, while landings in Newport, Tiverton and New Bedford have risen significantly. Other ports such as Montauk have individual vessels which sell skate directly to lobster and other pot fishermen for bait, though there are no major skate bait dealers here. Bait skate is primarily landed by trawlers, often as a secondary species while targeting monkfish or groundfish. Since 2003, with the implementation of the original Skate FMP, all vessels landing skate must be on a groundfish Day-at-Sea (DAS).

New Bedford is one of the major skate wing or food skate ports. Skate wings are also landed significantly in Gloucester, Chatham, Point Judith, Boston and Barnegat Light. Secondarily they are landed in Portland. Since 2000, skate wing landings in Provincetown have been on the decline, while Chatham landings have risen. Both trawlers and gillnets catch food skate. Some trawlers target skate, with others catching skate as a bycatch. Most of the gillnet vessels are targeting skate. The gillnets are based largely in Chatham but also in New Bedford. There is a very small skate wing fleet in Virginia, though it has dramatically declined in recent years. Most of these are monkfish gillnets though some draggers caught skate as a bycatch at the height of the fishery.

5.5.7 Skate Fishing Areas

Vessels landing skates for the wing market generally fish on Georges Bank, in the Great South Channel near Cape Cod, or west of the Nantucket Lightship Area in Southern New England (SNE) waters. Gillnet wing vessels often also fish east of Cape Cod.

Vessels that land skate as a bycatch often fish in Massachusetts Bay and on Georges Bank. Scallop dredges with general category permits often catch skate while fishing in the Great South Channel. There is also a mixed monkfish/skate fishery west of the Nantucket Lightship Area and off northern New Jersey, near Point Pleasant.

Vessels landing bait skate generally fish in the inshore waters of SNE, are most often trawlers, and frequently fish in an exempted fishery.

5.5.8 Data on Lobster Fishing in Top Skate Ports

By order of dependence on lobster landings, the top five lobster ports where skate is also landed are in Other Rhode Island, followed by Sea Isle City, NJ; Portland ME; Fall River, MA; and Little Compton, RI. It should be noted, however, that Portland lobstermen do not currently use skate for bait. By total value of lobster landings, the top five lobster ports where skate are also landed are: Gloucester, MA; Portland, ME; Point Judith, RI; New Bedford, MA and Other Rhode Island.

Table 45. Lobster landings and value of at least $10,000 or 10,000lbs in skate ports

ST	COUNTY	PORT	LOBVAL	LOBLBS	LOBVAL /TOTVAL	LOBLBS /TOTLBS	Rank in Value of ALL Lobster Ports
RI	NOT-SPECIFIED	OTHER R.I.	$5,083,319	967,196	75.95%	87.66%	19th
MA	BARNSTABLE	PROVINCETOWN	$1,664,494	306,541	45.34%	22.13%	58th
NJ	CAPE MAY	SEA ISLE CITY	$832,688	143,406	41.69%	17.34%	87th
ME	CUMBERLAND	PORTLAND	$9,108,218	1,966,185	38.00%	6.09%	8th
MA	BRISTOL	FALL RIVER	$1,348,898	252,701	26.66%	1.67%	69th
RI	NEWPORT	LITTLE COMPTON	$768,022	145,012	25.26%	5.21%	98th
MA	BARNSTABLE	CHATHAM	$3,368,519	621,526	23.15%	7.40%	36th
RI	WASHINGTON	POINT JUDITH	$8,417,621	1,609,982	22.91%	4.51%	10th
MA	ESSEX	GLOUCESTER	$9,971,471	2,001,331	21.29%	2.22%	5th
MA	SUFFOLK	BOSTON	$2,525,594	506,079	20.06%	5.99%	41st
NJ	OCEAN	POINT PLEASANT	$2,271,733	384,764	9.99%	1.65%	48th
NY	SUFFOLK	MONTAUK	$1,208,908	202,767	6.81%	1.89%	72nd
MA	BRISTOL	NEW BEDFORD	$5,901,537	1,159,697	2.21%	0.86%	15th
NJ	CAPE MAY	CAPE MAY	$748,991	118,191	1.42%	0.18%	91st
NY	SUFFOLK	HAMPTON BAYS	$37,819	5,774	0.62%	0.12%	183rd

In terms of permit homeport and town of owner’s residence, when looking at all profiled towns for this amendment, only two (in bold) have more than 5% of all lobster permits. These are Gloucester and New Bedford, MA. An additional nine have between 1-4% of homeport and/or owner’s residence for all lobster permits. These are (in italics) Portland, ME, Cape May, NJ, Montauk, NY, Chatham, MA, Boston, MA, Newport, RI, Barnegat Light/Long Beach, NJ, Belford/Middletown, NJ, and Point Judith/Narragansett, RI. It should again be noted that Portland lobstermen do not currently use skate for bait.

Table 46. Northeast Lobster Permit Homeport and Owner's Residence Listings for 2007 Among Profiled Skate Ports

ST	CITY	HOMEPORT	RESIDENCE	% HOMEPRT of ALL LOB Permits	% RESIDENCE OF ALL LOB Permits
MA	***Gloucester***	***338***	***246***	***8.16%***	***5.94%***
MA	***New Bedford***	***255***	***187***	***6.16%***	***4.51%***
ME	*Portland*	*128*	*42*	*3.09%*	*1.01%*
NJ	*Cape May*	*92*	*50*	*2.22%*	*1.21%*
NY	*Montauk*	*88*	*63*	*2.13%*	*1.52%*
MA	*Chatham*	*81*	*35*	*1.96%*	*0.85%*
MA	*Boston*	*71*	*6*	*1.71%*	*0.14%*
RI	*Newport*	*64*	*27*	*1.55%*	*0.65%*
NJ	*Barnegat Light/Long Beach*	*57*	*34*	*1.38%*	*0.82%*
NJ	*Belford/Middletown*	*43*	*34*	*1.04%*	*0.82%*
NJ	Point Pleasant/Point Pleasant Beach	38	8	0.92%	0.19%
NY	Hampton Bays/Shinnecock	37	16	0.89%	0.39%
MA	Provincetown	32	19	0.77%	0.46%
RI	*Point Judith/Narragansett*	*18*	*54*	*0.43%*	*1.30%*
CT	Stonington	15	9	0.36%	0.22%
RI	Tiverton	14	12	0.34%	0.29%
VA	Hampton	13	14	0.31%	0.34%
NJ	Sea Isle City	12	2	0.29%	0.05%
MD	Ocean City/West Ocean City	11	2	0.27%	0.05%
RI	Little Compton	7	18	0.17%	0.43%
MA	Fall River	3	4	0.07%	0.10%

6.0 ENVIRONMENTAL CONSEQUENCES (EA)

6.1 Biological Impacts on Skates

6.1.1 ACL alternatives

No Action

No Action will keep the ACL limits the same as they were in the 2010 fishing year. And because skate biomass has increased, the No Action alternative would prevent the fishery from achieving optimum yield. Discards would increase due to the higher catch rates and possible early closure of the directed skate fisheries.

Preferred alternative

ACL alternatives are described in Section 4.1 and include increases in the ABC, in the aggregate skate ACL, and in the skate bait and skate wing fishery TALs. These changes are needed in response to increases in skate biomass measured by the NMFS trawl surveys, particularly for little and winter skates which are targeted by the bait and wing fisheries, respectively. The revised ABC was calculated using the same reference point (median catch/biomass exploitation ratio) that was approved in Amendment 3 for setting ABCs.

In Amendment 3, the Council took a risk-adverse approach for setting a Skate Complex ABC. Although overfishing not defined by mortality or catch per se (see Section ???), analyses prepared for Amendment 3 found that catches at or below the median catch/biomass exploitation ratio tended to increase biomass more frequently and by a greater amount than catches that were above the median exploitation ratio [see Appendix ??? of Amendment 3 (NEFMC 2009)]. These catch and survey biomass data were re-analyzed using peer reviewed methods approved by the SSC to take account of changes in the survey data required because of the new survey methodology (see Appendix I of this document) and to take into account the effects of new discard mortality data presented to the Skate PDT and peer reviewed by the SSC (Appendix II of this document).

The effect of changes in gear and survey sampling procedures were taken into account by calibrating the FSV Bigelow data collected in 2009-2011 to FSV Albatross IV units and adjusting the stratified mean biomass calculations to include survey strata that were consistently sampled from 1963-2008 and 2009-2011. Most of the change in the median catch/biomass exploitation ratio (C/B medians in the table below) was for clearnose and little skates which frequently occur in inshore strata that are not surveyed by the FSV Bigelow due to depth considerations. The C/B medians were also affected by the changes in the assumed discard mortality for little[15] and winter skates. The combined effects of these two changes are given in the table below and in more detail in Appendix II of this document. Even with the calibration and adjustments, most of the change in the survey biomass is attributable to increases in little and winter skate survey catches in 2008-2010 compared to the low biomass average for 2006-2008 surveys.

[15] The new discard mortality rate partially offset the change in the C/B ratio caused by the new survey methodology.

Applying the approved Amendment 3 ACL formula for skate specifications to the new data, the aggregate ABC is the sum product of survey biomass and the median exploitation ratio in thousands of metric tons, or 50,435 mt. The FMP sets the ACL equal to the ABC and applies a 25% buffer between the ABC and ACT to account for management uncertainty. The remainder is then allocated between projected discard mortality (assumed to be 36.3%, the average estimated 2008-2010 discard mortality), state landings (projected to be 3%), the wing fishery (66.5% after deducting state landings), and the bait fishery (33.5% after deducting state landings).

The biological impacts of the ABC and allocations to discards and catch result mainly from preventing overfishing and keeping catches below a level that has been shown in Amendment 3 to produce larger and more frequent increases in skate biomass[16]. Variations in landings and discards may cause catch to exceed the ACT and any overages of the risk-adverse ACT will be absorbed by the 25% management uncertainty buffer. Any overages of the ACL will trigger accountability measures. Thus it is highly unlikely that skate catches will exceed the ABC, which was chosen to account for scientific uncertainty and keep mortality below a level that would be more likely to cause declines in skate biomass. A more detailed review of this analysis is given in Appendix 1, Document 4 of Amendment 3 (NEFMC 2009).

[16] Projections based on analytical models are not available however because the attempted analytical stock assessment models have not been reliable for management (NEFSC 2007???).

Table 47. Current and proposed 2012-2013 specifications including changes in input parameters: C/B exploitation medians, updated stratified mean biomass in FSV Albatross IV units, and a average mean discard mortality rate weighted by estimated discards by species and fishing gear.

	Current specifications	Proposed 2012-2013 specifications
	2006-2008 survey, 2007-2009 discards	2008-2010 survey, 2008-2010 discards
ACL specifications		
ABC (mt)	41,080	50,435
ACT (mt)	30,810	37,826
TAL (mt)	14,780	24,088
Assumed state landings	924	723
Federal TAL	13,856	23,365
Wing TAL	9,214	15,538
Bait TAL	4,642	7,827
Season 1	1,430	2,411
Season 2	1,722	2,904
Season 3	1,490	2,513
C/B medians		
Barndoor	3.230	2.938
Clearnose	2.440	5.910
Little	2.390	2.384
Rosette	2.190	3.622
Smooth	1.690	2.388
Thorny	3.140	2.300
Winter	4.120	2.256
Survey biomass (mean kg/tow)		
Barndoor	1.020	1.114
Clearnose	1.037	0.933
Little	5.040	7.848
Rosette	0.053	0.040
Smooth	0.133	0.161
Thorny	0.420	0.245
Winter	5.230	9.684
Discard rate	52.0%	36.3%
Discard mortality	50.0%	31.0%

Although calculated for individual stocks using estimated catch and stratified mean survey biomass, the ABC was aggregated due to difficulties in monitoring skate catches by species. Although many skates can be readily distinguished from one another, some species, notably immature little and small winter skates are difficult to identify, even for biologists. There has also been some confusion about skate names which leads to rare cases of mis-reporting by dealers and fishermen. Skates that are prohibited due to their being overfished, at risk of becoming overfished, or in a rebuilding program are pretty easy to distinguish in whole form at sea however. Species identification of landed wings is more difficult. Therefore, lacking better identification methods and accurate reporting, the Council chose to monitor the TALs by (wing and bait) fishery and the ACL in the aggregate.

Because of the added management uncertainty using an aggregate ABC, the analysis below characterizes the potential interactions with and marginal changes in catch between the trawl and sink gill net fisheries (fisheries that contribute to the vast majority of landings) and the distribution of barndoor, smooth, and thorny skates. These fisheries target mainly little skate for the bait fishery (which mainly occurs near shore in Southern New England and has little interaction with barndoor, smooth, and thorny skates) and winter skate for the wing fishery (targeting this species mainly due to landings prohibitions for barndoor and thorny skates that are otherwise suitable for cutting and marketing wings). The analysis therefore focuses on the wing fishery which is more likely to interact with barndoor, smooth, and thorny skates.

There are three ways that vessels may respond to the higher TALs and new possession limits, depending on the situation. Vessels that target skates may take longer trips to catch the possession limit, may fish in more productive areas that might be further from port, or take more trips targeting skates because the fishery is open longer, or a little of all three. Vessels in other fisheries may also begin targeting skates due to the greater fishing opportunity offered by the higher skate TALs (this may be mitigated somewhat by the potential of lower skate prices). And finally, vessels targeting other species and catching an incidental amount of skates may land more skates rather than discard them[17].

In the spring, barndoor skate are mainly distributed along the southern edge of Georges Bank and along the shelf edge down to NJ (see Map 16). Some barndoor skate also occur in shallower water from the western part of the Nantucket Lightship Area west to the eastern end of Long Island, NY. In the fall, barndoor skate are distributed in the same areas, but move into shallower waters of Southern New England and Georges Bank. Catches in the Gulf of Maine in both seasons are rare.

In contrast, the survey catches smooth skate mainly in the deeper water of the Gulf of Maine and off the northern edge of Georges Bank (see Map 17). The distribution of smooth skate is similar in the spring and fall, but there appears to be some shoreward migration of smooth skate in the Gulf of Maine during the spring, particularly in the area of Jefferies Ledge. It should be noted that a large proportion of smooth skate abundance has been observed in the Western Gulf of Maine closed area, offering protection from fishing. In the fall, there appears to be some offshore migration, particularly in the area of Cashes and Fippenes Ledges. It also should be noted that the area around Cashes Ledge are also closed to fishing (not shown; see http://www.nero.noaa.gov/nero/regs/infodocs/MultsClosedAreas.pdf for more details), offering protection from fishing.

Thorny skate are also caught by the survey in the Gulf of Maine (see Map 18), but in somewhat shallower areas than for smooth skate. During the spring, thorny skate were observed in more abundance on Jeffries Ledge, Stellwagen Bank, and Tillies Bank, off of MA, along the outer portion of Cape Cod, and in the northern part of Closed Area I. In the fall, thorny skate are observed in somewhat deeper water, but generally have the same distribution as they exhibit in the spring. A few survey catches of thorny skate occurred along the southern edge of Georges Bank in the spring, but not in the fall. It should be noted that the Western Gulf of Maine, Closed Area I, and the Cashes Ledge closed area afford thorny skate a significant amount of protection from fishing, although a relatively high proportion of thorny skates occur on Stellwagen Bank and the outer portion of Cape Cod, both areas being open to fishing.

[17] The skate wing possession limit was reduced to only 500 lbs. of skate wings (1137 lbs. whole) on September 3, 2010 to accommodate some incidental landings, but may have caused vessels on some trips to discard excess skates.

6.1.1.1 Potential interactions with the skate wing fishery effort distribution for vessels using trawls

6.1.1.1.1 Directed skate fishing effort

Fishing effort by vessels using trawls to target (or partially targeting) skate wings is shown in Map 16 to Map 18. Most of the fishing effort occurs along and just north of the northern edge of Georges Bank, to the SW of Closed Area II, and in the spring on the SE part of Georges Bank. Some effort also occurs along the shelf break off Southern New England and in the Hudson Canyon area, but these trips are probably targeting other species. The fishing effort that appears near Block Island Sound, south of RI, is probably targeting skates for the bait market, but these boats do not have Skate Bait Letters of Authorization[18] and it is impossible to determine in vessel trip reports whether the vessel was landing skates for bait or wings[19].

Except for one area, the distribution of directed skate wing fishing effort does not overlap the distribution of barndoor skate (Map 16). Few barndoor skate have been caught by the survey where the fishing effort is most intense, along the northern edge of Georges Bank. And the fishing effort on the SW edge of Closed Area II is too shallow to catch many barndoor skate. One area that does stand out is the skate trawl fishing effort along on the SE part of Georges Bank, in the spring. Fishing for skates in this area during the spring would be expected to have a relatively high proportion of barndoor skate in the catch.

There is even less overlap between directed skate wing fishing effort and the distribution of smooth (Map 17) and thorny (Map 18) skates. The main exception appears to be around the NE corner of Closed Area I in the spring, where the survey has had significant catches of smooth and thorny skates.

Since the new specifications will increase the landings and catch limits, it would be reasonable that fishing effort distribution may be more likely to be similar to 2009 effort than 2010 effort. And it is also reasonable that the increase is more likely to benefit and attract fishing effort for vessels that target skates, rather than land skates incidentally to fishing for other species. For the former group of vessels and trips, the higher limits may allow the vessels to take more trips and/or travel further from port. In contrast, the latter group of vessels and trips are targeting other species and if the possession limits are higher in 2012-2014 than they were in 2010, then the fishing effort is unlikely to change, but vessel may land more skates rather than discard them.

6.1.1.1.2 Potential changes in directed skate wing fishing effort

To analyze the potential changes in directed skate wing fishing effort, a comparison is made between skate fishing effort one year before July 16, 2010 (implementation of Amendment 3) and one year after this date. These differences are shown in Map 19 to Map 21, comparing the potential changes to the seasonal distributions of barndoor, smooth, and thorny skates. Areas with blue cells represent increases in effort during 2010. Conversely, warmer colors (yellow, orange, red) represent areas where effort was higher (in some cases much higher) than directed skate wing fishing effort in 2010. It is the latter areas

[18] Vessels only need a Skate Bait Letter of Authorization if they exceed the skate wing possession limit. The Skate Bait Letter of Authorization, however, specifically restricts vessels to landing only skates smaller than 23 cm in length, prohibiting possession of larger skates including barndoor, smooth, and thorny skates, which are usually larger than this limit.

[19] For monitoring purposes, the NMFS uses dealer reports which report the market for the skate landings. Vessel trip reports were used here for more information about the fishing trip and vessel characteristics. Fishermen can report whole skate or skate wing landings on vessel trip reports, but often whole skate reports are destined for the wing market and are only reported in whole form on the vessel trip reports.

where increases in effort might be expected in 2012-2014 due to higher limits, all other factors held constant.

The analysis shows that increases in directed skate wing fishing effort can be expected mostly on the northern edge of Georges Bank and to a lesser extent in the area SW of Closed Area II. These areas are generally more shallow than were barndoor skate occur (Map 19) and are outside the distribution of smooth (Map 20) and thorny (Map 21) skates.

6.1.1.1.3 Non-target fishing effort

Skate fishing effort on trips where any amount of skates were landed are shown in Map 22 to Map 24 and are generally more widely distributed than directed skate wing fishing effort (Map 16 to Map 18). In particular, more fishing effort occurs on these trips in shallower water of Georges Bank, and in the spring, to the east of the Western Gulf of Maine closed area, on Stellwagen Bank, and along the Southern New England and Mid-Atlantic shelf edge. These are mixed species fisheries of various sorts (often groundfish, monkfish, and squid fisheries), that land an incidental amount of skates.

In these other fisheries that land skates, there is a greater amount of overlap with the distribution of barndoor skate in the spring along the Southern New England and Mid-Atlantic shelf edge (Map 22). There is also a greater amount of overlap with the distribution of smooth skate between the Western Gulf of Maine closed area and Closed Area II (Map 23).

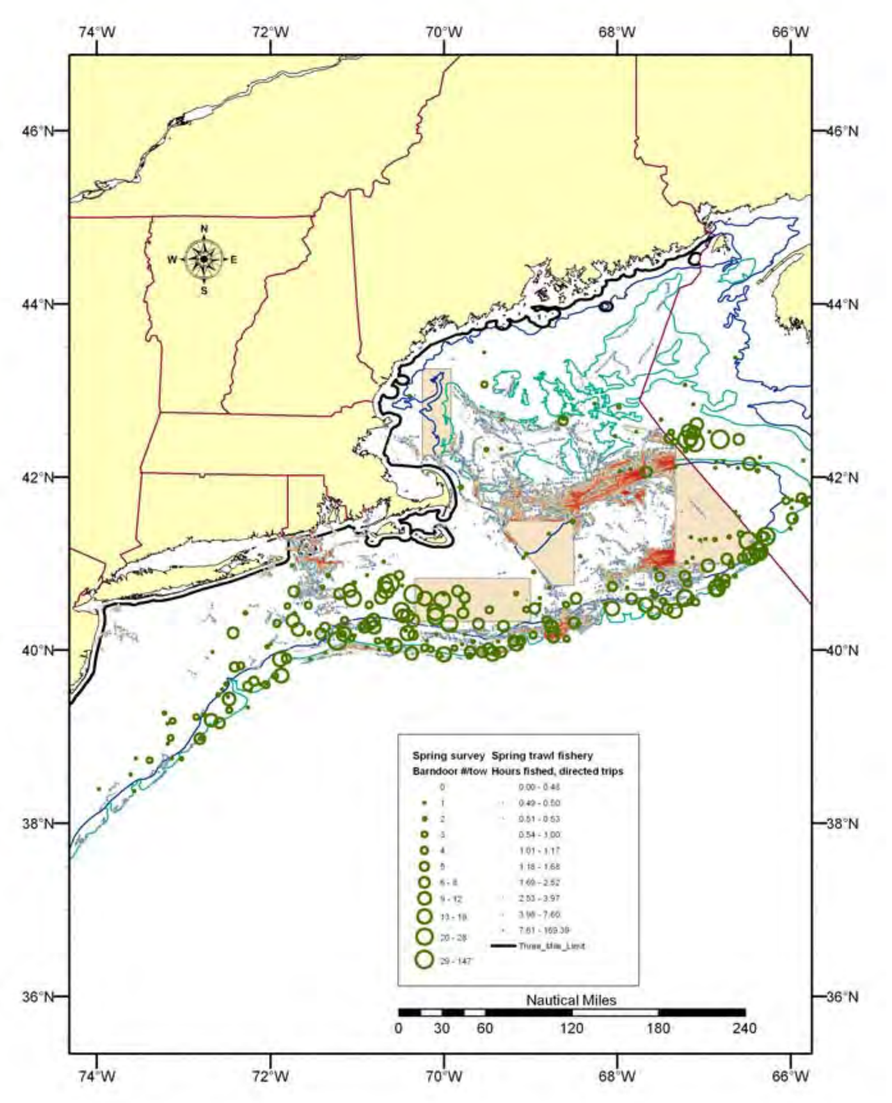
Most of the fishing effort on trawl trips that land an incidental amount of skates does not overlap the distribution of thorny skate, except for fishing effort on Stellwagen and Tillies Banks in the spring and along the NW edges of Closed Area II (Map 24).

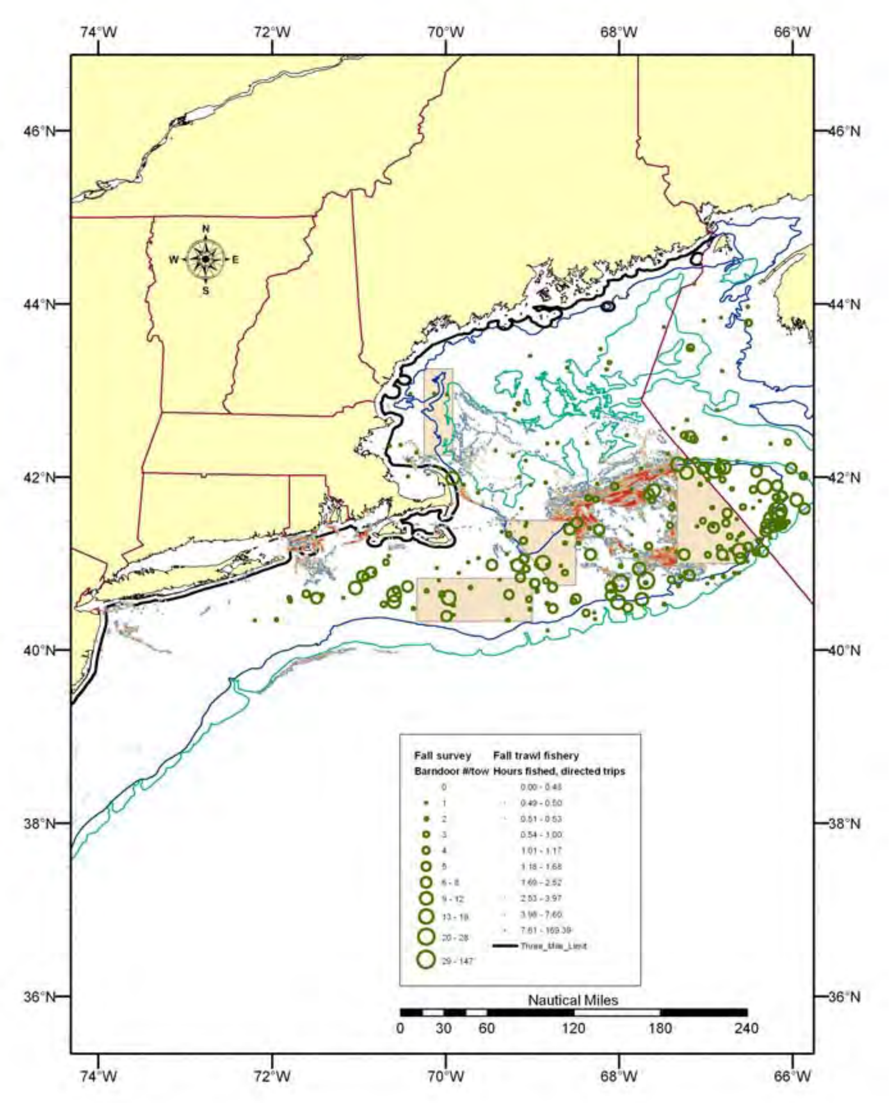
6.1.1.1.4 Conclusion

Overlaps in the distribution of trawl effort on trips targeting or landing an incidental amount of skates and the distributions of barndoor, smooth, and thorny skates on surveys is at best marginal. There are a few areas that the overlap suggests that catches of barndoor, smooth, and thorny skates might be problematic (see discussion above), but in general the analysis indicates that increases in the ABC and the skate wing TAL is not going to significantly impact the catches of barndoor, smooth, and thorny skates.

Map 16. Distribution of 2006-2010 barndoor skate abundance (#/tow) compared to distribution of 2009-2011 directed skate trawl fishing effort (hot colors, like red, represent more intense fishing effort). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using trawls.

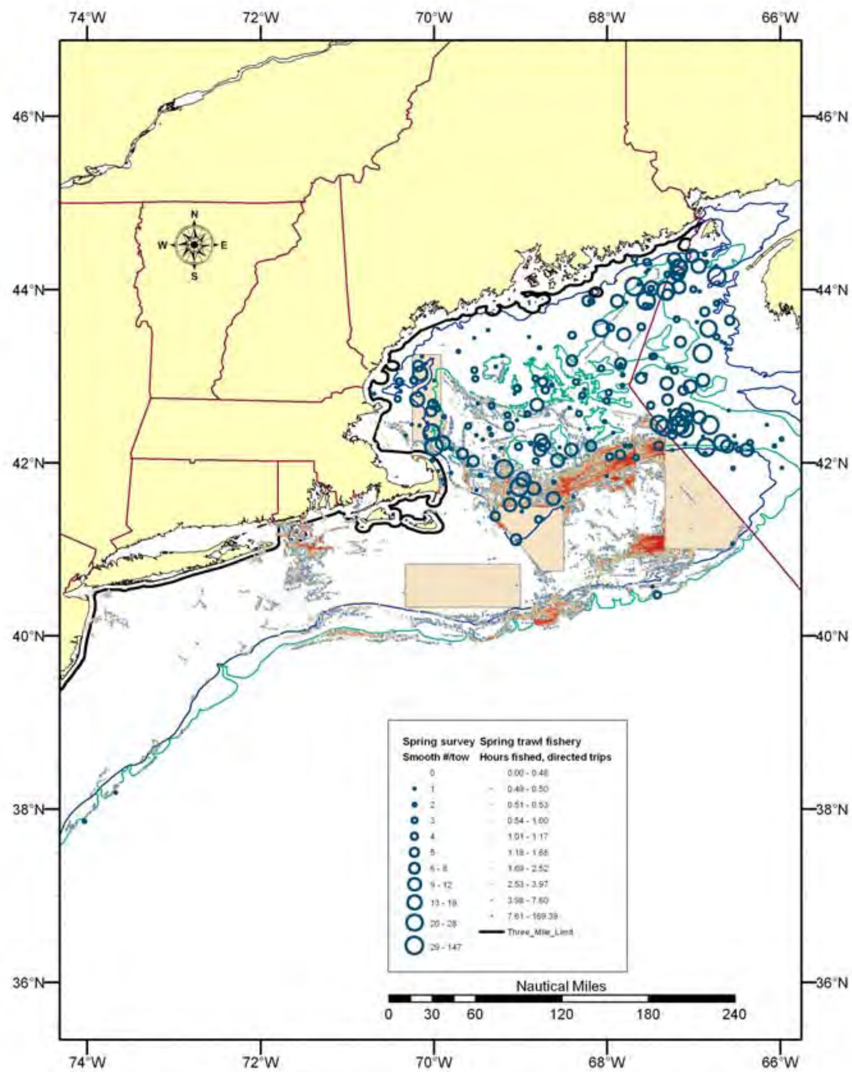
Spring (Jan-Jun effort)	Fall (Jul-Dec effort)



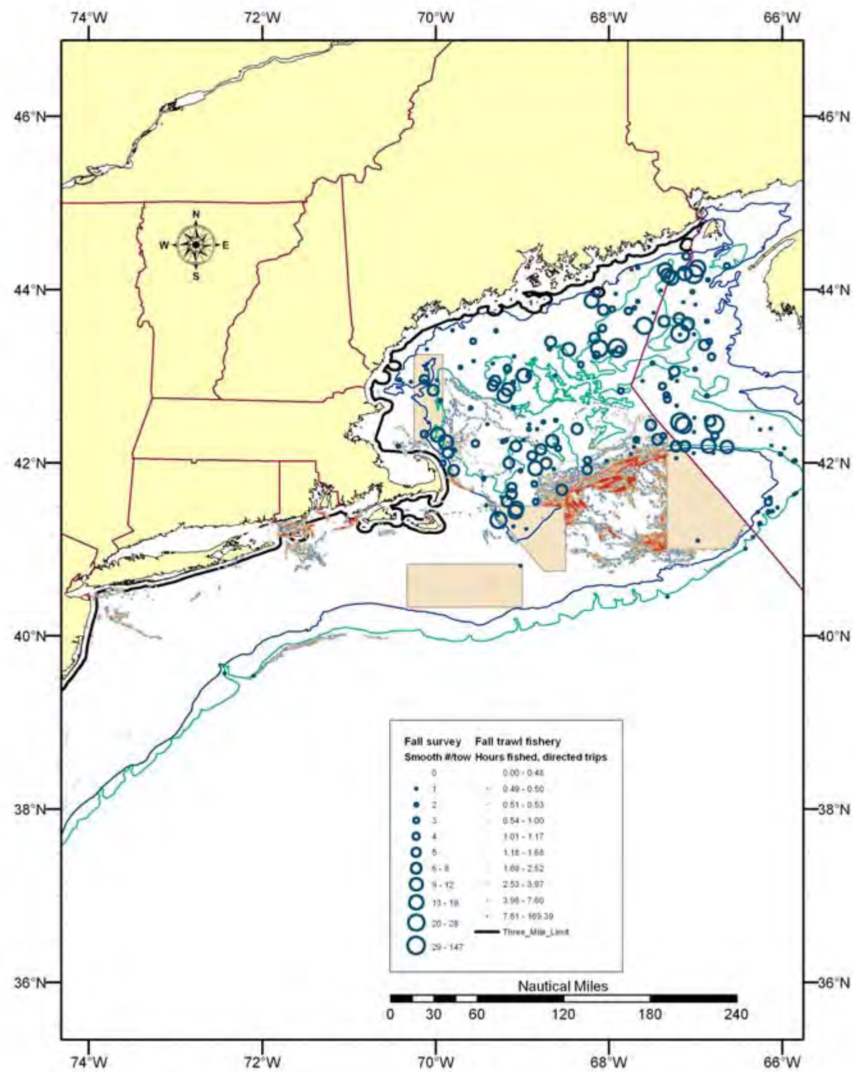


Map 17. Distribution of 2006-2010 smooth skate abundance (#/tow) compared to distribution of 2009-2011 directed skate trawl fishing effort (hot colors, like red, represent more intense fishing effort). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using trawls.

Spring (Jan-Jun effort)

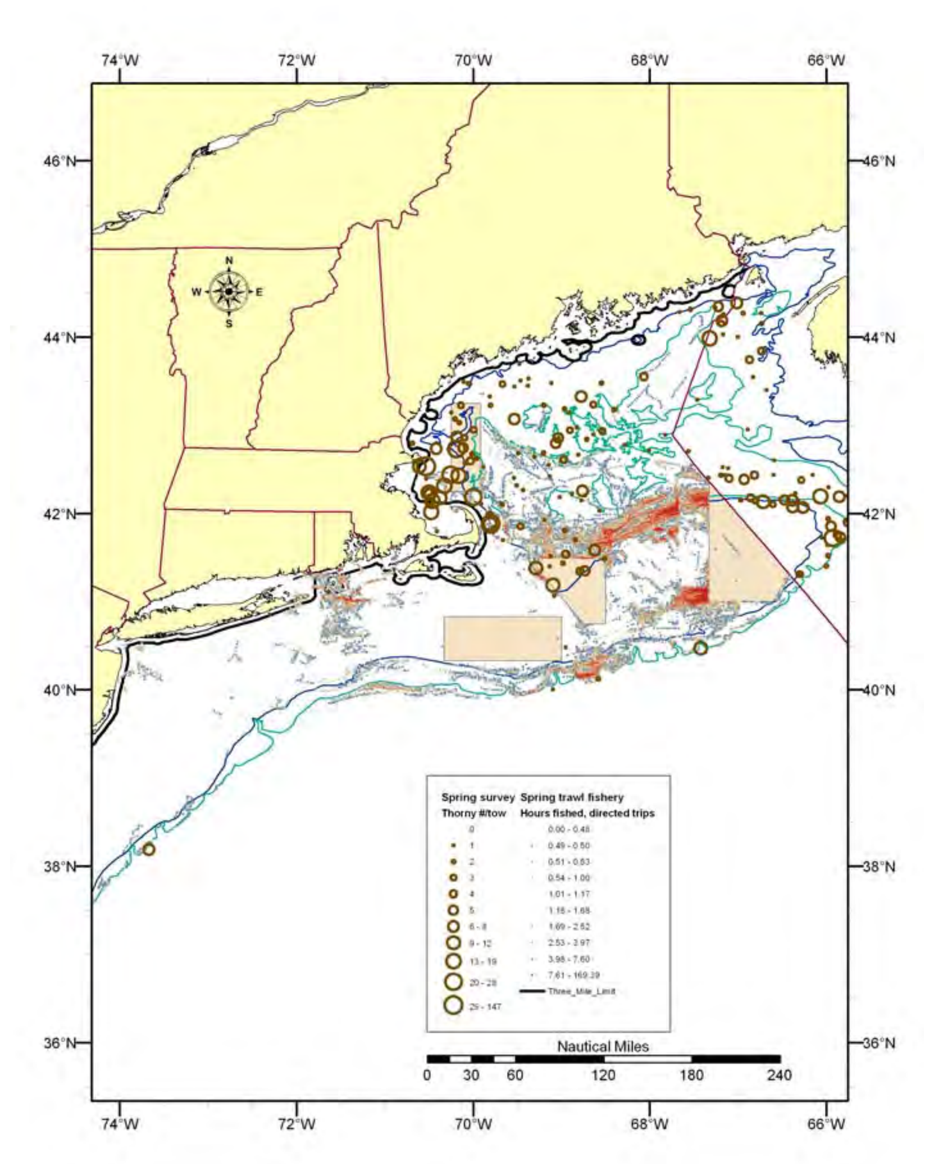


Fall (Jul-Dec effort)

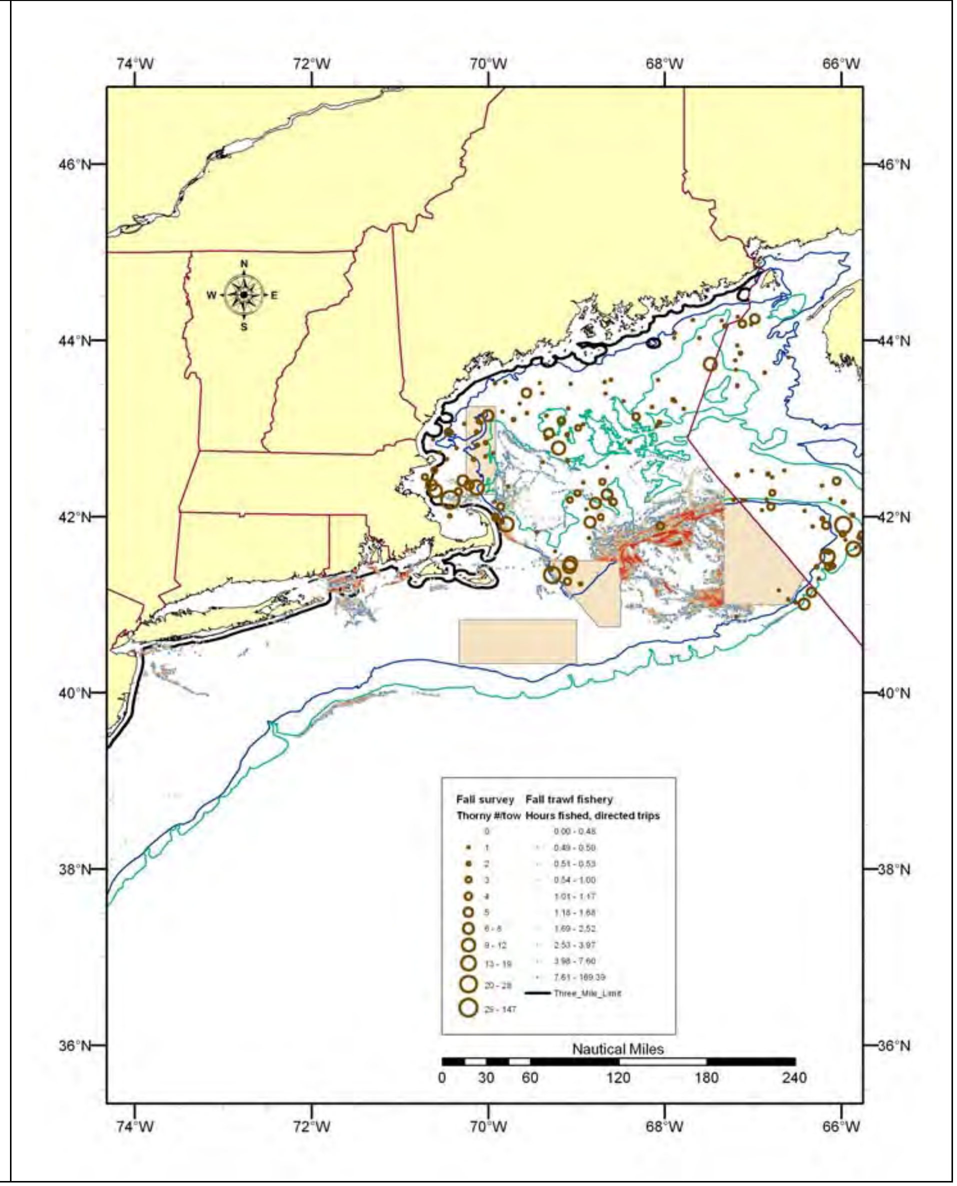


Map 18. Distribution of 2006-2010 thorny skate abundance (#/tow) compared to distribution of 2009-2011 directed skate trawl fishing effort (hot colors, like red, represent more intense fishing effort). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using trawls.

Spring (Jan-Jun effort)

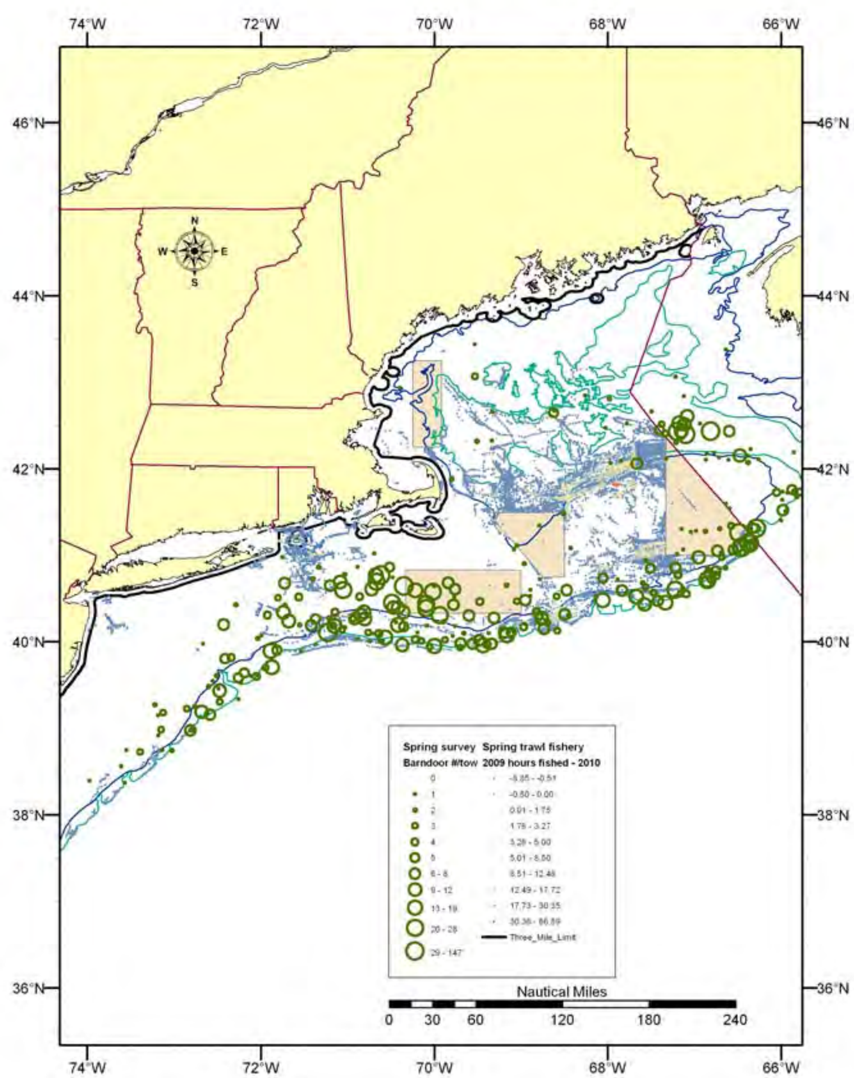


Fall (Jul-Dec effort)

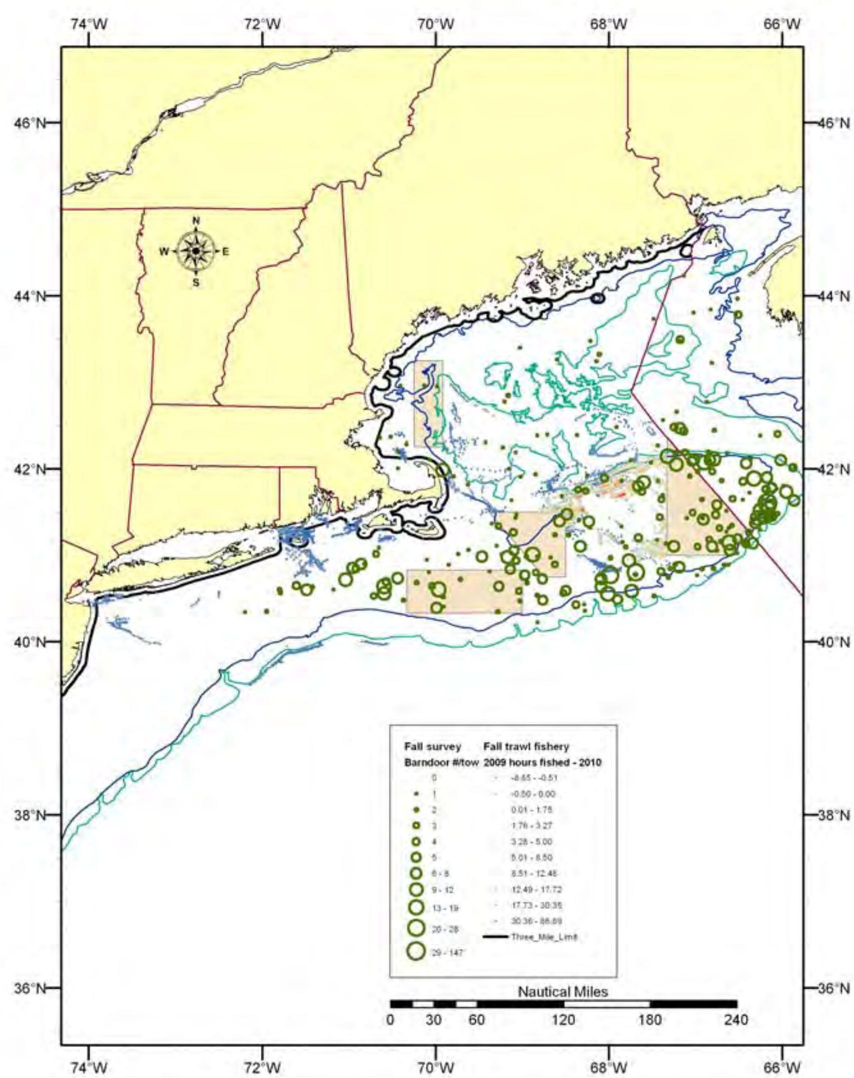


Map 19. Distribution of 2006-2010 barndoor skate abundance (#/tow) compared to distribution of 2009-2010 change in directed skate trawl fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using trawls.

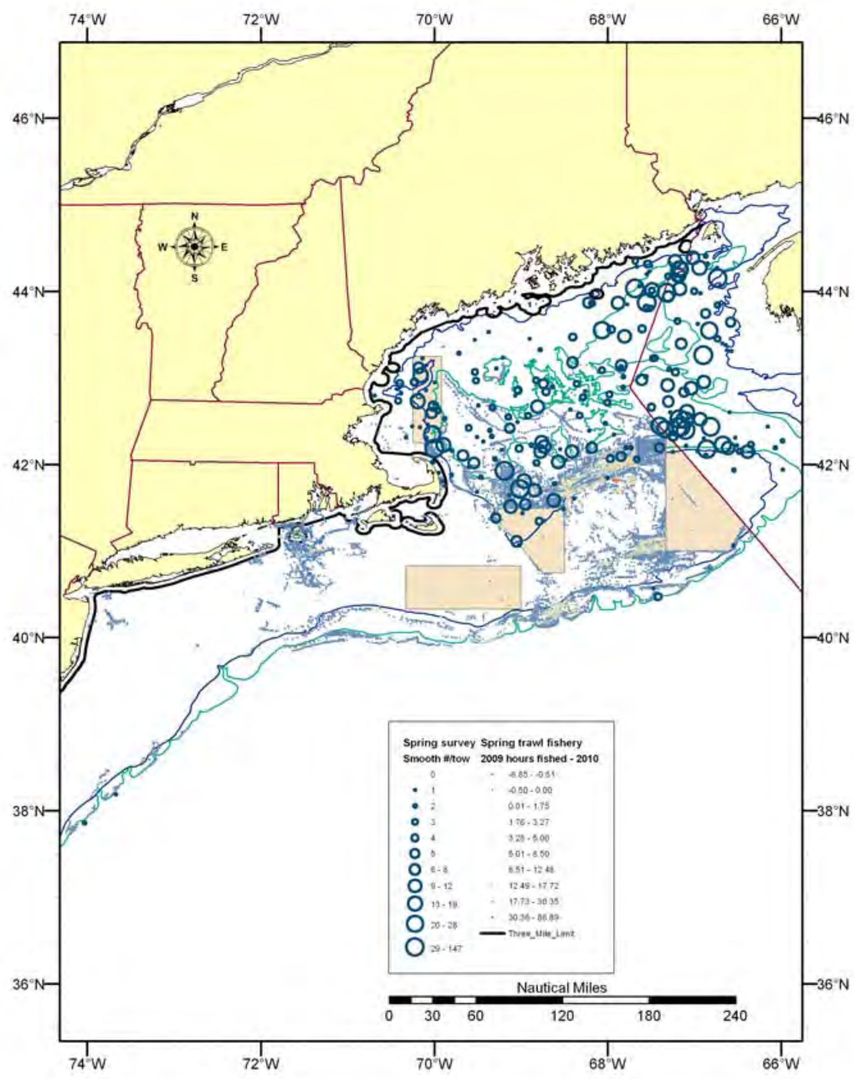
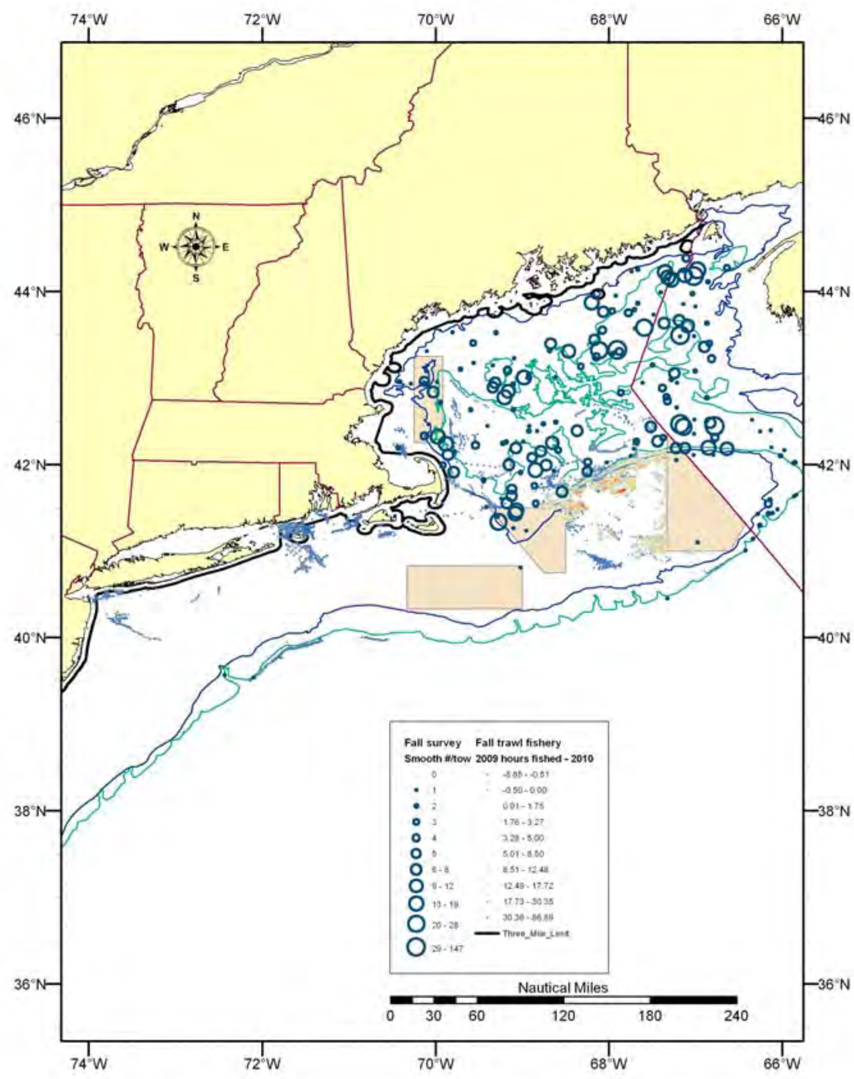
Spring (Jan-Jun effort)



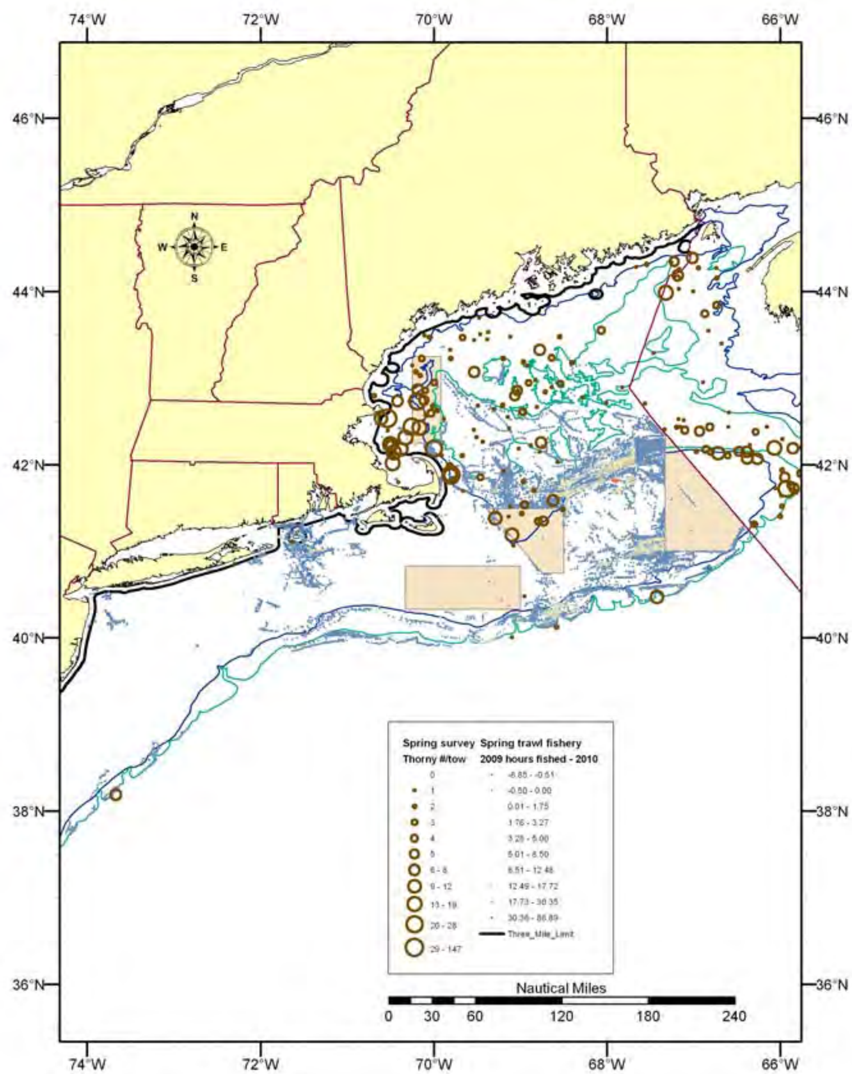
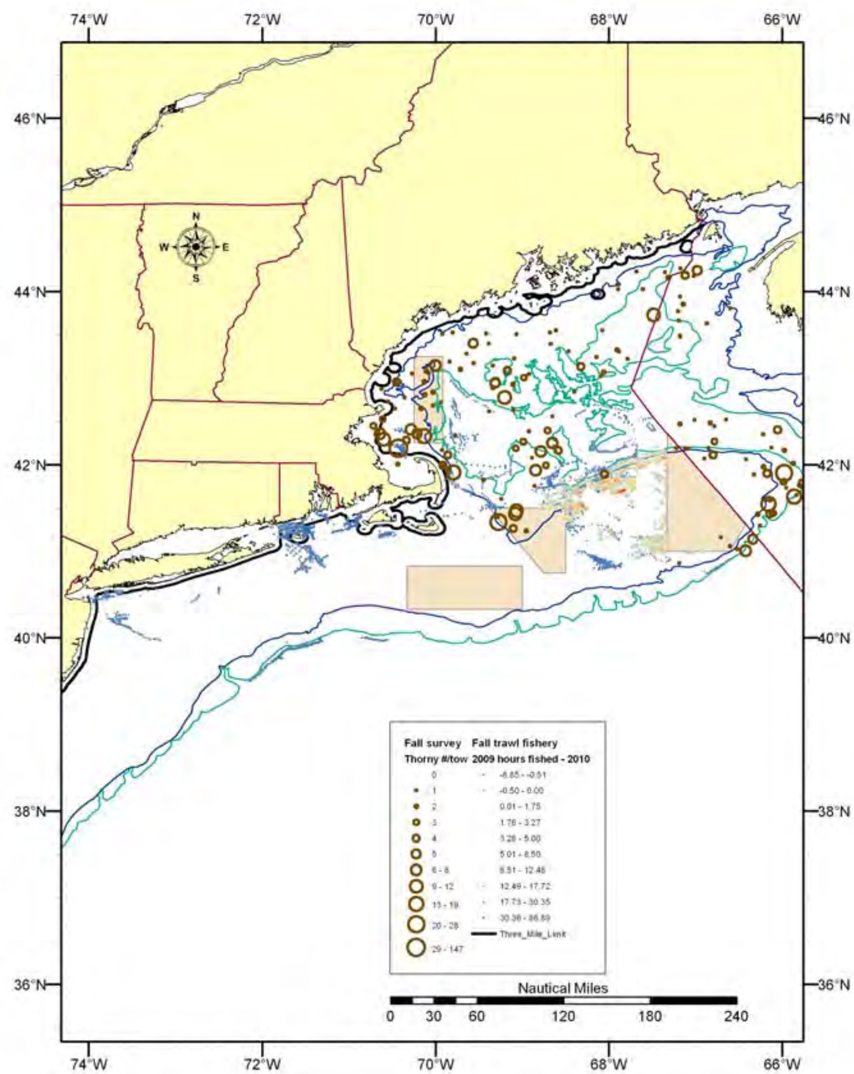
Fall (Jul-Dec effort)



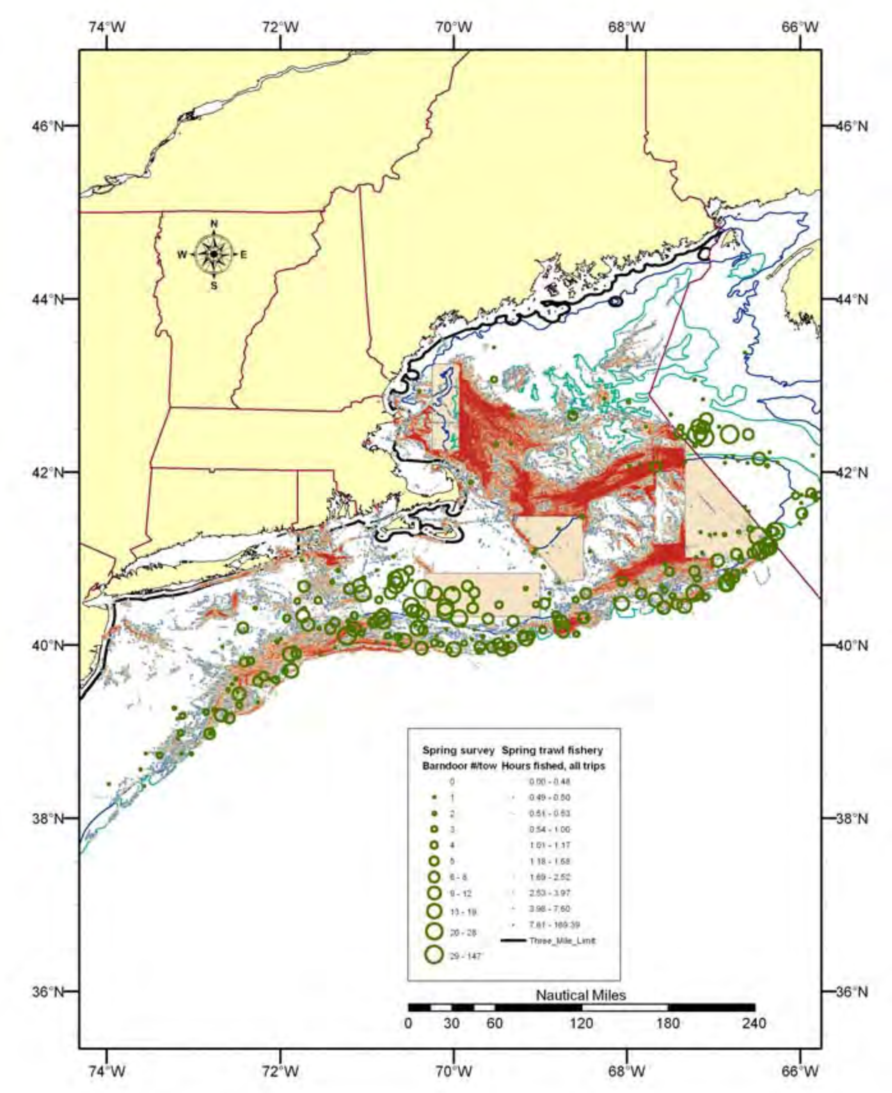
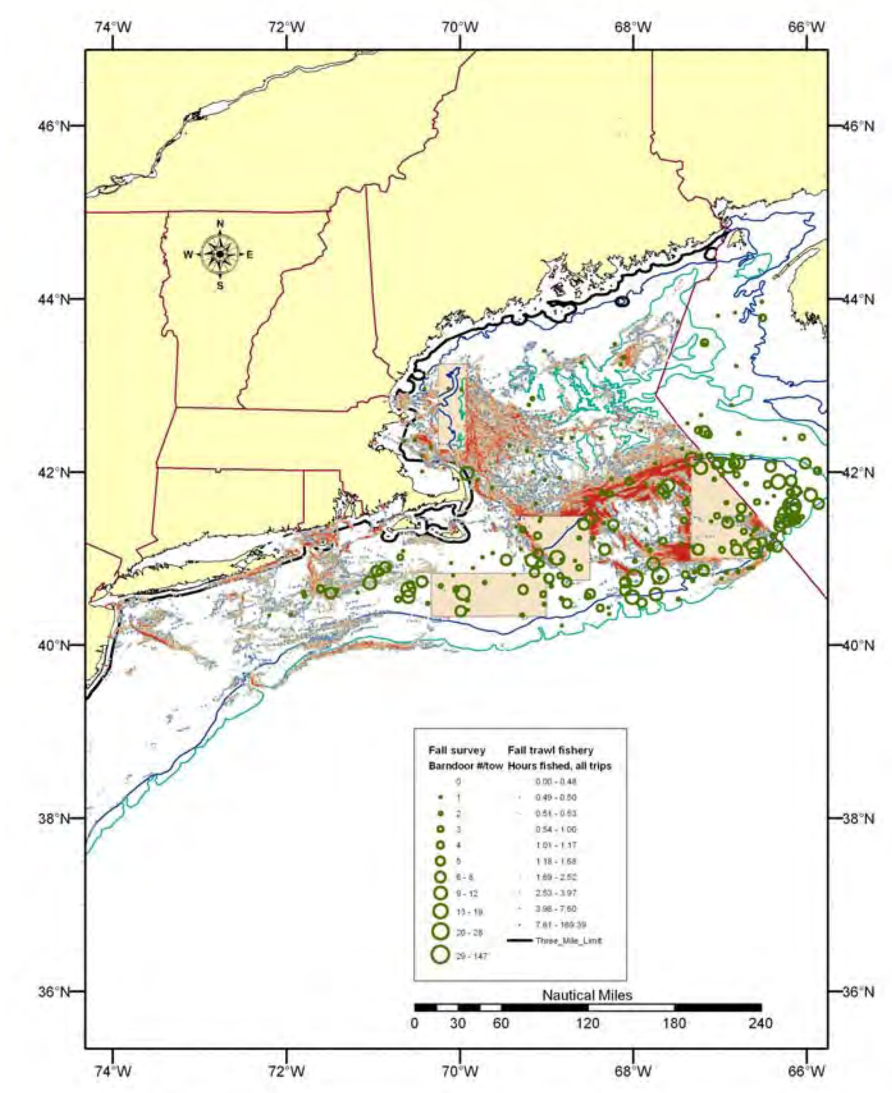
Map 20. Distribution of 2006-2010 smooth skate abundance (#/tow) compared to distribution of 2009-2010 change in directed skate trawl fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using trawls.

Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

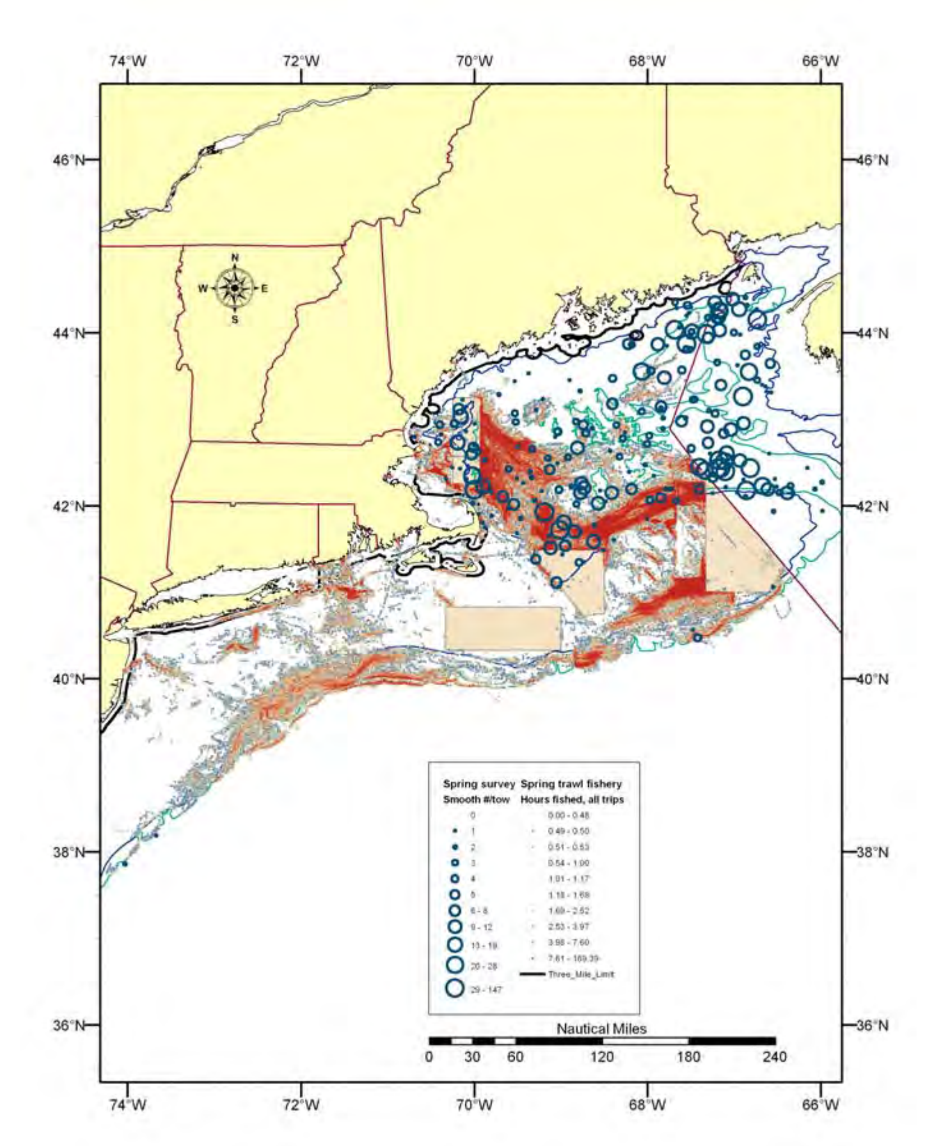
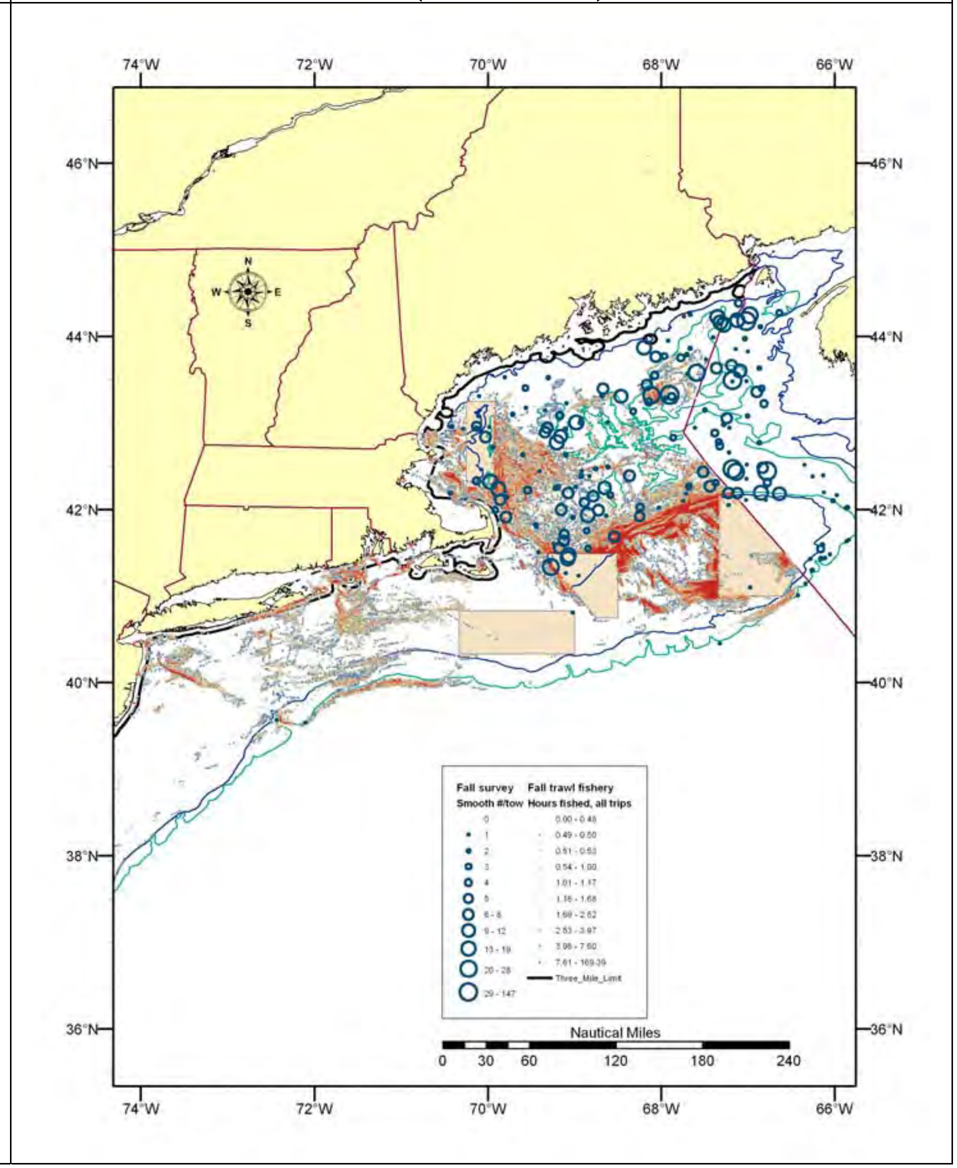
Map 21. Distribution of 2006-2010 thorny skate abundance (#/tow) compared to distribution of 2009-2010 change in directed skate trawl fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using trawls.

Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 22. Distribution of 2006-2010 barndoor skate abundance (#/tow) compared to distribution of 2009-2010 target and non-target skate trawl fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). The effort data include all trips landing more than 500 lbs. of skate wings by vessels without Skate Bait Letters of Authorization that reported using trawls.

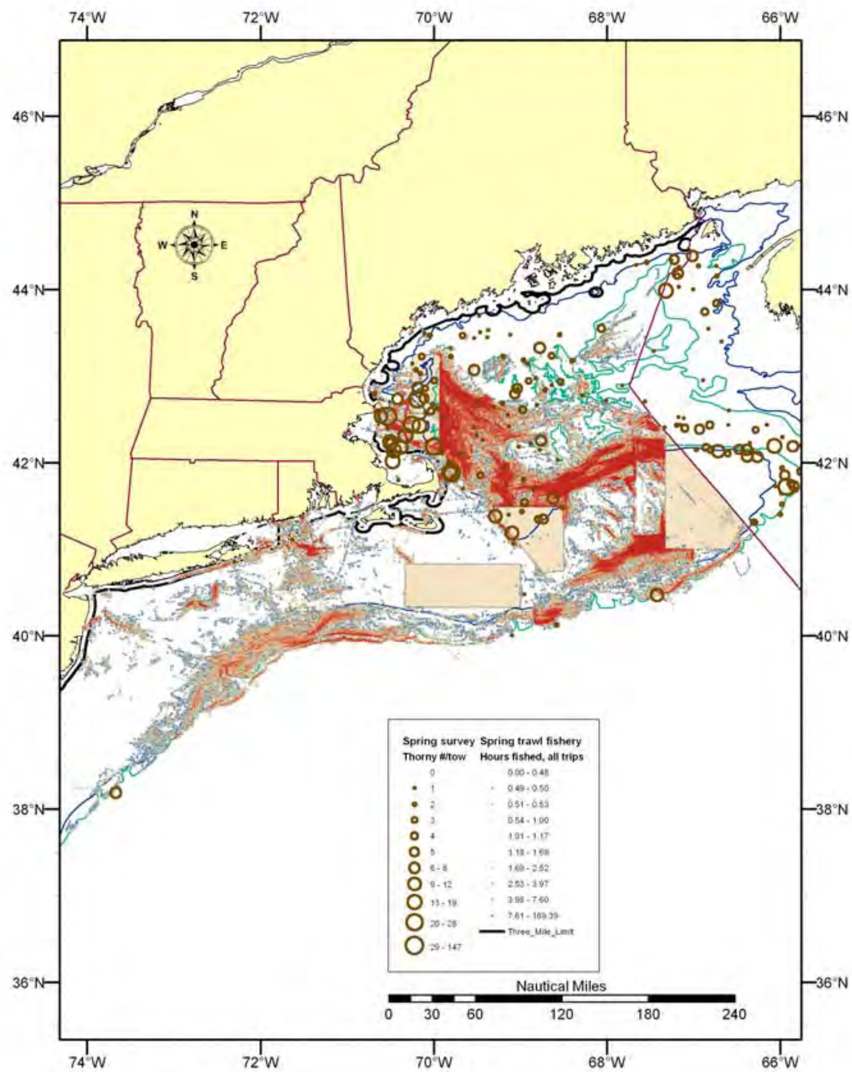
Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 23. Distribution of 2006-2010 smooth skate abundance (#/tow) compared to distribution of 2009-2010 target and non-target skate trawl fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). The effort data include all trips landing more than 500 lbs. of skate wings by vessels without Skate Bait Letters of Authorization that reported using trawls.

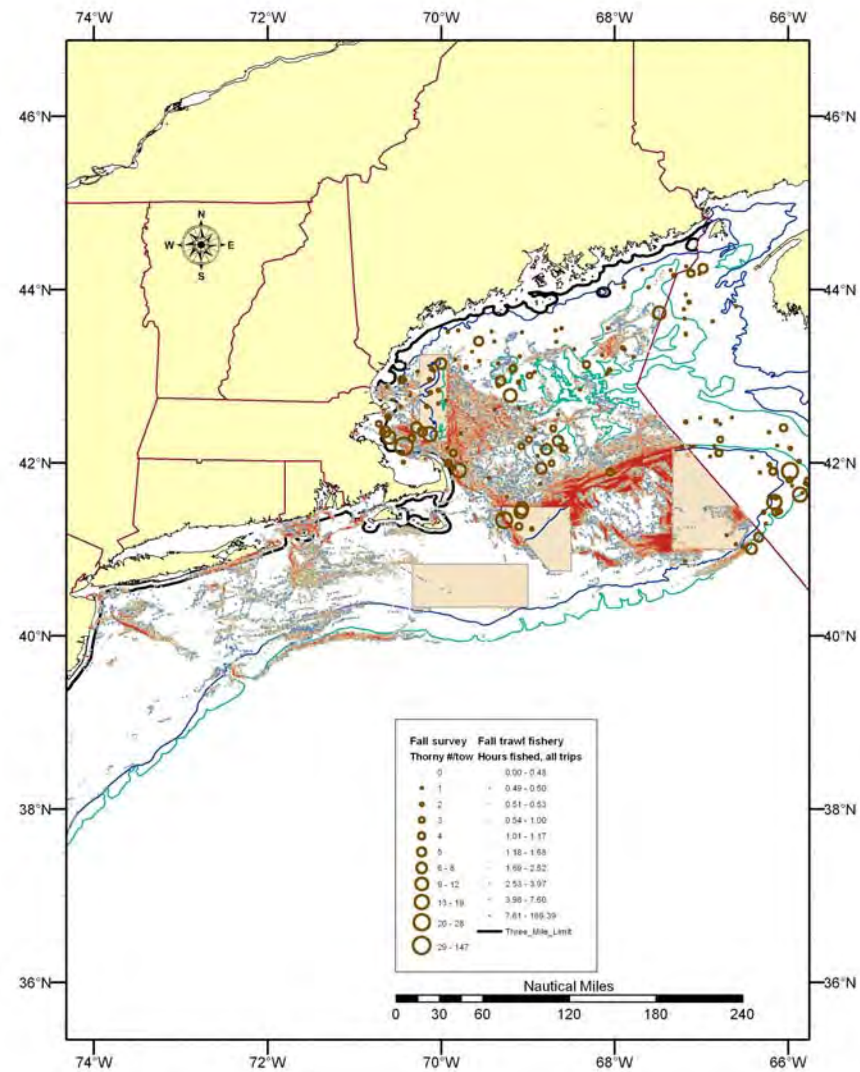
Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 24. Distribution of 2006-2010 thorny skate abundance (#/tow) compared to distribution of 2009-2010 target and non-target skate trawl fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). The effort data include all trips landing more than 500 lbs. of skate wings by vessels without Skate Bait Letters of Authorization that reported using trawls.

Spring (Jan-Jun effort)



Fall (Jul-Dec effort)



6.1.1.2 Potential interactions with the skate wing fishery effort distribution for vessels using gillnets

6.1.1.2.1 Directed skate fishing effort

As in the analysis above for trawl fishing effort, the distribution of fishing effort on trips using sink gillnets to target or land incidental amounts of skates can be compared with the distribution of barndoor, smooth, and thorny skates observed in surveys. The species distributions are of course the same as those used in the above trawl analysis, but the gillnet fishing effort distribution is different than it is for the trawl fishery evaluated in the previous section. Most of the gillnet fishing for skates lands skates for the wing market, which is plotted in the following maps. Nonetheless, vessels that held Skate Bait Letters of Authorization were excluded from the analysis, because they would be targeting little skate which mostly occur in shallow waters that have little overlap with the distributions of barndoor, smooth, and thorny skates.

In contrast to trawl fishing effort, the directed gill net fishing effort is concentrated in three areas: Southern New England from SW of the Nantucket Lightship Area to the eastern part of Long Island, NY, from the SE tip of Cape Cod, MA to the NW part of Closed Area I, and along the SW edge of the Western Gulf of Maine closed area (Map 25 to Map 27).

There is a considerable amount of overlap in directed skate gillnet effort and barndoor skate distribution in the spring to the south and west of the Nantucket Lightship Area (Map 25). This is a fishery that targets both skates and monkfish, and therefore is expected to have a significant amount of barndoor skate, if they do not evade capture by gillnet gear. Given that skates are captured by gillnets and the gillnets are designed to capture large monkfish, this evasion is unlikely.

There is almost no overlap in directed gillnet fishing effort and smooth skate distribution (Map 26). And although the directed gillnet fishing effort has little in common with the thorny skate distribution (Map 27), the gillnet effort on the SW edge of the Western Gulf of Maine closed area appears to have a year round interaction with thorny skates.

6.1.1.2.2 Potential changes in directed skate wing fishing effort

The areas of a high degree of overlap identified in the previous section can be examined for potential increases in fishing effort due to the higher ABC and skate wing TAL, bu comparing the 2009 effort to 2010 when more restrictive limits were implemented by Amendment 3, similar to the analysis for directed trawl effort above. In the area that directed gillnet fishing effort overlaps the barndoor skate distribution, effort was actually higher in 2010 than it was in 2009 (indicated by the blue cells in Map 28). This is an area where vessels target monkfish using gillnets, so the differences between 2009 and 2010 effort may have had more to do with monkfish fishing than skate fishing. As a result, the 500 lbs. incidental skate possession limit probably caused a considerable amount of discarding in this area where vessels target monkfish with gillnets. In the area SW of the Western Gulf of Maine closed area that overlaps the thorny skate distribution (Map 30), there was little change in the amount of effort in 2010 compared to 2009 and therefore increases in the skate limits would not be expected to change the effort distribution there and the catches of thorny skate.

6.1.1.2.3 Non-target fishing effort

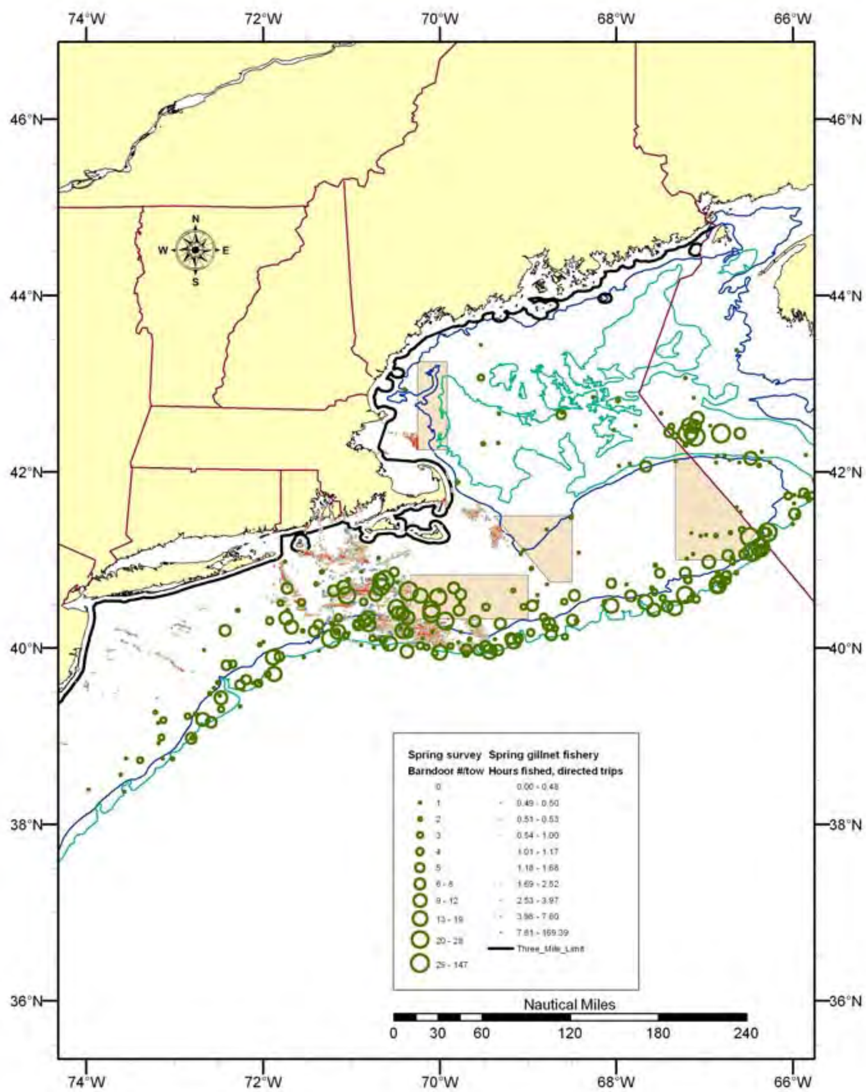
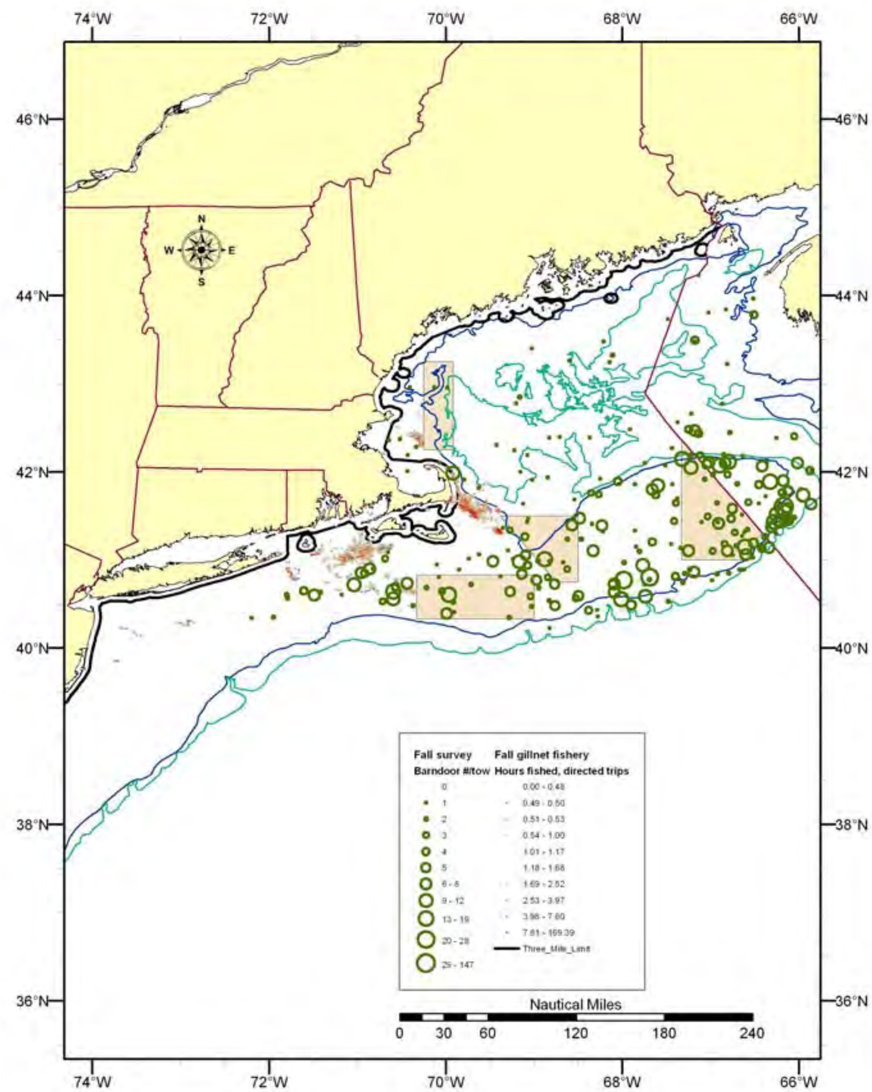
The distribution of gillnet fishing effort on all trips landings skates (Map 31 to Map 33) is of course more widely distributed than it is for trips targeting skates (Map 25 to Map 27). The additional effort is located around Hudson Canyon in the Mid-Atlantic and on the various banks in the central Gulf of Maine. The Hudson Canyon gillnet fishing effort is unlikely to have any interaction with barndoor, smooth, and thorny skates. On the other hand, the gillnet trips targeting non-skate species in the central Gulf of Maine are likely to have interactions with smooth skates (Map 32) and to a somewhat lesser extent with thorny skate (Map 33).

6.1.1.2.4 Conclusion

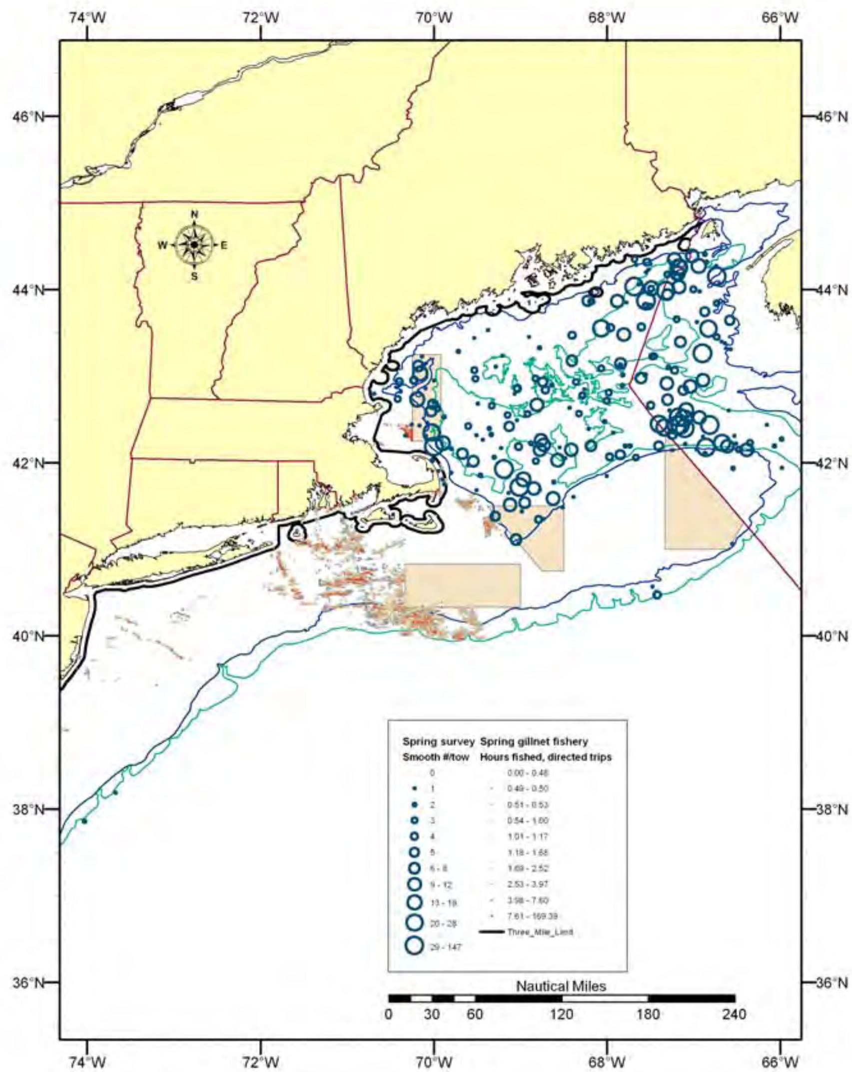
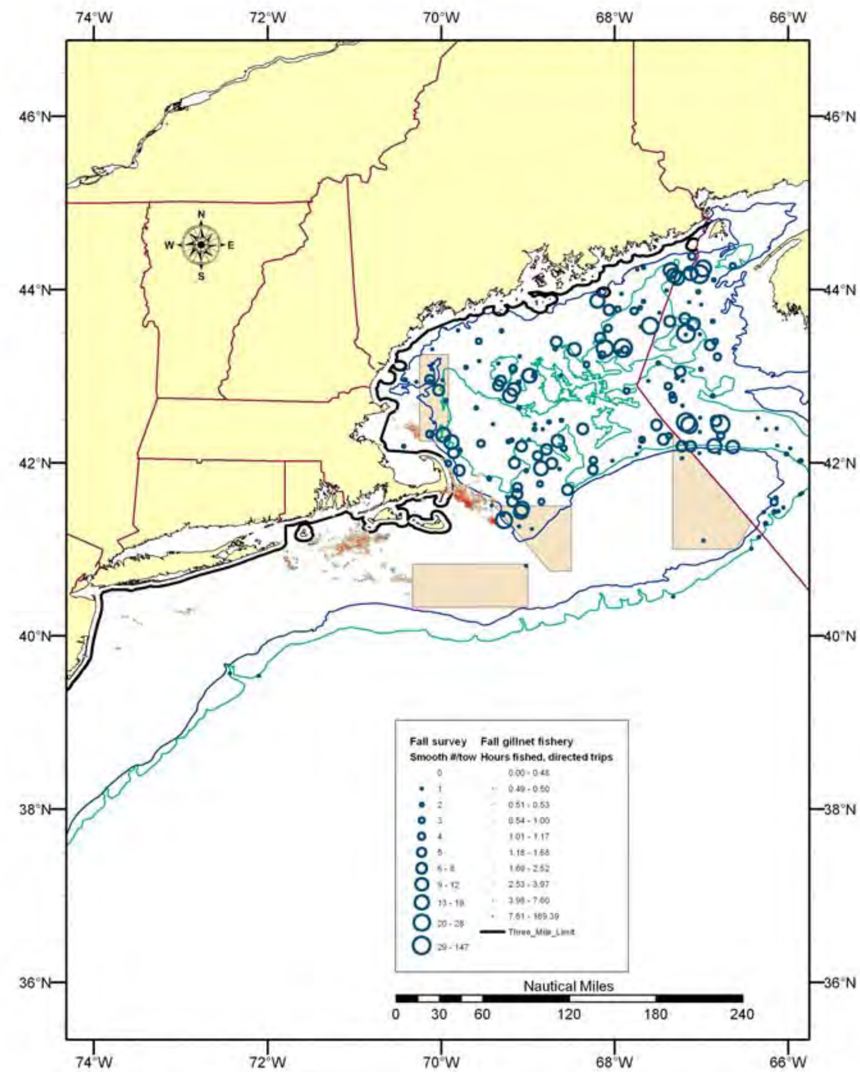
Except for gillnet trips targeting or landing incidental amounts of skates to the south and west of the Nantucket Lightship Area and to a much lesser extent the trips fishing SW of the Western Gulf of Maine closed area, gillnets do not overlap the distribution of barndoor, smooth, and thorny skates very much and increases in the skate ABC and skate wing TAL are unlikely to have much effect on the biomass of these species. The gillnet fishing effort south and west of the Nantucket Lightship Area however overlaps a considerable amount of the spring distribution of barndoor skate. Gillnet fishing in this area could have a meaningful impact on the biomass of barndoor skate, although discard survival may be better than the 50% level assumed by the Council[20]. But it should also be noted that barndoor biomass skate has increased considerably in the last decade despite this interaction and could soon reach the rebuilding target.

[20] There are no data on discard survival of skates when captured by gillnets in US waters.

Map 25. Distribution of 2006-2010 barndoor skate abundance (#/tow) compared to distribution of 2009-2011 directed skate sink gillnet fishing effort (hot colors, like red, represent more intense fishing effort). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

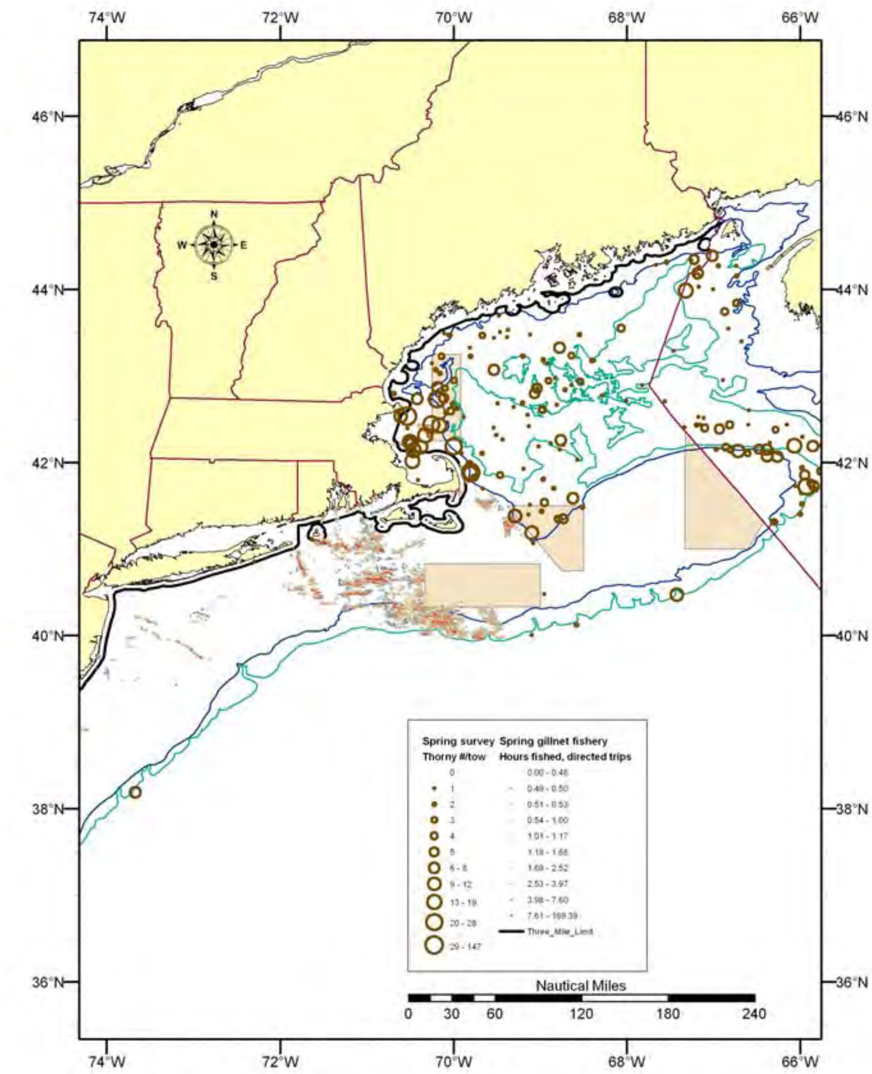
Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 26. Distribution of 2006-2010 smooth skate abundance (#/tow) compared to distribution of 2009-2011 directed skate sink gillnet fishing effort (hot colors, like red, represent more intense fishing effort). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

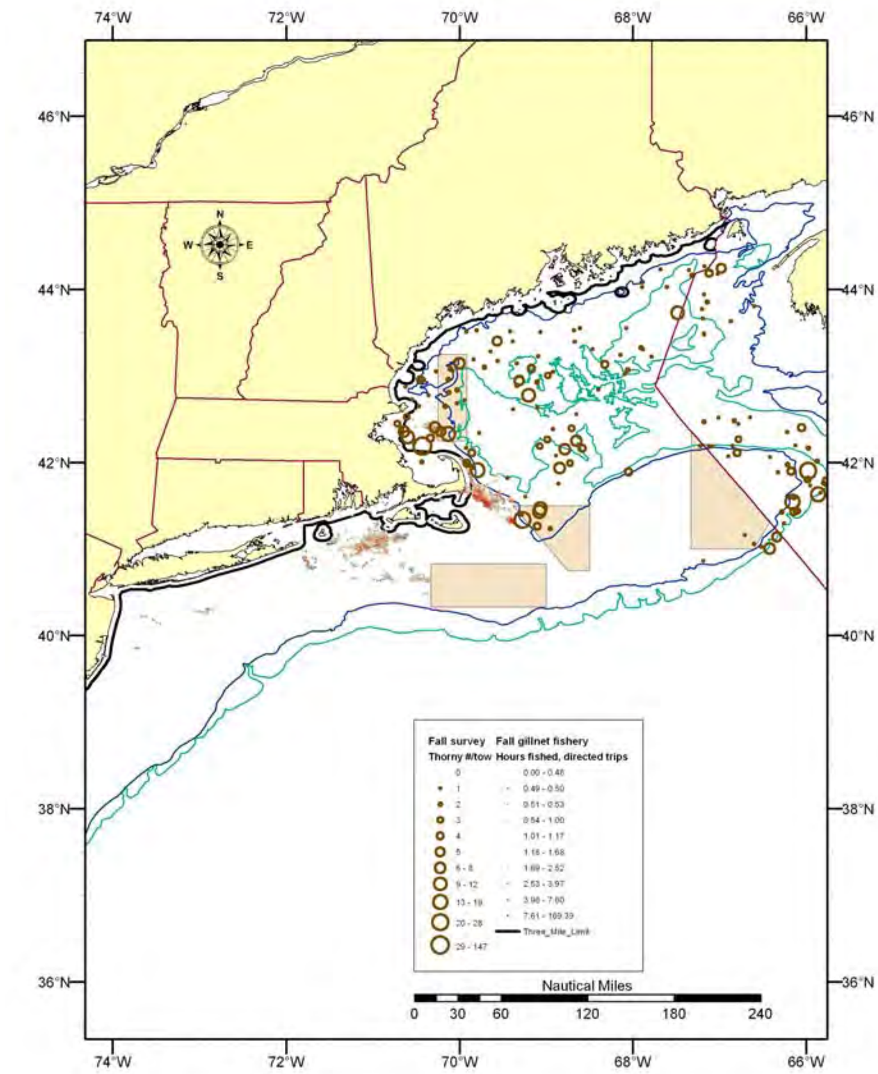
Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 27. Distribution of 2006-2010 thorny skate abundance (#/tow) compared to distribution of 2009-2011 directed skate sink gillnet fishing effort (hot colors, like red, represent more intense fishing effort). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

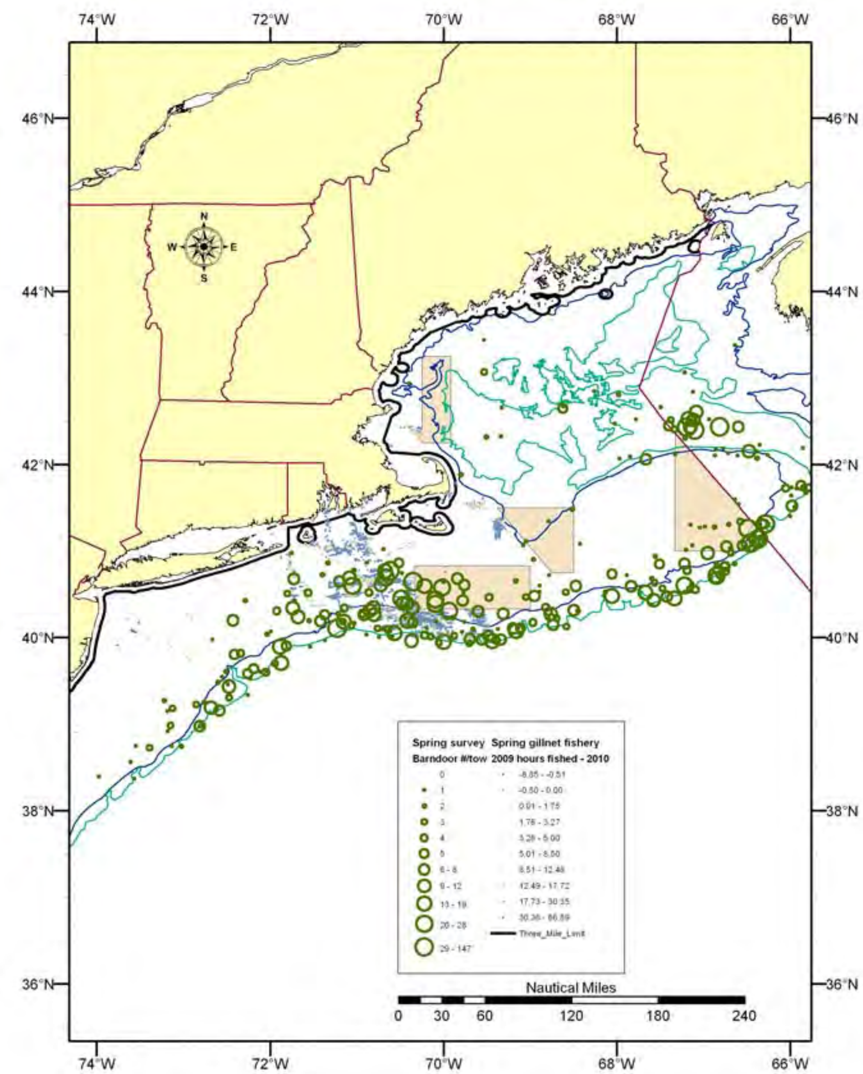
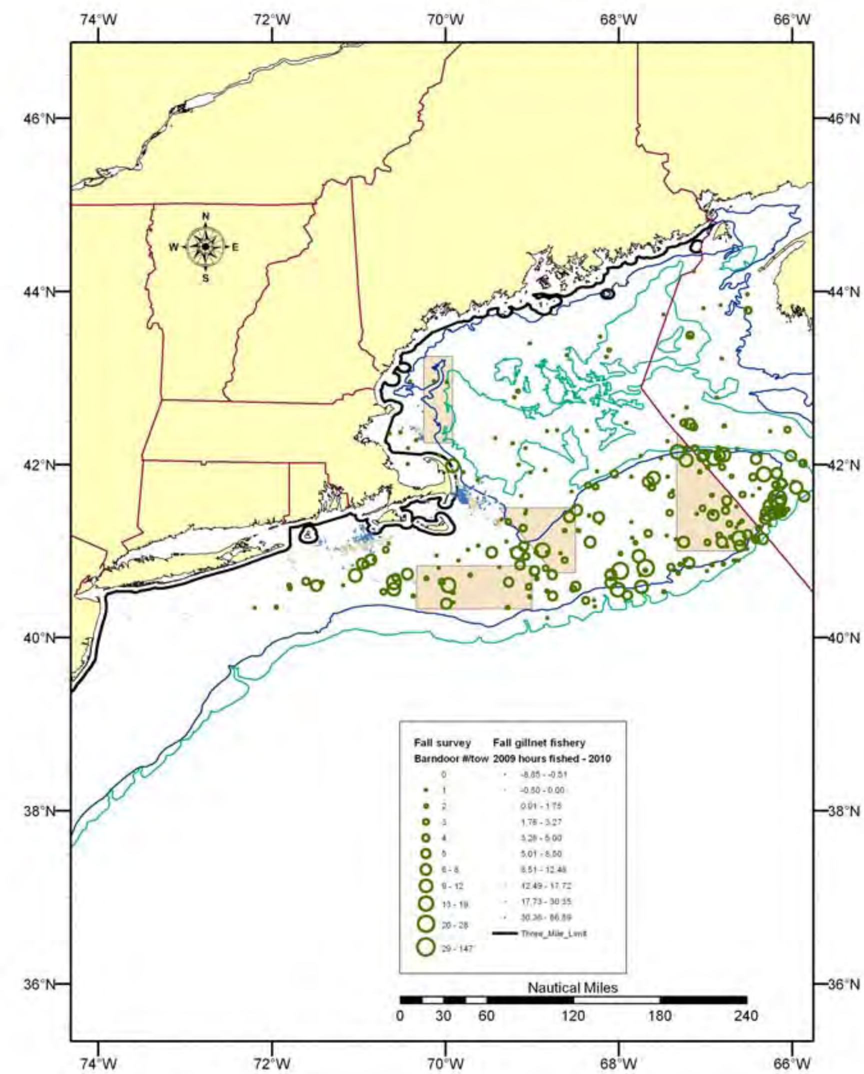
Spring (Jan-Jun effort)



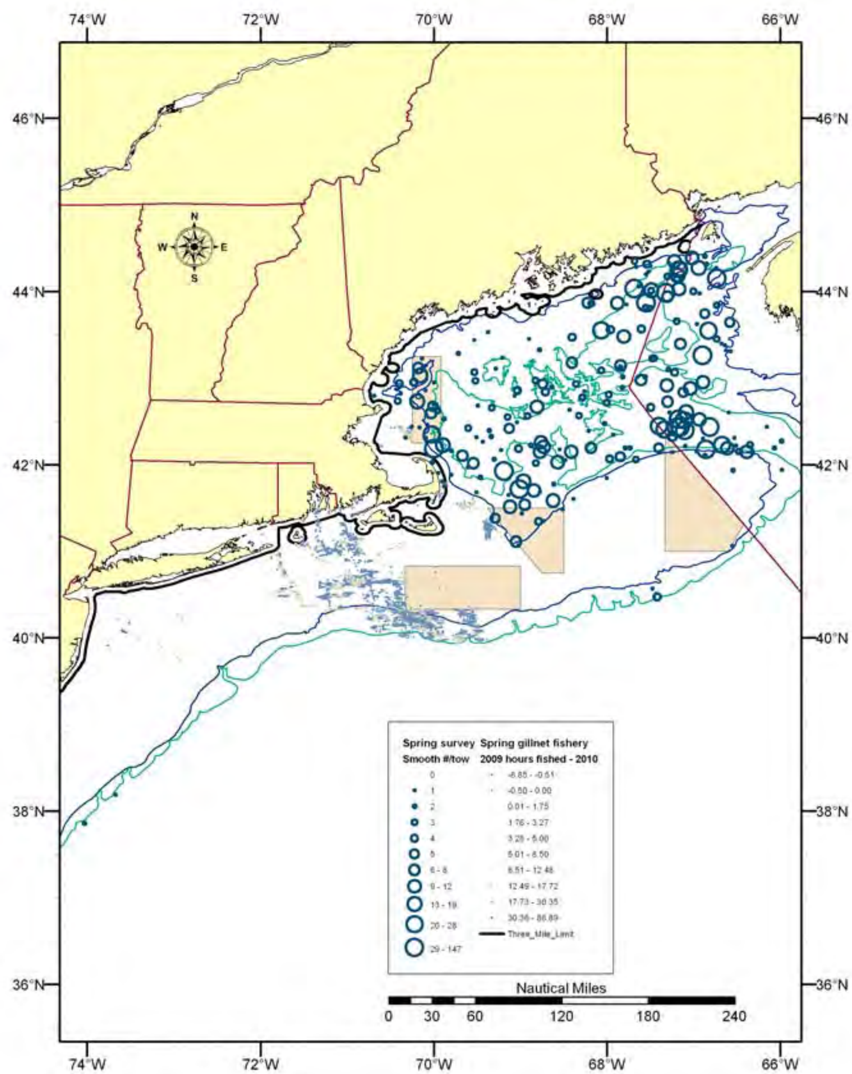
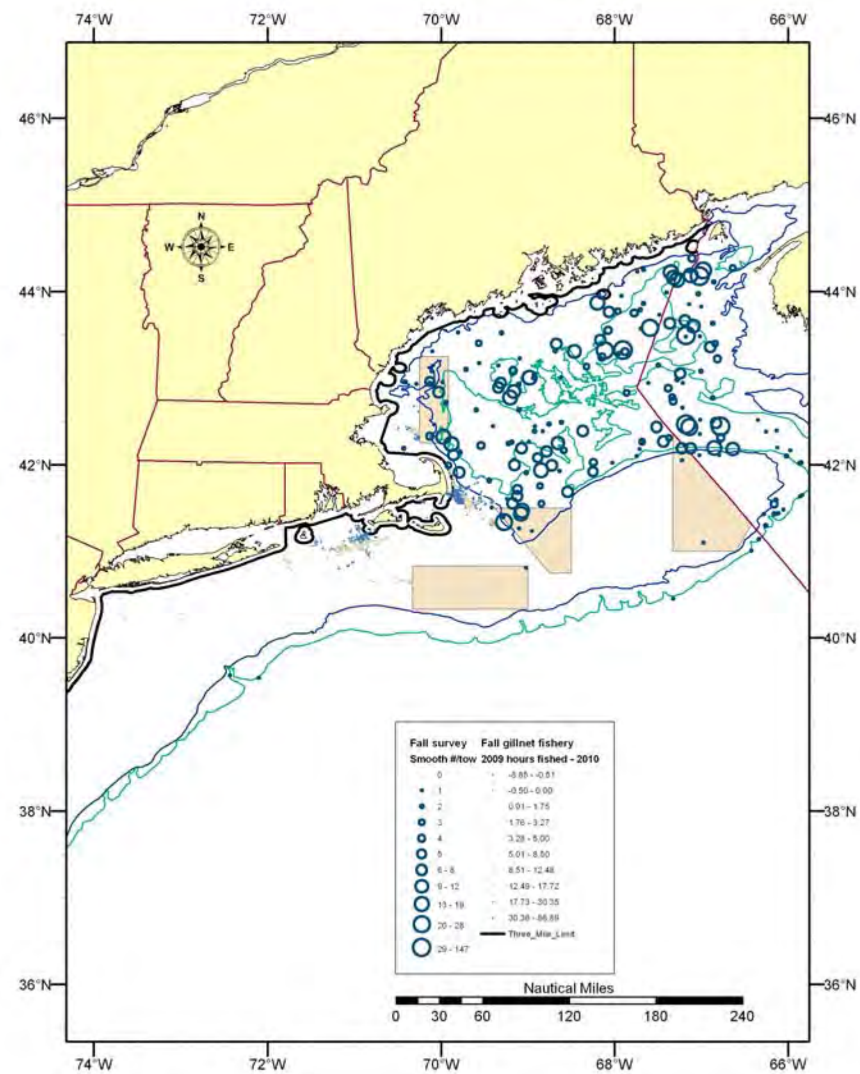
Fall (Jul-Dec effort)



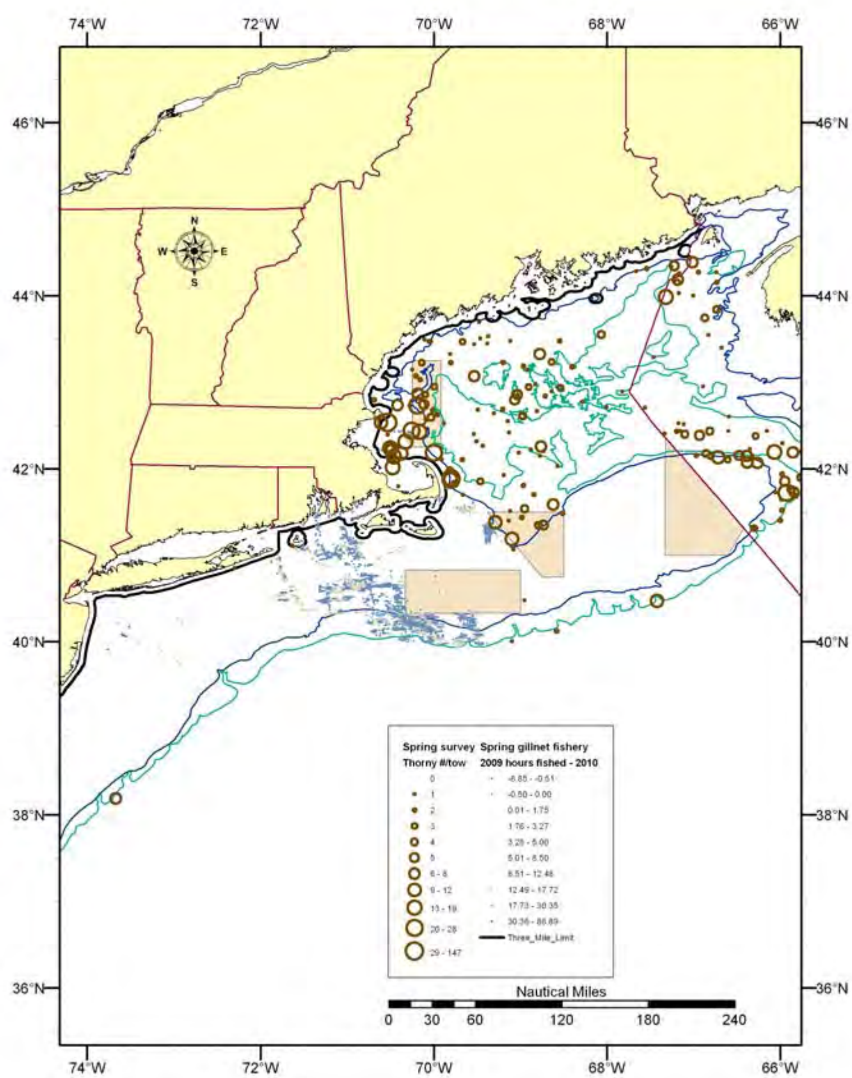
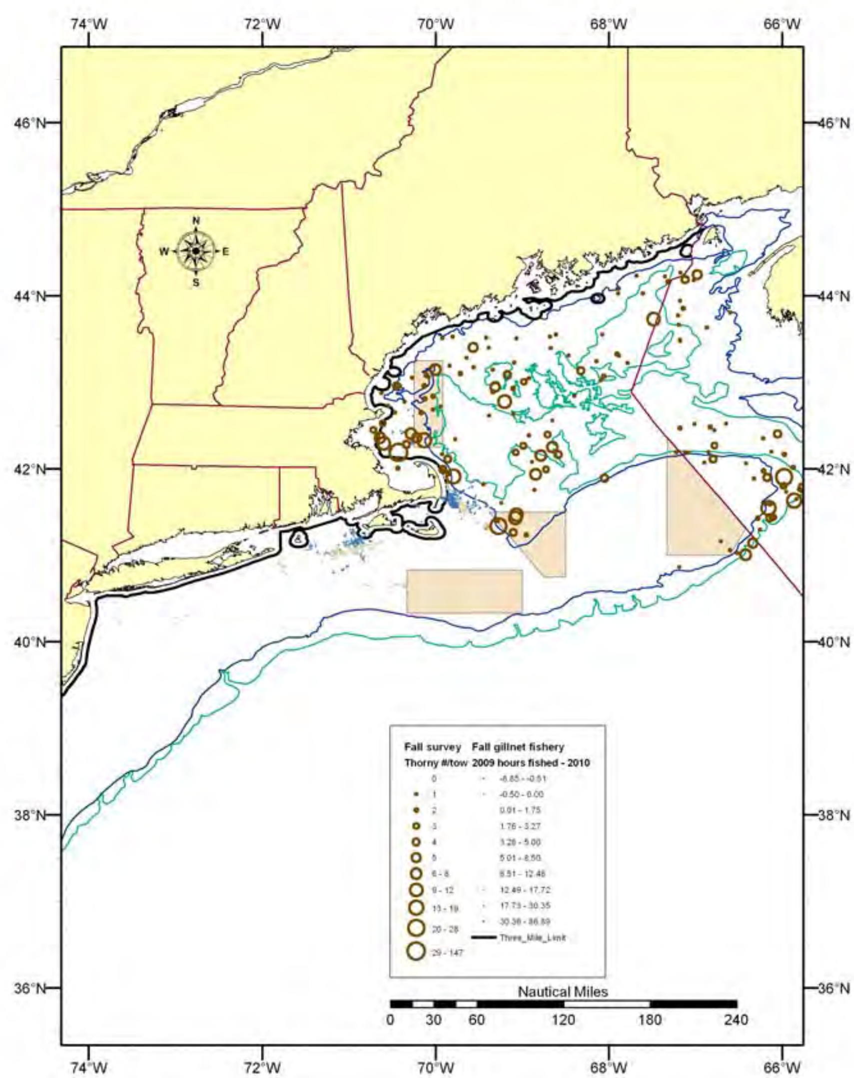
Map 28. Distribution of 2006-2010 barndoor skate abundance (#/tow) compared to distribution of 2009-2010 change in directed skate sink gillnet fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

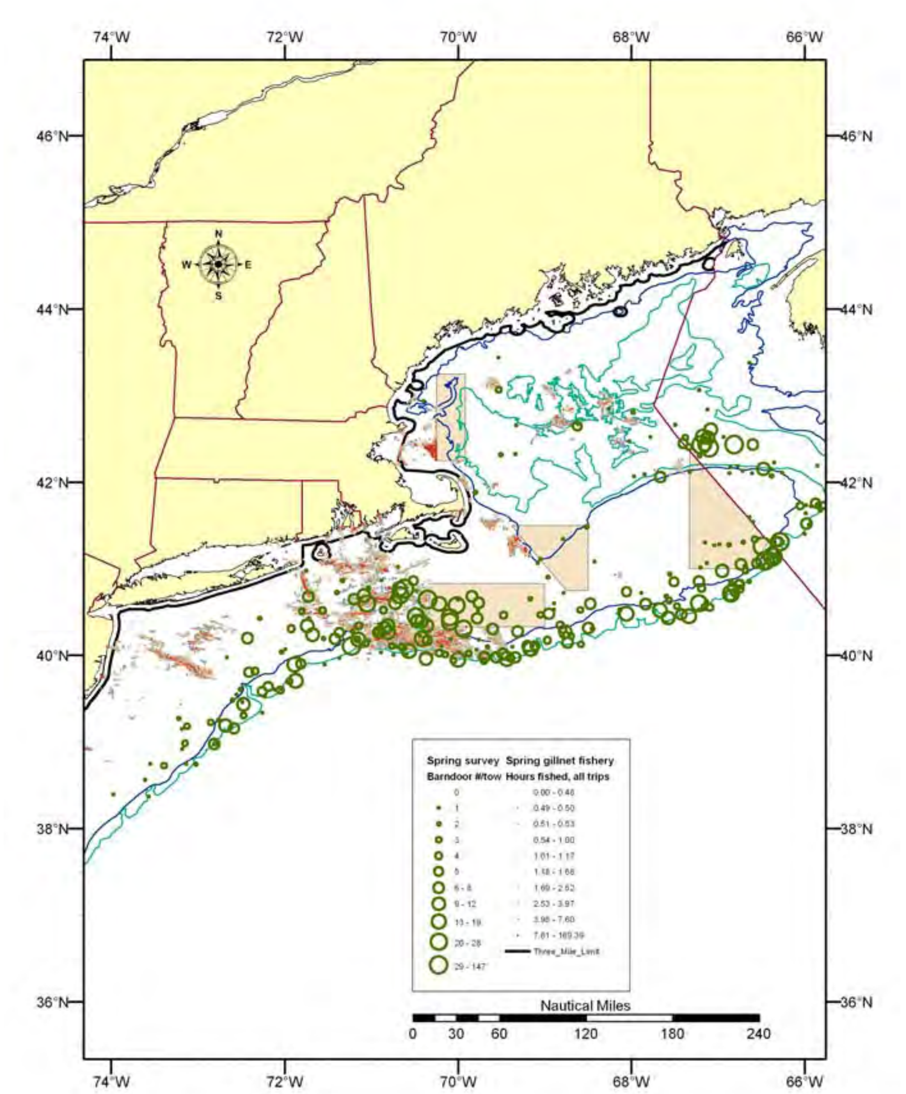
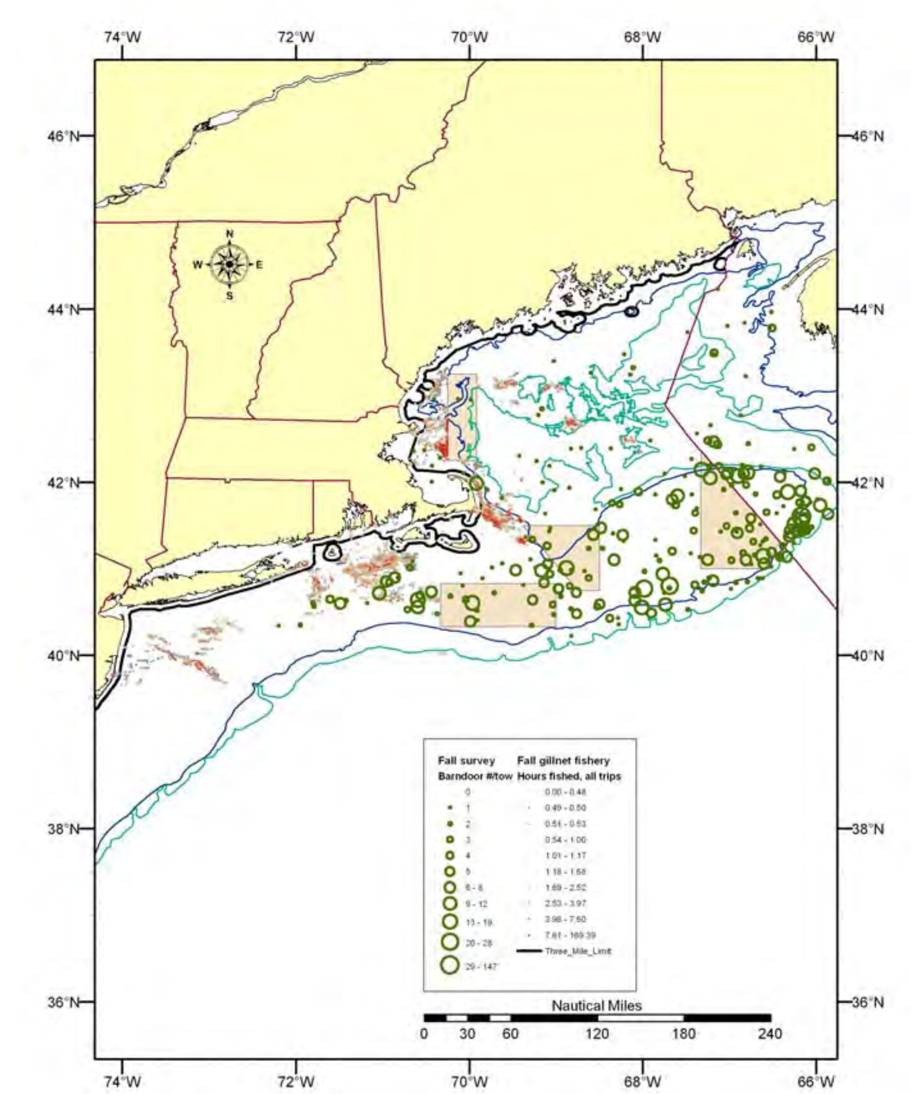
Map 29. Distribution of 2006-2010 smooth skate abundance (#/tow) compared to distribution of 2009-2010 change in directed skate sink gillnet fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 30. Distribution of 2006-2010 thorny skate abundance (#/tow) compared to distribution of 2009-2010 change in directed skate sink gillnet fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). Directed effort includes trips landing more than 500 lbs. of skate wings and with skates contributing more than 30% of total landings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

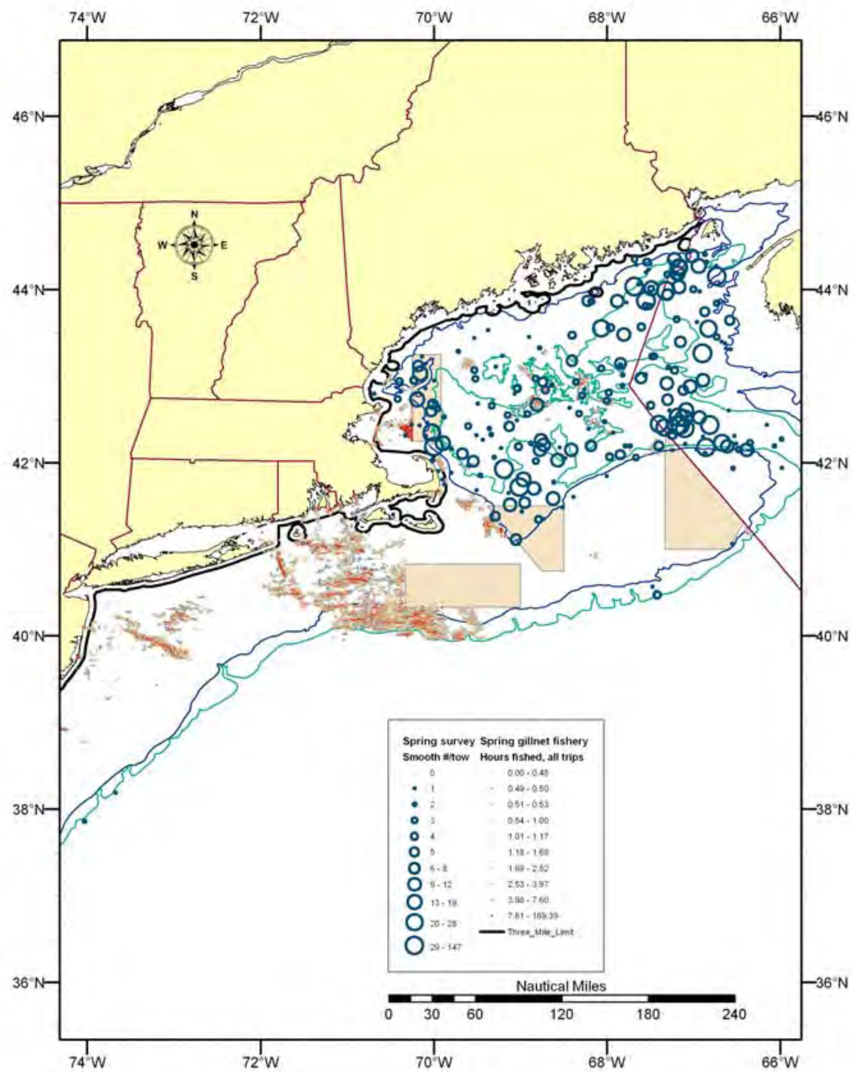
Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 31. Distribution of 2006-2010 barndoor skate abundance (#/tow) compared to distribution of 2009-2010 target and non-target skate sink gillnet fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). The effort data include all trips landing more than 500 lbs. of skate wings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

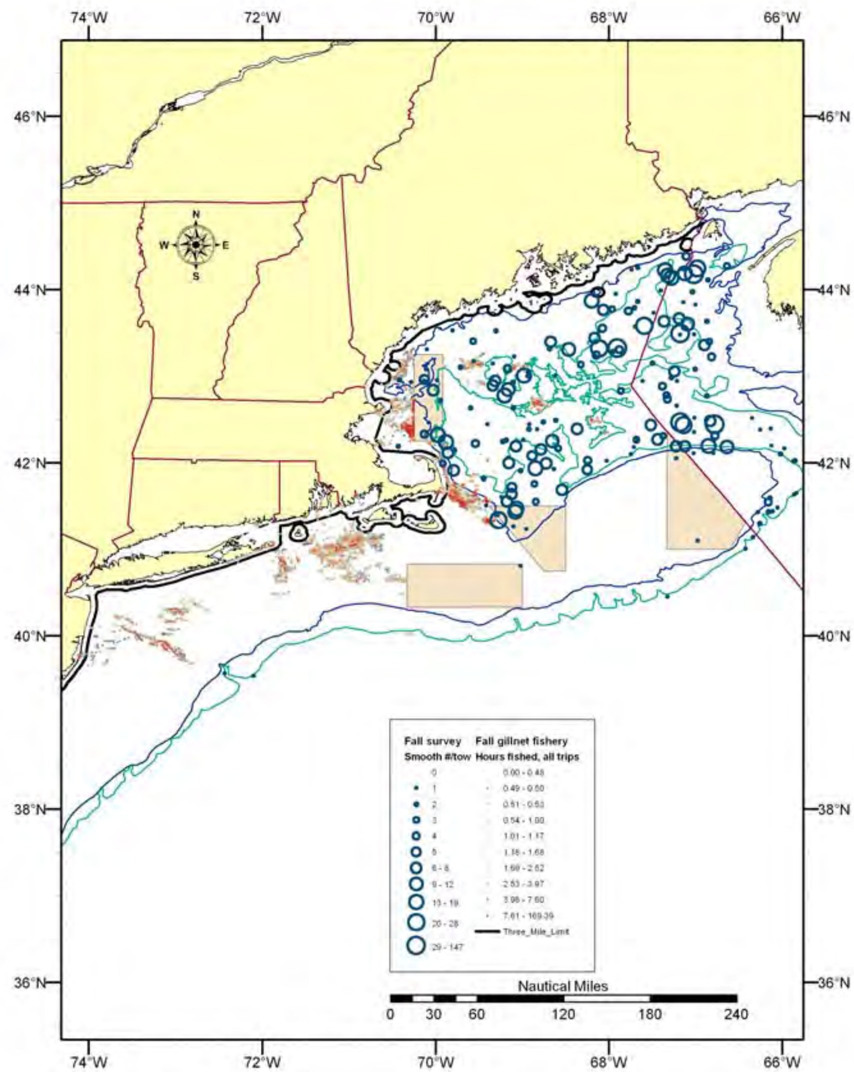
Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

Map 32. Distribution of 2006-2010 smooth skate abundance (#/tow) compared to distribution of 2009-2010 target and non-target skate sink gillnet fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). The effort data include all trips landing more than 500 lbs. of skate wings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

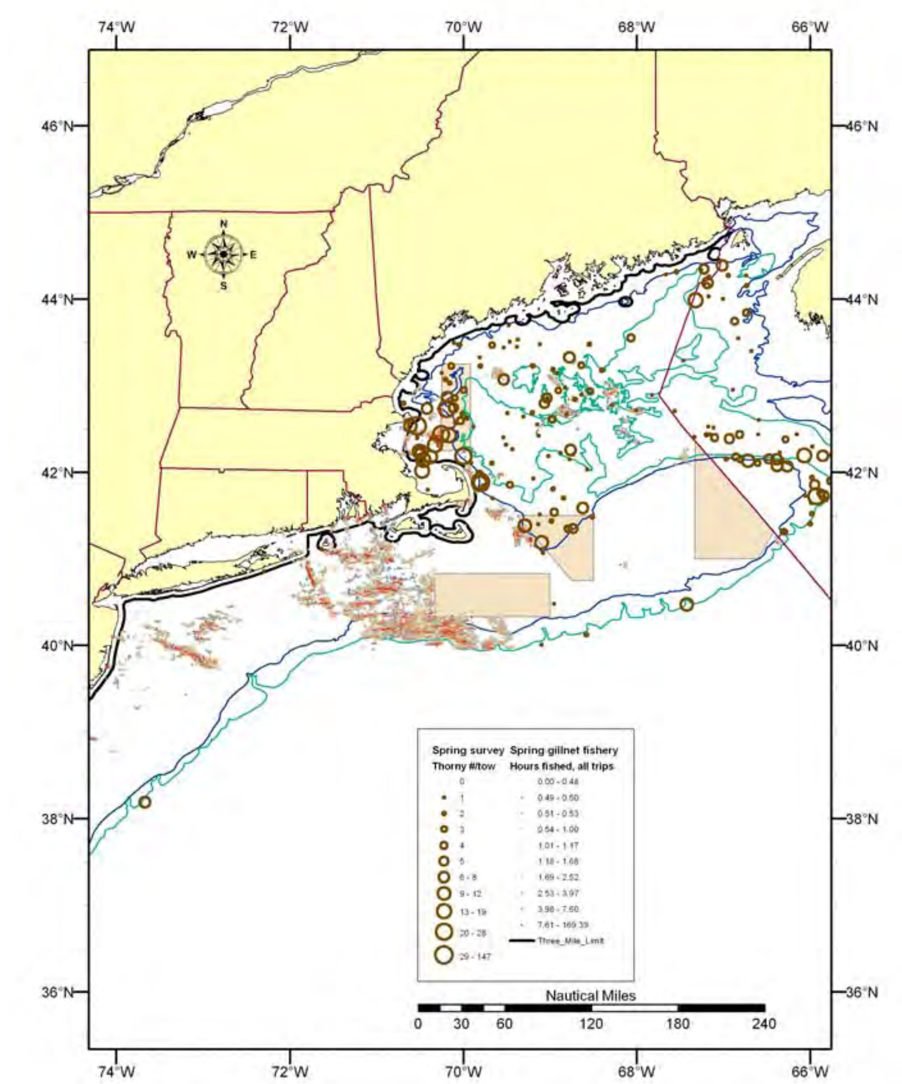
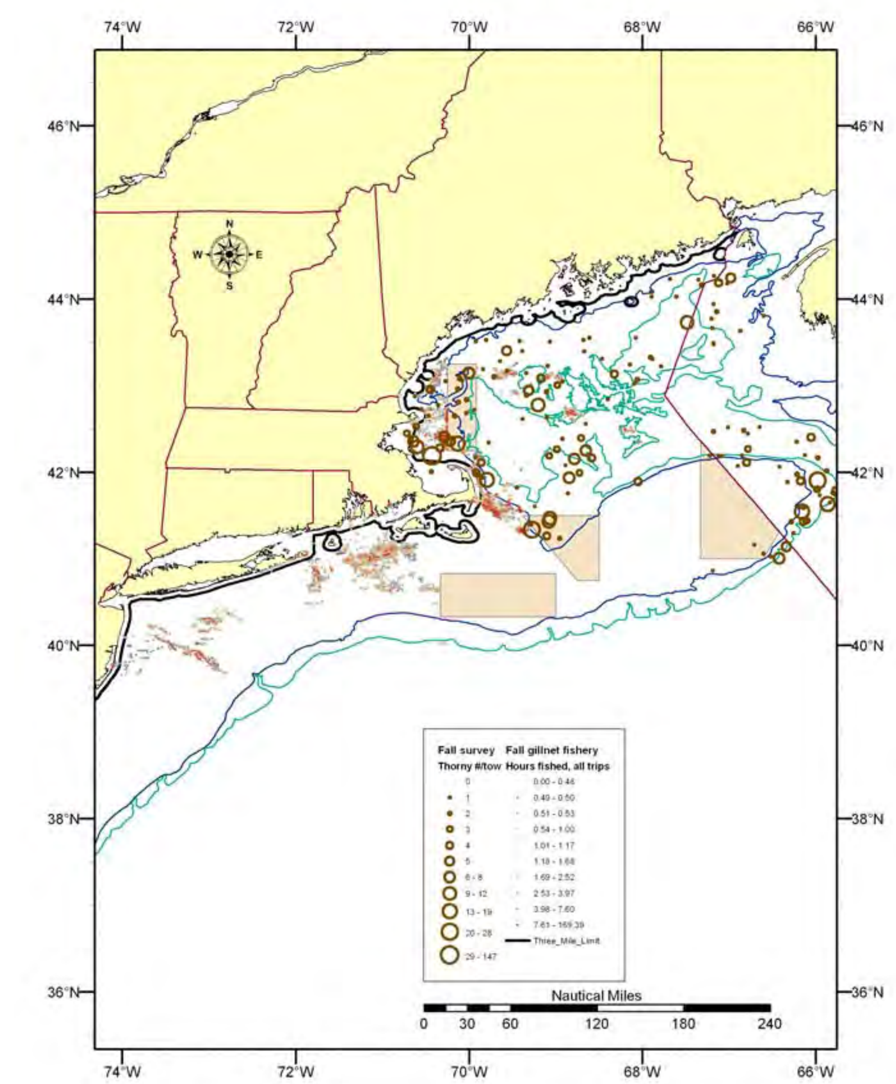
Spring (Jan-Jun effort)



Fall (Jul-Dec effort)



Map 33. Distribution of 2006-2010 thorny skate abundance (#/tow) compared to distribution of 2009-2010 target and non-target skate sink gillnet fishing effort (Hot colors, like red, represent less fishing effort in 2010 after implementation of ACLs. Cool colors, like blue represent more fishing effort in 2010). The effort data include all trips landing more than 500 lbs. of skate wings by vessels without Skate Bait Letters of Authorization that reported using sink gillnets.

Spring (Jan-Jun effort)	Fall (Jul-Dec effort)
	

6.1.2 Status Determination Specifications

The adjustments to status determination specifications are necessary to properly respond to changes in survey methods (see Appendix I of this document), but have little biological consequences. No changes in status are indicated by the proposed change in specifications and clearnose skate overfishing definition.

The determination of status will be more certain under the proposed alternative because it is consistent with the NMFS survey conducted with the new FSV Bigelow. And any uncertainty about the reference points has been accommodated in the analysis and allowance for scientific uncertainty, taken into account when setting the skate ABCs (see Appendix II of this document).

6.1.3 Skate Wing Possession Limit Alternatives

No Action

The No Action alternative would keep the current possession limits the same as those set by Framework Adjustment 1. A more detailed comparison is given in the analysis below, but the No Action alternative possession limits would close the directed skate wing fishery possibly as early as mid-February when landings reach 85% of the TAL. If this occurs, the analysis below indicates that the fishery would not achieve the TAL by the end of the fishing year, probably resulting in more skate discards while the fishery is closed from Feb-Apr.

Preferred alternative and non-preferred alternative

Skate wing possession limit alternatives are described in Section 4.3 and include changes in the seasonal wing possession limits, estimated to allow the wing fishery to remain open throughout the year without triggering in-season accountability measures. The May 1 to Aug 31 possession limit is held constant at a 26:41 ratio to the Sep 1 to Apr 30 possession limit to discourage targeting skates during the summer months when prices are typically depressed compared to other parts of the year, not for biological conservation reasons.

The main biological effect of the skate wing possession limit is on the discard mortality, as a proportion of total catch. With a low possession limit, the fishery may not be able to land the allocated TAL and optimum yield will not be achieved. With a high possession limit, the fishery may reach the 85% TAL trigger early in the season (as it did during 2010) and skates will be discarded on trips that target other species and whose catch exceeds the 500 lbs. incidental skate wing limit[21]. This effect may be exacerbated by vessels fishing for skates in state waters in response to the stricter skate regulations in Federal waters and by vessels that target other species in lieu of skates, but continue to discard incidental catches of skates.

For the above reason, the Council believes that it is in the best interest of the fishery and it will minimize the biological impacts on skates and other species if the skate wing possession limit is set at a level that will 1) allow the fishery to take the skate wing TAL and 2) will not close the directed skate fishery early. It is also possible that the effects on barndoor, smooth, and thorny skates will be greater if the skate fishery closes early and vessels shift effort onto other species that may have a greater interaction with these skates.

[21] Framework Adjustment 1 (NEMFC 2011) considered and proposed raising the incidental skate possession limit from 500 to 1,250 lbs. to reduce discards but this measure was disapproved by NMFS.

Two analyses of skate wing possession limits were performed, updating the approach used in Framework Adjustment 1 (NEFMC 2011) with new data. It is apparent that daily 2011 skate wing landings were considerably higher than in previous periods since May 1, 2010 given that the possession limit was only 2,600 lbs. as of May 17, 2011 when NMFS implemented Framework Adjustment 1. When the 2,600 lbs. skate wing possession limit was effective from May 17 to Aug 15[22], the daily skate wing landings averaged 105,084 ± 43,670 lbs., which is considerably higher than that landed in fishing year 2010 while the skate wing possession limit was 5,000 lbs. (78,663 ± 28,993 lbs.). Also, during 2011 when the 5,000 lbs. skate wing possession limit was effective, daily landings averaged 158,925 ± 57,900 lbs, much higher than it had been during 2010.

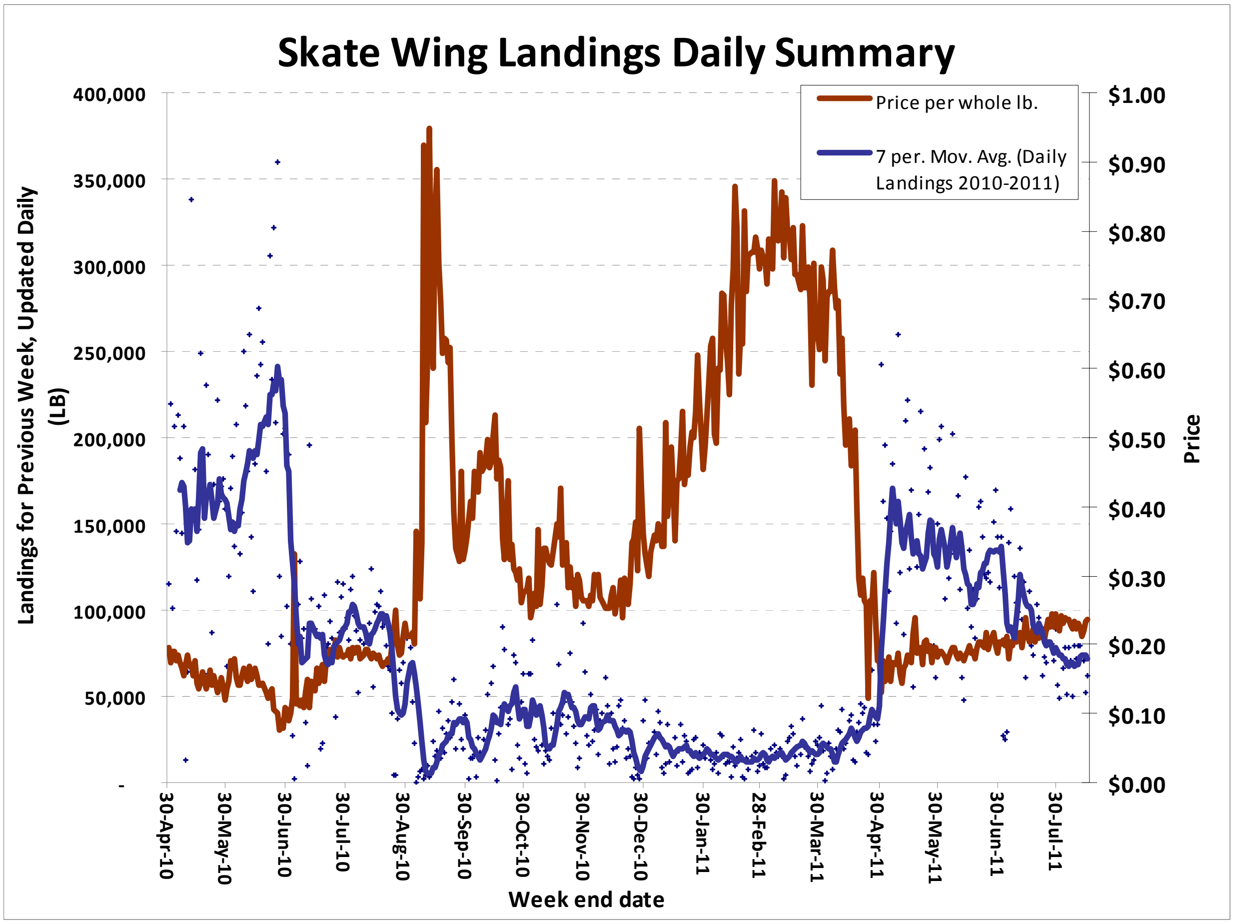
Although the outcome of these analyses depends on the estimated regression parameters and the regressions fit the data relatively well, it is important to understand the causes of the higher daily landings in 2011. The new TAL of 15,538 mt is equivalent to 93,850 lbs./day, less than the daily landings rate while the 2,600 lbs. skate wing possession limit was in effect. Under normal circumstances, average daily landings during May 1 to Aug 31 with a 2,600 lbs. possession limit should be lower than it will be with a 4,100 lbs. possession limit after Sep 1, especially since prices in the fall and winter are expected to be higher than they are in the summer.

This seasonality in the fishery has more economic than biological implications, except for impacts from delayed mortality that result from net changes in growth (growth less natural mortality). If the net changes in growth are positive, then for a given TAL the fishery will remove fewer skates and fishing mortality will be lower if catches (and by implication trips targeting skates for the wing market) are postponed from the summer to the following fall and winter.

Examining the relationship between landings and price may shed some light on the behavior of the fishery. According to dealer reports, the average daily landed price of skate wings during May to Aug 2010 was $0.10 to 0.18 per lb. of skates[23]. In comparison, skate wing prices began the 2011 fishing year about $0.15 and then gradually increased in price to $0.24 per lb. (Figure 15). During this same time period in 2011, daily landings rose to over 150,000 lbs./day when the the skate possession limit increased from 500 to 5,000 lbs. on May 1, 2011. Since, there has been a gradual decline in daily landings to about 75,000 lbs./day in early Aug 2011. Landings are expected to increase after Sep 1 when the skate wing possession limit increases to 4,100 lbs.

[22] This is the latest date that landings could be analyzed. The 2,600 lbs. skate wing possession limit will continue through Aug 31, when it will increase to 4,100 lbs.
[23] This value is for a equivalent pound of whole skates. To get the actual average skate wing price, multiply by 2.27 to convert the amount to a price per pound of wings.

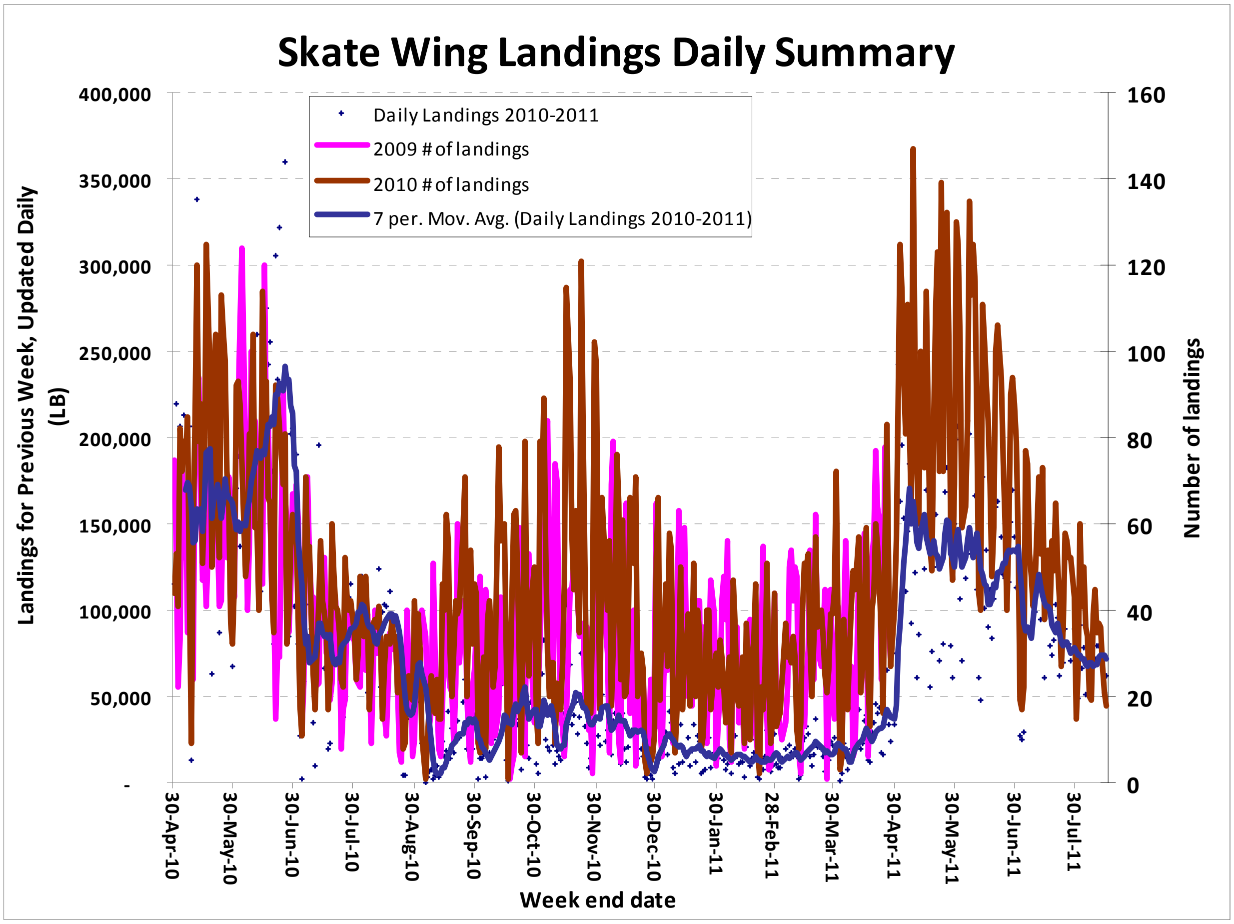
Figure 15. Trend in daily skate wing landings and price from May 1, 2010 to August 15, 2011.



There are three ways that the fishery can land more skates per day: either more vessels land skates, existing vessels in the skate fishery take more trips, or vessels land more of their skate catch when targeting other species. The only changes in impacts caused by the first two responses above are economic. The last response (landing more skates that are caught while targeting other species) might not change the amount of skates captured, but fewer skates would be discarded (and fewer would as a result survive when the discard mortality is less than 100%).

In any case, during 2011 the skate fleet made 80 to 120 landings per day, much higher than at any time in 2010 (Figure 16). Therefore the higher daily landings rate appears to result from more trips landing skate, either by existing or new vessels in the fishery. Since the beginning of the fishing year, the number of landings per day has declined to 20-40 in late July and early August. This response is not caused a by a decline in skate wing price (Figure 15), so it is possible that some vessels have reduced skate fishing activity in anticipation of a higher skate wing possession limit on Sep 1, or when it became more apparent that the 2011 TAL would be increased through Secretarial Emergency Action and it would be less likely that NMFS would have to shut down the directed skate wing fishery during the year.

Figure 16. Trend in number of trips landing skate wings and the daily landings rate, compared year over year with 2009 skate wing trips.



As in Framework Adjustment 1, a logarithmic model (Figure 17 and Figure 18) has been fitted to the data to estimate the potential response of the fishery and average amount of daily landings at various possession limits. The new 2011 data indicate that the daily landings rate would be higher than it had been in previous estimates for Framework Adjustment 1 (NEFMC 2011) using only 2010 data. There are indications however that the daily landings rate has declined during July and August, but may reach a different equilibrium when the possession limit increases to 4,100 lbs. on Sep 1, 2011. These latter data are not yet available.

Logarithmic equations have been fitted to the daily landings data with (Figure 17) and without (Figure 18) the landings before Amendment 3 implementation (20,000 lb. possession limit). The equations fit the data with $R^2 > 0.5$ and are better than other types of equations with two or more parameters. The estimated parameters for the two equations are fairly similar and the expected values at various possession limits (Figure 19) have little differences.

Figure 17. Fitted logarithmic relationship between daily skate wing landings and possession limit since May 1, 2010.

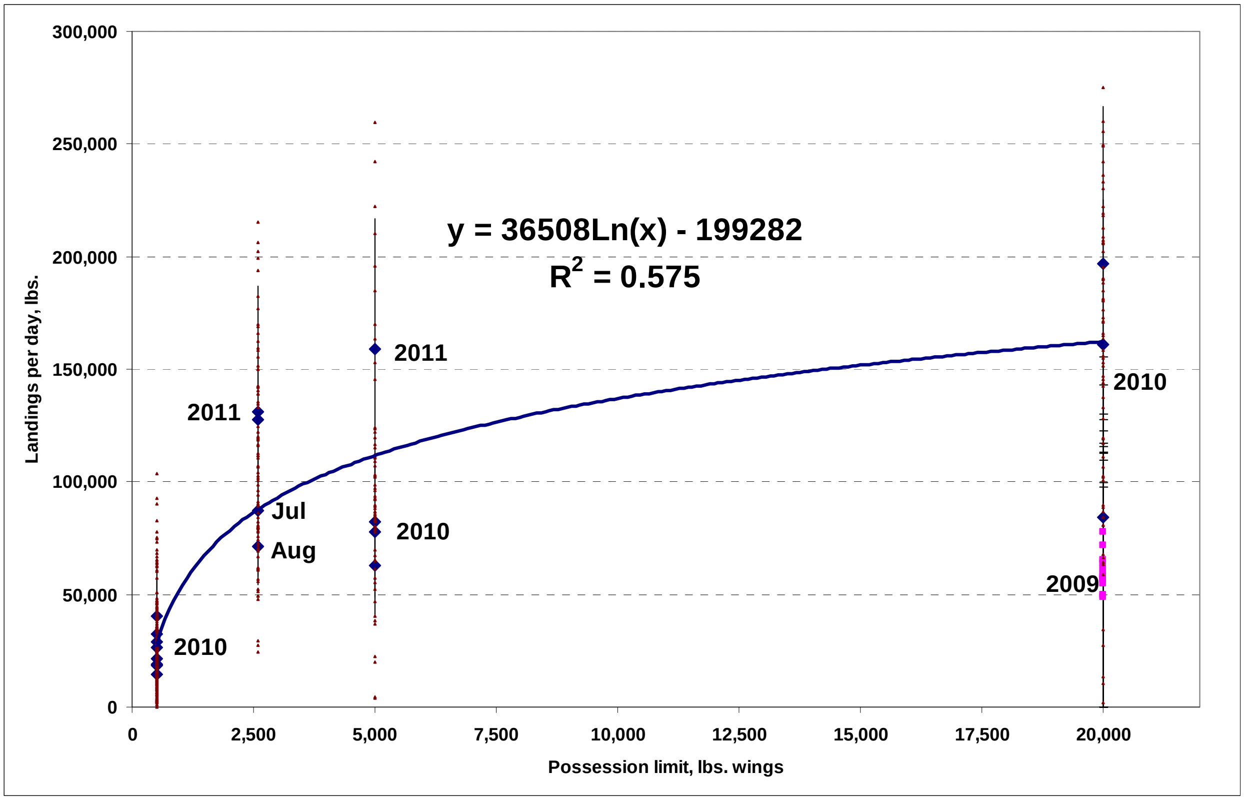


Figure 18. Fitted logarithmic relationship between daily skate wing landings and possession limit since Amendment 3 implementation on July 16, 2010. Daily landings while a 20,000 lbs. possession limit was in effect are shown simply for comparative purposes, but are not included in the fitted logarithmic equation.

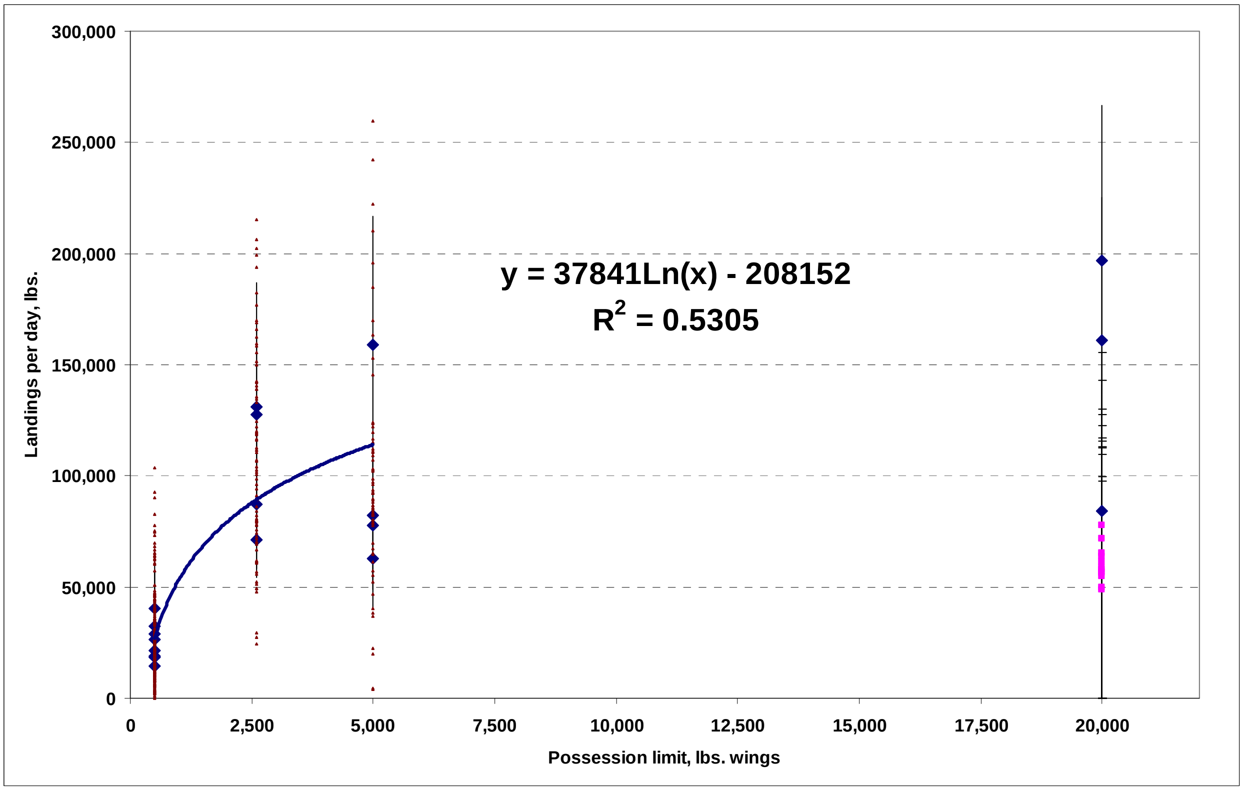
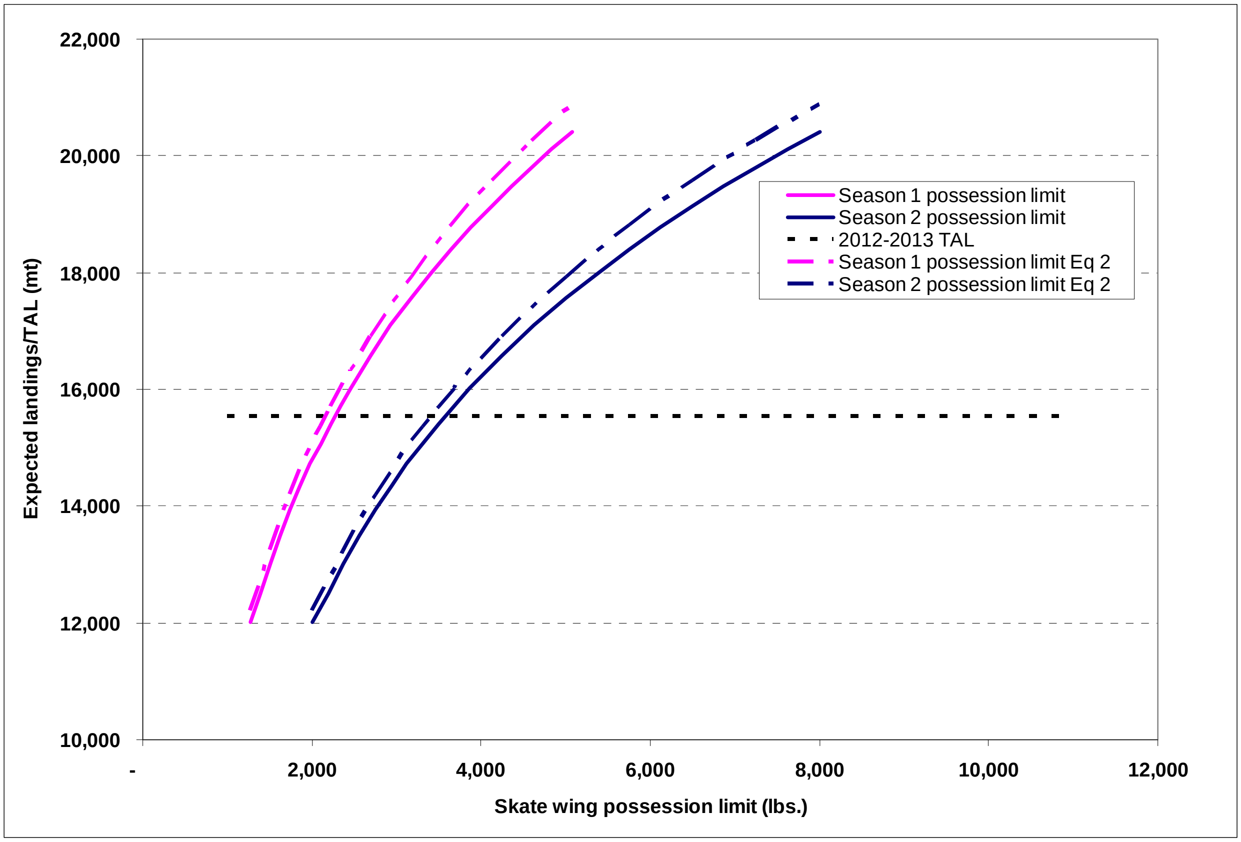


Figure 19. Total expected fishing year landings over a range of skate wing possession limits which retain a 26/41 ratio between the May – Aug 31 skate wing possession limit and the Sep 1 to Apr 30 skate wing possession limit. Solid lines are fitted to all data since May 1, 2010 and the dashed lines are fitted to all data since Amendment 3 implementation on July 16, 2010.



The results for Alternatives 1 and 2 (Sections ???) are given in the table below, using the two sets of parameters shown in Figure 17 and Figure 18. Calculated to take 100% of the TAL without closing the directed fishery (Alternative 1, Section ???), the updated analysis indicates that the May 1 to Aug 31 possession limit should be between 2,100-2,300 lbs. followed by an increase in the skate wing possession limit to 3,400-3,600 lbs. on Sep 1 (rows 1 and 3 in the table below). Under both cases, the skate wing fishery would reach the 85% TAL trigger between March 8 and March 11, but keeping the directed fishery open through the end of the fishing year would not cause the skate wing landings to exceed the 15,538 mt TAL.

In Alternative 2 (Section ???), the Council would set a more conservative skate wing possession limit, calculated to take 85% of the TAL by the end of the fishing year (rows 2 and 4 in the table below). This approach is appropriate to keep the directed fishery open year around if the current data underestimate the actual daily landings rate during the fishing year. In this case, the analysis indicates that the May 1 to Aug 31 possession limit should be 1,500 lbs., increasing to 2,400 lbs. on Sep 1. By definition, the projections indicate that the fishery would not exceed the 85% TAL trigger by the end of the fishing year.

It should be noted that due to the higher daily landings rates in the analysis above, these skate wing possession limit alternatives have lower values than the status quo, despite the significant increase in the TAL to 15,538 mt. Applying the same parameters to the status quo possession limits, the analysis indicates that the fishery would reach the 85% TAL trigger between Feb 22 and Feb 22 (lines 5 and 6 in the table below). But due to the low 500 lbs. incidental skate wing limit, the fishery would take only between 90 and 91 percent of the TAL despite reaching the 85% trigger in Feb.

The biological impacts of various skate wing possession limits arise primarily from when and at what size the skates are caught and the amount of discards that result from the skate wing possession limit alternatives. More of the impacts will be economic, rather than biological since (at least according to the analysis) the fishery would only take 90-91 percent of the TAL, probably resulting in more discards than either alternative.

Table 48. Possession limits estimated to achieve 85 and 100% of the TAL without closing the directed skate wing fishery, plus estimate of TAL trigger data and projected landings with the status quo, applying a 500 lbs. possession limit after the 85% trigger is reached.

Specifications	Season 1 possession limit	Season 2 possession limit	Wing TAL trigger	Incidental wing limit	Projected TAL trigger date	Projected percent TAL landed	Parameters	
							Alpha	Beta
100%TAL all data	2,300	3,600	85%	500	3/8/2013	100%	-199282	36508
85% TAL all data	1,500	2,400	85%	500	NA	84%	-199282	36508
100% TAL A3 data	2,100	3,400	85%	500	3/11/2013	100%	-208152	37841
85% TAL A3 data	1,500	2,400	85%	500	4/27/2013	86%	-208152	37841
Status quo, all data	2,600	4,100	85%	500	2/22/2013	90%	-199282	36508
Status quo, A3 data	2,600	4,100	85%	500	2/16/2013	91%	-208152	37841

6.1.4 Skate Bait Fishery Alternatives

No Action

The No Action alternative would keep the skate bait fishery possession limit at 20,000 lbs. Due to the higher catch rates expected from higher little skate biomass (the primary target of the skate bait fishery), the seasonal skate bait quotas may be reached early and a lower possession limit may promote some derby-style fishing behavior, with potentially negative impacts on skate discarding (making sure the trip lands exactly 20,000 lbs.), product quality, and price. The No Action skate bait limit might also prevent the fishery from landing the TAL and achieving optimum yield.

Preferred alternative

Management alternatives for the skate bait fishery are described in Section 4.4 and include raising the skate bait fishery possession limit and counting against the TAL the reported landings from skates transferred at sea for bait. The bait possession limit was not chosen in Amendment 3 (NEFMC 2009) to keep the fishery open, but rather as a brake or cap to prevent derby style fishing behavior to develop when the landings began approaching the seasonal quotas. Doing so would prevent abrupt price declines as vessels landed larger volumes in a short time period. Thus there are few biological effects of the skate bait possession limit alternatives, except as a means to prevent large discards if the fishery develops a derby style behavior.

6.2 Biological Impact on non-target species and other discarded species

The Skate FMP requires that all vessels landing skates be fishing under a monkfish, multispecies, or scallop DAS. As such, fishing effort in the wing and bait fishery is constrained by the effort controls in place in those other fisheries. And while a considerable portion of skates is landed while targeting other species, some vessels may target skates more frequently with the higher proposed limits.

The added effort targeting skates is unlikely to represent new fishing effort, but more likely will result from diverting effort from other fisheries, some of them requiring DAS use. Catch of other species on trips landing skates are controlled by the DAS limits or sector rules in other FMPs. Furthermore, vessels that target skates in lieu of other fish while on a DAS are likely to catch and possibly discard less amounts of other species. Conversely, the No Action would result in less fishing for skates and possibly more fishing for other species to make up the difference in skate landings and revenue.

6.3 Essential Fish Habitat (EFH) Impacts

This section describes the potential impacts of the alternatives in this specifications package on Essential Fish Habitat (EFH). The magnitude of the adverse effects to EFH that results from the skate fishery as a whole depends on: (1) the mix of gears used to harvest the skates, (2) the amount of time that gear contacts the seabed, and (3) the locations fished.

Skate landings come mostly from bottom otter trawl and sink gillnet fisheries: little skate are targeted near shore in Southern New England for the bait market, and winter skate are targeted for the wing market. In general, adverse effects resulting from mobile gear (i.e. bottom otter trawl) fishing are greater than those from fixed gear (i.e. sink gillnet fishing). Analyses developed for the EFH Omnibus Amendment indicate that this conclusion applies on an amount of seabed swept/contacted basis (i.e. the quality of the impact from mobile vs. fixed gears varies), and on an adverse effect generated per amount of skates (or other species) landed basis (i.e. for a given amount of habitat impact, more skates can be landed with a gillnet than with a trawl).

Although the exact relationship between the amount of seabed contacted/seabed area swept and the magnitude of adverse effects is not known, if area swept increases, it is expected that adverse effects will increase. (Analyses developed for the EFH Omnibus Amendment assume a 1:1 relationship between amount of area swept by fishing gear and habitat impacts.) Seabed area swept can increase if there is more fishing, or if catches overall remain similar but catch rates decline.

Finally, some locations are more vulnerable to the effects of fishing gears than others. Thus, if the spatial distribution of fishing effort changes, even if total seabed area swept remains constant, adverse effects to EFH could increase or decrease.

The specifications document includes alternatives related to (1) annual catch limits (ACLs), (2) skate wing possession limits, and (3) bait fishery possession limits and reporting. It is difficult to predict how fishing behavior and thus adverse effects to EFH might change as a result of the alternative ACL specifications and possession limits proposed in this framework. The biological impacts section notes that vessels targeting skates could respond in a variety of ways: (1) take longer trips to catch the bait possession limit, (2) fish in more productive areas further from port, and/or (3) take more trips targeting skates. Vessels targeting other species may begin targeting skates due to the opportunity afforded by the higher TALs, and vessels that have incidental catches of skates may land more skates. The sections below discuss potential changes in EFH impacts that may result from adoption of the three different types of alternatives.

6.3.1 ACL alternatives

The alternative and no action ACL allocations for all skate species combined (the skate complex) are described in Section 4.1. The preferred alternative raises ACL/ABC, ACT, overall TAL, and the wing and bait TALs as follows.

Specification	Updated ACL specifications (preferred)	No Action*
ACL = ABC	50,435 mt	41,080 mt
ACT = 75% ACL	37,826 mt	30,810 mt
TAL = ACT – discards – state landings	23,365 mt	14,780 mt
Wing TAL	15,538,mt	9,214 mt
Bait TAL	7,827 mt	4,642 mt

** Note that no action is different from status quo because the status quo specifications were implemented via an emergency action which will expire on April 30, 2012.*

Since the ratio between the wing and bait TALs remains constant, the relative contribution of trawl vs. gillnet gear is not likely to change and thus the magnitude of adverse effects is not expected to change substantially. (If the gillnet component of the fishery was expected to increase substantially relative to the trawl component, for example, adverse effects would be expected to decline.)

To the extent that total area swept/fishing time by trawl and gillnet gear increases, adverse effects to EFH would be expected to increase. It is likely that total area swept will increase in response to TAL increases.

Recent years with different TALs can be compared in order to estimate whether the location of directed skate fishing effort would be expected to shift to more or less vulnerable habitats. If fishing is expected to shift into more vulnerable habitats, adverse effects would be likely to increase. Maps 1-3 in the biological impacts section show where directed trawl fishing effort was located between 2009 and 2011. Maps 4-6 in the biological impacts section show the difference between fishing year 2009, which had higher TAL limits, and fishing year 2010, which had lower TAL limits. The areas with the most concentrated fishing effort during 2009-2010 are the same areas where 2009 hours fished is much higher than 2010 hours fished. In other words, under higher 2009 limits, fishing effort increased at the core of the general effort distribution, not at the margins. It could be expected, therefore, than an increase in fishing effort as a result of the proposed specifications would not shift fishing effort into new locations/habitats, but rather, would increase effort in locations that are already heavily fished.

6.3.2 Skate Wing Possession Limit Alternatives

Skate wing possession limit alternatives are summarized below (see Section 4.3 for details).

	No Action	Alternative 1	Alternative 2
May 1-Aug 31	2,600 lbs.	2,200 lbs.	1,500 lbs.
Sep 1-Apr 30	4,100 lbs.	3,600 lbs.	2,400 lbs.
Goal of alternative	-	Take 100% of TAL without triggering in season AMs	Take 85% of TAL without triggering in season AMs

The biological impacts section of the document notes that the differences in impacts between the two alternatives and no action are primarily economic, not biological, although the higher possession limits could lead to increased discards later in the season if the TAL trigger is reached early and the incidental catch limit of 500 lbs. is applied. It is difficult to estimate the differences in adverse effects to EFH that would result from Alternative 1 vs. Alternative 2 vs. no action. However, changes in the relative contributions of different gear types to total skate landings and differences in the locations fished seem unlikely. Differences in the amount of area swept, and thus differences in EFH impacts, could result from differences in discard rates among the three sets of possession limits, but the magnitude and direction of change in these area swept estimates are difficult to estimate.

6.3.3 Skate Bait Fishery Alternatives

Skate bait fishery alternatives are detailed in Section 4.4.

The first alternative would raise the possession limit for whole skates from the no action/Amendment 3 level of 20,000 lbs. to 25,000 lbs per trip. This bait possession limit is not intended to balance the daily landings rate with the TAL.

As above, the biological impacts section of the document notes that the differences in impacts between the alternative and no action bait fishery possession limit are primarily economic, not biological, as the possession limit was intended to prevent a derby-style fishery as the seasonal catch limits were approached. As above, it is difficult to estimate the differences in adverse effects to EFH that would result from the alternative possession limit vs. no action. However, changes in the relative contributions of different gear types to total skate landings and differences in the locations fished seem unlikely. Differences in the amount of area swept, and thus differences in EFH impacts, could result from differences in discard rates among the two possession limits, but the magnitude and direction of change in these area swept estimates are difficult to estimate.

The second alternative would count the reported landings from skates transferred at sea for bait against the TAL. These landings would then be combined with shoreside dealer bait landings to determine if and when accountability measures should be triggered to prevent ACL overage. Adoption of this alternative is unlikely to have substantial effects on the magnitude of EFH impacts in the skate fishery.

6.4 Impact on Stellwagen Bank National Marine Sanctuary (SBNMS)

6.4.1 ACL alternatives

ACL alternatives are described in Section 4.1 and include increases in the ABC, in the aggregate skate ACL, and in the skate bait and skate wing fishery TALs. Since comparatively little fishing for skates occurs within the SBNMS, increasing the ACL specifications is unlikely to have anything than a marginal impact.

6.4.2 Status determination specifications

The proposed changes in status determination specifications and the clearnose skate overfishing definition is described in Section 4.2. Although these changes may require a future action if one or more of the skates become overfished or experience overfishing, there are no direct or indirect impacts of this change in specifications on the SBNMS.

6.4.3 Skate Wing Possession Limit Alternatives

Skate wing possession limit alternatives are described in Section 4.3 and include changes in the seasonal wing possession limits, estimated to allow the wing fishery to remain open throughout the year without triggering in-season accountability measures. The May 1 to Aug 31 possession limit is set at a 26:41 ratio to the Sep 1 to Apr 30 possession limit to discourage targeting skates during the summer months when prices are typically depressed compared to other parts of the year, not for biological conservation reasons.

It is unlikely that changing the skate wing possession limit will have more than a marginal impact on fishing within the SBNMS. In fact, if the skate wing possession limits increase, vessels may venture farther from shore to target skates in areas where winter skates are more abundant. Conversely decreasing the skate wing possession limit may cause vessels to fish more frequent trips, closer to port. This could marginally increase skate fishing effort within the SBNMS, but the main target species of winter skate is less abundant there than elsewhere.

6.4.4 Skate Bait Fishery Alternatives

Management alternatives for the skate bait fishery are described in Section 4.4 and include raising the skate bait fishery possession limit and counting against the TAL the reported landings from skates transferred at sea for bait.

The skate bait fishery does not occur within the SBNMS, so changes to the skate bait possession limit will not have an affect on fishing within the SBNMS.

6.5 Impacts on Endangered and Other Protected Species (ESA, MMPA)

6.5.1 ACL alternatives

ACL alternatives are described in Section 4.1 and include increases in the ABC, in the aggregate skate ACL, and in the skate bait and skate wing fishery TALs.

6.5.2 Status determination specifications

The proposed changes in status determination specifications and the clearnose skate overfishing definition is described in Section 4.2. Although these changes may require a future action if one or more of the skates become overfished or experience overfishing, there are no direct or indirect impacts of this change in specifications on Endangered or Other Protected Species.

6.5.3 Skate Wing Possession Limit Alternatives

Skate wing possession limit alternatives are described in Section 4.3 and include changes in the seasonal wing possession limits, estimated to allow the wing fishery to remain open throughout the year without triggering in-season accountability measures. The May 1 to Aug 31 possession limit is set at a 26:41 ratio to the Sep 1 to Apr 30 possession limit to discourage targeting skates during the summer months when prices are typically depressed compared to other parts of the year, not for biological conservation reasons.

6.5.4 Skate Bait Fishery Alternatives

Management alternatives for the skate bait fishery are described in Section 4.4 and include raising the skate bait fishery possession limit and counting against the TAL the reported landings from skates transferred at sea for bait.

6.6 Human Communities/Economic/Social Environment

6.6.1 ACL alternatives

ACL alternatives are described in Section 4.1 and include increases in the ABC, in the aggregate skate ACL, and in the skate bait and skate wing fishery TALs.

No Action

Under the No Action Alternative, the skate catch limits would be those proposed by Amendment3 and FW1 (Section 4.1). No additional impacts on human communities beyond those already analyzed in Amendment 3 and FW1 (refer to Section 6.0 of the FW1 EA) are expected. The FW1 EA determined that the action would have positive economic and social benefits, mainly by reducing the risk of closing the directed skate wing fishery early in the fishing year. This was expected to prolong the fishing season, stabilize skate wing markets and revenue, maintain processing jobs, and reduce the incentives for derby-style fishing behavior. The two seasonal skate wing possession limits implemented by FW1 (2,600 lb for May 1 through August 31, and 4,100 lb for September 1 through April 30) were also expected to increase efficiency and revenue in the skate wing fishery by allowing more landings when prices are typically higher, and when winter skates can generally be captured closer to shore.

Preferred Alternative

Economic Impacts

Under the Preferred Alternative, skate catch limits would be higher than those implemented by Amendment 3 and FW1 (No Action Alternative) and therefore, are expected to result in greater revenue. Assuming the skate wing fishery lands its entire TAL, which is 56% higher relative to the No Action Alternative, the fishery could potentially increase its revenue proportionally. A comparison of the potential revenue from the proposed skate wing and bait fishery TALs compared with the No Action Alternative is below in Table 5. Since the proposed action does not change skate possession limits, the trip-level revenue would be similar to that expected under the No Action Alternative. However, under the Preferred Alternative, more trips could land skates under the FW1 possession limits, rather than being constrained by the incidental limit triggered at 85-90% of the TAL. Despite the expected positive economic impacts of the Preferred Alternative, skates only represent approximately 4% of the total fishing related revenue of participating vessels (Section 8.7 of the FW1 EA). Most skate fishing vessels derive the vast majority of their revenue from other species, including groundfish and monkfish.

Table 49. Estimate of potential FY 2011 skate landing revenues between the No Action and Preferred alternatives, assuming an average bait price of $0.11 per lb and an average wing price **of $0.23 per lb (whole wt.).**

	No Action		Preferred		Percent change
	TAL (lb)	Revenue	TAL (lb)	Revenue	
Bait fishery	10,227,240	$1,124,996	34,255,417	$3,768,096	56%
Wing fishery	20,302,370	$4,669,545	17,255,576	$3,968,783	56%

Social Impacts

The Preferred Alternative may contribute marginally to improved attitudes towards the Federal fishery management process. Many vessel owners, operators, and crew are currently impacted by the relatively low annual catch limits for many stocks. Therefore, when the actions of the Federal government result in additional economic opportunity, there may be a small amount of positive attitude and relief generated. Second, the ability of fishing businesses to plan is enhanced with the knowledge that the revised skate fishery TALs make it less likely that the fishery will be constrained by closures early in the fishing season. Relative to No Action, the higher TALs proposed in the Preferred Alternative are likely to stabilize employment for vessel operators, crew, and processors, which provides positive social benefits to affected communities. The proposed action should enhance the positive social impacts anticipated from FW1.

6.6.2 Status determination specifications

The proposed changes in status determination specifications and the clearnose skate overfishing definition is described in Section 4.2. Although these changes may require a future action if one or more of the skates become overfished or experience overfishing, there are no direct impacts of this change in specifications on human communities or the socio-economic environment.

Indirectly, the impacts on human communities or the socio-economic environment should be positive because status determinations will be more consistent with trends in stock conditions, indexed by data collected by the FSV Bigelow. Responses to a potential overfished condition or overfishing would be more likely to prevent overfishing and prevent a stock from becoming overfished, since the specifications are more consistent with the data being collected.

6.6.3 Skate Wing Possession Limit Alternatives

Skate wing possession limit alternatives are described in Section 4.3 and include changes in the seasonal wing possession limits, estimated to allow the wing fishery to remain open throughout the year without triggering in-season accountability measures. The May 1 to Aug 31 possession limit is set at a 26:41 ratio to the Sep 1 to Apr 30 possession limit to discourage targeting skates during the summer months when prices are typically depressed compared to other parts of the year, not for biological conservation reasons.

6.6.4 Skate Bait Fishery Alternatives

Management alternatives for the skate bait fishery are described in Section 4.4 and include raising the skate bait fishery possession limit and counting against the TAL the reported landings from skates transferred at sea for bait.

6.7 Cumulative effects analysis

The need for a cumulative effects analysis (CEA) is referenced in the CEQ regulations implementing NEPA (40 CFR Part 1508.25). CEQ regulations define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action.” The purpose of this CEA is to consider the effects of the Proposed Action and the combined effects of many other actions on the human environment over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective; rather, the intent is to focus on those effects that are truly meaningful. The CEA baseline in this case consists of the combined effects of Amendment 3, FW1, and the past, present, and reasonably foreseeable future fishing and non-fishing actions which are described below.

This CEA assesses the combined impact of the direct and indirect effects of the proposed skate specifications for 2012-2013 with the impact from the past, present, and reasonably foreseeable future fishing actions, as well as factors external to the skate fishery that affect the physical, biological, and socioeconomic resource components of the skate environment. This analysis is focused on the VECs (see below) and because this action is supplementing Amendment 3 and FW1, it relies heavily on the analysis contained in the Amendment 3 EIS (NEMFC 2009; Section 8.1) and in the FW1 EA (NEMFC 2011; Section 6.6).

Valued Ecosystem Components (VECs): The CEA focuses on VECs, specifically including:

- Physical environment/habitat (including EFH);
- Regulated stocks (skate complex);
- Non-target species and bycatch;
- Protected resources/endangered species; and
- Human communities.

Temporal and Geographic Scope of the Analysis: The temporal range that will be considered for habitat, allocated target species, non-allocated target species and bycatch, and human communities, extends from 2010, the year that Amendment 3 was implemented, through May 1, 2012 the beginning of the next fishing year. While the effects of actions prior to Amendment 3 are considered (see Amendment 3 for a full cumulative effects analysis), the cumulative effects analysis for this action is focused primarily on Amendment 3 and subsequent actions because Amendment 3 implemented ACLs for skates and included major changes to management of the skate fishery.

The temporal range considered for endangered and other protected species begins in the 1990s when NMFS began generating stock assessments for marine mammals and developed recovery plans for sea turtles that inhabit waters of the U.S. EEZ. In terms of future actions, the analysis examines the period of approval for this action through May 1, 2012, which is the beginning of the subsequent fishing year when new management measures will be implemented. The broad geographic scope considered for cumulative effects to habitat, allocated target species, and non-allocated target species and bycatch consists of the range of species, primary ports, and geographic areas (habitat) discussed in Section 5.0 (Affected Environment) of the FW1 EA. Similarly, the range of each endangered and protected species as presented in Section 5.4 of FW1 will be the broad geographic scope for that VEC, however, the most likely geographic scope for all cumulative effects will be the Gulf of Maine, Georges Bank, and Southern New England waters where most of the skate fishery occurs. The geographic scope for the human communities will consist of those primary port communities from which vessels fishing for skates originate.

6.7.1 Summary of Direct/Indirect Impacts of the Proposed Action

The direct and indirect effects on the VECs from the revised ACL analyzed in this supplemental EA (Preferred Alternative) compared to what the impacts would be if the skate specifications approved are those described in the No Action Alternative are summarized in Table 6 below. The nomenclature used is the following:

- Physical Environment: positive = actions that improve or reduce disturbance of habitat; negative = actions that degrade or increase disturbance of habitat;
- Biological Environment: positive = actions that increase stock size; negative = actions that decrease stock size;
- Human Communities: positive = actions that increase revenue and well-being of fishermen and/or associated businesses; negative = actions that decrease revenue and well-being of fishermen and/or associated businesses

Table 50. Summary of Direct and Indirect Effects of the Alternatives

Alternative	Valued Ecosystem Components (VECs)				
	Physical Env	Biological Environment			Human Communities
	Habitat/EFH	Allocated Target Species	Non-Allocated Target Species and Bycatch	Protected Resources	Skate fishery participants
ACL alternatives described in Section 4.1					
No-Action Alternative	negligible	negligible	negligible	negligible	negligible
Proposed Alternative	negligible	positive	positive	negligible	positive
Status specification alternatives described in Section 4.2					
No-Action Alternative	negligible	negligible	negligible	negligible	negligible
Proposed Alternative	negligible	negligible	negligible	negligible	positive
Skate wing fishery possession limit alternatives described in Section 4.3					
No-Action Alternative	negligible	negligible	negligible	negligible	negligible
Proposed Alternative 1	negligible	positive	negligible	negligible	positive
Proposed Alternative 2	negligible	positive	negligible	negligible	positive
Skate bait fishery possession limit alternatives described in Section 4.4					
No-Action Alternative	negligible	negligible	negligible	negligible	negligible
Proposed Alternative	negligible	negligible	negligible	negligible	positive

Impacts to the physical and biological environment from the proposed action were assessed and found to be negligible. In general, the larger allowable amounts of skate catch and landings are not likely to result in considerable additional fishing effort. Fishing effort for skates is largely controlled by DAS in the groundfish, monkfish, and scallop fisheries. The amount of fishing effort in the fishery in FY 2012-2013 is likely to be similar FY 2010 effort and will be within the scope of fishing effort analyzed in Amendment 3 and FW1, as well as in recent actions in the DAS fisheries noted above.

6.7.2 Past, Present and Reasonably Foreseeable Future Actions

Detailed information on the past, present, and reasonably foreseeable future actions that may impact this action can be found in the FEIS for Amendment 3 and in the FW1 EA (Section 6.6.10). The information on relevant past, present and reasonably foreseeable future actions and their impacts are summarized in this section.

Other Fishing Effects: Past, Present and Reasonably Foreseeable Future Skate and Related Management Actions

The following is a summary of the past, present, and reasonably foreseeable future fishing actions and effects thought most likely to impact this cumulative effects assessment. The three FMP's that have had the greatest impact on skate fishery VECs, other than the Skate FMP, are the Atlantic Sea Scallop, Monkfish, and NE Multispecies FMPs, because of the spatial overlap of the fisheries, the relatively high level of incidental catch of skate in those fisheries, and the fact that more than 90 percent of the skate permit holders are also permitted in one or the other of those three fisheries. For additional information on the cumulative effects and to view the complete summary of the history of the Skate FMP, please see Amendment 3 (NEFMC 2009) and Section 6.6.10 of the FW1 EA (NEMFC 2011).

Past and Present Actions:

Skates. Amendment 3 to the Skate FMP implemented an ACL and AMs for the skate complex and was designed to reduce skate discards and landings sufficiently to rebuild stocks of thorny and smooth skates, and to prevent other skates from becoming overfished. Skate FW1, implemented in May 2011, reduced skate possession limits and adjusted other measures to lengthen the fishing season for the directed skate wing fishery. The Regional Administrator has also published a proposed rule to implement an Emergency Action to raise the 2011 specifications, with an ABC of 50,435 mt.

NE Multispecies. Amendment 16 and FW 44 to the NE Multispecies FMP are regulations that have effectively reduced fishing effort for skates as well as other targeted groundfish. FW 45 implemented a variety of measures including revision of biological reference points, updated ACLs for several groundfish stocks, and established new closed areas to protect spawning cod.

Monkfish. Monkfish Amendment 5 implemented ACL and AMs for the monkfish fishery, and updated the biological reference points for monkfish stocks. FW 7 has proposed a new ACT for the monkfish Northern Fishery Management Area, increasing the allocated DAS from 31 to 40 days per vessel, and adjustment of some possession limits.

Atlantic Sea Scallops. Amendment 15 to the Scallop FMP implemented ACLs and AMs for the scallop fishery. It also included updates to EFH, biological reference points, the research set-aside program, and other measures to improve the limited access general category fishery. FW 22 implemented fishery specifications for 2011 and 2012 to prevent overfishing on scallops and help improve the yield-per-recruit in the resource. It built upon the measures implemented by Amendment 15, and adjusted DAS and access area trip allocations, and implemented measures to minimize fishery interactions with endangered sea turtles.

Spiny Dogfish. Along with skates, spiny dogfish are one of the primary incidental species in the NE multispecies fishery. Spiny dogfish have historically been landed more with bottom gillnets rather than bottom trawls. Specifications for FY 2010 and 2011 included an overall commercial quota (15 million lb in 2010; 20 million lb in 2011) and a 3,000-lb trip limit. Fishing effort is largely constrained by NE Multispecies and Monkfish DAS.

American Lobster. Since the skate bait fishery supplies a large proportion of bait to lobster trap fisheries, regulations affecting lobster fishing effort may influence demand for skate products. NMFS is in rulemaking to limit future access and control trap fishing effort in Lobster Management areas 2 (southern MA and RI waters) and the Outer Cape Area (east of Cape Cod, MA). This action will address measures to: implement a trap transferability system in these areas, as well as Area 3 (the offshore Area from ME to

NC); allow trap transfers among qualifiers; and impose a trap reduction or conservation tax on any trap transfers. Another action proposes to limit future access into the lobster trap fishery in Lobster Area 1 (the inshore Gulf of Maine). This action is intended to discourage lobster non-trap vessels from entering the lobster trap fishery, and discourage lobster trap vessels fishing in other lobster management areas from entering the Area 1 lobster trap fishery. A proposed rule for these actions is under development at this time.

Atlantic Herring. The impacts of the herring fishery on skates catch is considered negligible. However, the 2010-2012 herring specifications reduced the ABC by 45% to 106,000 mt. Herring are often used as lobster bait in the Gulf of Maine and the Area 1A TAC declined by 41% to 26,546 mt. As the supply of herring bait for the lobster fishery declines, it could result in increased demand for skate bait.

Mid-Atlantic Species. Skates are occasionally caught as bycatch in various fisheries managed by the Mid-Atlantic Fishery Management Council (e.g., summer flounder, scup, black sea bass, bluefish). NMFS has recently proposed regulations implementing the Mid-Atlantic ACL Omnibus Amendment, which will implement ACLs and AMs for all species managed by the Mid-Atlantic Council. As many of these fisheries are jointly managed with the Atlantic States Marine Fisheries Commission (ASMFC), seasons, quotas, trip limits, and other measures are specified by state agencies. The implementation of ACLs and AMs for these fisheries will help constrain total catch of these species, as well as bycatch of non-target species like skates.

Large Whales. The Atlantic Large Whale Take Reduction Program (ALWTRP) requires the use of sinking groundlines, which may have a negligible to low negative impact on habitat due to associated bottom sweep by the groundline. In addition, required use of weak links in gillnets may result in floating “ghost gear,” which could snag on and damage bottom habitat.

Future Actions:

Skates. Skate fishery specifications for the 2012-2013 fishing years would replace the management measures implemented by Amendment 3, Framework Adjustment 1, and the pending Emergency Action. Without approval of the proposed action in this specifications document, the Emergency Action would expire during the 2012 fishing year and the ACL specifications would revert back to ones set by Amendment 3 for the 2010-2011 fishing years. No other skate actions are currently planned, but the Council may consider initiating a future action when it considers priorities for 2012. The industry has asked the Council to consider limiting access to the skate bait fishery and NMFS set a control date in 2010 at the request of the Council.

NMFS has received two petitions to list certain skates as endangered or threatened species under authority of the Endangered Species Act. NMFS has 90 days to respond whether it should consider listing one or more of the species identified in the two petitions. One petition was submitted by the Animal Welfare Institute on Aug 11, 2011, and requests the US Department of Commerce to list the Northwest Atlantic or the US District Population Segment of thorny skate as an endangered or threatened species. The other petition submitted on Aug 22, 2011, requests the US Secretary of Commerce to list thorny, barndoor, winter, and smooth skates as endangered or threatened species. NMFS will respond to the petitions by mid-November as to whether these species will be considered as candidate species. Therefore, it would be speculative to predict future actions that might arise from these petitions at this time, and no further consideration of this is made in this document.

The Council has asked coastal states to examine their state water fisheries for skates and determine whether they need to take action to prevent state water fisheries from undermining the conservation goals of the Skate Complex FMP. During the review of 2010 data for this document, state landings had jumped from an assumed 3% of total landings (6.7% in 2009) to 12%, possibly in response to tighter fishing regulations in Federal waters and an early closure of the directed skate wing fishery on Sep 3, 2010. States may as a result of this Council letter take action to bring state fishing rules in line with those that apply to Federal waters. As of this time, MA and RI are evaluating their fisheries to determine whether action is necessary. Action by states may improve monitoring and reduce management uncertainty.

NE Multispecies. FW 46, if approved by NMFS, would increase the amount of haddock allowed to be caught by the herring fishery ("haddock catch-cap") from its current level of 0.2 percent of the ABC, to 1% of the ABC, and make separate allocations for the Georges Bank and Gulf of Maine stocks. The Council is expected to initiate FW 47 in June 2011 to set specifications (OFLs, ABCs, and ACLs) for 20 groundfish stocks for FYs 2012-2013 (beginning May 1, 2012). Framework 47 would also refine AMs for ocean pout, windowpane flounder, Atlantic halibut, Atlantic wolffish, and SNE/MA winter flounder, consider eliminating the scallop access area yellowtail flounder caps, and consider additional allocation of yellowtail flounder to the scallop fishery based on estimated catch.

Atlantic Sea Scallops. The Council is currently developing FW 23 to the Scallop FMP. The action is expected to consider scallop dredge gear modifications and measures to reduce bycatch of sea turtles and yellowtail flounder.

Essential Fish Habitat. Reasonably foreseeable future actions that will likely affect habitat include the EFH Omnibus Amendment (under development at this time). The EFH Omnibus Amendment will provide for a review and update of EFH designations, identify HAPCs, as well as provide an update on the status of current knowledge of gear impacts. It will also include new proposals for management measures for minimizing the adverse impact of fishing on EFH that will affect all species managed by the NEFMC.

Sea Turtles. The Strategy for Sea Turtle Conservation and Recovery in Relation to Atlantic Ocean and Gulf of Mexico ("Strategy") is a gear-based approach to addressing sea turtle bycatch. NMFS is considering increasing the size of the escape opening for Turtle Excluder Devices (TEDs) in the summer flounder fishery, expanding the use of TEDs to other trawl fisheries, and modifying the geographic scope of the TED requirements (74 FR 88 May 8, 2009).

Atlantic Sturgeon. Atlantic sturgeon has been proposed for listing under the Endangered Species Act (ESA). Final listing determinations for the Atlantic sturgeon distinct population segments (DPSs) are expected by October 2011. Serious injuries and mortalities of Atlantic sturgeon in commercial fishing gear are a likely concern for the long-term persistence and recovery of the DPSs, and a primary reason cited for the proposals to list the DPSs under the ESA. If the species is listed under the ESA, re-initiation of formal consultations on FMPs, and the effects of fisheries on the five DPSs would be fully examined. The formal consultation process may result in conservation recommendations and, if pertinent, reasonable and prudent measures or reasonable and prudent alternatives, which would be actions deemed appropriate or necessary to minimize the impact of take of Atlantic sturgeon.

Non-Fishing Effects: Past, Present and Reasonably Foreseeable Future Actions

Non-fishing activities that occur in the marine nearshore and offshore environments and their watersheds can cause the loss or degradation of habitat and/or affect the species that reside in those areas. Section 6.6.10.2 in the FW1 EA provides a summary of past, present, and reasonably foreseeable non-fishing activities and their expected effects on VECs in the affected environment. The following discussions of impacts are based on past assessments of activities and assume these activities will likely continue into the future as projects are proposed.

Construction/Development Activities and Projects: Construction and development activities include, but are not limited to, point source pollution, agricultural and urban runoff, land (roads, shoreline development, wetland loss) and water-based (beach nourishment, piers, jetties) coastal development, marine transportation (port maintenance, shipping, marinas), marine mining, dredging and disposal of dredged material and energy-related facilities. These activities can introduce pollutants (through point and non-point sources), cause changes in water quality (temperature, salinity, dissolved oxygen, suspended solids), modify the physical characteristics of a habitat or remove/replace the habitat altogether. Many of these impacts have occurred in the past and present and their effects would likely continue in the reasonably foreseeable future. It is likely that these projects would have negative impacts caused from disturbance, construction, and operational activities in the area immediately around the affected project area. However, given the wide distribution of the affected species, minor overall negative effects to offshore habitat, protected resources, allocated target stocks, and non-allocated target species and bycatch are anticipated since the affected areas are localized to the project sites, which involve a small percentage of the fish populations and their habitat. Thus, these activities for most biological VECs would likely have an overall low negative effect due to limited exposure to the population or habitat as a whole. Any impacts to inshore water quality from these permitted projects, including impacts to planktonic, juvenile, and adult life stages, are uncertain but likely minor due to the transient and limited exposure. It should be noted that wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the allocated target stocks, non-allocated target species and bycatch, and protected resources.

Restoration Projects: Other regional projects that are restorative or beneficial in nature include estuarine wetland restoration; offshore artificial reef creation, which provides structure and habitat for many aquatic species; and eelgrass (*Zostera marina*) restoration, which provides habitat for many juvenile fishes. Due to past and present adverse impacts from human activities on these types of habitat, restorative projects likely have slightly positive effects at the local level.

Protected Resources Rules: The NMFS final Rule on Ship Strike Reduction Measures (73 FR 60173, October 10, 2008) is a non-fishing action in the US-controlled North Atlantic that is likely to affect endangered species and protected resources. The goal of this rule is to significantly reduce the threat of ship strikes on North Atlantic right whales and other whale species in the region. Ship strikes are considered the main threat to North Atlantic right whales; therefore, NMFS anticipates this regulation will result in population improvements to this critically endangered species.

Energy Projects: Cape Wind Associates (CWA) has received approval to construct a wind farm on Horseshoe Shoal, located between Cape Cod and Nantucket Island in Nantucket Sound, MA. The CWA project would have 130 wind turbines located as close as 4.1 miles off the shore of Cape Cod in an area of approximately 24 square miles with the turbines being placed at a minimum of 1/3 of a mile apart. The potential impacts associated with the CWA offshore wind energy project include the construction, operation, and removal of turbine platforms and transmission cables; thermal and vibration impacts; and changes to species assemblages within the area from the introduction of vertical structures. Other offshore projects that can affect VECs include the construction of offshore liquefied natural gas (LNG) facilities such as the project “Neptune.” As it related to the impacts of the Proposed Action, the Neptune project is expected to have small, localized impacts where the pipelines and buoy anchors contact the bottom.

6.7.3 Summary of Cumulative Effects

The following analysis summarizes the cumulative effects of past, present, and reasonably foreseeable future actions in combination with the proposed action on the VECs identified in this section.

Physical Environment/Habitat/EFH

The management measures described above in the NE Multispecies, Scallop, Monkfish, and Skate FMPs, largely have positive effects on habitat due to reduced fishing efforts, consequently reducing gear interaction with habitat. The other FMP actions that reduce fishing effort generally result in fewer habitat and gear interactions, resulting in low positive effects on habitat. The ALWTRP resulted in low negative to negligible effects on habitat due to the possibility of groundline sweep on the bottom and "ghost gear." The proposed TED requirements would possibly have negative effects on habitat due to potential slight increases in towing time. However, this gear is still being tested. The effects of the proposed action on habitat are considered neutral. Overall, the cumulative effect of past, present, and reasonably foreseeable future fishing actions has resulted in low positive effects on habitat.

While the impact analysis in this action is focused on direct and indirect impacts to the physical environment and EFH, there are a number of non-fishing impacts that must be considered when assessing cumulative impacts. Many of these activities are concentrated near-shore and likely work either additively or synergistically to decrease habitat quality. Other non-fishing factors such as climate change and ocean acidification are also thought to play a role in the degradation of habitat. The effects of these actions, combined with impacts resulting from years of commercial fishing activity, have negatively affected habitat. However, impacts from the proposed action were found to be negligible. Therefore, when considering the cumulative effects of this action in combination with past, present, and reasonably foreseeable future actions, no significant impacts to the physical environment, habitat or EFH from the proposed action are expected.

Target Species

The management measures described above are expected to have overall neutral to low positive impacts on target species (skates). Effort limits in the NE Multispecies, Monkfish, and Scallop FMPs are likely to constrain skate catches, while the Skate FMP and the proposed action are likely to convert more skate discards into landings (relatively neutral fishing mortality) and divert some fishing activity to trips targeting skates.

Future measures that will likely restrict fishing effort (EFH Omnibus) will also have positive effects on target species. Future measures such as the TED requirements would likely result in positive effects to target species because they may help reduce bycatch. Overall, the cumulative effect of past, present, and reasonably foreseeable future fishing actions has resulted in positive effects on target species. The decline in allowable herring landings could open up new markets for alternative lobster baits, some of it filled by either whole skate landings or by the carcasses of skates landed for the wing market.

As found in the cumulative effects analysis for FW1, the long-term trend has been positive for cumulative impacts to target species. While thorny skate remains overfished, effort reductions in the NE Multispecies, Monkfish, and Scallop FMPs have allowed other skate stocks to rebuild, and the rebuilding process for others is underway. Due to differences in effort and species distributions, only marginal increases in barndoor, smooth, and thorny skates catch is expected to result from the proposed action, certainly not enough to cause a stock to become overfished and not enough to derail increases in stock biomass for rebuilding stocks. Further, indirect impacts from the effort reductions in other FMPs are also thought to contribute to skate mortality reductions. These factors, when considered in conjunction with the proposed action which would have negligible impacts to target species due to the implementation of the recommended ABC, would not have any significant cumulative impacts.

Non-Target Species and Bycatch

Actions that reduce fishing effort have had positive effects on non-target species and bycatch because in general, less fishing effort results in less impact to non-allocated target species and bycatch. Conversely, actions that increase fishing effort are considered to have low negative effects on non-target species and bycatch because more fishing generally results in more bycatch. Increases in directed skate fishing effort are likely to come from diverted fishing activity targeting other species, due in part to the requirement to have a multispecies, scallop, or monkfish DAS limited access permit. And when this occurs, it would decrease catch of non-target species that occur more frequently in other areas than those where vessels fish for skates.

Catch of primary non-target species in the skate fishery is monitored and controlled through other FMPs. TED requirements would likely have a positive effect on non-target species and bycatch and discards as they would likely exclude some of these species from capture in the cod end. Overall, the cumulative effect of past, present, and reasonably foreseeable future fishing actions has resulted in positive effects on non-target species and bycatch.

Skates are typically harvested incidentally to fishing for other more valuable species. The primary non-target and bycatch species analyzed for the purposes of this EA are monkfish, spiny dogfish, groundfish, and prohibited skates (barndoor, thorny, and smooth). Management efforts in the past have led to these species being managed under their own FMP. While some groundfish stocks remain in an overfished condition, or subject to overfishing, actions in the NE Multispecies FMP (e.g. Amendment 16) are attempting to control mortality on these stocks. Monkfish, spiny dogfish, barndoor skate, and smooth skate are no longer overfished or experiencing overfishing. Only thorny skate remains overfished, but there is little overlap between skate or groundfish fishing effort and thorny skate distribution (e.g. deep basins in the Gulf of Maine) (NEFMC 2009 and Section 6.1.1.1 of this document). Mortality and effort controls such as NE Multispecies, Monkfish, and Scallop DAS collectively help reduce bycatch of non-target species. Impacts to all of these species from the proposed action were found to be negligible, and the proposed action would not result in any significant cumulative direct or indirect impacts.

Protected Resources

Past and present actions in fisheries that catch skates (groundfish, monkfish, scallop) have had negligible or positive effects on protected resources. Management plans for marine mammals have implemented effort restrictions and had positive affects by reducing injuries and deaths. Future positive impacts are likely.

The proposed action is not expected to increase the potential for gear interactions with protected species. This action would likely have negligible impacts on protected resources. Historically, the implementation of FMPs has resulted in reductions in fishing effort and as a result, past fishery management actions are thought to have had a slightly positive impact on strategies to protect protected species. Gear entanglement continues to be a source of injury or mortality, resulting in some adverse effects on most protected species to varying degrees. One of the goals of future management measures will be to decrease the number of marine mammal interactions with commercial fishing operations. The cumulative result of these actions to meet mortality objectives will be slightly positive for protected resources. The effects from non-fishing actions are also expected to be low negative as the potential for localized harm to VECs exists. The combination of these past actions along with future initiatives to reduce turtle interactions through the Sea Turtle Strategy when considered with the proposed action would not result in significant cumulative impacts.

Human Communities

The effects of past, present, and reasonably foreseeable future fishery management actions have been slightly positive on nearly all VECs with the exception of human communities. Mandated reductions in fishing effort have resulted in negative economic impacts to human communities. Management measures designed to benefit protected resources and restrict fishing effort have low negative effects on the human communities. However, the implementation of annual catch limits and expansion of opportunities through numerous sectors and achievement of the larger goal of fishing groundfish stocks at sustainable rates and rebuilding groundfish stocks to of scallops, spiny dogfish, and monkfish have also helped increase revenue and positive economic impacts. Overall, the cumulative effect of past, present, and reasonably foreseeable future fishing actions has resulted in negative effects on human communities.

The proposed action will have positive impacts on human communities due to large increases in allowable landings of skates. The positive impacts from the proposed action would provide some mitigation of the negative economic impacts of recent actions in the NE Multispecies fishery. Therefore, the proposed action when taken into consideration with past, present, and reasonably foreseeable future actions is not expected to have significant cumulative impacts. The table below summarizes the cumulative effects resulting from implementation of the proposed action and CEA baseline.

Table 51. Cumulative Effects resulting from implementation of the proposed action and CEA Baseline.

		Biological Impacts				
		Habitat Impacts	Allocated Target Species	Non-allocated Target Species and Bycatch	Endangered/ Protected Species	Human Community Impacts
Cumulative Effect Baseline	Effects of Past, Present, and Reasonably Foreseeable Future Non-Fishing Actions	Low negative / negligible	Low negative / negligible	Low negative / negligible	Low negative / negligible	Low negative / negligible
	Effects of Past, Present, and Reasonably Foreseeable Future Fishing Actions	Positive	Positive	Positive	Negligible / positive	Negative
Direct and Indirect Effects of Proposed /Supplemental Action		Negligible	Negligible	Negligible	Negligible	Positive
Cumulative Effects Summary of Effects from implementation of Proposed Action and Cumulative Effect Baseline		Negligible	Negligible	Negligible	Negligible	Low positive

7.0 COMPLIANCE WITH THE MAGNUSON-STEVENS FISHERY MANAGEMENT AND CONSERVATION ACT (MSA)

Section 301 of the Magnuson-Stevens Act requires that FMPs contain conservation and management measures that are consistent with the ten National Standards. The most recent Skate FMP changes implemented by Amendment 3 and FW1 address how the proposed management actions comply with the National Standards (refer to Section 6.1 of Amendment 3 and Section 7.1 of the FW1 EA). Under Amendment 3, the NEFMC adopted conservation and management measures that would rebuild overfished skate stocks to achieve, on a continuing basis, the optimum yield for US fishing industry using the best scientific information available consistent with National Standards 1 and 2. The Skate FMP and implementing regulations manage all seven skate species throughout their entire US range, as required by National Standard 3. Amendment 3 (Section 6.1) and FW1 (Section 7.1) describes how the measures implemented under that action do not discriminate among residents of different states consistent with National Standard 4, do not have economic allocation as their sole purpose (National Standard 5), account for variations in these fisheries (National Standard 6), avoid unnecessary duplication (National Standard 7), take into account fishing communities (National Standard 8), addresses bycatch in fisheries (National Standard 9), and promote safety at sea (National Standard 10). By proposing to meet the National Standards requirements of the Magnuson-Stevens Act through future FMP amendments and framework actions, the NEFMC will ensure that overfishing is prevented, overfished stocks are rebuilt, and the maximum benefits possible accrue to the ports and communities that depend on these fisheries and the Nation as a whole.

The proposed action would comply with all elements of the Magnuson-Stevens Act, including the National Standards, and the Skate FMP. This action is being taken in response to new data that indicate an increase in skate biomass, new research on little and winter skate discard mortality, and new information about how the wing fishery responds to various possession limits. The FW1 EA, completed prior to the development of the updated skate ABC, did not contain an analysis of the revised ABC and associated catch limits. Therefore, this EA analyzes the impacts of the revised ABC, ACL, and TALs for skates and adjustments to wing and bait fishery possession limits, in compliance with applicable laws requirement for an analysis of proposed measures.

8.0 COMPLIANCE WITH OTHER APPLICABLE LAW

8.1 National Environmental Policy Act (NEPA)

8.1.1 Revised FONSI

This supplemental EA updates the Finding of No Significant Impact (FONSI) consistent with the conclusions derived in the Amendment 3 SEIS, the FW1 EA, and this document.

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

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

Response: The Proposed Action for the Supplemental EA would not jeopardize the sustainability of any of the target species (primarily winter and little skates) affected by the action, because the biomass of these species has increased to levels significantly above their B_{msy} targets and would be harvested at a sustainable, conservative rate (see Appendix 1, Document 4 of Amendment 3, NEFMC 2009). The action is expected to reduce the discards of these species and to increase landings within sustainable levels. The indirect impacts affecting other stocks are expected to be negligible. The biological impacts of the Proposed Action on the allocated target species are analyzed in Section 6.1.

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

Response: The Proposed Action for the Supplemental EA is not expected to jeopardize the sustainability of any non-target species. As described in Section 6.2, fishing for skates is typically done on trips targeting more valuable species such as groundfish and monkfish. Effort and catch in these fisheries are controlled by DAS and/or sectors and trip limits. Changes in skate catch limits, therefore, are not expected to influence the sustainability of other species caught on trips that land skates.

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

Response: The Proposed Action for the Supplemental EA is not expected to allow substantial damage to the ocean and coastal habitats and/or Essential Fish Habitat (EFH) as defined under the Magnuson-Stevens Act and identified in the FMP. This action is not expected to result in increases in total fishing effort (Section 6.1.1), but may intensify effort in areas where vessels target skates while reducing effort elsewhere. Most of the effort in areas targeting skates are not in sensitive EFH areas (Section 6.3)

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

Response: The Proposed Action for the Supplemental EA is not expected to have a substantial adverse impact on public health and safety. The additional amount of allowable skate landings will likely prolong the fishing season and enable additional flexibility regarding when fishing trips can be planned. Safety could be enhanced if such flexibility enables vessels to fish during more optimal weather conditions.

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

Response: Since this action is not expected to result in an overall increase in fishing effort, the net effect on protected species is expected to be negligible (Section 6.5). The Proposed Action for the Supplemental EA does not constitute a modification to the operation of the fishery under the FMP that would cause an effect to ESA-listed species or critical habitat not considered in the October 29, 2010, Opinion or the Section 7 Consultation for the FW1 EA. There have been no new species listed or critical habitat designated that may be affected by the action.

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

Response: The Proposed Action for the Supplemental EA is not expected to have a substantial impact on biodiversity and ecosystem function within the Gulf of Maine, Georges Bank, or Southern New England regions, where the skate fishery primarily occurs. Effort restrictions in the multispecies, monkfish, and scallop fisheries have proven effective at limiting the impacts of fishing.

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

Response: There are no significant social and economic impacts of the Proposed Action for the Supplemental EA that are interrelated with natural or physical environmental effects. The proposed action would provide additional skate landings and is likely to enable the skate fishery to remain open year around. Within the context of the region and the fishery as a whole, these benefits would continue to be insignificant as determined under criteria of the Regulatory Flexibility Act (see Section 8.7). While the fishing industry members that fish for skates would benefit socially and economically by the approval of this action, it is not related with any impacts associated with the biological or physical environment. Such impacts are negligible.

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

Response: The effects of the Proposed Action for the Supplemental EA on the quality of human environment are not expected to be highly controversial. The public is aware of the revised skate ABC recommendation and annual catch limits, resulting from increases in skate biomass. The Proposed Action would not modify the majority of measures proposed by FW1, only increase the ACL and TALs. The Proposed Action is not expected to negatively impact habitat, allocated target species, non-allocated target species and bycatch, or protected resources as described in Sections 6.1 through 6.5.

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

Response: The Proposed Action cannot be reasonably expected to result in substantial impacts to unique areas or ecological critical areas. There are no known parkland, prime farmlands, wetlands, or wild scenic rivers in the affected area. Vessel operations around the unique historical and cultural resources encompassed by the Stellwagen Bank National Marine Sanctuary would not likely be altered by this action (see Section 6.1.1). The skate fishery is mainly prosecuted by trawl and gillnet gear, and this action does not propose alterations in the spatial extent of the fishery. As a result, no substantial impacts are expected from this action.

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

Response: The effects of the Proposed Action for the Supplemental EA on the human environment are not expected to be highly uncertain or involve unique or unknown risks. Vessels fishing for skates will primarily use trawl and gillnet gear, and maintain traditional fishing practices which will have no greater impact on habitat, protected species, and limit bycatch species as those conditions existing currently. Approval of the revised catch limits would provide additional revenue to the fishery at a time when some other groundfish catch levels have been reduced and the overall economic environment is difficult for small businesses, while at the same time meeting the conservation requirements of the Skate FMP. The skate fishery has been successfully managed under the FMP, and the trends in biomass for nearly all managed skates are encouraging. Therefore, the effects on the human environment are not uncertain or involve unique or unknown risks.

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

Response: The cumulative effects analysis presented in Section 6.7 considers the impacts of the Proposed Action in combination with relevant past, present, and reasonably foreseeable future actions and concludes that no significant cumulative impacts are expected from the approval of the revised catch limits for skates. Since none of the cumulative impacts of the original Proposed Action or the Supplemental Proposed Action are considered significant, Section 6.7 concluded there are no significant cumulative impacts among these related actions. Further, the Proposed Action would not have any significant impacts when considered individually or in conjunction with any of the other actions presented in Section 6.7 (fishing related and non-fishing related).

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

Response: The fishing operations would take place on ocean waters and would not affect any human communities on the adjacent shorelines. There are no known districts, sites, or highways in the area of the Proposed Action. The Proposed Action is unlikely to affect objects listed in the National Register of Historic Places or cause significant impact to scientific, cultural, or historical resources. The only objects in the fishery area that are listed in the National Register of Historic Places are various ship wrecks. However, vessels typically avoid fishing near wrecks to avoid tangling gear on the wreck. Therefore, this action would not result in any adverse affects to the wrecks.

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

Response: No non-indigenous species would be introduced during the Proposed Action because the increase in catch affects the scope of current fishing practices and does not introduce new methods. No non-indigenous species would be used or transported during fishing activities. Therefore, the Proposed Action would not be expected to result in the introduction or spread of a non-indigenous species.

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

Response: Amendment 3 established a process in the Skate FMP to estimate ABC and associated catch limits for skates. These catch limits are determined in relation to estimates of skate catch and biomass trends. Significant effects are unlikely, because any future changes to catch limits are constrained by the biomass estimates, and a sustainable proportion of catch from the resource. Most other direct and indirect impacts of the proposed action are not likely to establish any precedents for future actions with significant effects.

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

Response: The Proposed Action is not expected to threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment. Vessels fishing for skates are required to comply with all local, regional, and national laws and permitting requirements.

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

Response: The Proposed Action is not expected to result in cumulative adverse effects that could have a substantial effect on target or non-target species. As stated in Section 6.7, impact on resources encompassing skates, groundfish, and other stocks is expected to be minimal.

DETERMINATION

In view of the information presented in the FW1 EA and this document, the analysis contained in the supporting EA prepared for the approval of revised catch limits for skates, it is hereby determined that the approval of the revised Skate ABC and catch limits will not significantly impact the quality of the human environment as described above and in the supporting EA. In addition, all beneficial and adverse impacts of the Proposed Action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environmental Impact Statement (EIS) for this action is not necessary.

___________________________	____________________
Patricia A. Kurkul	Date
Regional Administrator Northeast Region, NMFS	

8.1.2 List of preparers; point of contact

The information contained in this document was prepared throught the cooperative efforts of the Skate Plan Development Team members, and other members of the staffs of NMFS and the New England Fiisheery Management Council. Contributers are:

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8.1.3 Agencies consulted

This proposed action was developed by the New England Fishery Management Council in coordination with the National Marine Fisheries Service and the Mid-Atlantic Fishery Management Council.

8.1.4 Opportunity for public comment

The proposed action in this specifications document was prepared by the New England Fishery Management Council during a series of public meetings, including SSC and Skate Oversight Committee meetings, a Council meeting on June 19-21 2011, and a review of the final proposed specifications at the Sep 26-29, 2011. NMFS will publish the new specifications as a proposed rule following submission of this document to the Secretary of Commerce, which will provide an additional opportunity for public comment.

8.2 Endangered Species Act (ESA)

Section 7 of the ESA requires Federal agencies conducting, authorizing, or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. In a Biological Opinion dated October 29, 2010, NMFS determined that fishing activities conducted under the Skate FMP and its implementing regulations are not likely to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS or result in the destruction or adverse modification of critical habitat. An informal consultation under the ESA for FW1 measures was conducted. This action is consistent with, and does not affect the analysis and conclusions of the FW1 EA regarding compliance with the ESA. For further information, refer to Section 8.2 of the FW1 EA.

8.3 Marine Mammal Protection Act (MMPA)

NMFS has reviewed the impacts of FW1 and the Skate FMP on marine mammals and concluded that the specifications are consistent with the provisions of the MMPA and would not alter existing measures to protect the species likely to inhabit the management unit of the Skate FMP. For further information on the potential impacts of the proposed management action, see Section 6.5 of this document.

8.4 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the CZMA requires that all Federal activities which affect any coastal use or resource be consistent with approved state coastal zone management programs (CZMP) to the maximum extent practicable. NMFS has reviewed the relevant enforceable policies of each coastal state in the NE region for this action and has determined that this action is incremental and repetitive, without any cumulative effects, and is consistent to the maximum extent practicable with the enforceable policies of the CZMP of the following states: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, and North Carolina. NMFS finds this action to be consistent with the enforceable policies to manage, preserve, and protect the coastal natural resources, including fish and wildlife, and to provide recreational opportunities through public access to waters off the coastal areas. Pursuant to the general consistency determination provision under Section 307 of the CZMA and codified at 15 CFR 930.36(c), NMFS sent a general consistency determination applying to Amendment 3 to the Skate FMP, and all routine Federal actions carried out in accordance with the FMP, to the following states: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, and North Carolina on December 18, 2009. New Hampshire, Connecticut, Pennsylvania, New Jersey, Delaware, Virginia, and North Carolina have concurred with this determination. For the remaining states that have not responded, consistency has been inferred pursuant to the consistency letter.

8.5 Administrative Procedure Act

Section 553 of the APA establishes procedural requirements applicable to rulemaking by federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process and to give the public adequate notice and opportunity for comment. At this time, no abridgement of the rulemaking process for this action is being requested.

8.6 Executive Order 13132 (Federalism)

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

8.7 Initial Regulatory Flexibility Analysis (IRFA) – Determination of Significance

Introduction

The RFA requires agencies to assess the impacts of their proposed regulations on small entities. The Regulatory Flexibility Act Analysis (RFAA) determines whether the proposed action would have a significant economic impact on a substantial number of small entities. The Small Business Administration (SBA) size standards define whether a business entity is small and, thus, eligible for Government programs and preferences reserved for "small business" concerns. Size standards have been established for all for-profit economic activities or industries in the North American Industry Classification System (NAICS). The SBA defines a small business in the commercial fishing and recreational fishing sector, as a firm with receipts (gross revenues) of up to $4 million.

This section provides an assessment and discussion of the potential economic impacts of the proposed action, as required of the RFA. The objective of the RFA is to require consideration of the capacity of those affected by regulations to bear the direct and indirect costs of regulation. The Final Regulatory Flexibility Analysis (FRFA) must identify the number and types of businesses that would be regulated, indicate how many of these entities are small businesses, explain the expected economic impact of the regulation on small businesses, and describe any feasible alternatives that would minimize the economic impacts.

Description of the Reasons Why Action by Agency is Being Considered

The purpose for this action is to implement revised catch limits for skates for FY 2011, in order to achieve a better balance of the conservation and economic objectives of the MSA. This action is needed due to the change in circumstances caused by the availability of new scientific information and resulting recommendations to increase the ABC for the skate complex. For more information refer to Sections 3.1 and 4.0 of this Supplemental EA.

The Objectives and Legal Basis for the Proposed Action

As stated above, the purpose for this action is to implement a revised ABC and catch limits for skates for FY 2011. The legal basis for the action is the Magnuson-Stevens Fishery Conservation and Management Act.

Summary of the Significant Issues Raised by Public Comments in Response to the IRFA. A Summary of the Assessment of the Agency of Such Issues, and a Statement of Any Changes Made from the Proposed Rule as a Result of Such Comments

The public has not yet had an opportunity to comment on the IRFA and proposed rule for this action. Seven comments were received on the proposed rule to implement FW1, and responses to those comments were addressed in the final rule (76 FR 28328).

Estimate of the Number of Small Entities

The proposed increase in the Skate ACL and TALs would impact vessels that hold Federal open access commercial skate permits that participate in the skate fishery. For the purposes of this analysis, each permitted vessel is treated as a single small entity and is determined to be a small entity under the RFA. Accordingly, there are no differential impacts between large and small entities under this analysis. According to the FW1 final rule and Final Regulatory Flexibility Analysis (76 FR 28328), as of December 31, 2010, the maximum number of small fishing entities (as defined by the Small Business Administration (SBA)) that may be affected by this action is 2,607 entities (number of skate permit holders). However, during fishing year 2010, only 503 vessels landed skates for the wing market, and only 56 landed skates for the bait market.

Reporting, Recordkeeping and Other Compliance Requirements

This action does not introduce any introduce any new reporting, recordkeeping, or other compliance requirements. This proposed action does not duplicate, overlap, or conflict with other Federal rules.

Description of Steps the Agency Has Taken to Minimize the Significant Economic Impact on Small Entities Consistent with the Stated Objectives of Applicable Statutes

During the development of FW1, NMFS and the Council considered ways to reduce the regulatory burden on and provide flexibility to the regulated community. The measures implemented by the FW1 final rule minimize the long-term economic impacts on small entities to the extent practicable. The proposed action is expected to further minimize adverse economic impacts on participants in the skate fishery by increasing skate catch limits, potentially extending the directed fishing season, and avoiding the impacts associated with closures. Overall, long term impacts of FW1 rule, as well as the related actions of the Skate FMP, are minimized by ensuring that management measures and catch levels are sustainable and contribute to rebuilding stocks and, therefore, maximizing yield, as well as providing additional flexibility for fishing operations in the short term. In particular, the revised catch limits for skates that is the subject of this EA, directly or indirectly provides small entities with some ability to offset at least some portion of the estimated economic impacts associated with FW1 and the FMP as a whole.

Economic Impacts on Small Entities Resulting from Proposed Action

The economic impact resulting from this action on these small entities is positive since the action would provide additional fishing opportunity for vessels participating in the skate fishery for FY 2012 and FY 2013. The Preferred Alternative is almost certain to result in greater revenue from skate landings. Based on recent landing information, the skate fishery is able to land close to the full amount of skates allowable under the quotas. The estimated potential revenue from the sale of skates under the proposed catch limits is approximately $9.0 million, compared with $5.8 million if this action were not implemented (Table 49). Due to the implications of closing the directed skate fisheries early in the fishing year, the larger catch limits associated with the Preferred Alternative, compared with the No Action Alternative will result in additional revenue, if fishing is prolonged. According to analyses in FW1, vessels that participate in the skate fishery derive most (an average of 96%) of their revenues from other fisheries (e.g. groundfish, monkfish).

Therefore, relative to total fishing revenues, catch limits of other species would be expected to have more significant economic impacts than revenues derived from skates alone. However, as skate prices have begun increasing in recent years, more vessels are deriving a greater proportion of their income from skates.

8.8 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 Amendment, 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.

8.9 Paperwork Reduction Act

The purpose of the PRA is to control and, to the extent possible, minimize the paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by, or for, the Federal Government. PRA for data collections relating to the Skate FMP have been considered and evaluated under the original Skate FMP implemented in 2003, and approved by the Office of Management and Budget (OMB). This action relies upon the existing collections, including those approved by the OMB under the original FMP, and does not propose to modify any existing collections or to add any new collections. Therefore, no review under the PRA is necessary for this action.

8.10 Executive Order 12866

The purpose of E.O. 12866 is to enhance planning and coordination with respect to new and existing regulations. This E.O. requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be “significant.” The Regulatory Impact Review (RIR) for FW1 (refer to section 8.10 of the FW1 EA) concluded that the action was not a “significant regulatory action” because it would not affect in a material way the economy or a sector of the economy. Based on the objectives of the proposed action and alternatives (Sections 4.0 and the analyses contained within FW1 and this supplemental EA (Section 6.0), there is no rationale to change the determination of the FW1 RIR. The proposed action is intended to increase skate landings and revenue, and help avoid the potential negative economic impacts associated with the No Action Alternative. Therefore, this action is also not considered a “significant regulatory action”.

8.11 Executive Order 12898 (Environmental Justice)

[To be completed for submission]

8.12 Information Quality Act (IQA)

Pursuant to NOAA guidelines implementing Section 515 of Public Law 106-554 (the Information Quality Act), all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of the information (including statistical information) disseminated by or for federal agencies. The following section addresses these requirements.

Utility

The information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the measures proposed, and the impacts of those measures. A discussion of the reasons for selecting the proposed action is included so that intended users may have a full understanding of the proposed action and its implications.

This document is the principal means by which the information contained herein is available to the public. The information provided in this document is based on the most recent available information from the relevant data sources. The development of this document and the decisions made by NMFS to propose this action are the result of a multi-stage public process.

The *Federal Register* notice that implements the proposed revision to the skate catch limits would be made available in printed publication and on the NMFS NE Regional Office website. Instructions for obtaining a copy of this supplemental EA are included in the *Federal Register* notice.

Integrity

Prior to dissemination, information associated with this action, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information. All electronic information disseminated by NMFS adheres to the standards set out in Appendix III, "Security of Automated Information Resources," of OMB Circular A-130; the Computer Security Act; and the Government Information Security Act. All confidential information (e.g., dealer purchase reports) is safeguarded pursuant to the Privacy Act; Titles 13, 15, and 22 of the United States Code (confidentiality of census, business, and financial information); the Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity

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

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Stock status (including estimates of biomass) and the recommended ABC reported in this product are based on the results of the NEFSC bottom trawl survey and catch statistics reported to NMFS, and were subject to peer-review through the Council's Skate PDT and SSC. These methods were developed and peer-reviewed during the 2008 Northeast Data Poor Stocks Working Group stock assessment of the skate complex (NEFSC 2009). These reports are developed using an approved, scientifically valid sampling process. Original analyses in this supplemental EA build upon the analyses contained in Amendment 3 and the FW1 EA, and were prepared using data from accepted sources, and the analyses have been reviewed by NOAA.

Despite current data limitations, the measures proposed for this action were selected based upon the best scientific information available (NEFMC 2011). The principal author of this document is a professional fishery scientist employed by the Council, the chair of the Council's Skate Plan Development Team, and is familiar with the available data and information relevant to the state of the regulated fisheries under the FMP, fishing techniques in the NE Region, biology of skates, and the socioeconomic impacts of the fisheries on impacted communities.

The policy choices are clearly articulated in Section 4.0 of this document, as the management alternatives considered in this action. The supporting science and analyses, upon which the policy choices are based, are summarized and described, or incorporated by reference, in Sections 5.0 and 6.0 of this supplemental EA. All supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency.

The review process used in preparation of this supplemental EA involves the Northeast Fisheries Science Center, the Northeast Regional Office, and NMFS Headquarters. The Center's technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment methods, demersal resources, population biology, and the social sciences. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the action proposed in this supplemental EA and clearance of any rules prepared to implement resulting regulations is conducted by staff at NMFS Headquarters, the Department of Commerce, and the United States Office of Management and Budget.

9.0 Glossary

ABC – "Acceptable biological catch" means a level of a stock or stock complex's annual catch that accunts for the scientific uncertainty in the estimate of OFL.

ACL – "Annual catch limit" is the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures (AMs).

ACT – "Annual catch target" is an amount of annual catch of a stock or stock complex that is the management target of the fishery.

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

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

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

AMs – "Accountability measures" are management controls that prevents ACLs or sector ACLs from being exceeded, where possible, and correct or mitigate overages if they occur.

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 procedure".

Availability – refers to the distribution of fish of different ages or sizes relative to that taken in the fishery.

Benthic community – Benthic means the bottom habitat of the ocean, and can mean anything as shallow as a salt marsh or the intertidal zone, to areas of the bottom that are several miles deep in the ocean. Benthic community refers to those organisms that live in and on the bottom.

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.

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

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

Bivalve – A class of mollusks having a soft body with platelike gills enclosed within two shells hinged together; e.g., clams, mussels.

Bottom tending mobile gear – All fishing gear that operates on or near the ocean bottom that is actively worked in order to capture fish or other marine species. Some examples of bottom tending mobile gear are otter trawls and dredges.

Bottom tending static gear – All fishing gear that operates on or near the ocean bottom that is not actively worked; instead, the effectiveness of this gear depends on species moving to the gear which is set in a particular manner by a vessel, and later retrieved. Some examples of bottom tending static gear are gillnets, traps, and pots.

B_{MSY} – the stock biomass that would produce maximum sustainable yield (MSY) when fished at a level equal to F_{MSY}. For most stocks, B_{MSY} is about ½ of the carrying capacity.

B_{target} – A desirable biomass to maintain fishery stocks. This is usually synonymous with BMSY or its proxy, and was set in the original Monkfish FMP as the median of the 3-yr. running average of the 1965-1981 autumn trawl survey biomass index.

$B_{threshold}$ – 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 Bthreshold. A determination of overfished triggers the SFA requirement for a rebuilding plan to achieve Btarget as soon as possible, usually not to exceed 10 years except certain requirements are met. For monkfish, Bthreshold was specified in Framework 2 as 1/2BTarget (see below).

Bycatch – (v.) the capture of nontarget species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program.

Capacity – the level of output a fishing fleet is able to produce given specified conditions and constraints. Maximum fishing capacity results when all fishing capital is applied over the maximum amount of available (or permitted) fishing time, assuming that all variable inputs are utilized efficiently.

Catch – The sum total of fish killed in a fishery in a given period. Catch is given in either weight or number of fish and may include landings, unreported landings, discards, and incidental deaths.

Coarse sediment – Sediment generally of the sand and gravel classes; not sediment composed primarily of mud; but the meaning depends on the context, e.g. within the mud class, silt is coarser than clay.

Continental shelf waters – The waters overlying the continental shelf, which extends seaward from the shoreline and deepens gradually to the point where the sea floor begins a slightly steeper descent to the deep ocean floor; the depth of the shelf edge varies, but is approximately 200 meters in many regions.

Council – New England Fishery Management Council (NEFMC).

CPUE – Catch per unit effort. This measure includes landings and discards (live and dead), often expressed per hour of fishing time, per day fished, or per day-at-sea.

DAS – A day-at-sea is an allocation of time that a vessel may be at-sea on a fishing trip. For vessels with VMS equipment, it is the cumulative time that a vessel is seaward of the VMS demarcation line. For vessels without VMS equipment, it is the cumulative time between when a fisherman calls in to leave port to the time that the fisherman calls in to report that the vessel has returned to port.

Days absent – an estimate by port agents of trip length. This data was collected as part of the NMFS weighout system prior to May 1, 1994.

Demersal species – Most often refers to fish that live on or near the ocean bottom. They are often called benthic fish, groundfish, or bottom fish.

Discards – animals returned to sea after being caught; see Bycatch (n.)

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. The Final EIS is referred to as the Final Environmental Impact Statement (FEIS).

Essential Fish Habitat (EFH) – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998).

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 – Any fishery determined by the Regional Director to have less than 5 percent regulated species as a bycatch (by weight) of total catch according to 50 CFR 648.80(a)(7).

Exploitation Rate – the percentage of catchable fish killed by fishing every year. If a fish stock has 1,000,000 fish large enough to be caught by fishing gear and 550,000 are killed by fishing during the year, the annual exploitation rate is 55%.

Fathom – A measure of length, containing six feet; the space to which a man can extend his arms; used chiefly in measuring cables, cordage, and the depth of navigable water by soundings.

Fishing effort – the amount of time and fishing power used to harvest fish. Fishing power is a function of gear size, boat size and horsepower.

Fishing Mortality (F) – (see also exploitation rate) a measurement of the rate of removal of fish from a population by fishing. F is that rate at which fish are harvested at any given point in time. ("Exploitation rate" is an annual rate of removal, "F" is an instantaneous rate.)

$F_{0.1}$ – F at which the increase in yield-per-recruit in weight for an increase in a unit-of effort is only 10% of that produced in an unexploited stock; usually considered a conservative target fishing mortality rate.

F_{MSY} – a fishing mortality rate that would produce the maximum sustainable yield from a stock when the stock biomass is at a level capable of producing MSY on a continuing basis.

F_{MAX} – the fishing mortality rate that produces the maximum level of yield per recruit. This is the point beyond which growth overfishing begins.

F_{target} – the fishing mortality that management measures are designed to achieve.

FMP (Fishery Management Plan) – a document that describes a fishery and establishes measures to manage it. This document forms the basis for federal regulations for fisheries managed under the regional Fishery Management Councils. The New England Fishery Management Council prepares FMPs and submits them to the Secretary of Commerce for approval and implementation.

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 – the situation existing when the rate of fishing mortality is above F_{MAX} and then the loss in fish weight due to mortality exceeds the gain in fish weight due to growth.

ICL – Interim catch limit is the maximum amount of skate catch, including landings and dead discards, that has been chosen to promote skate rebuilding. This limit has been calculated as the product of the median catch/biomass index for the time series and the latest 3 year moving average of the applicable survey biomass (spring survey for little skate; fall survey for all other managed skates).

Individual Fishing Quota (IFQ) – A Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by an individual person or entity

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

Larvae (or Larval) stage – One of several marked phases or periods in the development and growth of many animals. The first stage of development after hatching from the egg for many fish and invertebrates. This life stage looks fundamentally different than the juvenile and adult stages, and is incapable of reproduction; it must undergo metamorphosis into the juvenile or adult shape or form.

Limited Access – a management system that limits the number of participants in a fishery. Usually, qualification for this system is based on historic participation, and the participants remain constant over time (with the exception of attrition).

Limited-access permit – A permit issued to vessels that met certain qualification criteria by a specified date (the "control date").

LPUE – Landings per unit effort. This measure is the same as CPUE, but excludes discards.

Maximum Sustainable Yield (MSY) – the largest average catch that can be taken from a stock under existing environmental conditions.

Mesh selectivity (ogive) – A mathematical model used to describe the selectivity of a mesh size (proportion of fish at a specific length retained by mesh) for the entire population. L25 is the length where 25% of the fish encountered are retained by the mesh. L50 is the length where 50% of the fish encountered are retained by the mesh.

Meter – A measure of length, equal to 39.37 English inches, the standard of linear measure in the metric system of weights and measures. It was intended to be, and is very nearly, the ten millionth part of the distance from the equator to the north pole, as ascertained by actual measurement of an arc of a meridian.

Metric ton – A unit of weight equal to a thousand kilograms (1kgs = 2.2 lbs.). A metric ton is equivalent to 2,204.6 lbs. A thousand metric tons is equivalent to 2.204 million lbs.

Minimum Biomass Level – the minimum stock size (or biomass) below which there is a significantly lower chance that the stock will produce enough new fish to sustain itself over the long-term.

Mortality – Noun, either referring to fishing mortality (F) or total mortality (Z).

Multispecies – the group of species managed under the Northeast Multispecies Fishery Management Plan. This group includes whiting, red hake and ocean pout plus the regulated species (cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish).

Natural Mortality (M) – a measurement of the rate of fish deaths from all causes other than fishing such as predation, cannibalism, disease, starvation, and pollution; the rate of natural mortality may vary from species to species

Northeast Shelf Ecosystem – The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream.

Observer – Any person required or authorized to be carried on a vessel for conservation and management purposes by regulations or permits under this Act

OFL – "Overfishing limit" means the annual amount of catch that corresponds to the estimate of the maximum fishing mortality threshold applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish.

Open access – Describes a fishery or permit for which there is no qualification criteria to participate. Open-access permits may be issued with restrictions on fishing (for example, the type of gear that may be used or the amount of fish that may be caught).

Optimum Yield (OY) – the amount of fish which-
(a) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
(b) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and
(c) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overfished – A conditioned defined when stock biomass is below minimum biomass threshold and the probability of successful spawning production is low.

Overfishing – A level or rate of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis.

PDT (Plan Development Team) – a group of technical experts responsible for developing and analyzing management measures under the direction of the Council; the Council has a Skate PDT that meets to discuss the development of this FMP.

Proposed Rule – a federal regulation is often published in the Federal Register as a proposed rule with a time period for public comment. After the comment period closes, the proposed regulation may be changed or withdrawn before it is published as a final rule, along with its date of implementation and response to comments.

Rebuilding Plan – a plan designed to increase stock biomass to the B_{MSY} level within no more than ten years (or 10 years plus one mean generation period) when a stock has been declared overfished.

Recruitment overfishing – fishing at an exploitation rate that reduces the population biomass to a point where recruitment is substantially reduced.

Recruitment – the amount of fish added to the fishery each year due to growth and/or migration into the fishing area. For example, the number of fish that grow to become vulnerable to fishing gear in one year would be the recruitment to the fishery. "Recruitment" also refers to new year classes entering the population (prior to recruiting to the fishery).

Regulated groundfish species – cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish. These species are usually targeted with large-mesh net gear.

Relative exploitation – an index of exploitation derived by dividing landings by trawl survey biomass. This variable does not provide an estimate of the proportion of removals from the stock due to fishing, but allows for general statements about trends in exploitation.

Sediment – Material deposited by water, wind, or glaciers.

Spawning stock biomass (SSB) – the total weight of fish in a stock that sexually mature, i.e., are old enough to reproduce.

Status Determination Criteria – objective and measurable criteria used to determine if overfishing is occurring or if a stock is in an overfished condition according to the National Standard Guidelines.

Stock assessment – An analysis for determining the number (abundance/biomass) and status (life-history characteristics, including age distribution, natural mortality rate, age at maturity, fecundity as a function of age) of individuals in a stock

Stock – A grouping of fish usually based on genetic relationship, geographic distribution and movement patterns. A region may have more than one stock of a species (for example, Gulf of Maine cod and Georges Bank cod). A species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

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 trends in stock biomass, biomass weighted fishing mortality rates, MSY, FMSY, BMSY, 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). BMSY is often defined as the biomass that maximizes surplus production rate.

Survival rate (S) – Rate of survival expressed as the fraction of a cohort surviving the a period compared to number alive at the beginning of the period (# survivors at the end of the year / numbers alive at the beginning of the year). Pessimists convert survival rates into annual total mortality rate using the relationship A=1-S.

Survival ratio (R/SSB) – an index of the survivability from egg to age-of-recruitment. Declining ratios suggest that the survival rate from egg to age-of-recruitment is declining.

TAC – Total allowable catch is equivalent to the ICL.

TAL – Total allowable landings, which for skate management is equivalent to 75% of the TAC minus the dead discard rate.

Ten-minute- "squares" of latitude and longitude (TMS) – A measure of geographic space. The actual size of a ten-minute-square varies depending on where it is on the surface of the earth, but in general each square is approximately 70-80 square nautical miles at 40° of latitude. This is the spatial area that EFH designations, biomass data, and some of the effort data have been classified or grouped for analysis.

Total mortality – The rate of mortality from all sources (fishing, natural, pollution) Total mortality can be expressed as an instantaneous rate (called Z and equal to F + M) or Annual rate (called A and calculated as the ratio of total deaths in a year divided by number alive at the beginning of the year)

Yearclass (or cohort) – Fish that were spawned in the same year. By convention, the "birth date" is set to January 1st and a fish must experience a summer before turning 1. For example, winter flounder that were spawned in February-April 1997 are all part of the 1997 cohort (or year-class). They would be considered age 0 in 1997, age 1 in 1998, etc. A summer flounder spawned in October 1997 would have its birth date set to the following January 1 and would be considered age 0 in 1998, age 1 in 1999, etc.

Yield-per-recruit (YPR) – the expected yield (weight) of individual fish calculated for a given fishing mortality rate and exploitation pattern and incorporating the growth characteristics and natural mortality.

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