Framework 21 to the Atlantic Sea Scallop FMP

Including an Environmental Assessment, an Initial Regulatory Flexibility Analysis and Stock Assessment and Fishery Evaluation (SAFE) Report

Preliminary AP input highlighted in CAPS and underlined
Committee input highlighted in **BOLD** and *Italics*

Prepared by the New England Fishery Management Council, in consultation with the National Marine Fisheries Service and the Mid-Atlantic Fishery Management Council

Initial Council Meeting: April 7-9, 2009
Final Council Meeting: November 17-19, 2009
Submission to NMFS:

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EXCUTIVE SUMMARY

This framework and Environmental Assessment (EA) presents and evaluates management measures and alternatives to achieve specific goals and objectives for the Atlantic sea scallop fishery. This document was prepared by the New England Fishery Management Council and its Scallop Plan Development Team (PDT) in consultation with the National Marine Fisheries Service (NMFS, NOAA Fisheries) and the Mid-Atlantic Fishery Management Council (MAFMC). This framework was developed in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, M-S Act) and the National Environmental Policy Act (NEPA), the former being the primary domestic legislation governing fisheries management in the U.S. Exclusive Economic Zone (EEZ). This document also addresses the requirements of other applicable laws (See Section 6.0).

In addition to the No Action alternative, the Council considered various other alternatives to address the purpose and need of this action. The purpose of this action is to achieve the objectives of the Atlantic Sea Scallop Fishery Management Plan (FMP), which is to prevent overfishing and improve yield-per-recruit from the fishery. The primary need for this action is to set specifications to adjust the day-at-sea (DAS) allocations and an area rotation schedule for the 2010 fishing year This framework adjustment also addresses other issues such as compliance with reasonable and prudent measure required in recent turtle biological opinion and minor adjustments to the observer set aside program.

The proposed action includes:

<u>Summary of alternatives considered and the Council's rationale for the proposed action</u>

Table 1 is a summary of all the alternatives in Framework 21; the proposed action is shaded.

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APPENDICIES

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LIST OF ACRONYMS

A10 – Amendment 10 to the Atlantic Sea Scallop Fishery Management Plan
A13 – Amendment 13 to the Northeast Multispecies Fishery Management Plan
BMSY – Biomass Maximum Sustainable Yield
BO – Biological opinion
CEQ – Council on Environmental Quality
CAI – Closed Area I
CAII – Closed Area II
CV – Coefficient of variation, a standard statistical measure of variation, expressed as a percentage of the mean. Lower CVs indicate more accuracy in the estimates and less variation in data.
CWA – Cape Wind Associates
DAS – Day-at-sea
DMV – Delmarva
DSEIS – Draft Supplemental Environmental Impact Statement
EA – Environmental Assessment
ESA – Endangered Species Act
EFH – Essential Fish Habitat
EFH designation life stages
  A – Adult life stage
  J – Juvenile life stage
  E – Egg life stage
FMP – Fishery Management Plan
FR – Federal Register
FSEIS – Final supplemental environmental impact statement
FW18 – Framework Adjustment 18 to the Atlantic Sea Scallop Fishery Management Plan
GB – Georges Bank
GC – General Category
GOM – Gulf of Maine
HAPC – Habitat Area of Particular Concern
HC(L)(S) – Hudson Canyon (Large) (Small)
LPUE – Landings per unit effort, usually a DAS in this document
IRFA – Initial Regulatory Flexibility Analysis
IVR – Interactive Voice Reporting
LA – Limited access
LIPA – Long Island Power Authority
LNG = Liquefied Natural Gas
MA – Mid-Atlantic
MAFMC – Mid-Atlantic Fishery Management Council
M-S Act – Magnuson Stevens Act
NEFMC – New England Fishery Management Council
NEFSC – Northeast Fisheries Science Center
NEPA – National Environmental Policy Act
NLSA/NL/NLA – Nantucket Lightship Area
NMFS – National Marine Fisheries Service

NOAA – National Oceanographic Atmospheric Administration
RIR – Regulatory Impact Review
SAP – Special access program
SARC – Stock Assessment Review Committee
SAW – Stock assessment workshop
SBNMS – Stellwagen Bank Marine Sanctuary
SBRM – Standardized bycatch reporting methodology
SCH – Great South Channel
SEIS – Supplemental Environmental Impact Statement
SMAST –School of Marine Science and Technology, University of Massachusetts Dartmouth
SNE – Southern New England
TAC – Total Allowable Catch. This includes discards for finfish species, but not for scallops which have a much lower discard mortality rate.
PDT – Scallop Plan Development Team
U10 – A classification for large scallops, less than 10 meats per pound.
USGS – United States Geological Survey
VEC – Valued Ecosystem Component
VIMS – Virginia Institute of Marine Science
VMS – Vessel Monitoring System
VTR – Vessel Trip Reports
YTF/YT – Yellowtail flounder

1.0 BACKGROUND AND PURPOSE

1.1 BACKGROUND

In 2004, Amendment 10 introduced rotational area management and changed the way that the Scallop FMP allocates fishing effort for limited access scallop vessels. Instead of allocating an annual pool of DAS for limited access vessels to fish in any area, vessels now have to use a portion of their total DAS allocation in controlled access areas defined by the plan or exchange them with another vessel to fish in a different controlled access area. Vessels can fish their open area DAS in any area that is not designated a controlled access area. Amendment 10 set up this program with a biennial framework process, which means an action is required every two years to allocate fishing effort in both open and access areas. This framework action will only set specifications for a single fishing year, 2010. This framework is for a single year because the Council is working on Amendment 15 which will establish a process for implementing annual catch limits (ACLs) that are required to be in place in 2011 for the scallop fishery. Rather than have a framework with one year pre-ACLs and one year post-ACLs, the Council decided to develop this action for 2010 only and a subsequent framework will set measures for 2011 and 2012.

In addition, the Council recently approved Amendment 11 to the Scallop FMP, which recommends a limited entry program for the general category fishery as well as other measures. Most of that action has been implemented, but the IFQ program for limited access general category vessels is not fully implemented yet, so this action will have to consider measures in case the IFQ program is not implemented in 2010 (See Section ???). A separate hard-TAC and limited entry program for the Northern Gulf of Maine was also adopted in Amendment 11 and the hard-TAC for 2010 will be specified in this action as well.

There are also several other issues that have been included for consideration in this framework that are not directly related to fishery specifications for FY2010. For example, NMFS recently published a biological opinion, pursuant to section 7 of the Endangered Species Act (ESA), that considered the effects of the continued authorization of the Atlantic sea scallop fishery on ESA-listed species. That biological opinion included a specific Reasonable and Prudent Measure (RPM) and accompanying Term and Condition (T/C) to limit the amount of allocated scallop fishing effort by limited access scallop vessels that can be used in the area and during the time of year when sea turtle distribution overlaps with scallop fishing activity. The biological opinion required NMFS to comply with this measure no later than the 2010 fishing year, so this action will consider measures that will comply with the RPM and T/C (See Section 2.8).

In addition this framework is considering minor adjustments to the industry-funded observer set-aside program including an alternative to prohibit vessels from not paying for observers and addressing a loophole for observed general category access area trips in terms of the amount of compensation a general category vessel can get per observed trip.

In summary, this framework adjustment will address several primary management issues:

1. Fishery specifications for FY2010 including setting of acceptable biological catch as required by the reauthorized MSA and compliance with the first RPM and T/C required in the recent biological opinion

2. Area rotation adjustments (if necessary) including consideration of a new scallop access area on Georges Bank
3. Other measures including minor adjustments to the observer set-aside program

1.2 PURPOSE AND NEED

The purpose of this action is to achieve the objectives of the Atlantic Sea Scallop Fishery Management Plan (FMP) to prevent overfishing and improve yield-per-recruit from the fishery. The primary need for this action is to set specifications to adjust the day-at-sea (DAS) allocations and area rotation schedule for the 2010 fishing year and to comply with reasonable and prudent measure required in recent turtle biological opinion.

1.3 SCALLOP MANAGEMENT BACKGROUND

To be completed later

1.4 DETAILED BACKGROUND ON ROTATIONAL AREA MANAGEMENT

Amendment 10 introduced area rotation: areas that contain beds of small scallops are closed before the scallops experience fishing mortality, then the areas re-open when scallops are larger, producing more yield-per-recruit. The details of which areas should close, for how long and at what level they should be fished were described and analyzed in Amendment 10. Except for the access areas within the groundfish closed areas on Georges Bank, all other scallop rotational areas should have flexible boundaries. Amendment 10 included a detailed set of criteria or guidelines that would be applied for closing and re-opening areas. Framework adjustments would then be used to actually implement the closures and allocate access in re-opened areas. The general management structure for area rotation management is described in Table 1. An area would close when the expected increase in exploitable biomass in the absence of fishing mortality exceeds 30% per year, and re-open to fishing when the annual increase in the absence of fishing mortality is less than 15% per year. Area rotation allows for differences in fishing mortality targets to catch scallops at higher than normal rates by using a time averaged fishing mortality so the average for an area since the beginning of the last closure is equal to the resource-wide fishing mortality target (80% of Fmax, estimated to be F=0.20).

Table 1- General management structure for area rotation management as implemented by Amendment 10

Area type	Criteria for rotation area management consideration	General management rules	Who may fish
Closed rotation	Rate of biomass growth exceeds 30% per year if closed.	• No scallop fishing allowed • Scallop limited access and general category vessels may transit closed rotation areas provided fishing gear is properly stowed. • Scallop bycatch must be returned intact to the water in the general location of capture.	• Any vessel may fish with gear other than a scallop dredge or scallop trawl • Zero scallop possession limit
Re-opened controlled access	A previously closed rotation area where the rate of biomass growth is less than 15% per year if closure continues. Status expires when time averaged mortality increases to average the resource-wide	• Fishing mortality target set by framework adjustment subject to guidelines determined by time averaging since the beginning of the most recent closure. • Maximum number of limited access trips will be determined from permit activity, scallop possession limits,	• Limited access vessels may fish for scallops only on authorized trips. • Vessels with general category permits will be allowed to target scallops or retain

Area type	Criteria for rotation area management consideration	General management rules	Who may fish
	target, i.e. as defined by the Council by setting the annual mortality targets for a re-opened area.	and TACs associated with the time-average annual fishing mortality target. • Transfers of scallops at sea would be prohibited	scallop incidental catch, with a 400 lb. scallop possession limit in accordance with general category rules.
Open	Scallop resource does not meet criteria to be classified as a closed rotation or re-opened controlled access area	• Limited access vessels may target scallops on an open area day-at-sea • General category vessels may target sea scallops with dredges or trawls under existing rules. • Transfers of scallops at sea would be prohibited	All vessels may fish for scallops and other species under applicable rules.

2.0 MANAGEMENT ALTERNATIVES UNDER CONSIDERATION

2.1 SUMMARY OF THE PROPOSED ACTION

To be completed later

2.2 NO ACTION

This section describes the No Action alternative as well as several other alternatives that are dependent on full implementation of the IFQ program for limited access general category qualifies approved under Amendment 11 and measures that would be in place if this action (Framework 21) were delayed.

2.2.1 No Action

In the alternatives for area rotation management and for open area DAS allocations, “No Action” is exactly what it implies: no additional action will be taken and so the measures and allocations that are specified in the present regulations (CFR §648, Sub-part D) are maintained. The scallop regulations state (paragraph 648.55(b)): “If the biennial framework action is not undertaken by the Council, or if a final rule resulting from a biennial framework is not published…with an effective date on or before March 1…the measures from the most recent fishing year shall continue, beginning March 1 of each year.”

Under “No Action,” the trip allocations for access areas would roll over from FY 2009. In terms of Mid-Atlantic access areas, full-time vessels would receive 3 Elephant Trunk Access Area (ETA) trip and one trip in Delmarva, part-time vessels would receive 2 access area trips in the Mid-Atlantic (1 trip in DMV, 1 trip in ETA; or 2 trips in ETA), and occasional vessels would receive one access area trip that could be taken in either area. As for Georges Bank access areas, Closed Area I is scheduled to open in 2010, but no trips would be allocated because none were allocated in 2009; Closed Area II is scheduled to be closed, and NL is scheduled to be open, but again since no trips were allocated in 2009, no trips would be allocated in 2010.

The TACs for all areas would remain as estimated in Amendment 11 and Framework 19. When Georges Bank access areas close due to yellowtail flounder catches, vessels would receive compensation for each access area trip not taken due to the closure. In addition, under “No Action,” the Hudson Canyon Access Area would remain closed.

In terms of open areas, under "No Action", limited access scallop vessels would receive the same allocation designated for FY2009 had the IFQ program been fully implemented, resulting in the DAS fleet receiving 94.5 % of the allocated total target TAC rather than the 90% allocated to this fleet during the "transition period" to IFQs. This allocation would result in 42 DAS for full-time limited access scallop vessels. Part-time and occasional vessels would receive a pro-rata share of 40% and 1/12th, respectively, which is equivalent to 17 and 3 open area DAS, respectively.

This action also includes a status quo option, which for practical purposes is No Action in terms of how the Council would set specifications. Specifically, status quo would maintain the same approach the Council has used in recent years by setting specifications (access area trips and DAS allocations) equal to an overall F= 0.20 to prevent overfishing and account for uncertainty in projections and management measures in the fishery. Status quo for this action is considered to be the scenario that has an overall fishing mortality of 0.20 and does not include a new closure in the Channel (NCLF20). Therefore, this scenario is the baseline condition, which provides the standard against which all other alternative actions are compared. This scenario (NCLF20) is consistent with how the Council has been setting specifications for this fishery in the last few years (a handful of access area trips and DAS set to meet an overall F and no new closed areas under the area rotation program).

Table 2 – Open area DAS allocations under No Action

Full-Time		**Part-Time**		**Occasional**	
2009	*2010*	*2009*	*2010*	*2009*	*2010*
37	42	15	17	3	3

Table 3 -Sea scallop access area allocation schedule under No Action

	2009	**2010**
CAII	Open	Closed
NLCA	Closed	Open – but no allocation
CAI	Closed	Open – but no allocation
ETAA	Open	Open
HCAA	Closed	Closed
Delmarva	Open	Open

Table 4 – Access area trip allocations under No Action

Area	NLCA		CAI		CAII		ETAA		Delmarva	
Fishing Year	2009	2010**	2009	2010**	2009	2010	2009	2010	2009	2010
Full-time	0	0	0	0	1	0	3	3	1	1
Part-time*	0	0	0	0	Up to 1	0	Up to 2	Up to 2	Up to 1	Up to 1
Occasional*	0	0	0	0	Up to 1	0	Up to 1	Up to 1	Up to 1	Up to 1
General Category	0	0	0	0	0	0	1,964	1,964	728	728

* Part-time and occasional scallop vessel owners could determine which areas to take their trips, up to the maximum number of trips specified in the table above
** Scheduled to be open in 2010, but no trips allocated until FW21 is implemented

2.2.2 No Action if IFQ program is not fully implemented before March 1, 2010

If the limited access general category IFQ program is not fully implemented before March 1, 2010 then the fishery reverts to management under the "transition period" to IFQs. This "transition period" would continue through the entire 2010 fishing year and the IFQ program would not be implemented until March 1, 2011. The major difference between the transition period and post IFQs is the total allocation for the general category sector is set at 10% of the target scallop catch compared to 5% under IFQs. The Council selected 10% for the transition period to recognize that more vessels will be fishing under appeals so 10% would help reduce impacts on general category qualifiers. In addition, 10% was still lower than recent years before development of Amendment 11, so was not viewed as very restrictive on the limited access fishery.

The 10% allocation for IFQ scallop vessels will be divided into quarterly hard TACs similar to how the fishery was managed in 2008 and 2009. The DAS allocation to the limited access scallop fishery would be the same as the "transition period" allocation in FY2009: Full-time limited access scallop vessels would receive 37 DAS, while part-time and occasional vessels would receive 15 and 3 open area DAS, respectively.

2.2.3 Measures that will be in effect March 1, 2010 until Framework 21 is implemented

If Framework 21 is not implemented by March 1, 2010, several measures implemented by Amendment 11 and Framework 19 will carry-over. For example, the Elephant Trunk Area would be managed under the same regulations in place in 2009 (three trips for full-time vessels and a total of 1,964 general category trips). In addition, under No Action the Mid-Atlantic access area allocations would rollover. Hudson Canyon would remain closed and vessels would get one trip in the Delmarva area.

The open area DAS allocations for limited access vessels will also carry over from Framework 19 into FY2010 until Framework 21 is implemented. As previously mentioned, the exact values of the DAS allocations will depend on whether or not the IFQ program has been fully implemented prior to March 1, 2010.

Because Council final action has been moved back to the November Council meeting, the action may not be implemented before the start of FY2010; therefore, this action will have to assess impacts of the potential delay and consider measures to compensate.

<u>THE LIST OF MEASURES BELOW WERE IN FW19 – IT IS LIKELY THAT SIMLAR MEASURES SHOULD BE INCLUDED IN FW21 IF IT IS DELAYED</u>
The specific measures that are included in this alternative if this action is not implemented by March 1, 2010, are:

1. Any limited access open area DAS used in 2010 above the ultimate value allocated for 2010 will be reduced the following fishing year (2011).
2. Any limited access or general category Elephant Trunk area trips taken in 2010 above the ultimate allocation for 2010 will be deducted from the following fishing year.
3. If the IFQ program is not in place prior to March 1, the LAGC TAC will remain at 10% for the entirety 2010 fishing year. The TAC will remain at 2,082 mt, 10% of 2009 projected catch value of 20,820 mt, until FW 21 implements the 2010 specifications. If the general category quarterly hard TAC for Quarter 1 (March 1-May 31) is exceeded, then those pounds will be removed from Quarter 3 and/or 4. Catch cannot be removed from Quarter 2 because any overage would not be known until the Quarter 2 TAC was allocated. If the 2010 projected catch value differs from 2009, the LAGC TAC will be adjusted and permit holders will be notified.
4. If the IFQ program is in place before March 1, IFQ vessels without a limited access DAS scallop permit will receive an IFQ based on a TAC of 1041 mt, which is 5% of 2009 projected catch value of 20,820 mt. IFQ vessels that have also been issued a limited access DAS scallop permit will receive an IFQ based on a TAC of 104.1 mt, which is 0.5% of the 2009 projected catch value of 20,820 mt. If that differs from 2010 final projected catch values, 2010 IFQs will be adjusted either up or down, depending on the difference in the projected catch. Vessels will receive notice during the fishing year with different IFQs for 2010. If the 2010 projected catch value is less than the 2009 projected catch value, and if a vessel exceeds their ultimate 2010 IFQ before the 2010 IFQs are adjusted, the vessel's 2011 IFQ will be deducted by the same amount. A vessel that increases its IFQ through a lease will use leased IFQ before using its own IFQ, and multiple leases of IFQ will be used in the order that it was leased by the vessel. IFQ for the 2011 fishing year will be deducted from either the leased or the vessel's own IFQ that resulted in the excess catch.
5. Any landings from within the Northern Gulf of Maine (NGOM) area caught in fishing year 2010 above the ultimate TAC for 2010 will be reduced the following year.

2.3 ACCEPTABLE BIOLOGICAL CATCH

The MSA was reauthorized in 2007. Section 104(a) (10) of the Act established new requirements to end and prevent overfishing, including annual catch limits (ACLs) and accountability measures (AMs). Section 303(a)(15) was added to the MSA to read as follows: ''establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.'' ACLs and AMs are required by fishing year 2010 if overfishing is occurring in a fishery, and they are required for all other fisheries by fishing year 2011. The Council initiated Scallop Amendment 15 to comply with these new ACL requirements, and that action is expected to be implemented before the start of the 2011 fishing year as required. However, the Act also requires that an acceptable biological catch be set in each fishery, and that provision is required in actions that set specifications after the Act was implemented (January 2007).

Acceptable Biological Catch (ABC) is defined as the maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan. The determination of ABC will consider scientific uncertainty and may not exceed the fishing level recommendations of its Science and Statistical Committee (SSC) in developing ACLs (Section 302(h)(6)). The MSA enhanced the role of the SSCs, mandating that they shall provide ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch (MSA 302(g(1)(B)). This requirement for an SSC recommendation for ABC was effective in January 2007.

Therefore, while the full ACL program will not be implemented in the Scallop FMP until 2011 under Amendment 15 (if approved), this action is still required to include an ABC recommendation by the SSC, and the Council may not set management measures so that catch exceeds that amount. The SSC identified an ABC for the scallop fishery for 2010 at their September 2009 meeting and the results were presented to the Council on September 23, 2009. **The SSC recommends that Acceptable Biological Catch of scallops in 2010 should be 29,578 mt (65.2 million pounds) for the overall fishery, which includes landings plus discard and incidental mortality.** This recommendation is based on analyses prepared by the Scallop PDT that would set ABC at the fishing mortality rate estimated to have 25% chance of exceeding OFL. In summary, Monte-Carlo simulations were used to determine the distribution around the model parameters such as growth, natural mortality, discard mortality etc. The probability of overfishing was plotted alongside the fraction loss of YPR to search for a best risk scenario. The details of these analyses and the SSC final recommendations are included in Amendment 15.

2.4 SUMMARY OF FW21 ALLOCATION SCENARIOS

The alternatives described in this section are separated out by area (i.e. Georges Bank access areas, Elephant Trunk, Delmarva etc.), but due to the interrelated nature of area rotation and how the model projects impacts for the entire resource overall, it is difficult to pull out specific impacts by area. Therefore, the various alternatives under consideration have been combined into a number of scenarios. The access area boundaries are depicted in Figure 1and Figure 2.

Overall four main scenarios are under consideration:

- No closure in Channel, Overall F = 0.20 (status quo)

- No, closure in Channel, Overall F = 0.24
- S. Channel closure, Overall F = 0.20 ***(Cmte recommends rejection)***
- S. Channel closure, Overall F = 0.18

Overall F was reduced to 0.18 for last alternative because the new closure had unpredictable model effects on the overall F, so a lower value (0.18) was made an alternative instead of higher F strategies (F=0.20 or F=0.24).

The following table gives the four alternatives and the resulting landings and DAS associated with each. Again, these may change as the PDT refines these alternatives.

Option	2010 Landings (mt)	2010 DAS
NoCl-0.20	18829	29
NoCl-0.24	21445	38
Cl-0.18	22299	42
Cl-0.20	24269	51

Shaded scenario – Scallop Committee recommends this option be rejected from further consideration

Access area allocations are the same for all four scenarios: one trip in Nantucket Lightship, 1 trip in Delmarva and 2 trips into Elephant Trunk. The openings dates for all access areas are the same as in the past: June 15 for Nantucket Lightship and March 1 for both Elephant Trunk and Delmarva.

The two month seasonal closure in Elephant Trunk that was implemented in FW16 will remain in effect for this action as well. Both LA and LAGC vessels are prohibited from fishing in Elephant Trunk in September and October to minimize interactions with sea turtles. In addition, FW19 included two measures for access area trips that would remain in effect for this framework as well: elimination of crew restrictions and prohibition on leaving any access area with more than 50 bushels of in-shell scallops to eliminate deckloading (insert reference to specific regs).

Overall allocation alternatives under consideration for 2010 are lower than recent years because of two primary reasons: there are only four access area trips in 2010 compared to five in recent years, and overall effort has to be cut back by about 20% because preliminary estimates of F for 2009 are close to F=0.30, which is above the overfishing threshold of 0.29, and well above the target F of 0.20.

When considering the overall allocation scheme for 2010 it is also important to consider other issues that could impact fishing behavior and fishing mortality in 2010. Specifically, the final decision about how much YT to allocate the scallop fishery could be a factor and what measures are adopted to comply with the recent biological opinion for sea turtles could also impact fishing behavior, projected catch and F levels for the fishery in 2010 and beyond.

Figure 1 - Boundaries of scallop access areas within Multispecies closed areas on Georges Bank

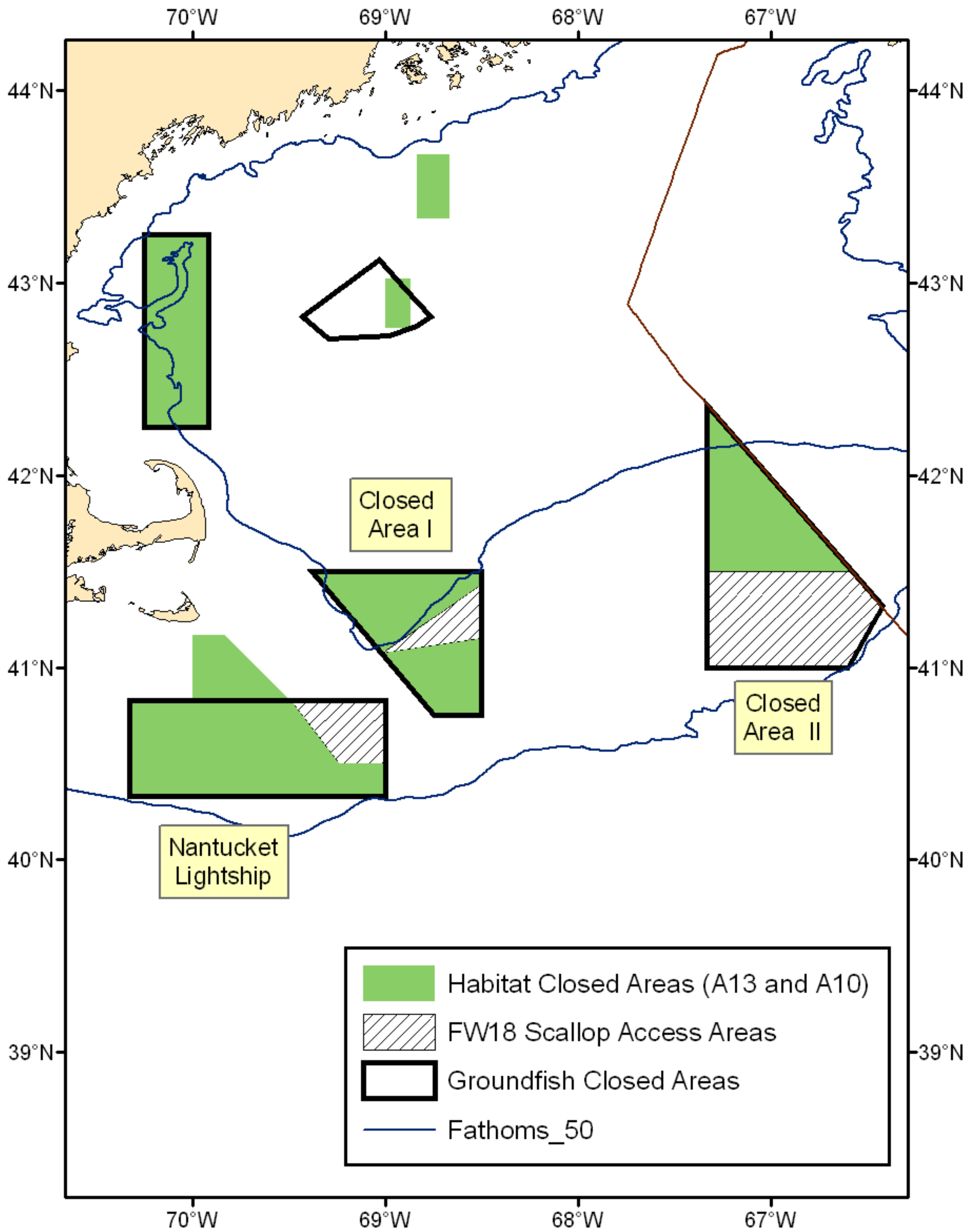
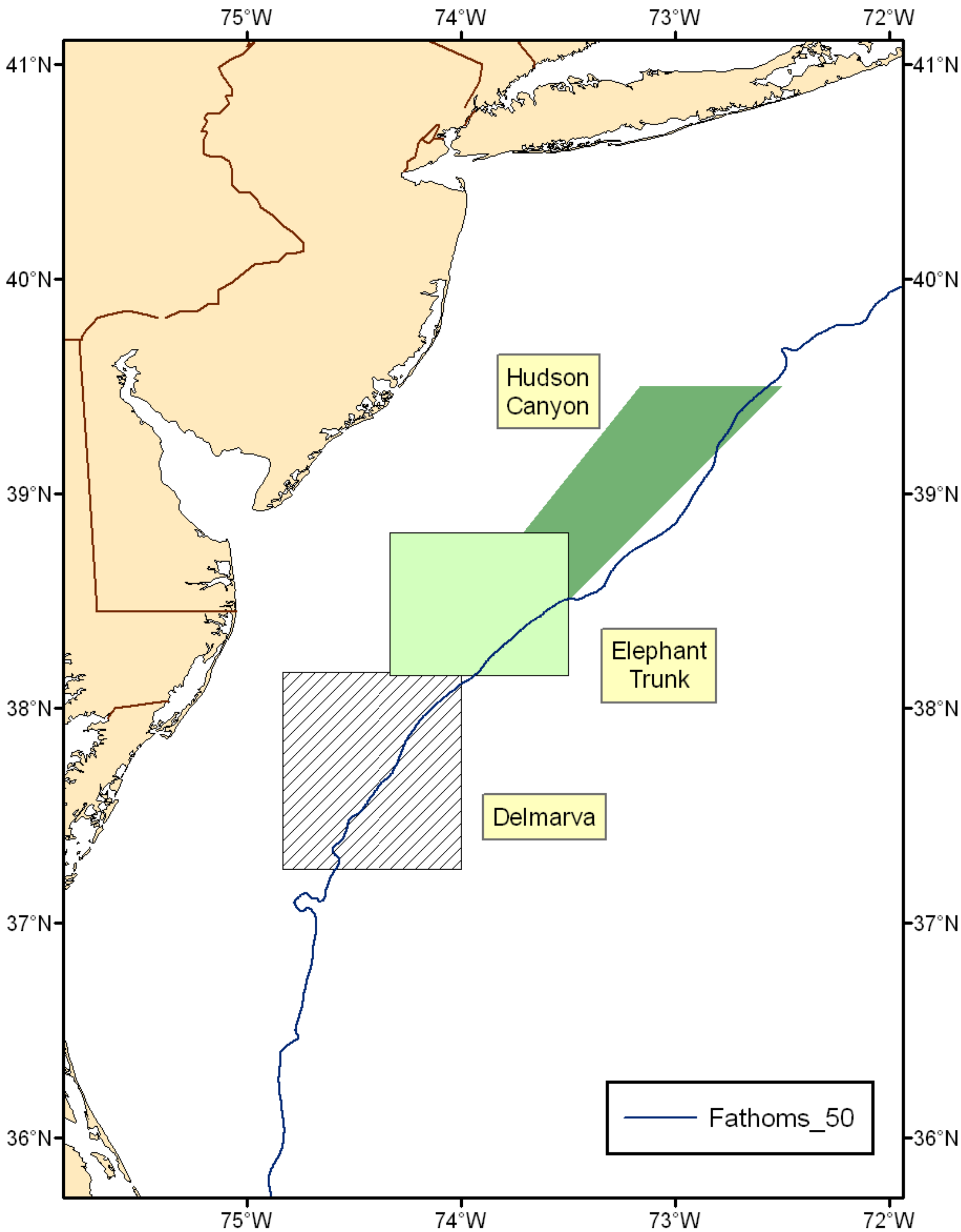


Figure 2 – Boundaries of scallop access areas in the Mid-Atlantic



2.5 MEASURES FOR LIMITED ACCESS VESSELS

Under current regulations (CFR §648.60), limited access vessels are authorized to take a certain amount of trips to each controlled access area during a fishing year. Each full-time vessel has been authorized to land 18,000 pounds of scallop meat per trip (40% of that for part-time vessels and 8.33% for occasional vessels). Fishing in controlled access areas may be subject to other limits such as seasons or potential closures due to TACs for yellowtail flounder. The maximum number of trips per area will be considered in this action for FY2010 to prevent overfishing and optimize yield. Access areas include areas within the Multispecies closed areas (Closed Area I, Closed Area II, and Nantucket Lightship), as well as areas specifically closed as scallop rotational closed areas (Hudson Canyon, Elephant Trunk, and Delmarva) (See Figure 1 and Figure 2).

Limited access vessels are also allocated a specific number of open area DAS in biennial frameworks to achieve optimum yield at the target fishing mortality of F=0.2 for the total scallop resource. The open area DAS allocations depend on what controlled access areas are available and the number of trips the Council recommends to allocate per area, as well as allocations made to the general category fishery. The open area allocations are also based on the assumption that a part-time vessel receives 40% of a full-time allocation, and an occasional vessel receives 8.33% of a full-time vessel.

2.5.1.1 Adjustments when yellowtail flounder catches reach 10% TAC limit

Under current regulations, if the 10% yellowtail flounder (YT) bycatch TAC is reached and the Georges Bank access areas close, limited access vessels that have not taken trips are authorized to take up to two unused trips in open areas. This action is considering an alternative that would allocate additional open area DAS for each trip not taken before the area closes, but at a prorated value of DAS. The prorated amount is calculated to achieve an equal amount of scallop mortality per DAS. This calculation takes into account the expected average landings per DAS based on relative biomass and scallop size in the open areas, compared to the GB access areas.

In 2006, the YT TAC for the scallop fishery in access areas was 14.3 mt (31,544 lbs) for Nantucket Lightship and in 2007 it was 21.3 mt. (46,958 lbs), and in 2008 it was 31.2 mt. (68,784 lbs). In 2010 the total YT ACL for SNE YT flounder is ???. Framework 44 to the Multispecies FMP is considering a range of YT allocations for the scallop fishery for 2010 – 2012. However, currently there is a cap of 10% that can be used in access areas. So for at least this action the limit of YT bycatch that can be used in the access area program in NL is 10% of 493, or 49.3 mt.

Table 5 – Preliminary estimates of SNE YT TAC available for scallop access area program

	2008
SNE/MA YT	493 mt
10% for scallop access program	49.3 mt (108,687.9 pounds)

In order to calculate the compensation that will be used for limited access trips that have not been taken if the YT bycatch TAC is reached, an estimate is made about the number of days in the open areas required to remove the same number of scallops that would have been taken in the closed areas. For example, in Nantucket Lightship, a full trip is 18,000 lbs, and according to the projections for the NCLF20 scenario, the average meat count will be 9.8, implying that 18,000*9.8 = 176,400 scallops will be removed per trip. In the open areas, the average meat count will be about 19 so that 176,400 scallops correspond to 176,400/19 = 9,284 pounds. The LPUE in the open areas in 2010 will be about 1,720, so it will take 9,284/1,720 = 5.4 DAS to land the same number of scallops, resulting in compensation of 5.4 DAS. The proposed action includes an allocation of ? open area DAS for a full-time vessel if the Nantucket Lightship Area closes in 2010 due to the YT TAC being reached.

Table 6 – Open area DAS Compensations for unused GB access area trips

GB Access Area	Open Area Compensation
Nantucket Lightship (2008)	5.4 DAS (for NCLF20)

2.5.1.2 TAC set-asides for observers (1%) and research (2%)

One-percent of the estimated TAC for each access area and open area DAS would be set-aside to help fund observers. In addition, 2% of the estimated TAC for each access area and open area DAS would be set-aside to fund scallop-related research. The percent of TAC and total DAS set aside for observers and research would be removed before allocations are set for limited access and general category fisheries.

In terms of the access areas, see Table 7 for a breakdown of the expected TAC that would be assigned for observers and research the proposed action for access areas.

Table 7 – Summary of research and observer set-asides in access areas for the proposed action (in million pounds)

	2010		
	NL	**ETA**	**Delmarva**
Total TAC			
2% for research			
1% for observers			

This action also continues the set-aside program that deducts one-percent of the allocated DAS to help fund observers on limited access scallop vessels in open areas and two-percent to fund scallop-related research with compensation trips taken in open scallop fishing areas. This allocation would be removed after the general category allocation is removed from open areas.

The total open area DAS allocated to the limited access fishery in 2010 is approximately ??? DAS (?DAS for each of the 340 full-time equivalent vessels). That value is equal to approximately 97% of the "total" TAC available in open areas (after catch has been removed for the general category fishery). The remaining 3% is for observer and research set asides. When those amounts are added in, the total open area DAS is equal to ??? DAS for 2010. Table 8 illustrates the open area DAS that should be removed for the observer and research set-aside programs based on the proposed action.

It should be noted that the average LPUE in open areas for 2010 is estimated to be about ??? pounds per day. That is calculated by taking the total estimated catch by limited access vessels in open areas and dividing that catch by the total number of DAS allocated (about ??? million pounds divided by ??? DAS).

Table 8 – Summary of open area DAS set-asides for research and observers for the proposed action

	2010
"Total" DAS for open areas	
Allocated DAS to the limited access fishery	
DAS set-aside for research (2%)	? (2% of ??)
DAS set-aside for observers (1%)	? (1% of ??)

2.5.1.3 Research priorities for 2010 and recent RSA announcement

Insert summary of process this year – and note that no decision necessary in FW21 on research since the announcement went out already and was not based on actual TAC amounts this year.

2.5.1.4 DAS adjustments if the LAGC IFQ program is not implemented by March 1, 2010

If the LAGC IFQ program is not fully implemented before March 1, 2010 the LAGC fishery is allocated 10% of the total projected scallop catch during the transition period to ITQs, compared to 5%. The FW21 management scenarios include a specific DAS allocation to the LA fishery based on that sector of the fleet being allocated 95% of the projected catch. Regulations require that if the transition period is extended for another year LA DAS must be reduced by an equivalent amount to prevent overfishing. The needed DAS reductions per scenario are described in Table 9.

Table 9 – Summary of DAS reductions if the LAGC IFQ program is delayed and the LAGC fishery is allocated 10% of total projected catch compared to 5%

Alternative	Landings	LPUE	5%ToTOTDAS	DASRed
Cl18	22298	1620	1517	4.5
Cl20	24269	1542	1735	5.1
NC20	18829	1722	1205	3.5
NC24	21445	1696	1394	4.1

2.6 MEASURES FOR GENERAL CATEGORY VESSELS

2.6.1 Measures if IFQ program is delayed

2.6.1.1 Quarterly hard-TAC for transition period to limited entry (FY2008)

Once the final scenario is identified the quarterly hard TACs and allocations will be identified.

Table 10 – Summary of general category catch and access area trips by quarter under the transition period to the IFQ program recommended under Amendment 11

Option A*	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
	35%	40%	15%	10%	100%
Estimated landings by area					
All areas (lb.)					
Access are landings (lb.) % of annual TAC % of QTR landings					
Open area landings (lb.) Open area as % of total					
Access area trips DMV ETA NLS					

Note: Access area allocations are not made by quarter. All trips for that area are allocated at the start of the quarter. If all trips in an area are not caught in one quarter, those trips will be available in following quarters.

2.6.2 Georges Bank access area management

All four scenarios include access into Nantucket Lightship for both the LA and LAGC fleets. The LAGC fleet would be allocated 5% of the total projected catch for that area in the form of fleetwide trips.

2.6.2.1 Yellowtail flounder bycatch TAC

Under current regulations, if the 10% yellowtail flounder bycatch TAC for SNE is reached and the Nantucket Lightship access areas closes, general category vessels are not permitted to fish in the area. Furthermore, since it is a fleetwide allocation, there is no compensation for vessels on an individual basis if the area closes before the total number of general category trips have been taken. The yellowtail flounder bycatch TAC is shared between the two fisheries; therefore, once the TAC is reached the area closes for both fleets. This is currently in the regulations and will not change as a result of this action.

2.6.3 Mid-Atlantic access area management

All four scenarios include access into both Elephant Trunk and Delmarva for both the LA and LAGC fleets. The LAGC fleet would be allocated 5% of the total projected catch for both areas in the form of fleetwide trips.

2.6.4 Northern Gulf of Maine (NGOM) Hard-TAC

The Council approved a separate limited entry program for the NGOM with a hard-TAC. Framework 21 will need to consider a separate hard TAC for this area for 2010. Individuals qualified for a permit if their vessel had a general category permit when the control date was implemented (November 1, 2004). There is no landings qualification for this permit. Vessels would be restricted to fish in this area under a 200 pound possession limit until the overall hard-TAC was reached. Currently there are approximately ??? vessels that qualified for this permit.

Amendment 11 specifies that the Scallop PDT will recommend a hard-TAC for the federal portion of the scallop resource in the NGOM. The amendment recommends that the hard-TAC be determined using historical landings until funding is secured to undertake a NGOM stock assessment. The PDT reviewed landings data from the VTR database and recommends that the **hard-TAC for this area be 70,000 pounds for FY2010**.

While the fishery only landed less than 15% of the NGOM TAC in 2008 and 2009, the PDT still feels this TAC is appropriate until a formal assessment of the area can be completed. A survey of the scallop resource in the NGOM is currently being conducted by RSA funds under the Scallop FMP. That survey was conducted in summer 2009, but results are not available yet. The survey results may be reviewed at the next scallop assessment, and then can be used for management purposes.

2.6.5 Estimate of catch from LA incidental catch permits

Amendment 11 includes a provision that the Scallop FMP should consider the level of mortality from incidental catch and remove that from the projected total catch before allocations are made. The amendment requires the PDT to develop an estimate of mortality from incidental catch and remove that from the total. This section includes a summary of the PDT estimate and the value that was removed from the total projected catch before allocations to the limited access and general category fisheries were made.

In Frameowrk 19 the PDT reviewed incidental landings from previous years (<40 pounds per trip) to estimate what level of projected catch should be removed in future years. According to the dealer database, approximately 10,000 to 27,000 pounds of scallops have been landed on trips with less than 40 pounds. According to the VTR database, closer to 30,000 pounds have been caught in previous years in increments less than 40 pounds. The PDT discussed that it is more appropriate to use the VTR data as a starting point for this estimate since incidental catch is not always sold to a dealer (i.e., it is consumed for personal use). The PDT also recommended that the average landings from the VTR database should be increased to some degree to account for an expected increase in scallop landings by incidental catch permits. Since some vessels are not going to qualify for a limited entry general category IFQ permit under Amendment 11, landing scallops under incidental catch may be the only other alternative for some vessels (assuming the vessels had a general category permit before the control date). **Therefore, the PDT recommends taking VTR landings analyzed in FW19 as a starting point for an estimate of mortality from incidental catch and increasing that to 50,000 pounds to account for an expected increase due to measures implemented by Amendment 11. This amount will be removed from the total projected catch before allocations to the LA and LAGC fisheries.**

2.6.6 Allow leasing of partial general category IFQ allocations during the fishing year

The Scallop Committee passed a motion at the November 3, 2009 Committee meeting that the Council consider the motion below.

Motion 5. Preble/Cunningham
Add an alternative in FW21 that would allow leasing of partial allocations (in amounts equal to or greater than 100 pounds) throughout the fishing year with existing applications and protocols. It is understood that the intention is not to slow down the implementation of FW21.
Vote: 7:0:1, motion carries.

Rationale/Discussion: A member of the audience explained that this FW already includes several measures to adjust the IFQ program to make it more workable, and this request is in line with that (*A15 is actually the action that includes several measures to address IFQ issues*). He explained that this was discussed at the last AP meeting and it was supported. The Committee agreed that increased flexibility in lease amounts would be helpful for the IFQ program. Before this can be added in FW21 NMFS must look into why the current increments exist and what it would take to change them, may need an amendment depending on the reason the restriction was put in place in A11.

2.7 CONSIDERATION OF NEW ROTATIONAL AREA IN THE GREAT SOUTH CHANNEL

Amendment 10 defines the criteria for closing an area to protect young scallops. Under adaptive area rotation, an area would close when the expected increase in exploitable biomass in the absence of fishing mortality exceeds 30% per year and re-open to fishing when the annual increase in the absence of fishing mortality is less than 15% per year. Identification of areas would be based on a combination of the NEFSC dredge survey and available industry-based surveys. The boundaries are to be based on the distribution and abundance of scallops at size; ten-minute squares are the basis for evaluating continuous blocks that may be closed. The guidelines are intended to keep the size of the areas large enough and regular in shape to be effective, while allow a degree of flexibility. The Council and NMFS are not bound to closing an area that meets the criteria and the Council and NMFS may deviate from the guidelines to achieve optimum yield.

If any areas qualify, the area would close to all scallop vessels and vessels would not be permitted in that area until a later date when biomass estimates project higher yields. The Council is not required to implement these rotational closed areas just because they meet the criteria recommended in Amendment 10 for new closures, but they should be considered.

Preliminary results from the 2009 survey suggest that small scallops have settled in parts of the Great South Channel. The PDT recommended consideration of an area to the north of the Nantucket Lightship closed area and west of Closed Area I; the top left coordinate of the polygon is 41 20’ N and 69 30’ W and the bottom left coordinate is 40 50’N and 68 50’W (Figure 3). Recruitment on GB has been below average since 2001 and has only improved in the last few years. High numbers of small scallops (<70 mm) were caught on 2007, 2008 and 2009 survey tows in this area.

2.7.1.1 No Action

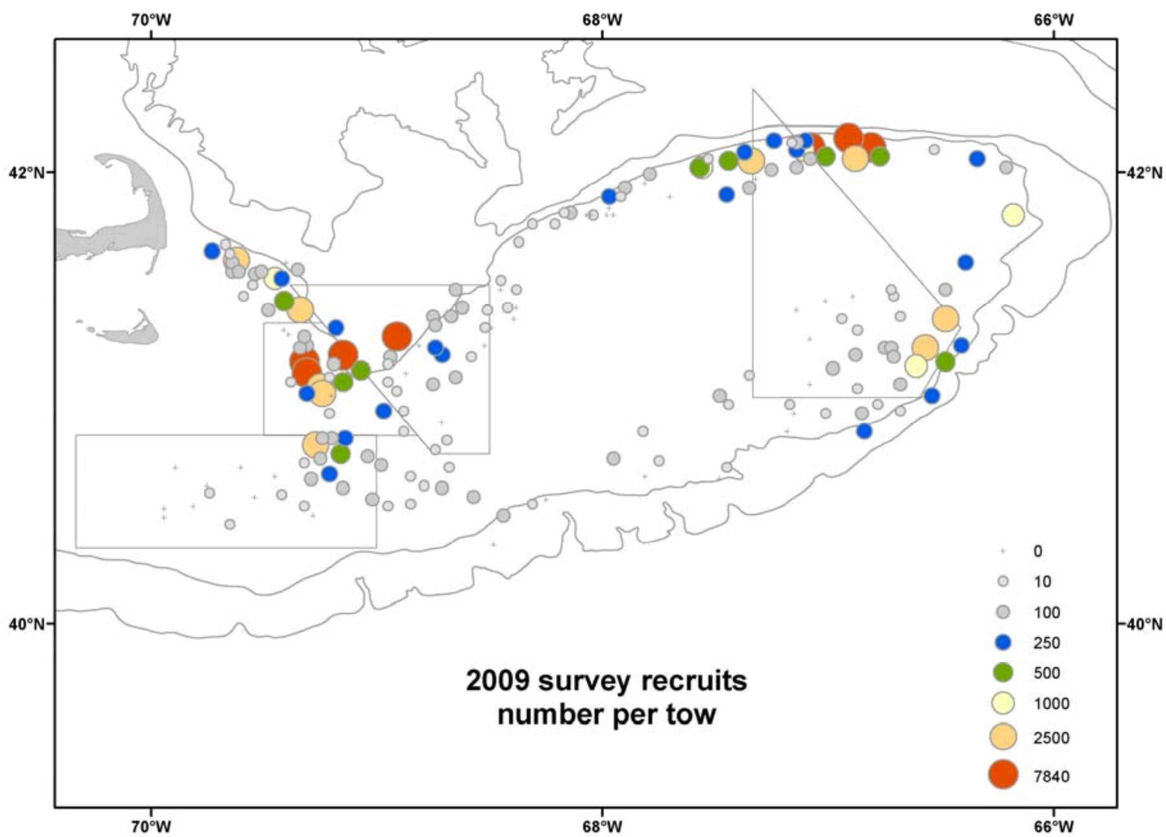
No new rotational area would close in this action in the Great South Channel vicinity.

2.7.1.2 New rotational area in the Channel north of Nantucket Lightship and west of Closed Area I

An area to the north of the Nantucket Lightship closed area and west of Closed Area I would close to scallop fishing for at least FY2008 and 2009; the top left coordinate of the polygon is 41 20' N and 69 30' W and the bottom left coordinate is 40 50'N and 68 50'W (Figure 3).

AP DOES NOT SUPPORT THIS ALTERNATIVE

Figure 3 – Scallop recruitment on Georges Bank from the 2009 federal survey (scallops less than 70mm) with potential boundaries for a scallop rotational area within the Great South Channel



2.8 COMPLIANCE WITH REASONABLE AND PRUDENT MEASURE IN RECENT BIOLOGICAL OPINION

On March 14, 2008, NMFS completed an ESA Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan.[1] Under the ESA, each Federal agency is required to ensure its actions are not likely to jeopardize the continued existence of any listed species or critical habitat. If a Federal action is likely to adversely affect a listed species, formal consultation is necessary. Five formal Section 7 consultations, with resulting biological opinions, have been completed on the Atlantic sea scallop fishery to date. All five have had the same conclusion: the continued authorization of the scallop fishery may adversely affect, but is not likely to jeopardize the continued existence of four sea turtles (loggerheads, green, Kemp's ridley, and leatherback). In the accompanying Incidental Take Statement, NMFS is required to identify and implement non-discretionary reasonable and prudent measures (RPMs) necessary or appropriate to minimize the impacts of any incidental take, as well as Terms and Conditions (T/C) for implementing each RPM. RPMs and T/C cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes. Five RPMs and T/Cs were identified in the March 2008 biological opinion. One RPM requires a limit of effort in the Mid-Atlantic during times when sea turtle distribution is expected to overlap with fishing activity; the other four are related to ongoing research needs and identification of measures to reduce interactions and/or the severity of such interactions.

NMFS Northeast Regional Administrator sent the Council a letter on April 9, 2008 requesting that the Council take the opportunity to develop the measures to meet RPM#1 through FW21 taking into consideration the impacts of possible effort shifts of the fishery and other potential impacts. The Council reviewed the biological opinion and RPM and found some issues with how the agency developed the first RPM and T/C, namely the reasonableness of the measures and the justification for selecting certain percentages in the T/C. On August 1, 2008, the agency submitted a second letter to the Council to clarify these issues and in that letter requested that the "Council should conduct an analysis to: (a) Determine whether the RPM and Term and Condition provided in the March 14, 2008, Opinion is reasonable and prudent in light of the regulatory and statutory guidance provided, and if not, then (b) identify what revisions are necessary to make it reasonable and prudent or identify why there is no acceptable revision that would make it meet the standard." On November 26, 2008, the Council developed a response to the agency with such analyses and found that the first RPM and T/C were not reasonable and prudent as they would cause more than a minor change to the scallop fishery. As such, the Council recommended revisions to the first RPM and T/C.

Based on the Council's response, the agency did revise the language of the first RPM and term and condition and replaced them with the text below:

Reasonable and Prudent Measures

NMFS has determined that the following reasonable and prudent measures are necessary or appropriate to minimize impacts of incidental take of sea turtles:

- *NMFS must limit the amount of allocated scallop fishing effort by "Limited access scallop vessels" as such vessels are defined in the regulations (50 CFR 648.2), that can*

[1] The full biological opinion can be found at http://www.nero.noaa.gov/prot_res/section7/.

be used in the area and during the time of year when sea turtle distribution overlaps with scallop fishing activity (amended February 5, 2009).

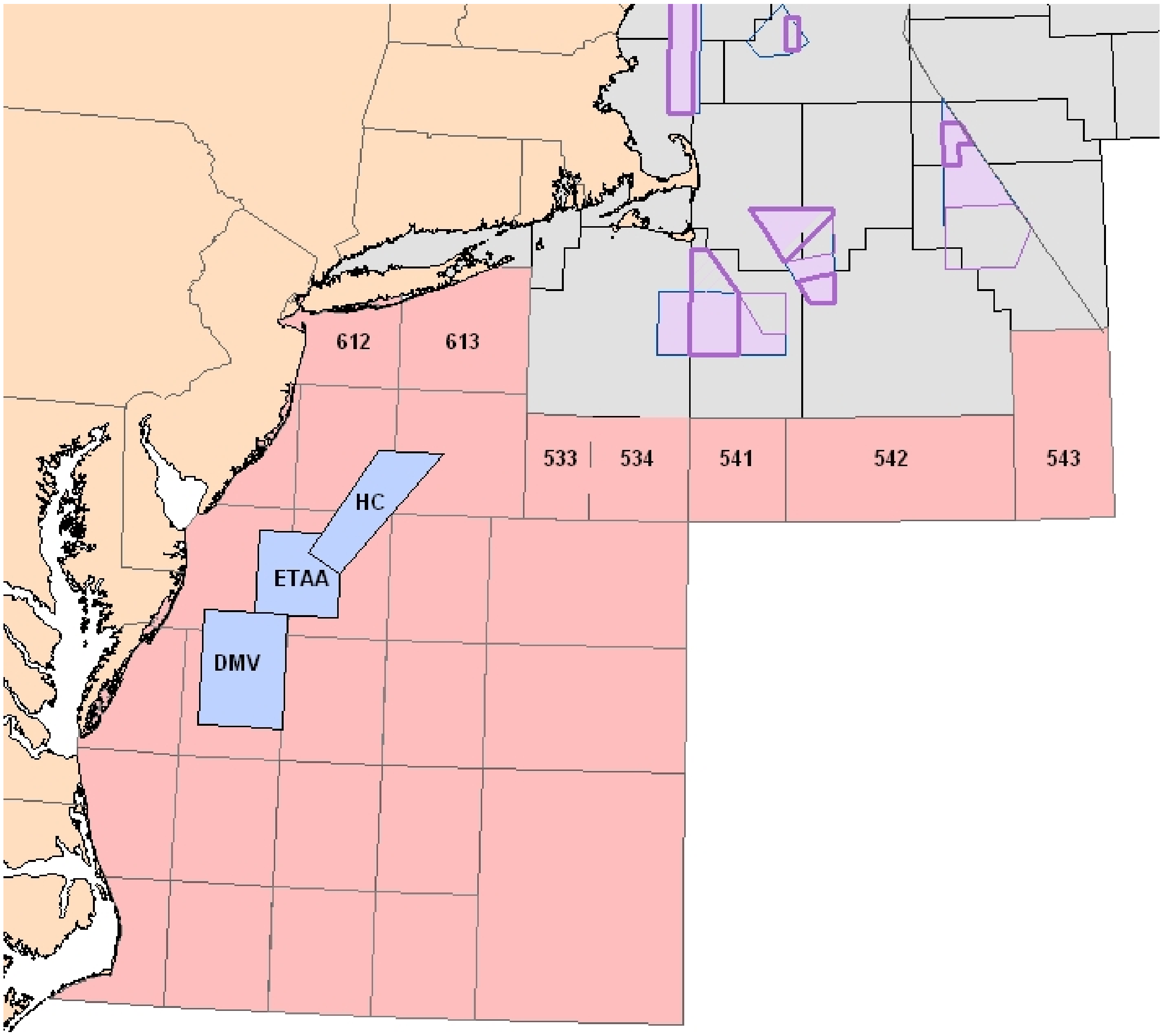
Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, and regulations issued pursuant to section 4(d), NMFS must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To comply with 1 above, no later than the 2010 scallop fishing year, NMFS must limit the amount of allocated limited access scallop fishing effort that can be used in waters south of the northern boundaries of statistical areas 612, 613, 533, 534, 541-543 during the periods in which turtle takes have occurred. Restrictions on fishing effort described above shall be limited to a level that will not result in more than a minor impact on the fishery. (amended February 5, 2009)

The alternatives in this section have been developed to comply with the RPM and T/C above. The figure below depicts the area that is referenced in the first Term and Condition. It is referenced as the “Mid-Atlantic” within this document.

Figure 4 – Area defined as the "Mid-Atlantic" in the 2008 biological opinion
Waters south of the northern boundaries of statistical areas 612, 613, 533, 534, 541, 542, and 543.



2.8.1 Alternatives to comply with RPM

2.8.1.1 Restrict the number of open area DAS an individual vessel can use in the Mid-Atlantic during a certain window of time

This alternative would set a maximum on the number of allocated open area DAS each limited access vessel can use in the area defined as the Mid-Atlantic during the time periods under consideration (June 16-October 14 or June 15-October 31). The maximum number of DAS that can be used will be identified as the maximum number of DAS before any less DAS would have "more than a minor impact" on the fishery as defined by the PDT analyses in Section 2.8.2. Measures to comply with a reasonable and prudent measure cannot have more than a minor impact on the fishery. This particular measure is expected to have differential impacts on vessels from the north and the south because in general, most open area DAS are used in areas closer to a vessel's homeport. So this restriction will likely have the potential to have more impacts on vessels in the south that tend to use most of their DAS in southern areas. The actual values will be included in this document before final decisions are made.

- *Option A for Area: in the entire area defined by the RPM*
  The restriction on DAS used would apply to all statistical areas south of the northern boundaries of statistical areas 612, 613, 533, 534, 541, 542, and 543 (Figure 4).

- *Option B for Area: in a subset of the area where turtle interactions are more likely to occur based on sea surface temperature data*
  The PDT is analyzing sea surface temperature data to determine if the area defined by the RPM can be refined at all to maximize benefits for turtles and minimize impacts on the fishery. For example, the PDT is considering an option that would refine the line for the month of June by two criteria: 1) waters where mean sea surface temperature is greater than 17.9°C, the minimum temperature loggerhead turtles have been observed, and 2) waters that do not overlap any observed takes in the fishery. So far it looks like this approach could allow fishing in the statistical areas that are just south of the boundary for the month of June, but would revert back to the original RPM line in July-October.

- *Option A for time window: June 16-October 14*
  This time period is consistent with the full range of dates for all observed turtle takes in the scallop fishery. From 2003-2008 a total of 59 turtles have been observed between these dates for both gear types on both on and off watches.

- *Option B for time window: June 15 – October 31*
  This time period is slightly longer than Option A to recognize that turtle migration patterns change over time and space and turtles may be in this area earlier and later than have been observed to date. It has also been noted that one turtle was observed on a research trip in late October 2002 in waters west of the Elephant Trunk Area.

2.8.1.2 Restrict the number of access area trips in the Mid-Atlantic that can be used during a certain window of time

This alternative would restrict the number of allocated access area trips that can be taken in the Mid-Atlantic during the two time periods under consideration. In 2010, each limited access scallop vessel is expected to be allocated three trips in access areas within the Mid-Atlantic. This alternative would restrict when those trips can be taken in terms of placing a maximum on the number that can be taken during either June 16-October 14, or June 15 – October 31. The maximum number of trips that can be taken in this window of time will be identified as the maximum number of trips before any fewer trips would have "more than a minor impact" on the fishery as defined by the PDT analyses in Section 2.8.2. Measures to comply with a reasonable and prudent measure cannot have more than a minor impact on the fishery. Most likely this alternative will consider the impact of restricting the fishery to 2 trips, 1 trip and zero trips during these time period. Based on the results of the more than minor analyses, the final alternative will be identified. This restriction would not change any seasonal closures already in place for Elephant Trunk, or under consideration for Delmarva.

- *Option A for time window: June 16-October 14*

This time period is consistent with the full range of dates for all observed turtle takes in the scallop fishery. From 2003-2008 a total of 59 turtles have been observed between these dates for both gear types on both on and off watches.

- *Option B for time window: June 15 – October 31*
  This time period is slightly longer than Option A to recognize that turtle migration patterns change over time and space and turtles may be in this area earlier and later than have been observed to date. It has also been noted that one turtle was observed on a research trip in late October 2002 in waters west of the Elephant Trunk Area.

2.8.1.3 Consider a seasonal closure for Delmarva ***(CMTE PREFERRED)***

This alternative would consider a seasonal closure of the entire access area to both general category and limited access scallop vessels. While the RPM only specifies that these measures need to limit effort for the limited access fishery, the PDT recommends this restriction for both fleets to be consistent with the seasonal closure in Elephant Trunk and to further minimize impacts on turtles. Which season is selected and how much this alternative is expected to affect the fishery will need to be evaluated. Measures to comply with a reasonable and prudent measure cannot have more than a minor impact on the fishery.

- *Option A: September 1 – October 31* ***(CMTE PREFERRED)***

- *Option B: October 1 – October 31*

2.8.1.4 Reduce possession limits in ETA and/or Delmarva to reduce fishing time per trip

In most cases a fulltime limited access vessel is allocated a maximum of 18,000 pounds per access area trip. The length of time it takes a vessel to catch that allowance varies, but in high density areas gear is fishing on the bottom a fraction of the time compared to open areas. If the possession limit is reduced, gear will be on the bottom that much less. For example, a 16,000 pound trip is 11% less than an 18,000 pound trip, so it is conceivable that gear will be fishing 11% less on that trip. That is a form of limiting the amount of effort that can be used in access areas in the Mid-Atlantic. The actual possession limits and how many trips should be reduced for this measure will depend on the results of the more than minor analyses (Section 2.8.2). Measures to comply with a reasonable and prudent measure cannot have more than a minor impact on the fishery.

2.8.2 More than minor impact on the fishery

In the Council response to the biological opinion last year, the PDT decided to base “more than minor” change on the percent change in effort shift caused by a specific limitation on effort, and the resulting impact that shift would have on overall fishing mortality imposed by the RPM and Term and Condition. A model was developed last year that estimated changes in F, efforts shifts and impacts on revenue when limitations are placed on the scallop fishery by season and/or area. The PDT recommends that this same approach be used for Framework 21 in terms of assessing which measures meet the requirements of an RPM in terms of whether they have more than a minor impact on the fishery. After final projections are available for 2010 the PDT will estimate effort shifts from these various alternatives and identify which ones qualify under RPM and what the expected impacts are from each. These analyses are described in Section 5.3.1.

2.9 IMPROVEMENTS TO THE OBSERVER SET-ASIDE PROGRAM

Over the last few years several concerns have been raised about the industry funded observer program. Primarily due to timing the Council has not been able to address most of these issues. The PDT identified a few adjustments that could be considered with limited work and analyses.

2.9.1 Provisions to discourage vessel owners from not paying deployed observers

2.9.1.1 No Action

There are currently two regulatory provisions to address the issue of observer non-payment. First, there is a provision that allows the observer service provider to refuse to deploy an observer due to non-payment (50 CFR 648.11(h)(4)(vii)(C)). The provider must notify NMFS of the issue and receive written confirmation authorizing such refusal. Written notification via email is provided to all providers, including those to whom the debt is not owed. If such a vessel calls into the Observer Program and is required to carry an observer in a future trip, providers may refuse to cover the trip. As a result, without a waiver or an observer, that vessel would be unable to fish until providers stop refusing observer deployment. The language of this provision also supports refusing observer coverage for any vessel owned by a corporation owning multiple vessels that owes a debt for one of its vessels.

In addition, there is also a prohibition against failure to comply with observer services payment requirements ((§ 648.14(i)(1)(ix)(C)). This prohibition supports the MSA permit sanction provision which states that permits may be sanctioned through an enforcement action due to outstanding observer fees. The Northeast Region's enforcement attorneys are currently discussing the protocol for how to handle delinquent observer payments and will work out the details with the enforcement agents and with the Observer Program.

2.9.1.2 Include observer payment provision as part of annual permit renewal process

Although there is a permit sanction process for observer non-payment that can be utilized by providers, this process would not allow for quick resolution of outstanding fees and permit sanctions are not automatic. In addition to the current policies for observer non-payment, this alternative would add observer payment to the list of annual requirements that must be met before a scallop permit can be renewed, similar to submitting vessel trip reports before permit issuance. Prior to the start of the permit year, providers would notify NMFS regarding delinquent bills and NMFS would not reissue a scallop permit until the debt dispute had been resolved.

AP DOES NOT SUPPORT THIS ALTERNATIVE

2.9.2 Limit the amount of observer compensation general category vessels can get per observed trip in access areas

In recent years there has been an increase in the amount of pounds general category vessels are compensated for observed trips in access areas. The Council was informed that a growing number of vessels seem to be taking advantage of a “loophole” for how compensation if granted. Some vessels seem to leave right before midnight on day 1 and return at some point on day 2 with 400 pounds for the trip plus 400 pounds for each calendar day carrying an observer (total of 1200 pounds). This alternative could create a ceiling to discourage overages in one of two ways:

a. Set the observer compensation for general category vessels at 400 pounds per trip, regardless of the compensation rate for access area trips allocated to the DAS scallop fleet. This would allow for a general category vessel on an observed access area trip to land up to 800 pounds per trip (400 pounds of which would be taken off the observer set-aside TAC for that area), regardless of the length of the trip..
b. Set the observer compensation rate annually, as with the DAS scallop fleet, and allow general category vessels observer compensation equivalent to one day, regardless of trip length. For example, the rate is set at 350 pounds per day for DAS scallop vessels and for general category vessels, observed trips will result in 350 pounds per trip.

3.0 CONSIDERED AND REJECTED ALTERNATIVES

4.0 DESCRIPTION OF AFFECTED ENVIRONMENT – SAFE REPORT

The environment affected by the sea scallop fishery as a whole is described in Section 4 of Amendment 11 to the Sea Scallop FMP (NEFMC, 2007). That description is incorporated herein by reference. This section serves as the 2009 SAFE Report, which updates the data and analysis of the fishery through the 2009 fishing year, including an updated assessment of the scallop resource and new analyses of limited access and general category scallop effort distribution.

4.1 THE ATLANTIC SEA SCALLOP RESOURCE

The Atlantic sea scallop, *Placopecten magellanicus* (Gmelin), is a bivalve mollusk ranging from North Carolina to the Gulf of St. Lawrence (Hart and Chute, 2004). Although all sea scallops in the US EEZ are managed as a single stock per Amendment 10, 4 regional components and 6 resource areas are recognized. Major aggregations occur in the Mid-Atlantic from Virginia to Long Island (Mid-Atlantic component), Georges Bank, the Great South Channel (South Channel component), and the Gulf of Maine (Hart and Rago, 2006; NEFSC, 2007). These 4 regional components are further divided into 6 resource areas: Delmarva (Mid-Atlantic), New York Bight (Mid-Atlantic), South Channel, southeast part of Georges Bank, northeast peak and northern part of Georges Bank, and the Gulf of Maine (NEFMC, 2007). Assessments focus on two main parts of the stock and fishery that contain the largest concentrations of sea scallops: Georges Bank and the Mid-Atlantic, which are combined to evaluate the status of the whole stock (NEFMC, 2007).

Sea scallops are generally found in waters less than 20^{o}C and depths that range from 30-110m on Georges Bank, 20-80m in the Mid-Atlantic, and less than 40m in the near-shore waters of the Gulf of Maine. They feed by filtering zoo- and phytoplankton and detritus particles. Sea scallops have separate sexes, reach sexual maturity at age 2, and use external fertilization. Scallops greater than 40mm are considered mature individuals. Spawning generally occurs in late summer and early autumn, although there is evidence of spring spawning as well in the Mid-Atlantic Bight (DuPaul et al., 1989) and limited winter-early spring spawning on Georges Bank (Almeida et al., 1994; Dibacco et al., 1995). Annual fecundity increases rapidly with shell height; individuals younger than 4 years may contribute little to total egg production (MacDonald and Thompson, 1985; NEFMC, 1993; NEFSC, 2007). The pelagic larval stage lasts 4-7 weeks with settlement usually on firm sand, gravel, shells, etc. (Hart and Chute, 2004; NEFMC, 2007; NEFSC, 2007). Recruitment to the NEFSC survey occurs at 40mm shell height (SH) and to the commercial fishery at 90-105mm SH, which corresponds to an age of 4-5 years old (NEFSC, 2007; NEFMC, 2007).

Meat weight can quadruple between the ages of 3 to 5 (NEFSC, 2004; NEFMC, 2007). Meat weight is dependent on shell size, which increases with age, and depth. Meat weight decreases with depth, possibly due to a reduced food supply (NEFSC, 2007). Both the Mid-Atlantic and Georges Bank showed a drop in meat weights between August and October, coinciding with the September-October spawning period (Haynes, 1966; Serchuk and Smolowitz, 1989; NEFSC, 2007). Meat weight of landed scallops may differ from those predicted based on research survey data because: 1) the shell height/meat weight relationship varies seasonally in part because of the reproductive cycle, causing meats collected during the NEFSC survey to differ from the rest of the year; 2) commercial fishers concentrate on speed while shucking, leaving some meat on the shell (Naidu, 1987; Kirkley and DuPaul, 1989); and 3) fishers may target areas with relatively large meat weight at shell height, thus increasing commercial weights compared to those seen on the research survey vessel (NEFSC, 2007).

4.1.1 Assessment

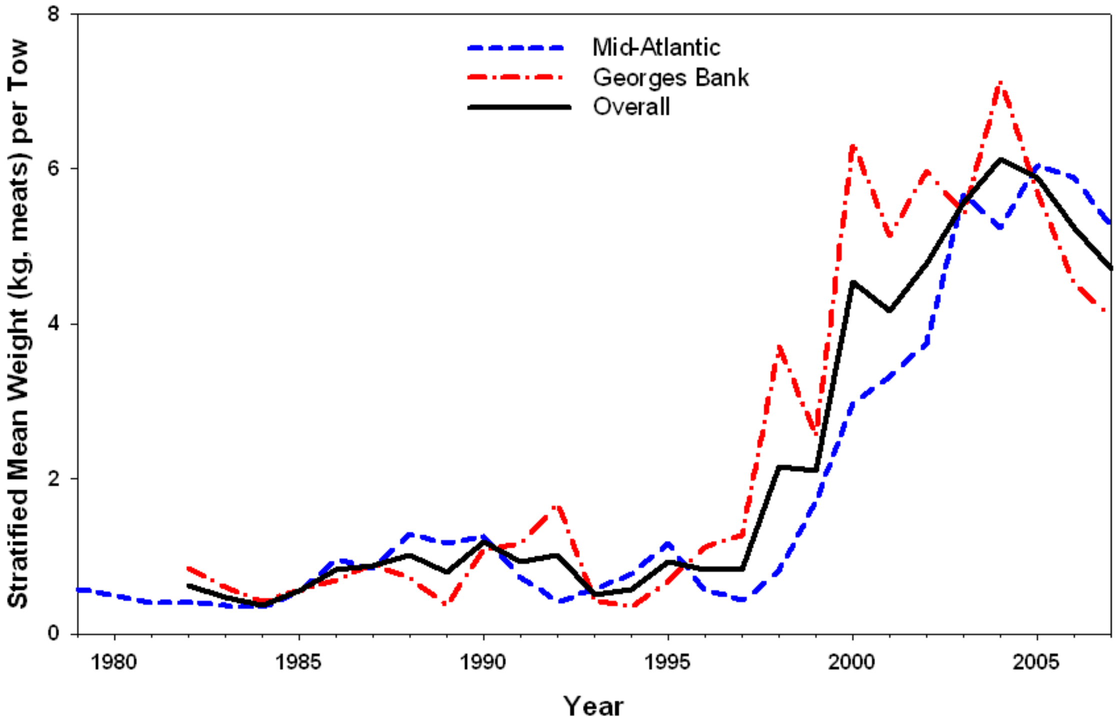
The primary source of data used in the biological component of the scallop assessment currently comes from the federal scallop survey. The scallop dredge survey has been conducted in a consistent manner since 1979. An 8-foot modified scallop dredge is used with 2” rings and a 1.5” liner. Tows are 15 minutes in length at a speed of 3.8 knots, and stations are identified using a random-stratified design. About 500 stations are completed each year on Georges Bank and the Mid-Atlantic. The vessel platform used in the past (R/V Albatross IV) went out of service in 2008. The 2008 and 2009 resource surveys were conducted on the R/V Hugh Sharp owned by the University of Delaware. The 2009 surveys were conducted six weeks earlier than previous surveys in hopes that the data would be available in time for 2010 management actions. Calibration tows have been conducted with the WHOI HabCam, in order to use this video survey in future projections. A Scallop Survey Advisory Panel (SSAP) is reviewing the scallop survey and making recommendations about how future surveys should be conducted.

Other primary components of the assessment include defining parameters for scallop growth, maturity and fecundity, shell height/meat weight relationships, recruitment, and estimates of natural mortality, which are all combined with fishery data (landing and discards) to estimate fishing mortality rates and biological reference points. The per-recruit reference points F_{max} and B_{max} are used by managers as proxies for F_{msy} and B_{msy} because the stock-recruitment relationship is not well defined. The Catch-At-Size-Analysis (CASA) model utilizes additional information including commercial catch, LPUE, commercial shell height compositions, data from the NMFS sea scallop and winter trawl surveys, data from the University of Massachusetts Dartmouth School of Marine Science and Technology (SMAST) small camera video surveys, data from dredge surveys conducted by VIMS, growth increment data from scallop shells, and shell height/meat weight data adjusted to take commercial practices and seasonality into account (NEFSC, 2007).

Based on the results of the last stock assessment workshop, biological reference points have been set for the entire US sea scallop stock. The threshold fishing mortality rate for fully-recruited scallops that generates the maximum yield-per-recruit, F_{max}, was estimated at 0.37. The biomass target is 108.6 thousand metric tons meats and the recommended biomass threshold is half the biomass target, or 54.3 thousand metric tons meats.

In general, scallop biomass has increased dramatically in recent years. Figure 5 shows this increase in terms of estimated Mid-Atlantic, Georges Bank and total scallop biomass based on the scallop survey through 2007. These values are unadjusted; therefore cannot be directly compared to biomass thresholds, but the general increasing trend in biomass in both areas is evident.

Figure 5 - Trend in R/V Albatross stratified mean weight per tow from mid 1980s through 2006 by region.



4.1.2 Stock Status

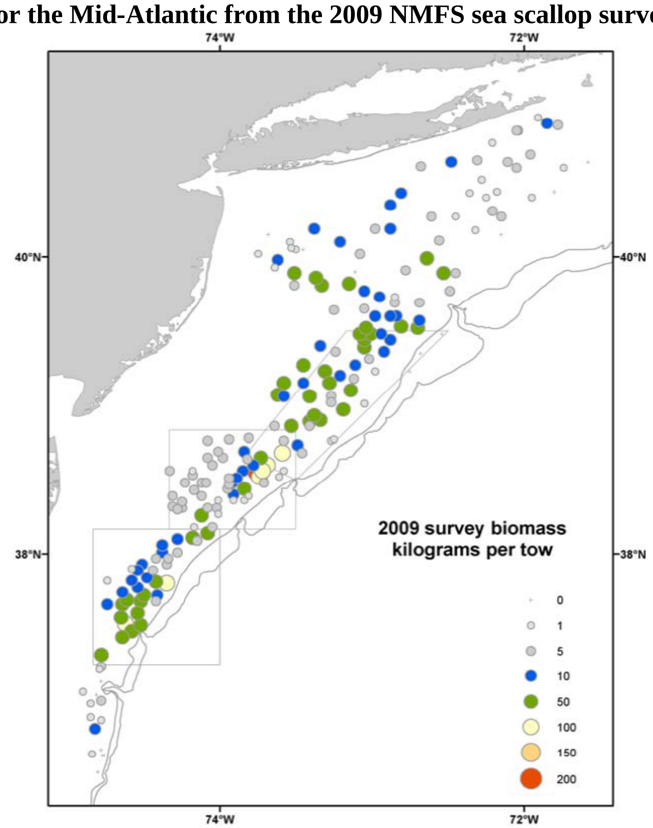
Preliminary results from the CASA model in 2009 estimate an overall fishing mortality of 0.30. Stock status has been fluctuating in recent years. Overall biomass increased almost without interruption since 1997, peaking at 8.2 kg/tow in 2004. Fishing mortality was above the original threshold of 0.24 and target of 0.20 for both 2003 and 2004 with both years at or above 0.30. For 2005, 2006, and 2007, fishing mortality was reduced to 0.22, 0.20, and 0.20 respectively, staying below the threshold value. In 2008 fishing mortality went back up to 0.28, and remained high again in 2009 at 0.30. Thus, it may be found that overfishing is occurring once the updated assessment is completed in 2010. It is therefore likely that a reduction in *F* of approximately 20% will be needed in 2010.

4.1.2.1 Biomass

Despite a decline in biomass in the past few years, the overall trend shows a considerable increase since 1994, especially in the Georges Bank closed areas (NEFSC, 2007). Scallop biomass on Georges Bank has increased by a factor of 18 and in the Mid-Atlantic Bight by a factor of 8 (Hart and Rago, 2006), which is likely due to very strong recruitment in the Mid-Atlantic and improved management in both the Mid-Atlantic and Georges Bank (NEFMC, 2007). The resource remains in relatively good condition even though mortality was above target for 2003-2004 and 2008-2009 with a greater share of the landings coming from older and larger scallops. Whole-stock estimates indicate that annual abundance, annual egg production, and biomass were relatively high during 2009, with recruitment relatively low.

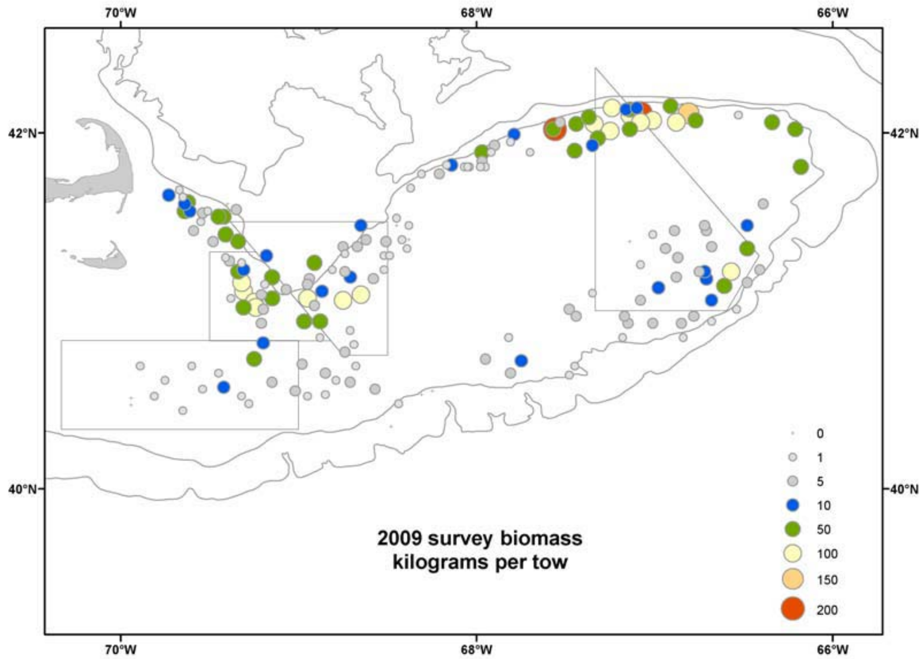
Biomass increased rapidly in the Mid-Atlantic Bight from 1998-2003 due to area closures, reduced fishing mortality, changes in fishery selectivity, and strong recruitment. Biomass in the Hudson Canyon area increased while it was closed from 1998-2001; likewise, biomass increased steadily in the ETA after its closure in 2004. Two very strong year classes were protected by the ETA closure, which contained over one-quarter of the total scallop biomass in 2007. Heavy fishing effort in the area since has decreased biomass. Figure 2 shows the biomass in the Mid Atlantic based on the 2009 NMFS scallop survey. Biomass is distributed fairly evenly throughout the three area closures (Hudson Canyon, Elephant Trunk, Delmarva), with the largest tows confined to ETA and Delmarva.

Figure 6. Biomass chart for the Mid-Atlantic from the 2009 NMFS sea scallop survey



The scallop abundance and biomass on Georges Bank increased from 1995-2000 after implementation of closures and effort reduction measures. Biomass and abundance then declined from 2006-2008 because of poor recruitment and the reopening of portions of groundfish closed areas. The 2009 survey estimates an increase in biomass on Georges Bank. The highest concentrations of biomass on Georges Bank are currently on the Northern Edge, within Closed Area I, and within the Nantucket Lightship closed area (Figure 3) (NEFMC, 2007). A large portion of the biomass is in the South Channel area proposed for closure in Framework 21.

Figure 7. Biomass chart for Georges Bank from the 2009 NMFS sea scallop survey



The sea scallop resource has experienced a change in distribution in recent years. Figure 8 displays scallop biomass in a pie chart by area based on 2007 (left) and 2009 (right) survey data. The ETA (shown in royal blue) contained 32% of the overall biomass in 2007, and now contains 15%. Overall biomass is less concentrated than in past years, with increases elsewhere in the Mid Atlantic and in open areas in both regions. Figure 5 illustrates the reduction in ET biomass from 2006-2009. The largest tows of scallops all but disappeared in 2009, and there has been a big reduction in the medium-sized tows as well. This is not surprising since effort levels have been high in this area for several years. However, biomass is lower in ET than previous projections estimated, even with high fishing pressure.

Figure 8. Distribution of scallop biomass by area in 2007 (left) and 2009 (right).

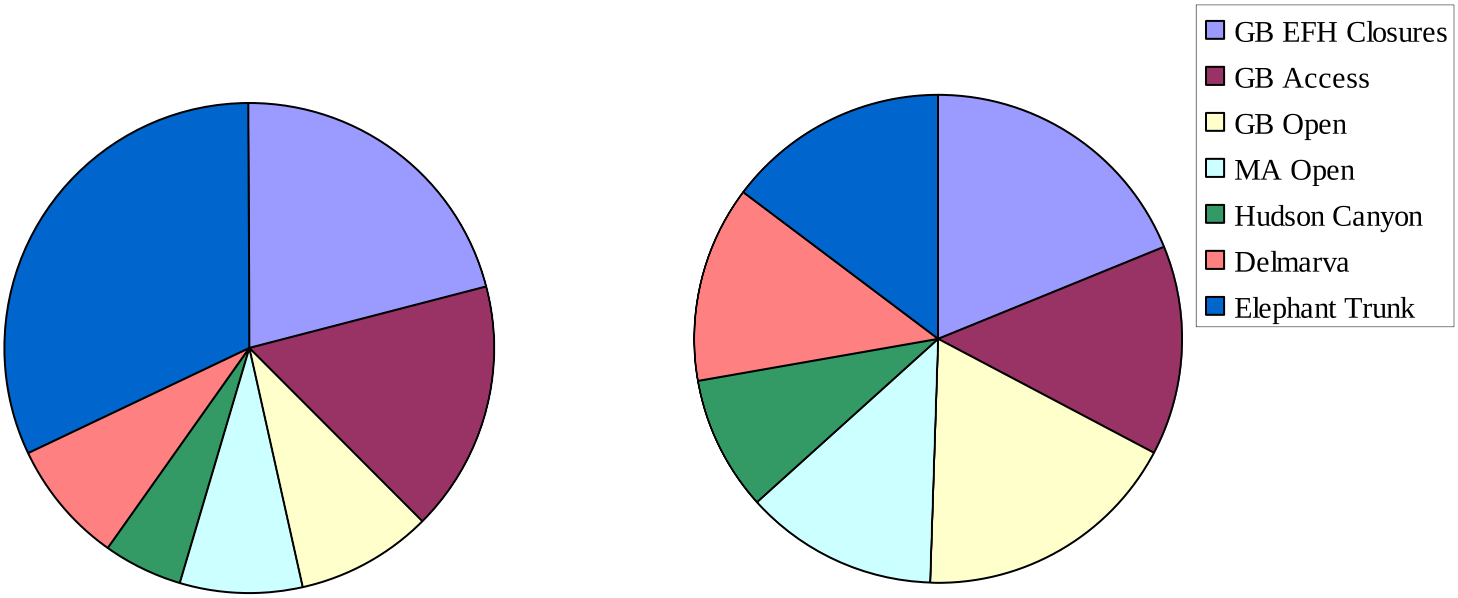
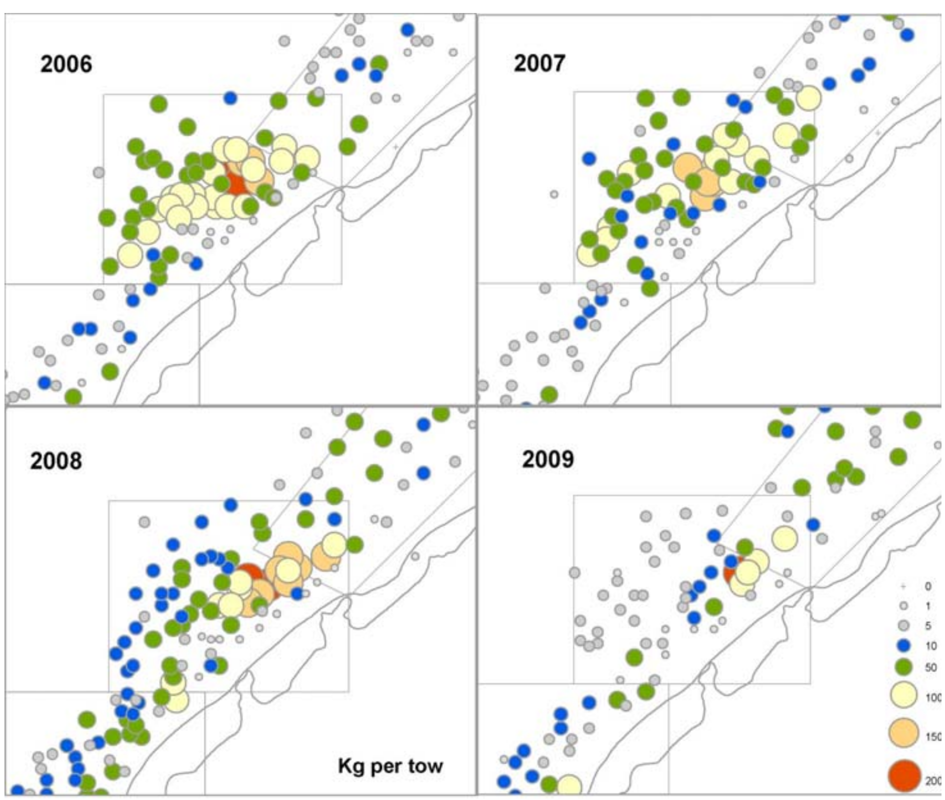


Figure 5. Reduction of ET Biomass from 2006-2009 surveys.



4.1.2.2 Recruitment

Strong recruitment was observed on Georges Bank in 2009, especially in the South Channel, on the Northern Edge, and in the Southeast part of CA II (Figure 6). Several very large tows of recruits were observed in the South Channel area proposed for closure in Framework 21.

Poor recruitment was observed in the Mid-Atlantic, except for some promising tows in the southern portion of the Delmarva area (Figure 7). Looking at trends for both portions of the scallop stock (Figure 8), there is a strong recruitment pattern in place currently for Georges Bank, with three high years in a row. The drop-off in the Mid-Atlantic is somewhat drastic, but not inconsistent with the variable pattern shown by the stock of several strong years followed by a drop-off and recovery.

Figure 6. Recruitment on Georges Bank from 2007 NMFS sea scallop survey

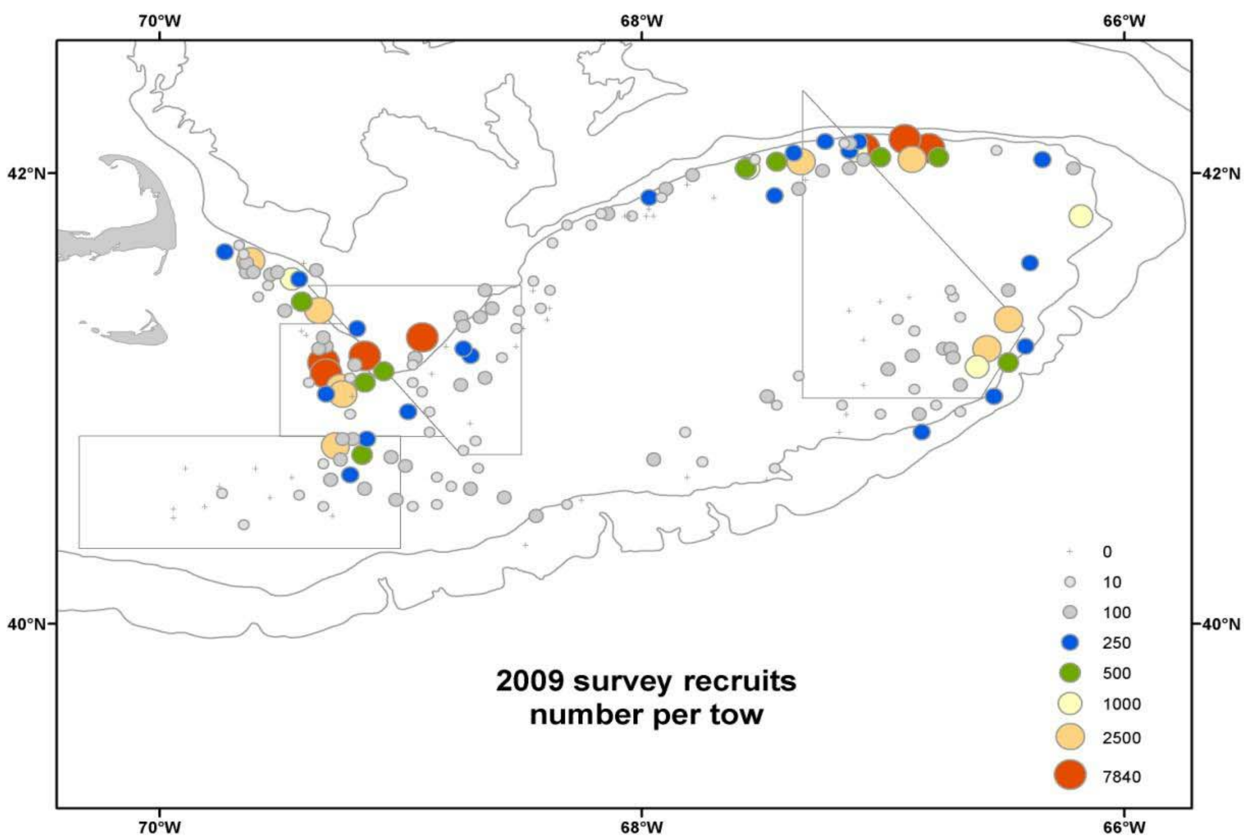


Figure 7. Recruitment in the Mid-Atlantic from the 2007 NMFS sea scallop survey

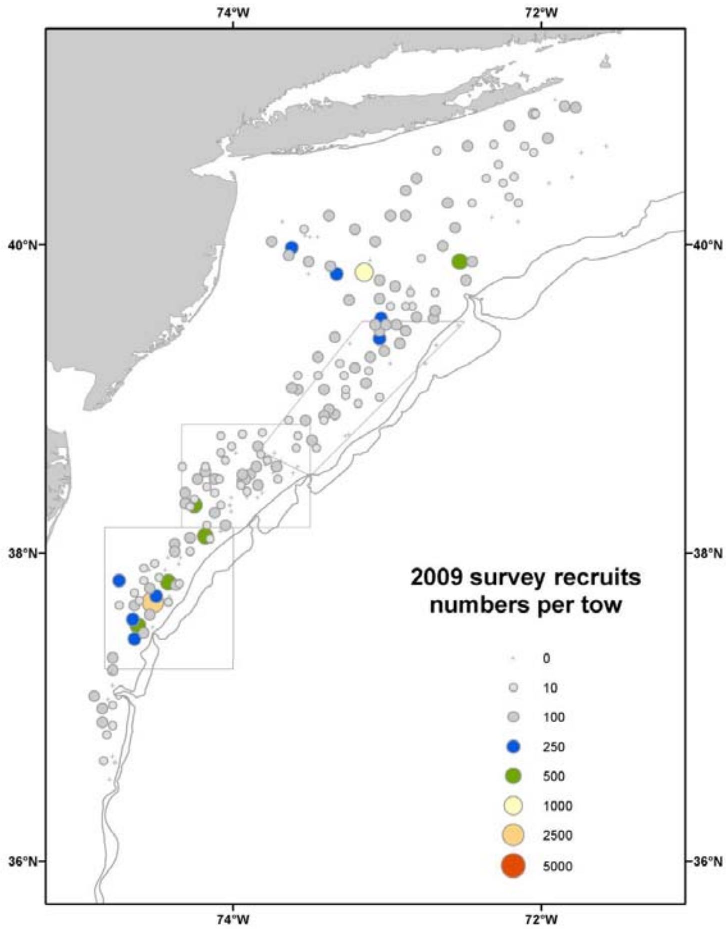
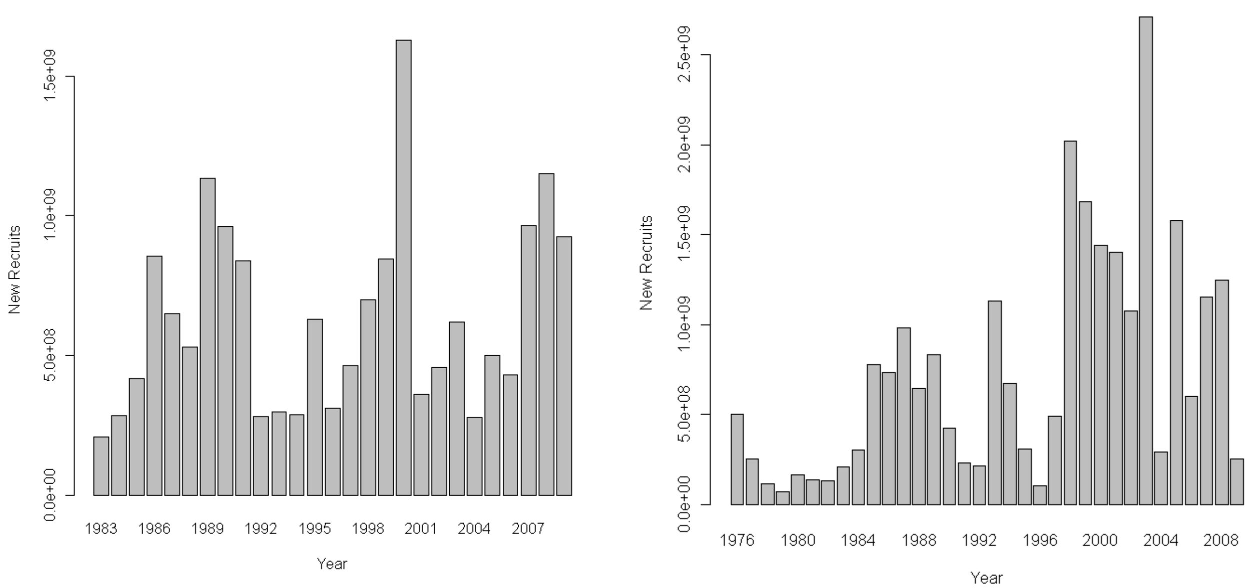


Figure 8. Recruitment patterns on Georges Bank (left) and the Mid-Atlantic (right).



4.1.2.3 Fishing mortality

Four types of mortality are accounted for in the assessment: natural, discard, incidental, and fishing mortality. The natural mortality rate was assumed to be M=0.1y^{-1} for scallops with shell heights greater than 40mm based on estimates of M based on ratios of clappers (still-intact shells from dead scallops) versus live scallops (Merrill and Posgay, 1964). Natural mortality may increase at larger shell heights (MacDonald and Thompson, 1986; NEFSC, 2007).

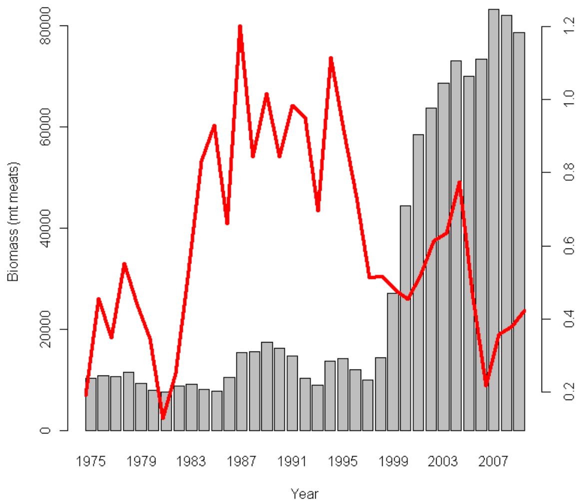
Discard mortality occurs when scallops are discarded on directed scallop trips because they are too small to be economically profitable to shuck or due to high-grading during access area trips to previously-closed areas. Discard ratios were low during the 2005-2006 season, probably because of new gear regulations (4” rings). Scallops can also be caught as bycatch and either landed or discarded in other fisheries. Trawl fisheries with the largest scallop bycatch for 1994-2006 were longfin squid, summer flounder, yellowtail, haddock, cod, and monkfish. From 1994-2006, an estimated mean of 94 mt meats of scallops were landed and 68 mt meats were discarded per year as bycatch in other fisheries. Total discard mortality is estimated at 20% (NEFSC, 2007).

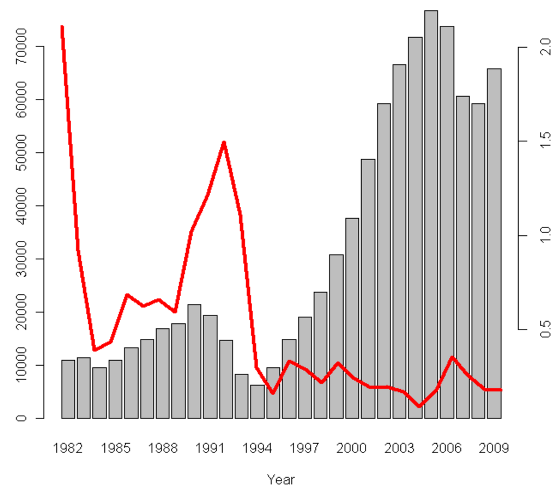
Incidental mortality is non-landed mortality associated with scallop dredges that likely kill and injure some scallops that are contacted but not caught by crushing their shells. Caddy (1973) estimated 15-20% of the scallops remaining in the dredge track were killed, while Murawski and Serchuk (1989) estimated that <5% were killed. The difference is possibly due to differences in substrate; the first study was done in a hard bottom area, while the subsequent study was in an area with a sandy bottom. Incidental mortality for this assessment was assumed to be 0.15 F_L in Georges Bank and 0.04 F_L in the Mid-Atlantic (NEFSC, 2007).

Fishing mortality, the mortality associated with scallop landings on directed scallop trips, was calculated separately for Georges Bank and the Mid-Atlantic because of differences in growth rates. For comparison to biological reference points used to identify overfishing and overfished stock conditions, a whole-stock estimate of fishing mortality is also necessary. Survey-based and rescaled F estimates show increasing mortality until the early 1990s and reductions from 1994-2006 (NEFSC, 2007). The current CASA F_{max} estimate for 2009 is 0.30, which is above the threshold (0.29) approved in the last stock assessment. This value is preliminary and will be reviewed and finalized in the stock assessment scheduled for June 2010.

Fishing mortality peaked for both stocks in the early 1990s, but has decreased substantially since then, as tighter regulations were put into place including area closures and biomass levels recovered (Figure 9). In general, F has remained stable on Georges Bank since 1995, and the Mid-Atlantic has shown larger fluctuations and an overall higher F.

Figure 9. Fishing mortality (red line) and biomass estimates (y^{-1}, gray bars) from the CASA model for sea scallops on Georges Bank (right), and in the Mid-Atlantic Bight (left).





4.2 PHYSICAL ENVIRONMENT AND EFH

The Northeast U.S. Shelf Ecosystem includes the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream to a depth of 2,000 m (Figure 9**,** Sherman et al. 1996). Four distinct sub-regions are identified: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope.[2]

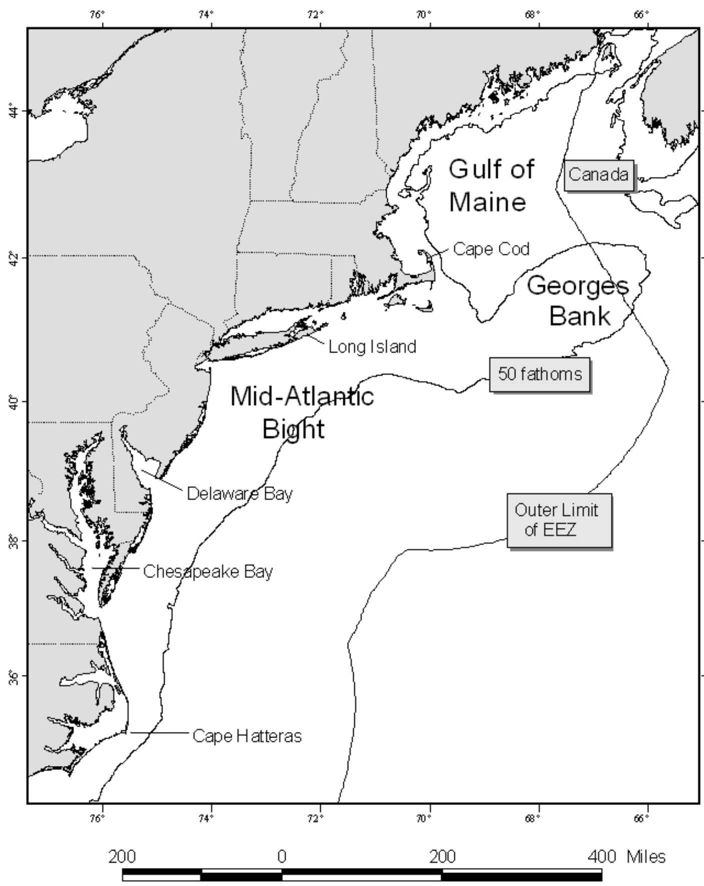


Figure 9 – Northeast U.S Shelf Ecosystem.

Primarily relevant to the scallop fishery are Georges Bank and the Mid-Atlantic Bight, although some fishing also occurs in the Gulf of Maine; the physical and biological features of these regions are described below. Much of this information was extracted from Stevenson et al. (2004), and the reader is referred to this document and sources referenced therein for additional information. These sources included, among others: Abernathy 1989; Backus 1987; Beardsley et al. 1996; Brooks 1996; Cook 1988; Mountain 1994; Reid and Steimle 1988; Schmitz et al. 1987; Sherman et al. 1996; Stumpf and Biggs 1988; Townsend 1992; andWiebe et al. 1987. Although part of the Northeast Shelf Ecosystem, the continental slope is not affected by the Atlantic sea scallop fishery and is therefore not discussed.

[2] Although considered distinct for the purpose of many fisheries stock assessments, Southern New England is not considered a distinct subregion in this text; discussions of any distinctive features of this area are incorporated into the sections describing Georges Bank and the Mid-Atlantic Bight.

4.2.1 Gulf of Maine

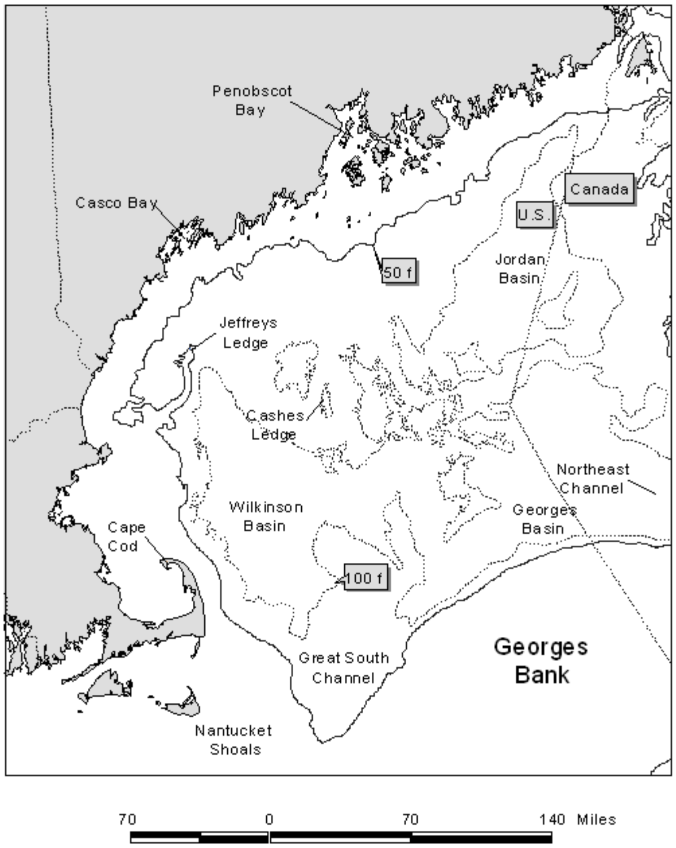


Figure 10 – Major features of the Gulf of Maine.

The Gulf of Maine is an enclosed, glacially-derived, 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 (Figure 10). The Gulf of Maine 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.

4.2.1.1 Geology

The Gulf of Maine is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The Gulf of Maine'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 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 Gulf of Maine 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 Gulf of Maine, 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 Gulf of Maine, 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 Gulf of Maine, but are more common south of Casco Bay, especially offshore of sandy beaches.

4.2.1.2 Physical oceanography

An intense seasonal cycle of winter cooling and turnover, springtime freshwater runoff, and summer warming influences oceanographic and biologic processes in the GOM. The Gulf has a general counterclockwise nontidal surface current that flows around its coastal margin (Figure 11). It is primarily driven by fresh, cold Scotian Shelf water that enters over the Scotian Shelf and through the Northeast Channel, and freshwater river runoff, which is particularly important in the spring. Dense, relatively warm, and saline slope water entering through the bottom of the Northeast Channel from the continental slope also influences gyre formation. Counterclockwise gyres generally form in Jordan, Wilkinson, and Georges Basins and the Northeast Channel as well. These surface gyres are more pronounced in spring and summer; with winter, they weaken, and are more wind-influenced.

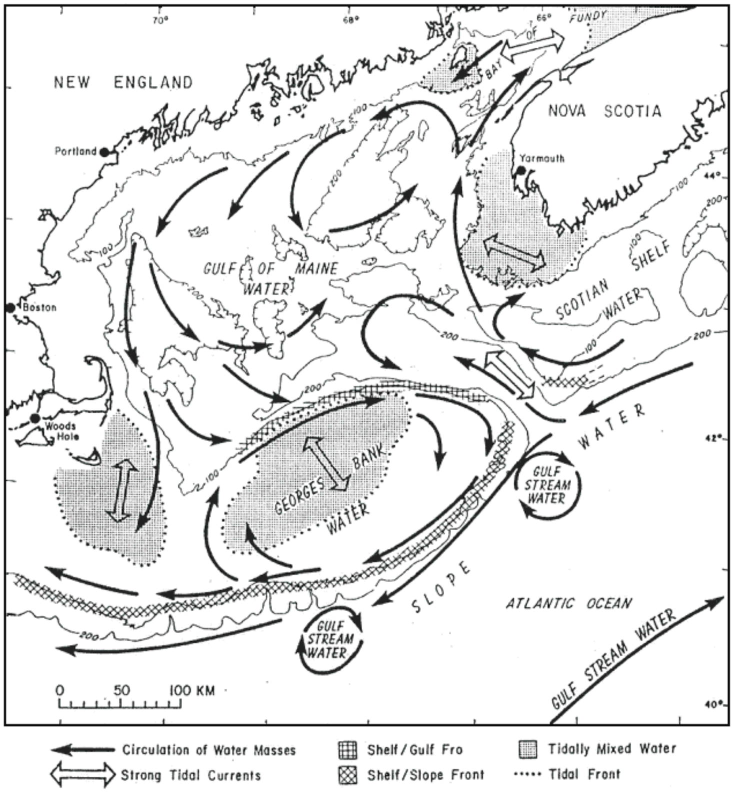


Figure 11 – Water mass circulation patterns in the Georges Bank - Gulf of Maine region.

Stratification of surface waters during spring and summer seals off a mid-depth layer of water that preserves winter salinity and temperatures. This cold layer of water is called Maine Intermediate Water, and is located between more saline Maine Bottom Water and the warmer, stratified Maine Surface Water. The stratified surface layer is most pronounced in the deep portions of the western Gulf of Maine. Tidal mixing of shallow areas prevents thermal stratification and results in thermal fronts between the stratified areas and cooler mixed areas. Typically, mixed areas include Georges Bank, the southwest Scotian Shelf, eastern Maine coastal waters, and the narrow coastal band surrounding the remainder of the Gulf.

The Northeast Channel provides an exit for cold Maine Intermediate Water and outgoing surface water while it allows warmer more saline slope water to move in along the bottom and spill into the deeper basins. The influx of water occurs in pulses, and appears to be seasonal, with lower flow in late winter and a maximum in early summer.

Gulf of Maine circulation and water properties can vary significantly from year to year. Notable episodic events include shelf-slope interactions such as the entrainment of shelf water by Gulf Stream rings, and strong winds that can create currents as high as $1.1\ m \cdot s^{-1}$ over Georges Bank. Warm core Gulf Stream rings can also influence upwelling and nutrient exchange on the Scotian shelf, and affect the water masses entering the Gulf of Maine. Annual and seasonal inflow variations also affect water circulation.
Internal waves are episodic and can greatly affect the biological properties of certain habitats. Internal waves can shift water layers vertically, so that habitats normally surrounded by cold MIW are temporarily bathed in warm, organic rich surface water. On Cashes Ledge, it is thought that deeper nutrient rich water is driven into the photic zone, providing for increased

productivity. Localized areas of upwelling interaction occur in numerous places throughout the Gulf.

4.2.1.3 Biological oceanography

Based on 303 benthic grab samples collected in the Gulf of Maine during 1956-1965, Theroux and Wigley (1998) reported that, in terms of numbers, the most common groups of benthic invertebrates in the GOM were annelid worms (35%), bivalve mollusks (33%), and amphipod crustaceans (14%). Biomass was dominated by bivalves (24%), sea cucumbers (22%), sand dollars (18%), annelids (12%), and sea anemones (9%). Watling (1988) considered predominant taxa, substrate types, and seawater properties when separating benthic invertebrate samples into seven bottom assemblages (Table 11**)**.

Table 11 – Gulf of Maine benthic assemblages as identified by Watling (1988).

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

Various studies have classified demersal fish assemblages for the Gulf of Maine and Georges Bank, including Gabriel (1992), Mahon et al. (1998), and Overholtz and Tyler (1985). Gabriel (1992) found that the most persistent feature over time in assemblage structure from Nova Scotia to Cape Hatteras was the boundary separating assemblages between the GOM and Georges Bank, which occurred at approximately the 100 m isobath on northern Georges Bank. The Overholtz and Tyler (1985) classification is given below (Table 12).

Table 12 – Demersal fish assemblages of Georges Bank and the Gulf of Maine as identified by Overholtz and Tyler (1985).

Assemblage	*Species*
Slope and Canyon	offshore hake, blackbelly rosefish, Gulf stream flounder, fourspot flounder, goosefish, silver hake, white hake, red hake
Intermediate	silver hake, red hake, goosefish, Atlantic cod, haddock, ocean pout, yellowtail flounder, winter skate, little skate, sea raven, longhorn sculpin
Shallow	Atlantic cod, haddock, pollock, silver hake, white hake, red hake, goosefish, ocean pout, yellowtail flounder, windowpane, winter flounder, winter skate, little skate, longhorn sculpin, summer flounder, sea raven, sand lance
Gulf of Maine-Deep	white hake, American plaice, witch flounder, thorny skate, silver hake, Atlantic cod, haddock, cusk, Atlantic wolffish
Northeast Peak	Atlantic cod, haddock, Pollock, ocean pout, winter flounder, white hake, thorny skate, longhorn sculpin

4.2.2 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.

4.2.2.1 Geology and physical oceanography

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. 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 et al. 1993).

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 move.

The Great South Channel separates the main part of Georges Bank from Nantucket Shoals (Figure 10). Nantucket Shoals is similar in nature to the central region of the Bank. Currents are strongest where water depth is shallower than 50 m. Tidal and storm currents range from moderate to strong, depending upon location and storm activity. Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm-generated ripples, and scattered shell and mussel beds.

Oceanographic frontal systems separate water masses of the GOM and Georges Bank from oceanic waters south of the Bank. These water masses differ in temperature, salinity, nutrient concentration, and planktonic communities, which influence productivity and may influence fish abundance and distribution. Currents on Georges Bank include a weak, persistent clockwise gyre around the Bank, a strong semidiurnal tidal flow predominantly northwest and southeast, and very strong, intermittent storm induced currents, which all can occur simultaneously. Tidal currents over the shallow top of Georges Bank can be very strong, and keep the waters over the Bank well mixed vertically. This results in a tidal front that separates the cool waters of the well-mixed shallows of the central Bank from the warmer, seasonally stratified shelf waters on the seaward and shoreward sides of the Bank. The clockwise gyre is instrumental in distribution of plankton, including fish eggs and larvae.

4.2.2.2 Biological oceanography

The strong, erosive currents affect the character of the biological community. Amphipod crustaceans (49%) and annelid worms (28%) numerically dominated the contents of 211 samples collected on Georges Bank during 1956-1965 (Theroux and Wigley 1998). Biomass was dominated by sand dollars (50%) and bivalves (33%). Theroux and Grosslein (1987) utilized the same database to identify four macrobenthic invertebrate assemblages. They noted that the boundaries between assemblages were not well defined because there is considerable intergrading between adjacent assemblages. These assemblages are associated with sedimentary provinces as defined by Valentine and Lough (1991) and Valentine (1993) (Table 13, Figure 12).

The Western Basin assemblage is found in the upper Great South Channel region at the northwestern corner of the Bank, in comparatively deepwater (150 - 200 m) with relatively slow currents and fine bottom sediments of silt, clay and muddy sand. Fauna are comprised mainly of small burrowing detritivores and deposit feeders, and carnivorous scavengers. Valentine and Lough (1991) did not identify a comparable assemblage; however, this assemblage is geographically located adjacent to Assemblage 5 as described by Watling (1998) (Table 11Error! Reference source not found.). The Northeast Peak assemblage is found along the Northern Edge and Northeast Peak, which varies in depth and current strength and includes coarse sediments, consisting mainly of gravel and coarse sand with interspersed boulders, cobbles, and pebbles. Fauna tend to be sessile (coelenterates, brachiopods, barnacles, and tubiferous annelids) or free-living (brittle stars, crustaceans, and polychaetes), with a characteristic absence of burrowing forms. The Central Georges Bank assemblage occupies the greatest area, including the central and northern portions of the Bank in depths less than 100 m. Medium-grained shifting sands predominate in this dynamic area of strong currents. Organisms tend to be small to moderately large with burrowing or motile habits. The Southern Georges Bank assemblage is found on the southern and southwestern flanks at depths from 80 - 200 m, where fine-grained sands and moderate currents predominate. Many southern species exist here at the northern limits of their range.

Along with high levels of primary productivity, Georges Bank has been historically characterized by high levels of fish production. Several studies have attempted to identify demersal fish assemblages over large spatial scales. Overholtz and Tyler (1985) found five depth related groundfish assemblages for Georges Bank and the GOM that were persistent temporally and spatially. Depth and salinity were identified as major physical influences explaining assemblage structure. Gabriel (1992) identified six assemblages, which are compared with the results of Overholtz and Tyler (1985) in Table 2. Mahon et al. (1998) found similar results.

Table 13 – Sedimentary provinces and associated benthic landscapes of Georges Bank. Sediment provinces as defined by Valentine et al. (1993) and Valentine and Lough (1991), with additional comments by Valentine (pers. comm.) and benthic assemblages assigned by Theroux and Grosslein (1987).

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

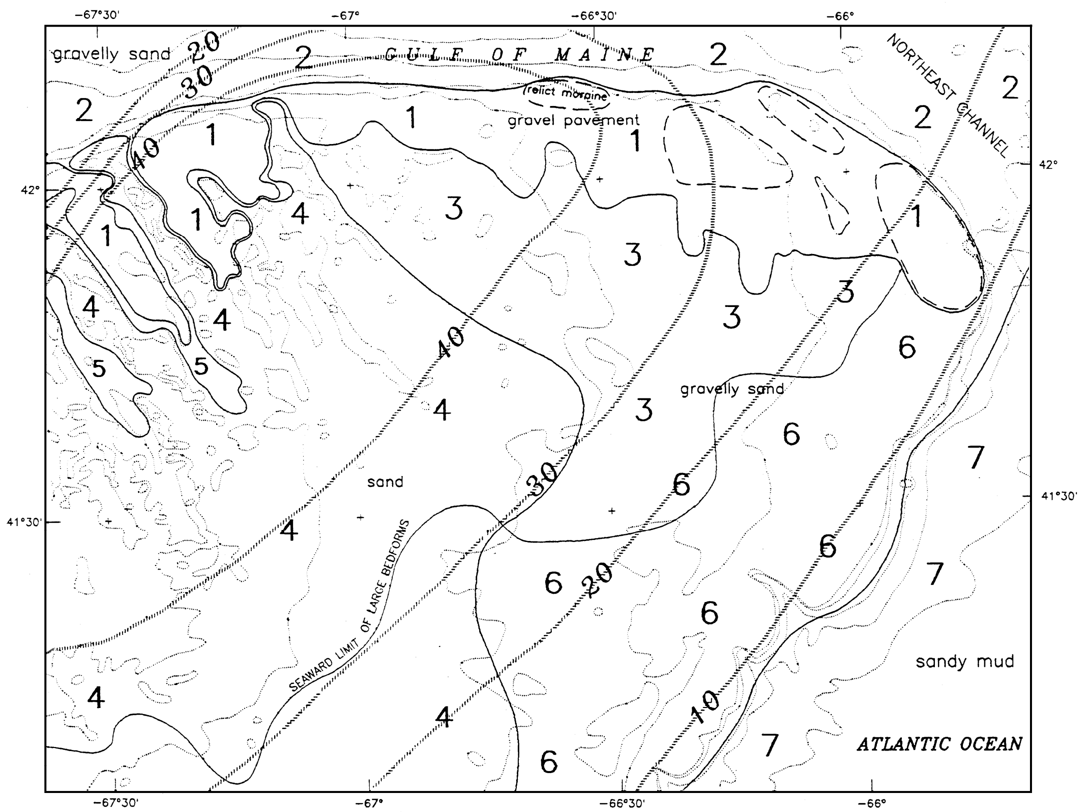


Figure 12 – Sedimentary provinces of eastern Georges Bank. Based on criteria of sea floor morphology, texture, sediment movement and bedforms, and mean tidal bottom current speed (cm/s). Relict moraines (bouldery seafloor) are enclosed by dashed lines. See Table 3 for descriptions of provinces. Source: Valentine and Lough (1991).

4.2.3 Mid-Atlantic Bight

The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank south to Cape Hatteras, and east to the Gulf Stream (Figure 1). 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.

4.2.3.1 Geology and physical oceanography

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.

Slope water tends to be warmer than shelf water because of its proximity to the Gulf Stream, and tends to be more saline. The abrupt gradient where these two water masses meet is called the shelf-slope front. This front is usually located at the edge of the shelf and touches bottom at about 75 - 100 m depth of water, and then slopes up to the east toward the surface. It reaches surface waters approximately 25 - 55 km further offshore. The position of the front is highly variable, and can be influenced by many physical factors. Vertical structure of temperature and salinity within the front can develop complex patterns because of the interleaving of shelf and slope waters; e.g., cold shelf waters can protrude offshore, or warmer slope water can intrude up onto the shelf.

The seasonal effects of warming and cooling increase in shallower, nearshore waters. Stratification of the water column occurs over the shelf and the top layer of slope water during the spring-summer and is usually established by early June. Fall mixing results in homogenous shelf and upper slope waters by October in most years. A permanent thermocline exists in slope waters from 200 - 600 m deep. Temperatures decrease at the rate of about 0.02ºC per meter and remain relatively constant except for occasional incursions of Gulf stream eddies or meanders. Below 600 m, temperature declines, and usually averages about 2.2ºC at 4000 m. A warm, mixed layer approximately 40 m thick resides above the permanent thermocline.

The "cold pool" is an annual phenomenon particularly important to the Mid-Atlantic Bight. It stretches from the Gulf of Maine along the outer edge of Georges Bank and then southwest to Cape Hatteras. It becomes identifiable with the onset of thermal stratification in the spring and lasts into early fall until normal seasonal mixing occurs. It usually exists along the bottom between the 40 and 100 m isobaths and extends up into the water column for about 35 m, to the bottom of the seasonal thermocline. The cold pool usually represents about 30% of the volume of shelf water. Minimum temperatures for the cold pool occur in early spring and summer, and range from 1.1 - 4.7ºC.

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 (see the "Continental Slope" section, below). The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales (Figure 13 and Figure 14).

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 (Figures 7 and 8). Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

The sediment type covering most of the shelf in the Mid-Atlantic Bight is sand, with some relatively small, localized areas of sand-shell and sand-gravel. On the slope, silty sand, silt, and clay predominate.

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.

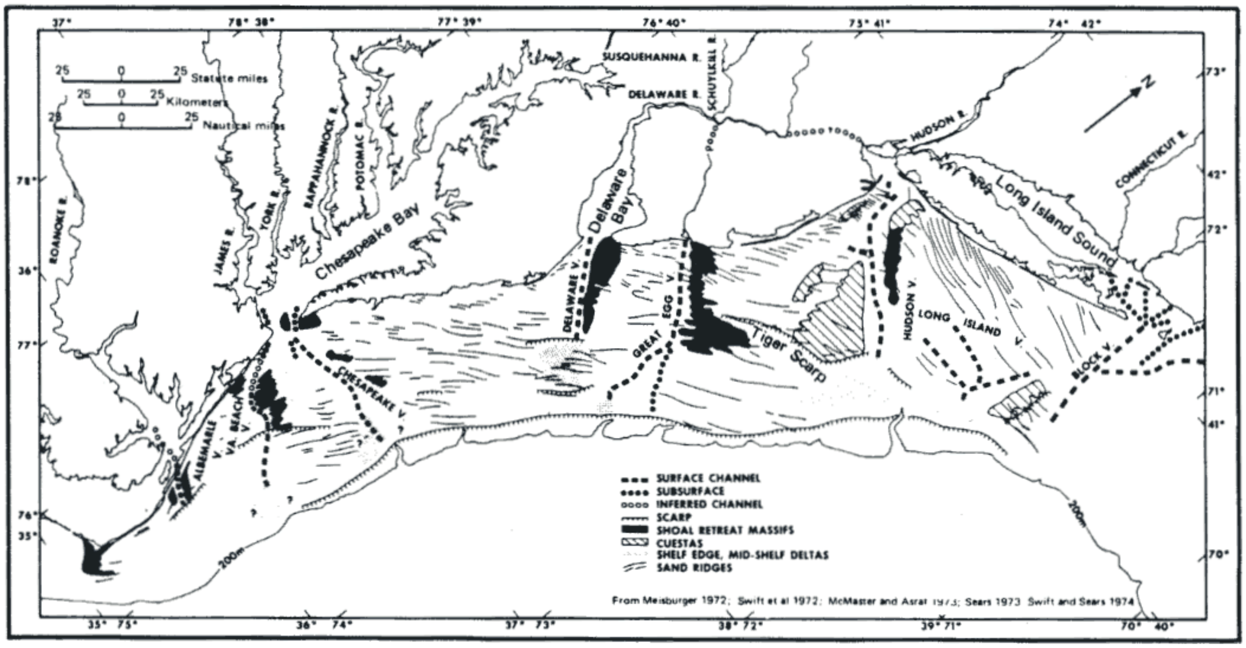


Figure 13 – Mid-Atlantic Bight submarine morphology. Source: Stumpf and Biggs (1988).

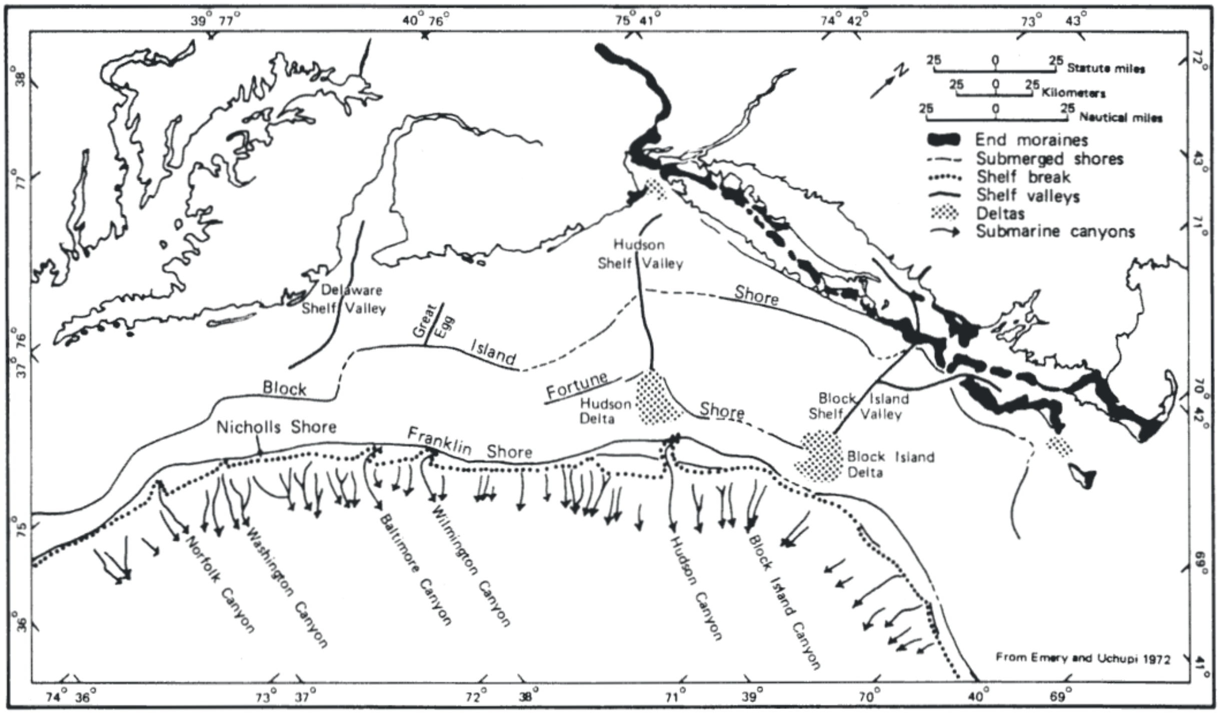


Figure 14 – Major features of the mid-Atlantic and southern New England continental shelf. Source: Stumpf and Biggs (1988).

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.

The mud patch (considered sometimes to be part of the Southern New England region) 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 of the water column. 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 cargos, 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. Steimle and Zetlin (2000) used NOAA hydrographic surveys to plot rocks, wrecks, obstructions, and artificial reefs, which together were considered by the authors to be a fairly complete list of nonbiogenic reef habitat in the Mid-Atlantic estuarine and coastal areas. They also described representative epibenthic/epibiotic, motile epibenthic, and fish species associated these habitats.

4.2.3.2 Biological oceanography

Wigley and Theroux (1981) reported on the faunal composition of 563 bottom grab samples collected in the Mid-Atlantic Bight during 1956-1965. Amphipod crustaceans and bivalve mollusks accounted for most of the individuals (41% and 22%, respectively), whereas mollusks dominated the biomass (70%). Three broad faunal zones related to water depth and sediment type were identified by Pratt (1973). The “sand fauna” zone was defined for sandy sediments (1% or less silt) that are at least occasionally disturbed by waves, from shore out to 50 m. The “silty sand fauna” zone occurred immediately offshore from the sand fauna zone, in stable sands containing a small amount of silt and organic material. Silts and clays become predominant at the shelf break and line the Hudson Shelf Valley, and support the “silt-clay fauna”.

Building on Pratt’s work, the Mid-Atlantic shelf was further divided by Boesch (1979) into seven bathymetric/morphologic subdivisions based on faunal assemblages (Table 14). Sediments in the region studied (Hudson Shelf Valley south to Chesapeake Bay) were dominated by sand with little finer materials. Ridges and swales are important morphological features in this area. Sediments are coarser on the ridges, and the swales have greater benthic macrofaunal density, species richness, and biomass. Faunal species composition differed between these features, and Boesch (1979) incorporated this variation in his subdivisions. Much overlap of species distributions was found between depth zones, so the faunal assemblages represented more of a continuum than distinct zones.

Demersal fish assemblages were described at a broad geographic scale for the continental shelf and slope from Cape Chidley, Labrador to Cape Hatteras, North Carolina (Mahon et al. 1998) and from Nova Scotia to Cape Hatteras (Gabriel 1992). Factors influencing species distribution included latitude and depth. Results of these studies were similar to an earlier study confined to the Mid-Atlantic Bight continental shelf (Colvocoresses and Musick 1984). In this study, there were clear variations in species abundances, yet they demonstrated consistent patterns of community composition and distribution among demersal fishes of the Mid-Atlantic shelf. This is especially true for five strongly recurring species associations that varied slightly by season (Table 15). The boundaries between fish assemblages generally followed isotherms and isobaths. The assemblages were largely similar between the spring and fall collections, with the most notable change being a northward and shoreward shift in the temperate group in the spring.

Table 14 – Mid-Atlantic habitat types as described by Pratt (1973) and Boesch (1979) with characteristic macrofauna as identified in Boesch (1979).

Description	***Depth (m)***	***Geology***	***Characteristic Benthic Macrofauna***
Inner shelf	0 - 30	coarse sands with finer sands off MD and VA (sand zone)	Polychaetes: *Polygordius, Goniadella, Spiophanes*
Central shelf	30 - 50	(sand zone)	Polychaetes: *Spiophanes, Goniadella,*Amphipod: *Pseudunciola*
Central and inner shelf swales	0 - 50	occurs in swales between sand ridges (sand zone)	*Polychaetes: Spiophanes, Lumbrineris, Polygordius*
Outer shelf	50 - 100	(silty sand zone)	Amphipods: *Ampelisca vadorum, Erichthonius* Polychaetes: *Spiophanes*
Outer shelf swales	50 - 100	occurs in swales between sand ridges (silty sand zone)	Amphipods: *Ampelisca agassizi, Unciola, Erichthonius*
Shelf break	100 - 200	(silt-clay zone)	not given
Continental slope	> 200	(none)	not given

Table 15 – Major recurrent demersal finfish assemblages of the Mid-Atlantic Bight during spring and fall as determined by Colvocoresses and Musick (1984).

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

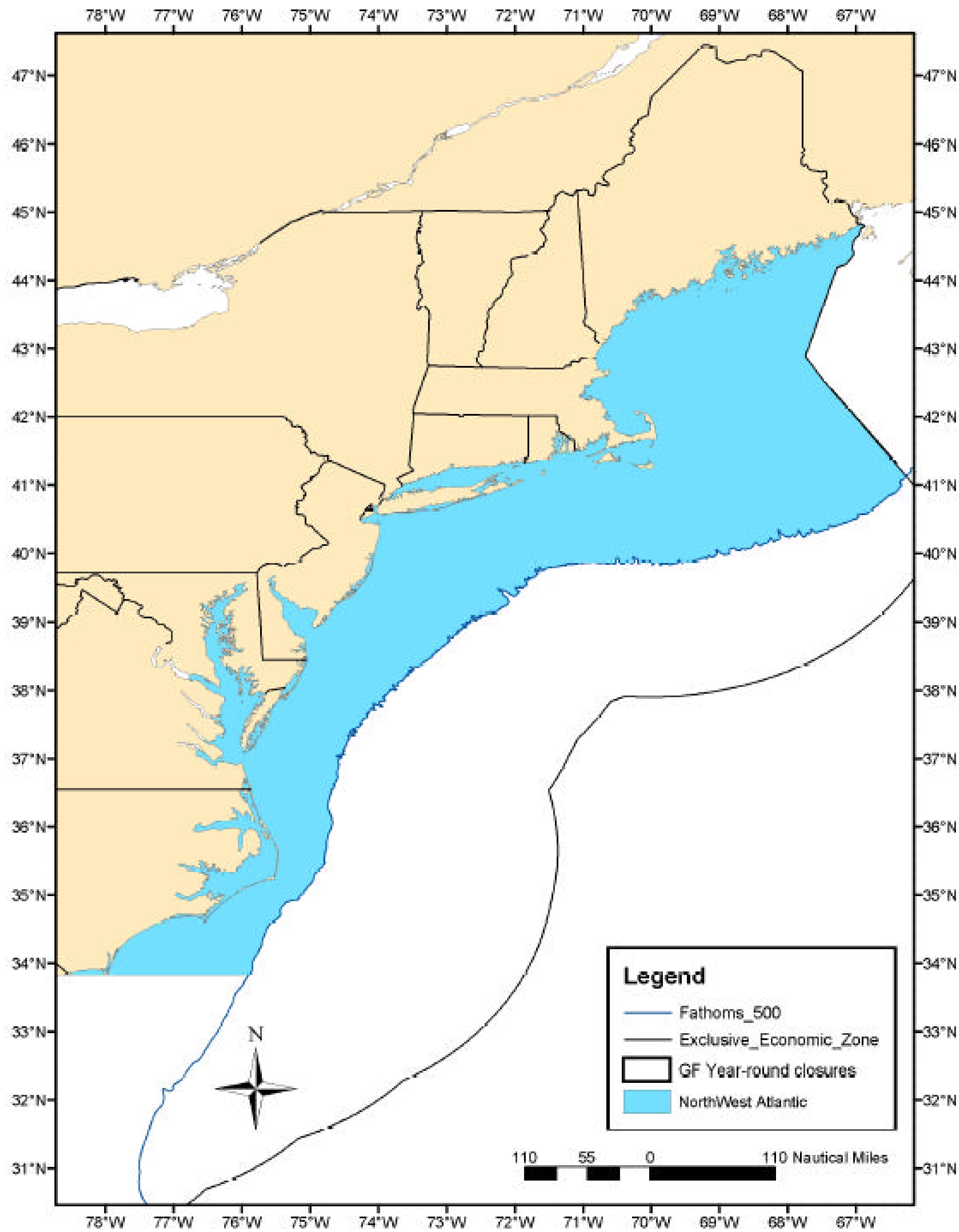
4.2.4 Essential Fish Habitat

The Atlantic sea scallop fishery is prosecuted in concentrated areas in and around Georges Bank and off the Mid-Atlantic coast, in waters extending from the near-coast out to the continental shelf (Figure 15). This area, which could potentially be affected by the proposed action, has been identified as EFHfor various species (

Table 16). Most of the current EFH designations were developed in NEFMC Essential Fish Habitat Omnibus Amendment 1 (1998). For additional information, the reader is referred to the Omnibus Amendment and the other FMP documents listed in Table 17. In addition, summaries of EFH descriptions and maps for Northeast region species can be accessed at http://www.nero.noaa.gov/hcd/webintro.html.

Two FMP amendments in development will update current EFH designations in the near term. Amendment 16 to the Northeast Multispecies FMP will add Atlantic wolffish to the management unit and includes an EFH designation for the species. Designations for all other species are being reviewed and updated in NEFMC EssentialFish Habitat Omnibus Amendment 2. The sea scallop fishery overlaps spatially with designated EFH for both NEFMC and MAFMC-managed species.

Figure 15 – Geographic extent of the Atlantic sea scallop fishery



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Legend
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Exclusive_Economic_Zone
GF Year-round closures
NorthWest Atlantic
110 55 0 110 Nautical Miles

Table 16 –Designated EFH that overlaps with the Atlantic sea scallop fishery, listed by managed species and lifestage.

Species	*Life stage*	*Geographic area*	*Depth (m)*	*EFH Description*
American plaice	juvenile	GOM and estuaries from Passamaquoddy Bay to Saco Bay, ME and from Mass. Bay to Cape Cod Bay, MA	45-150	Bottom habitats with fine grained sediments or a substrate of sand or gravel
American plaice	adult	GOM and estuaries from Passamaquoddy Bay to Saco Bay, ME and from Mass. Bay to Cape Cod Bay, MA	45-175	Bottom habitats with fine grained sediments or a substrate of sand or gravel
Atlantic cod	juvenile	GOM, GB, eastern portion of continental shelf off southern NE and following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	25-75	Bottom habitats with a substrate of cobble or gravel
Atlantic cod	adult	GOM, GB, eastern portion of continental shelf off southern NE and following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	10-150	Bottom habitats with a substrate of rocks, pebbles, or gravel
Atlantic halibut	juvenile	GOM, GB	20-60	Bottom habitats with a substrate of sand, gravel, or clay
Atlantic halibut	adult	GOM, Georges Bank	100-700	Bottom habitats with a substrate of sand, gravel, or clay
Atlantic herring	eggs	GOM, GB and following estuaries: Englishman/Machias Bay, Casco Bay, and Cape Cod Bay	20-80	Bottom habitats attached to gravel, sand, cobble or shell fragments, also on macrophytes
Atlantic herring	juvenile	GOM, GB and following estuaries: Englishman/Machias Bay, Casco Bay, and Cape Cod Bay	15-135	Pelagic waters and bottom habitats
Atlantic herring	adult	Pelagic waters and bottom habitats	20-130	Pelagic waters and bottom habitats
Atlantic sea scallop	eggs	GOM, GB, southern NE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	n/a	Bottom habitats
Atlantic sea scallop	larvae	GOM, GB, southern NE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	n/a	Pelagic waters and bottom habitats with a substrate of gravelly sand, shell fragments, pebbles, or on various red algae, hydroids, amphipod tubes, and bryozoans.
Atlantic sea scallop	juvenile	GOM, GB, southern NE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	18-110	Bottom habitats with a substrate of cobble, shells, and silt

Species	*Life stage*	*Geographic area*	*Depth (m)*	*EFH Description*
Atlantic sea scallop	adult	GOM, GB, southern NE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	18-110	Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand
Atlantic surfclam	juvenile	Eastern edge of GB and the GOM throughout Atlantic EEZ	0-60, low density beyond 38	Throughout substrate to a depth of 3 ft within federal waters, burrow in medium to coarse sand and gravel substrates, also found in silty to fine sand, but not in mud
Atlantic surfclam	adult	Eastern edge of GB and the GOM throughout Atlantic EEZ	0-60, low density beyond 38	Throughout substrate to a depth of 3 ft within federal waters
Barndoor skate	juvenile	Eastern GOM, GB, Southern NE, Mid-Atlantic Bight to Hudson Canyon	l0-750, mostly <150	Bottom habitats with mud, gravel, and sand substrates
Barndoor skate	adult	Eastern GOM, GB, Southern NE, Mid-Atlantic Bight to Hudson Canyon	l0-750, mostly <150	Bottom habitats with mud, gravel, and sand substrates
Black sea bass	juvenile	Demersal waters over continental shelf from GOM to Cape Hatteras, NC, also includes estuaries from Buzzards Bay to Long Island Sound; Gardiners Bay, Barnegat Bay to Chesapeake Bay; Tangier/ Pocomoke Sound, and James River	1-38	Rough bottom, shellfish and eelgrass beds, manmade structures in sand-shell areas, offshore clam beds, and shell patches may be used during wintering
Black sea bass	adult	Demersal waters over continental shelf from GOM to Cape Hatteras, NC, also includes estuaries: Buzzards Bay, Narragansett Bay, Gardiners Bay, Great South Bay, Barnegat Bay to Chesapeake Bay; Tangier/ Pocomoke Sound, and James River	20-50	Structured habitats (natural and manmade), sand and shell substrates preferred
Clearnose skate	juvenile	GOM, along shelf to Cape Hatteras, NC; includes the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem	0–500, mostly <111	Bottom habitats with substrate of soft bottom along continental shelf and rocky or gravelly bottom
Clearnose skate	adult	GOM, along shelf to Cape Hatteras, NC; includes the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem	0–500, mostly <111	Bottom habitats with substrate of soft bottom along continental shelf and rocky or gravelly bottom
Haddock	juvenile	GB, GOM, middle Atlantic south to Delaware Bay	35-100	Bottom habitats with a substrate of pebble and gravel
Haddock	adult	GB and eastern side of Nantucket Shoals, throughout GOM, *additional area of Nantucket Shoals, and Great South Channel	40-150	Bottom habitats with a substrate of broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches
Little skate	juvenile	GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0-137, mostly 73-91	Bottom habitats with sandy or gravelly substrate or mud

Species	*Life stage*	*Geographic area*	*Depth (m)*	*EFH Description*
Little skate	adult	GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0-137, mostly 73-91	Bottom habitats with sandy or gravelly substrate or mud
Longfin squid	eggs	GB, southern NE and middle Atlantic to mouth of Chesapeake Bay	<50	Egg masses attached to rocks, boulders and vegetation on sand or mud bottom
Monkfish	juvenile	Outer continental shelf in the middle Atlantic, mid-shelf off southern NE, all areas of GOM	25-200	Bottom habitats with substrates of a sandshell mix, algae covered rocks, hard sand, pebbly gravel, or mud
Monkfish	adult	Outer continental shelf in the middle Atlantic, mid-shelf off southern NE, outer perimeter of GB, all areas of Gulf of Maine	25-200	Bottom habitats with substrates of a sandshell mix, algae covered rocks, hard sand, pebbly gravel, or mud
Ocean pout	eggs	GOM, GB, southern NE, and middle Atlantic south to Delaware Bay, and the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts and Cape Cod Bay	<50	Bottom habitats, generally in hard bottom sheltered nests, holes, or crevices
Ocean pout	larvae	GOM, GB, southern NE, and middle Atlantic south to Delaware Bay, and the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts and Cape Cod Bay	<50	Bottom habitats in close proximity to hard bottom nesting areas
Ocean pout	juvenile	GOM, GB, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, and Cape Cod Bay	<80	Bottom habitats in close proximity to hard bottom nesting areas
Ocean pout	adult	GOM, GB, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, and Cape Cod Bay	<110	Bottom habitats, often smooth bottom near rocks or algae
Ocean quahog	juvenile	Eastern edge of GB and GOM throughout the Atlantic EEZ	8-245	Throughout substrate to a depth of 3 ft within federal waters, occurs progressively further offshore between Cape Cod and Cape Hatteras
Ocean quahog	adult	Eastern edge of GB and GOM throughout the Atlantic EEZ	8-245	Throughout substrate to a depth of 3 ft within federal waters, occurs progressively further offshore between Cape Cod and Cape Hatteras
Pollock	juvenile	GOM, GB, and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay to Waquoit Bay; Long Island Sound, Great South Bay	0 – 250	Bottom habitats with aquatic vegetation or a substrate of sand, mud, or rocks
Pollock	adult	GOM, GB, southern NE, and middle Atlantic south to New Jersey and the following estuaries: Passamaquoddy Bay, Damariscotta R., Mass Bay, Cape Cod Bay, Long Island Sound	15 – 365	Hard bottom habitats including artificial reefs

Species	***Life stage***	***Geographic area***	***Depth (m)***	***EFH Description***
Red hake	juvenile	GOM, GB, continental shelf off southern NE, and middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay, Mass. Bay to Cape Cod Bay; Buzzards Bay to Conn. R.; Hudson R./ Raritan Bay, and Chesapeake Bay	<100	Bottom habitats with substrate of shell fragments, including areas with an abundance of live scallops
Red hake	adult	GOM, GB, continental shelf off southern NE, and middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay, Mass. Bay to Cape Cod Bay; Buzzards Bay to Conn. R.; Hudson R./ Raritan Bay, Delaware Bay, and Chesapeake Bay	10-130	Bottom habitats in depressions with a substrate of sand and mud
Redfish	juvenile	GOM, southern edge of GB	25-400	Bottom habitats with a substrate of silt, mud, or hard bottom
Redfish	adult	GOM, southern edge of GB	50-350	Bottom habitats with a substrate of silt, mud, or hard bottom
Rosette skate	juvenile	Nantucket shoals and southern edge of GB to Cape Hatteras, NC	33-530, mostly 74-274	Bottom habitats with soft substrate, including sand/mud bottoms, mud with echinoid and ophiuroid fragments, and shell and pteropod ooze
Rosette skate	adult	Nantucket shoals and southern edge of GB to Cape Hatteras, NC	33-530, mostly 74-274	Bottom habitats with soft substrate, including sand/mud bottoms, mud with echinoid and ophiuroid fragments, and shell and pteropod ooze
Scup	juvenile	Continental shelf from GOM to Cape Hatteras, NC includes the following estuaries: Mass. Bay, Cape Cod Bay to Long Island Sound; Gardiners Bay to Delaware Inland Bays; and Chesapeake Bay	0-38	Demersal waters north of Cape Hatteras and inshore on various sands, mud, mussel, and eelgrass bed type substrates
Scup	adult	Continental shelf from GOM to Cape Hatteras, NC includes the following estuaries: Cape Cod Bay to Long Island Sound; Gardiners Bay to Hudson R./ Raritan Bay; Delaware Bay and Inland Bays; and Chesapeake Bay	2-185	Demersal waters north of Cape Hatteras and inshore estuaries (various substrate types)
Silver hake	juvenile	GOM, GB, continental shelf off southern NE, middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Casco Bay, Mass. Bay to Cape Cod Bay	20-270	Bottom habitats of all substrate types
Silver hake	adult	GOM, GB, continental shelf off southern NE, middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Casco Bay, Mass. Bay to Cape Cod Bay	30-325	Bottom habitats of all substrate types
Smooth skate	juvenile	Offshore banks of GOM	31–874, mostly 110-457	Bottom habitats with a substrate of soft mud (silt and clay), sand, broken shells, gravel and pebbles

Species	*Life stage*	*Geographic area*	*Depth (m)*	*EFH Description*
Smooth skate	adult	Offshore banks of GOM	31–874, mostly 110-457	Bottom habitats with a substrate of soft mud (silt and clay), sand, broken shells, gravel and pebbles
Summer flounder	juvenile	Over continental shelf from GOM to Cape Hatteras, NC; south of Cape Hatteras to Florida; also includes estuaries from Waquoit Bay to James R.; Albemarle Sound to Indian R.	0.5–5 in estuary	Demersal waters, on muddy substrate but prefer mostly sand; found in the lower estuaries in flats, channels, salt marsh creeks, and eelgrass beds
Summer flounder	adult	Over continental shelf from GOM to Cape Hatteras, NC; south of Cape Hatteras to Florida; also includes estuaries from Buzzards Bay, Narragansett Bay, Conn. R. to James R.; Albemarle Sound to Broad R.; St. Johns R., and Indian R.	0-25	Demersal waters and estuaries
Thorny skate	juvenile	GOM and Georges Bank	18-2000, mostly 111 - 366	Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud
Thorny skate	adult	GOM and GB	18-2000, mostly 111 - 366	Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud
Tilefish	juvenile	US/Canadian boundary to VA/NC boundary (shelf break, submarine canyon walls, and flanks: GB to Cape Hatteras)	76-365	Rough bottom, small burrows, and sheltered areas; substrate rocky, stiff clay, human debris
Tilefish	adult	US/Canadian boundary to VA/NC boundary (shelf break, submarine canyon walls, and flanks: GB to Cape Hatteras)	76-365	Rough bottom, small burrows, and sheltered areas; substrate rocky, stiff clay, human debris
White hake	juvenile	GOM, southern edge of GB, southern NE to middle Atlantic and the following estuaries: Passamaquoddy Bay to Great Bay; Mass. Bay to Cape Cod Bay	5-225	Pelagic stage - pelagic waters; demersal stage - bottom habitat with seagrass beds or substrate of mud or fine grained sand
White hake	adult	GOM, southern edge of GB, southern NE to middle Atlantic and the following estuaries: Passamaquoddy Bay to Great Bay; Mass. Bay to Cape Cod Bay	5-325	Bottom habitats with substrate of mud or fine grained sand
Windowpane flounder	juvenile	GOM, GB, southern NE, middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Great Bay; Mass. Bay to Chesapeake Bay	1-100	Bottom habitats with substrate of mud or fine grained sand
Windowpane flounder	adult	GOM, GB, southern NE, middle Atlantic south to Virginia - NC border and the following estuaries: Passamaquoddy Bay to Great Bay; Mass. Bay to Chesapeake Bay	1-75	Bottom habitats with substrate of mud or fine grained sand
Winter flounder	eggs	GB, inshore areas of GOM, southern NE, and middle Atlantic south to Delaware Bay	<5	Bottom habitats with a substrate of sand, muddy sand, mud, and gravel

Species	*Life stage*	*Geographic area*	*Depth (m)*	*EFH Description*
Winter flounder	juvenile	GB, inshore areas of GOM, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Chincoteague Bay	0.1–10 (1 - 50, age 1+)	Bottom habitats with a substrate of mud or fine grained sand
Winter flounder	adult	GB, inshore areas of GOM, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Chincoteague Bay	1-100	Bottom habitats including estuaries with substrates of mud, sand, grave
Winter skate	juvenile	Cape Cod Bay, GB, southern NE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0-371, mostly < 111	Bottom habitats with substrate of sand and gravel or mud
Winter skate	adult	Cape Cod Bay, GB southern NE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0-371, mostly < 111	Bottom habitats with substrate of sand and gravel or mud
Witch flounder	juvenile	GOM, outer continental shelf from GB south to Cape Hatteras	50-450 to 1500	Bottom habitats with fine grained substrate
Witch flounder	adult	GOM, outer continental shelf from GB south to Chesapeake Bay	25-300	Bottom habitats with fine grained substrate
Yellowtail flounder	juvenile	GB, GOM, southern NE continental shelf south to Delaware Bay and the following estuaries: Sheepscot R., Casco Bay, Mass. Bay to Cape Cod Bay	20-50	Bottom habitats with substrate of sand or sand and mud
Yellowtail flounder	adult	GB, GOM, southern NE continental shelf south to Delaware Bay and the following estuaries: Sheepscot R., Casco Bay, Mass. Bay to Cape Cod Bay	20-50	Bottom habitats with substrate of sand or sand and mud

Table 17 – Listing of sources for original EFH designation information

Species	*Management authority*	*Plan managed under*	*EFH designation action*
American plaice	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Atlantic cod	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Atlantic halibut	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Atlantic herring	NEFMC	Atlantic Herring	EFH Omnibus/Atlantic Herring FMP
Atlantic sea scallop	NEFMC	Atlantic Sea Scallop	EFH Omnibus/Atlantic Sea Scallop A9
Atlantic surfclam	MAFMC	Atlantic Surfclam Ocean Quahog	Atlantic Surfclam Ocean Quahog A12
Barndoor skate	NEFMC	NE Skate Complex	Original NE Skate Complex FMP
Black sea bass	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Summer Flounder, Scup, and Black Sea Bass A12
Clearnose skate	NEFMC	NE Skate Complex	Original NE Skate Complex FMP
Haddock	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Little skate	NEFMC	NE Skate Complex	Original NE Skate Complex FMP

Species	***Management authority***	***Plan managed under***	***EFH designation action***
Longfin squid	MAFMC	Atlantic Mackerel,Squid, and Butterfish	Atlantic Mackerel,Squid, and Butterfish A8
Monkfish	NEFMC, MAFMC	Monkfish	EFH Omnibus/Monkfish A1
Ocean pout	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Ocean quahog	MAFMC	Atlantic Surfclam Ocean Quahog	Atlantic Surfclam Ocean Quahog A12
Pollock	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Red hake	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Redfish	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Rosette skate	NEFMC	NE Skate Complex	Original NE Skate Complex FMP
Scup	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Summer Flounder, Scup, and Black Sea Bass A12
Silver hake	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Smooth skate	NEFMC	NE Skate Complex	Original NE Skate Complex FMP
Summer flounder	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Summer Flounder, Scup, and Black Sea Bass A12
Thorny skate	NEFMC	NE Skate Complex	Original NE Skate Complex FMP
Tilefish	MAFMC	Tilefish	Tilefish FMP
White hake	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Windowpane flounder	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Winter flounder	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Winter skate	NEFMC	NE Skate Complex	Original NE Skate Complex FMP
Witch flounder	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11
Yellowtail flounder	NEFMC	NE Multispecies	EFH Omnibus/NE Multispecies A11

4.3 PROTECTED RESOURCES

The following protected species are found in the environment in which the sea scallop fishery is prosecuted. A number of them are listed under the Endangered Species Act of 1973 (ESA) as endangered or threatened, while others are identified as protected under the Marine Mammal Protection Act of 1972 (MMPA). Two right whale critical habitat designations also are located within the action area. An update and summary is provided here to facilitate consideration of the species most likely to interact with the scallop fishery relative to the proposed action.

A more complete description of protected resources inhabiting the action area is provided in Amendment 10 to the Sea Scallop FMP (See Amendment 10 to the Atlantic Sea Scallop Fishery Management Plan, Section 7.2.7, Protected Species, for a complete list. An electronic version of the document is available at http://www.nefmc.org/scallops/index.html.).

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
Beaked whale (*Ziphius* and *Mesoplodon spp.*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
Spotted and striped dolphin (*Stenella spp.*)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Bottlenose dolphin: coastal stocks (*Tursiops truncatus*)	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected
Pinnipeds	
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

* *Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.*

Fish

Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered

Critical Habitat Designations
Right whale Cape Cod Bay
Great South Channel

4.3.1 Threatened and Endangered Species Not Likely to be Affected by the Alternatives Under Consideration

According to the most recent Biological Opinion (Opinion) provided by NMFS dated 3/14/08 (and amended February 5, 2009), the agency has previously determined that species not likely to be affected by the Scallop Fishery Management Plan or by the operation of the fishery include the shortnose sturgeon, the Gulf of Maine distinct population segment of Atlantic salmon, hawksbill sea turtles, and the following whales: North Atlantic right, humpback, fin, sei, blue, and sperm whales, all of which are listed as endangered species under the ESA. NMFS also concluded that neither the Sea Scallop FMP nor the fishery has had any adverse effects on habitat features in right whale critical habitat areas.

- **Large Cetaceans (Baleen Whales and Sperm Whale)**

The western North Atlantic baleen whale species (North Atlantic right, humpback, fin, sei, and minke) follow a general annual pattern of migration from high latitude summer foraging grounds, including the Gulf and 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. 2006). 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. 2006). However, sperm whale distribution in U.S. EEZ waters also occurs in a distinct seasonal cycle (Waring et al. 2006). 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. 2006). 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).

The most recent Marine Mammal Stock Assessment (SAR) (Waring et al. 2008) reviewed the current population trend for each of these cetacean species within U.S. Exclusive Economic Zone (EEZ) waters, as well as providing information on the estimated annual human-caused mortality and serious injury, and a description of the commercial fisheries that interact with each stock in the U.S. Atlantic. Information from the SAR is summarized below.

For North Atlantic right whales, the available information continues to indicate a decline in the population trend (Waring et al. 2008). While calf production in recent years has been higher than recorded in the late 1990’s, the minimum rate of annual human-caused mortality and serious injury to right whales averaged 3.2 per year (Waring et al. 2008). Recent mortalities included 6 female right whales, including three that were pregnant at the time of death (Kraus et al. 2005). The total number of North Atlantic right whales was estimated to be less than 400 animals in 2007 (Waring et al. 2008).

The North Atlantic population of humpback whales is estimated to be 11,570, although the estimate is considered to be negatively biased (Waring et al. 2008). The best estimate for the Gulf of Maine stock of humpback whales is 847 whales (Waring et al. 2008). Current data suggest that the trend for the Gulf of Maine stock is increasing. The best estimate available for the western North Atlantic fin whale stock is 2,269 whales but is considered a very conservative estimate (Waring et al. 2008). The population trend was considered positive for the SAR, although the current productivity rate is unknown. Total numbers of sperm whales, sei whales, and minke whales in the North Atlantic or in U.S. waters are unknown, and there are insufficient data to determine population trends for these cetacean species (Waring et al. 2008). Based on data available for selected areas and time periods, the minimum population estimate for each species is 128, 3,539, and 3,312 for sei whales, sperm whales, and minke whales, respectively (Waring et al. 2008).

The Atlantic Large Whale Take Reduction Plan (ALWTRP) was recently revised with publication of a new final rule (72 FR 57104, October 5, 2007) that is intended to continue to address entanglement of large whales (right, humpback, fin, and minke) in commercial fishing gear and to reduce the risk of death and serious injury from entanglements that do occur.

- **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, striped dolphins). Information on the western North Atlantic stocks of each species is summarized in Waring *et al*. (2008).

- **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*. 2006). 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*. 2006). 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*. 2006).

4.3.2 Threatened and Endangered Species Potentially Affected Adversely by the Alternatives Under Consideration

In the 2008 BiOp, NMFS determined that the action being considered in the Opinion may affect the following ESA-listed sea turtle species in a manner that will likely result in adverse effects: loggerhead, leatherback, Kemp's ridley, and green sea turtles.

- **Sea Turtle Ecology Background**

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 http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp).

In general, sea turtles are a long-lived species and reach sexual maturity relatively late (NMFS SEFSC 2001; NMFS and USFWS 2007a; 2007b; 2007c; 2007d). Sea turtles are injured and killed by numerous human activities (NRC 1990; NMFS and USFWS 2007a; 2007b; 2007c; 2007d; NMFS NERO 2008). Nest count data are a valuable source of information for each turtle species since the number of nests laid reflects the reproductive output of the nesting group each year. Based on the most recent information, a decline in the annual nest counts has been measured or suggested for four of five western Atlantic loggerhead nesting groups (NMFS and USFWS 2007a). Nest counts for Kemp's ridley sea turtles as well as leatherback and green sea turtles in the Atlantic demonstrate increased nesting by these species (NMFS and USFWS 2007b; 2007c; 2007d).

Loggerheads are found in temperate and subtropical waters and are the most common species of sea turtles in U.S. waters. The majority of nesting occurs on beaches of the southeastern U.S. Waters as far north as 41-42^{o} N (Figure 1) are used for foraging, with common occurrences from Florida through Cape Cod, MA. Declines in incidental catch were observed in Long Island, NY and Chesapeake Bay (NMFS 2008).

Leatherback sea turtles have a high tolerance to relatively low water temperatures, which allows them to be widely distributed throughout the world's oceans. Leatherbacks seem to be most vulnerable to entanglement in fishing gear, including bottom otter trawls.

Kemp's ridley sea turtles are one of the least abundant sea turtles. However, they are the second most abundant sea turtle in Virginia and Maryland state waters. They typically occur in the Gulf of Mexico and northern half of the Atlantic Ocean. Foraging areas along the Atlantic Coast include Pamlico Sound, Chesapeake Bay, Long Island Sound, Charleston Harbor, and Delaware Bay. The adults are found primarily in near-shore waters of 37m or less with sandy or muddy bottom.

Green sea turtles have a circumglobal distribution, ranging from the mid-Atlantic to Argentina and occurring seasonally in mid-Atlantic and New England waters. Of the 23 nesting groups assessed in the NMFS and USFWS (2007) report, 10 were considered increasing, 9 were considered stable, and 4 were considered decreasing. Fishery mortality accounts for a large proportion of annual anthropogenic mortality outside of the nesting beaches.

- **Impacts on Sea Turtles – 2008 Biological Opinion**

On February 23, 2007, the NEFSC released NEFSC Reference Document 07-04 (Murray 2007). Based on observer data for the scallop trawl fishery for 2004 and 2005, Murray (2007) provided the first estimates of the average annual bycatch of loggerhead sea turtles in scallop trawl gear. NMFS NERO determined that the reference document presented new information regarding the capture of sea turtles in scallop trawl gear that reveals effects of the action that may affect listed sea turtles in a manner or to an extent not previously considered. Therefore, in accordance with the regulations at 50 CFR 402.16, formal consultation was reinitiated on April 3, 2007, to reconsider the effects of the Atlantic sea scallop fishery on ESA-listed sea turtles. Consultation was completed on March 14, 2008.

The 2008 Biological Opinion identified four endangered or threatened sea turtle species that may be adversely affected by the Scallop FMP and the fishery: loggerhead, leatherback, Kemp's ridley and green sea turtles, but concluded that the fishery would not likely jeopardize their continued existence. Summary information is provided here that broadly describes the general distribution of sea turtles within the scallop action area, as well as the known interactions with sea scallop gear. Loggerheads are the most commonly taken species of sea turtle in the scallop fishery, thus most information herein pertains to loggerheads.

Additional background information on the relevant sea turtle species can be found in a number of published documents. These include sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; USFWS 1997; Marine Turtle Expert Working Group (TEWG) 1998, 2000, & 2009; NMFS and USFWS 2007a, b, c, d; Murray 2007; Leatherback TEWG 2007; Haas et al. 2008; Murray 2008; Merrick and Haas 2008), and recovery plans for Endangered Species Act-listed sea turtles (NMFS 1991; NMFS and USFWS 1991a; NMFS and USFWS 1991b; NMFS and USFWS 1992; NMFS 1998; USFWS and NMFS 1992; NMFS 2005; NMFS and USFWS 2008).

The recently published Loggerhead Sea Turtle Recovery Plan (NMFS and USFWS 2008) noted that out of five recovery units, one showed no trend in nesting numbers, while the other four showed declines. The highest priority threats include bottom trawl, pelagic and demersal longline, and demersal large mesh gillnet fisheries; legal and illegal harvest; vessel strikes; beach armoring and erosion; marine debris ingestion; oil and light pollution; and predation by native and exotic species. The Atlantic sea scallop dredge fishery was not pinpointed, however, as a main source of mortality of loggerheads. In the neritic zone, shrimp trawling is the most detrimental to the recovery of sea turtle populations (estimated 163,160 annually (NMFS 2008)). Atlantic sea scallop trawling is known to capture sea turtles. Annual loggerhead bycatch estimates in 2004 and 2005 in the mid-Atlantic scallop trawl fishery ranged from 81-191, depending on estimation methodology, and a reasonable point estimate from all six estimation methods utilized is 136 turtles (Murray 2007). Murray (2008) estimated the average annual bycatch in the mid-Atlantic scallop trawl gear was 20 loggerhead sea turtles (or 4.8% of total turtles caught), which is in addition to the estimate from Murray (2007) for turtles caught in trawl gear designed specifically to harvest scallops.

Results from a study done by Merrick and Haas (2008) suggest that mortalities of loggerhead sea turtles in the Atlantic sea scallop dredge and trawl fisheries are detectable, but have a relatively small effect on the trajectory of the adult female components of the western North Atlantic loggerhead sea turtle population over the next 100 years. The 1989-2005 population trends, with and without mortalities, were not significantly different and the probability of reaching the quasi-extinction threshold (250 adult females) under both scenarios was 0.01. Median times to extinction for both were greater than 200 years. This lack of impact occurred regardless of the use of values that generated the greatest consequence of the sea scallop fisheries takes of loggerheads. The comparison of the effect of different background mortalities suggests that up to ten times the level of loggerhead mortality in the sea scallop fisheries needs to be removed to stabilize the populations, which suggests that the relatively steep declining trend is being driven by some other larger source of mortality (Merrick and Haas 2008).

- **Estimated Sea Turtle Takes**

The 2008 BiOp anticipates that up to 929 loggerheads will be captured biennially in the scallop dredge fishery, of which 595 are anticipated to be lethal. Chain mats are not expected to reduce the effects of the dredge on turtles encountered on the bottom. The 2008 BiOp also estimates that annually in the scallop dredge fishery there will be takes of 1 leatherback, 1 Kemp's ridley, and 1 green sea turtle (all of which may be lethal or non-lethal). The 2009/2010 estimates of annual takes for the scallop trawl fishery is 154 loggerheads (20 lethal), 1 leatherback, 1 Kemp's ridley, and 1 green sea turtle (all of which may be lethal or non-lethal).

Sea turtles are known to be captured in scallop dredge and trawl gear, gear types that are used in the fisheries affected by this action. As the Recovery Plan (2008) discussed, loggerheads can be struck and injured or killed by scallop dredge frames or captured in the bag where they may drown or be further injured or killed when catch and heavy gear are dumped on deck. The most commonly described interaction is that of an injured juvenile loggerhead turtle caught in a dredge and brought aboard a vessel (Haas et al. 2008). The total estimated bycatch of loggerhead turtles in the scallop dredge fishery in the mid-Atlantic for 2003 was 749 turtles (Murray 2004), in 2004 was 180 turtles (Murray 2005), and 2005 was 0 turtles (Murray 2007). Changes over the 3 years include implementation of rotational closed areas, and voluntary use of chain mats that prevent turtles (live and/or killed or injured by the dredge) from entering the bag and being observed. Using Bayesian techniques, Haas et al. (2008) determined that a majority of loggerheads captured in the scallop dredge and trawl fisheries were likely derived from the south Florida nesting populations with relatively small representation from each of the other potential source populations.

Factors affecting estimated bycatch rates of loggerhead turtles, the species with the greatest number of interactions in scallop trawl and dredge gear in the Mid-Atlantic, vary from year to year (Murray 2004, 2005, 2007). All of the bycatch has occurred between June and October in the Mid-Atlantic. Bycatch analyses to date have not identified a shorter, more specific window of times and areas where the greatest probability of turtle bycatch occurs in any given year.

The 2008 BiOp summarizes most of the information available to date concerning sea turtle interactions with scallop gear, including research on factors affecting estimated bycatch rates in the dredge fishery. The BiOp states that from 1996-2007 there were 89 observed sea turtle takes in scallop dredge gear. These occurred in the gear, on top of the gear, swimming into the gear, or bumping by the gear at the surface. Nine turtles were dead before the tow (already decomposing) and 62 were brought on board. Of those 62, 58 were identified: 55 loggerheads, 2 Kemp's ridley, and 1 green sea turtle. Six were fresh dead, 34 were injured, 22 were uninjured, and 18 were alive but their condition was unknown. One primary issue is that being caught in the first place results in a higher level or mortality than evidenced due to submergence injuries and contact injuries. Submergence injuries are classified as an absence or reduction in breathing and consciousness with no other apparent injuries; mortality is strongly dependent on tow time. Tows of less than 10 minutes likely achieve <1% mortality rate, which is considered negligible, and mortality does not exceed 1% until more than 50 minutes of tow time (this data is for trawl gear, but NMFS assumes the same is true for dredge gear). Because scallop dredge tows are generally <= 1 hour, this should help reduce the risk of death from forced submergence. Contact injuries are classified as scrapes to soft tissues, cracks to the carapace and/or plastron, missing or damaged scutes, and/or bleeding from one or more orifice.

Chain mats do not decrease the number of turtles in contact with the gear; rather they decrease the likelihood that turtles will suffer serious injuries. However, since NMFS cannot quantify the decrease in the mortality rate, they adhered to the 64% mortality rate that was in effect prior to chain mat implementation. A 64% mortality rate assigned to the estimated 929 biennial loggerhead takes estimates that 595 of those takes will be lethal. The BiOp further stated that any Kemp's ridley and green sea turtle will be killed by the dredge fishery; however, the leatherback turtles will not have lethal takes due to their very hard shell.

From 2004-2007, there were 16 observed takes in scallop trawl gear reported in the 2008 BiOp. All were captured in the net. One was dead before the tow and was decomposing; 14 were loggerheads, 12 of which had no injuries. These takes were only observed from June through September. There is an estimated 154 loggerheads in trawl gear from 2004-2005, which is the best available information about the annual takes of loggerheads from the scallop trawl fishery. There were no observed leatherback, Kemp's ridley, or green sea turtle takes in scallop trawl gear. NMFS has not yet developed any serious injury criteria for turtles caught in scallop trawl gear. It is estimated (or assumed) that any turtle requiring resuscitation has a 50% chance of survival; applying the 50% to the 154 loggerhead takes results in 20 lethal takes.

According to the 2008 BiOp, the level of bycatch mortality removed from the turtle population would need to be much greater than the bycatch observed in the scallop fishery in order to have major effects on the population trajectory. There would need to be ten times the level of loggerhead mortality in the scallop fishery removed to stabilize the loggerhead population.

- **Action Required by 2008 Biological Opinion**

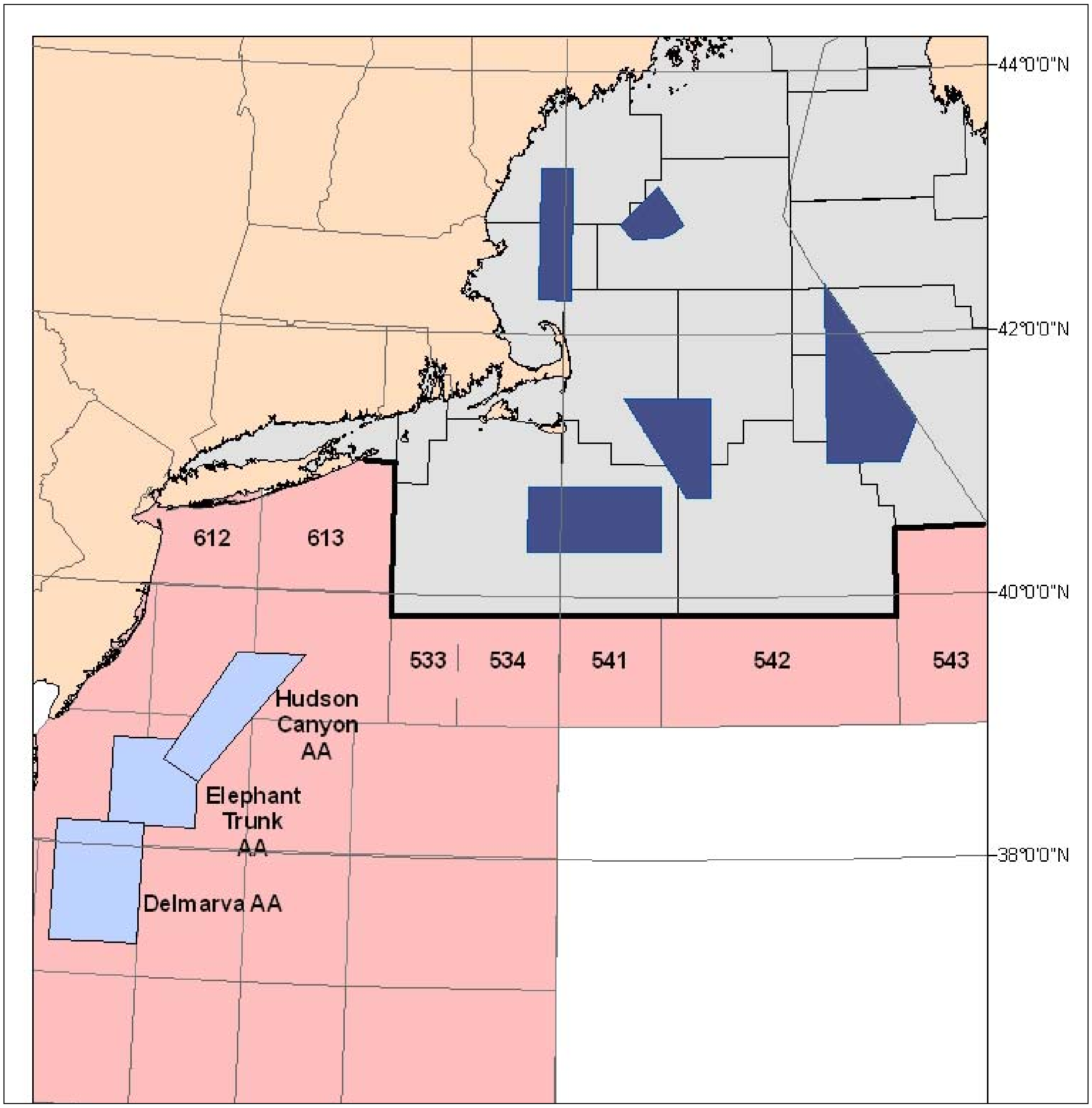
The overall conclusion of the 2008 BiOp for the sea scallop fishery is: "*After reviewing the current status of loggerhead, leatherback, Kemp's ridley, and green sea turtles, the environmental baseline and cumulative effects in the action area, the effects of the continued authorization of the Scallop FMP (including the seasonal use of chain mat modified scallop dredge gear in Mid-Atlantic waters), it is NMFS' biological opinion that the proposed activity may adversely affect but is not likely to jeopardize the continued existence of loggerhead, leatherback, Kemp's ridley and green sea turtles.*"

Specifically, the 2008 BiOp concluded that the four ESA-listed turtles will continue to be affected by the continued authorization of the scallop fishery as a result of: (a) capture in scallop dredge and trawl gear, and (b) physical contact with chain-mat equipped scallop dredge gear that may or may not result in subsequent capture of the sea turtle in the dredge bag or retention of the turtle against the outside of the dredge bag that is visible upon hauling of the gear. However, one major impact on turtles generally is ship strikes, which the BiOp found the scallop fishing vessels unlikely to do based on (a) scallop fishing vessels operate at a relatively low speed, (b) a portion of the fishing occurs in areas in which sea turtles are less or not likely (Georges Bank and Gulf of Maine), (c) a portion of the fishing occurs at times when sea turtles are not likely to be present (winter in the Mid-Atlantic and late fall thru mid spring in New England), (d) sea turtles spend part of their time at depths out of range of a vessel collision, (e) the proposed action is not expected to increase the amount of vessel traffic in areas where sea turtles occur, and (f) the fishery will continue as a limited access fishery such that the number of participants are expected to be further constrained. Lastly, continued authorization of the scallop fishery will not reduce the availability of prey for the four species of sea turtles.

The 2008 BiOp had five reasonable and prudent measures (RPMs) with an associated five terms and conditions (T&C) that implement the RPMs. The first RPM, which directly affects the sea scallop fishery, is that *NMFS must limit the amount of allocated scallop fishing effort by "Limited access scallop vessels" as such vessels are defined in the regulations (50 CFR 648.2), that can be used in the area and during the time of year when sea turtle distribution overlaps with scallop fishing activity* (as amended 2/5/09). Its associated T&C is: *to comply with (RPM 1), no later than the 2010 scallop fishing year, NMFS must limit the amount of allocated limited access scallop fishing effort that can be used in waters south of the northern boundaries of statistical areas 612, 613, 533, 534, 541-543* (Figure 1) *during the periods in which turtle takes have occurred. Restrictions on fishing effort described above shall be limited to a level that will not result in more than a minor impact on the fishery* (as amended 2/5/09).

Figure 16 – Area defined in the turtle biological opinion

Waters south of the northern boundaries of statistical areas 612, 613, 533, 534, 541, 542, and 543. In this memo this area is sometimes described as the "Mid-Atlantic."



The following are RPMs 2-5:

2. *NMFS must continue to investigate and implement, as appropriate, gear modifications for scallop dredge and trawl gear to reduce the capture of sea turtles and/or the severity of the interactions that occur.*
3. *NMFS must review available data to determine whether there are areas (i.e., "hot spots") within the action area where sea turtle interactions with scallop dredge and/or trawl gear are more likely to occur.*
4. *NMFS must quantify the extent to which chain mats reduce the number of serious injuries/deaths of sea turtles that interact with scallop dredge gear.*

5. *NMFS must determine (a) the extent to which sea turtle interactions with scallop dredge gear occur on the bottom vs. within the water column and (b) the effect on sea turtles of being struck by the scallop dredge.*

The T&C 2-5 are as follows:

2. *To comply with 2 above, NMFS must continue to investigate modifications of scallop trawl and dredge gear. Within a reasonable amount of time following completion of an experimental gear trial from or by any source, NMFS must review all data collected from the experimental gear trials, determine the next appropriate course of action (e.g., expanded gear testing, further gear modification, rulemaking to require the gear modification), and initiate action based on the determination. The goal of this RPM is ultimately to require modification of fishing gear used in the scallop fishery operating under the Atlantic Sea Scallop FMP within a reasonable timeframe following sound research that demonstrates that the gear modification is reasonable and feasible and will help tom minimize the number and/or severity of sea turtle interactions with scallop fishing gear.*
3. *To comply with 3 above, NMFS must review all data available on the observed take of sea turtles in the scallop fishery and other suitable information (i.e., data on observed turtle interactions for other fisheries or fishery surveys in the area where the scallop fishery operates) to assess whether there is sufficient information to identify "hot spots" within the action area. Within a reasonable amount of time after completing the review, if NMFS determines that "hot spots" do exist, NMFS must take appropriate action to reduce sea turtle interactions and/or impacts within any identified hot spot.*
4. *To comply with 4 above, NMFS must use available and appropriate technologies (e.g., underwater video as part of an experiment using scallop dredge gear in either the natural or controlled environment, computer modeling, etc.) to quantify the extent to which chain mats reduce the number of serious injuries/deaths of sea turtles that interact with scallop dredge gear. This information is necessary to better determine the extent to which chain mats do reduce injuries leading to death for sea turtles and may result in further modifications of the fishery to ensure sea turtle interactions and/or interactions causing death are minimized. Initiate study no later than fiscal year 2009.*
5. *To comply with 5 above, NMFS must use available and appropriate technologies to better determine where (on bottom or in the water column) and how sea turtle interactions with scallop dredge gear are occurring. Such information is necessary to assess whether further gear modifications in the scallop dredge fishery will actually provide a benefit to sea turtles by either reducing the number of interactions or the number of interactions causing mortal injuries. Initiate study no later than fiscal year 2009.*

The report also includes other requirements for monitoring, as well as several conservation recommendations. Conservation recommendations are discretionary activities designed to minimize or avoid adverse effects of an action, to help implement recovery plans, or to develop information. They are recommendations, not requirements like RPMs.

- **Sea Turtle Conservation**

Below is a summary of some of the regulations in place for turtle conservation.
NMFS finalized a rule (71 FR 50361, August 23, 2006) that requires modification of scallop dredge gear, regardless of dredge size, by use of a chain mat when the gear is fished in Mid-Atlantic waters south of 41 9.0' N from the shoreline to the outer boundary of the EEZ during the period May 1 through November 30 each year. The intent of the dredge gear modification is to reduce the severity of some turtle interactions that might occur by preventing turtles from entering the dredge bag.

On February 15, 2007 the agency also issued an advance notice of proposed rulemaking to announce it is considering amendments to the regulatory requirements for turtle excluder devices (TEDs). Among other issues, NMFS is considering requiring the use of TEDs in the Mid-Atlantic sea scallop trawl fishery, and moving the current northern boundary of the summer flounder fishery sea turtle protection area off of Cape Charles, VA to a point farther north. The objective of the proposed measures is to effectively protect all life stages and species of sea turtle in Atlantic trawl fisheries where they are vulnerable to incidental capture and mortality. Lastly, the 2008 BiOp requires NMFS to limit the amount of allocated scallop fishing effort by LA vessels when the fishery and turtles overlap temporally and spatially.

On December 3, 2002, the agency published a final rule (67 *Federal Register* 71895) establishing seasonally adjusted gear restrictions by closing portions of the mid-Atlantic EEZ waters to fishing with large-mesh (>8") gillnets to protect migrating sea turtles, and expanded that in 2006 to include modifications to the large-mesh gillnet restrictions to stretched mesh that is 7 inches or greater (71 *Federal Register* 24776). This area overlaps with only part of the scallop fishery and this gear type is not managed under the Scallop FMP. Federal and state waters north of Chincoteague, VA remain unaffected by the large-mesh gillnet restrictions.

Among the many recovery objectives identified in the Loggerhead Recovery Plan (NMFS and USFWS 2008), one is to minimize bycatch in domestic and international commercial and artisanal fisheries. The plan includes 34 Priority 1 Actions needed that include promulgating regulations to require TEDs in trawl fisheries where they are currently not required, implementing seasonal TED regulations for domestic commercial non-shrimp trawl fisheries operating from Cape Charles, VA, north to Long Island Sound , and enforcement of fishery regulations to minimize loggerhead bycatch in commercial trawl fisheries.

Gear modifications that address interactions resulting in capture in the dredge bag are likely to affect more turtles than modifications that address interactions resulting in turtles getting caught in the sweep, in forward portions of the dredge frame, or atop the dredge. Also, because few turtles were comatose, gear modifications that reduce contact injuries are expected to result in a measurable conservation benefit to a larger number of turtles compared with tow time restrictions (Haas et al. 2008).

- **Loggerhead 2009 Status Review - Summary**

In 2007, a loggerhead 5-year review was conducted that acknowledged a possible separation by ocean basins and the need for a more in-depth analysis of the population structure. Also in 2007, NMFS and FWS received two separate petitions to reclassify loggerheads in the North Pacific and in the Northwest Atlantic Ocean as Distinct Population Segments (DPS) with endangered status. These actions prompted the most recent status review by the Biological Review Team (BRT) (Conant et al. 2009).

The BRT evaluated genetic data, tagging and telemetry data, demographics information, oceanographic features, and geographic barriers to determine whether population segments exist. Nine DPSs were identified as being discrete from other conspecific population segments and significant to the species. The 9 DPS are:

- North Pacific Ocean DPS
- South Pacific Ocean DPS
- North Indian Ocean DPS
- Southeast Indo-Pacific Ocean DPS
- Southwest Indian Ocean DPS
- Northwest Atlantic Ocean DPS
- Northeast Atlantic Ocean DPS
- Mediterranean DPS
- South Atlantic Ocean DPS

Note that the Northwest Atlantic Ocean DPS is the relevant DPS for the Atlantic sea scallop fishery, with the DPS delineated by 60 N latitude and the equator as the north-south boundaries and 40 W longitude as the east boundary.

Two analyses were completed to assess extinction risks of the DPSs. The first used a diffusion approximation approach based on counts of nesting females to calculate a metric (susceptibility to quasi-extinction (SQE)). SQE is an increasing function of the quasi-extinction threshold. As this analysis involved counts of nesting females, only beaches with >12-15 years of data were evaluated (North Pacific, South Pacific, Southwest Indian, Northwest Atlantic (besides Dry Tortugas Recovery Unit), South Atlantic). Of those five, the Northwest Atlantic, South Pacific, and North Pacific DPSs indicated a high likelihood of quasi-extinction over a wide range of QET values.

The second analysis used a deterministic stage-based population model focused on known anthropogenic mortalities on each DPS. This approach involved an estimation of how additional mortalities may affect the future growth and recovery of each DPS. According to the analysis, all DPS have the potential to decline in the future, but the threat is greatest for the North Indian, Northwest Atlantic, Northeast Atlantic, Mediterranean, and South Atlantic DPSs.

Overall, the BRT concluded that the Northeast Atlantic and Mediterranean DPSs are at immediate risk of extinction; the North Pacific, South Pacific, North Indian, Southeast Indo-Pacific, Northwest Atlantic DPSs are currently at risk of extinction; and the Southwest Indian and South Atlantic DPSs are likely not currently at immediate risk of extinction.

Note that the status review document is not a listing decision. The BRT submitted their independent report to NMFS and FWS on August 11, 2009, and the next steps are for the agencies to evaluate the report and determine what, if any, action is appropriate under the ESA. Possible decisions by the agencies include no change in listing status; a change in listing status for the species as currently defined (single species range wide); identification of distinct population segments (DPS) and proposing to list some or all of them as either threatened or endangered. The agencies will prepare proposed determinations and publish those in the Federal Register and solicit comments. The agencies will then review the comments and prepare a final determination which, again, could be any of the above options.   Typically a listing action becomes effective 30 days after publication of the final rule in the Federal Register. Only after that final listing decision is announced in the Federal Register would DPSs be applied if deemed necessary and warranted, and a new listing be in effect.

A new listing decision for loggerhead sea turtles would warrant reinitiation of section 7 consultation on the Atlantic sea scallop fishery, but that would not happen until after a proposed and final determination was issued. The new status review does not impact anything the Council and NMFS need to do for FW21.

4.4 ECONOMIC TRENDS IN THE SEA SCALLOP FISHERY

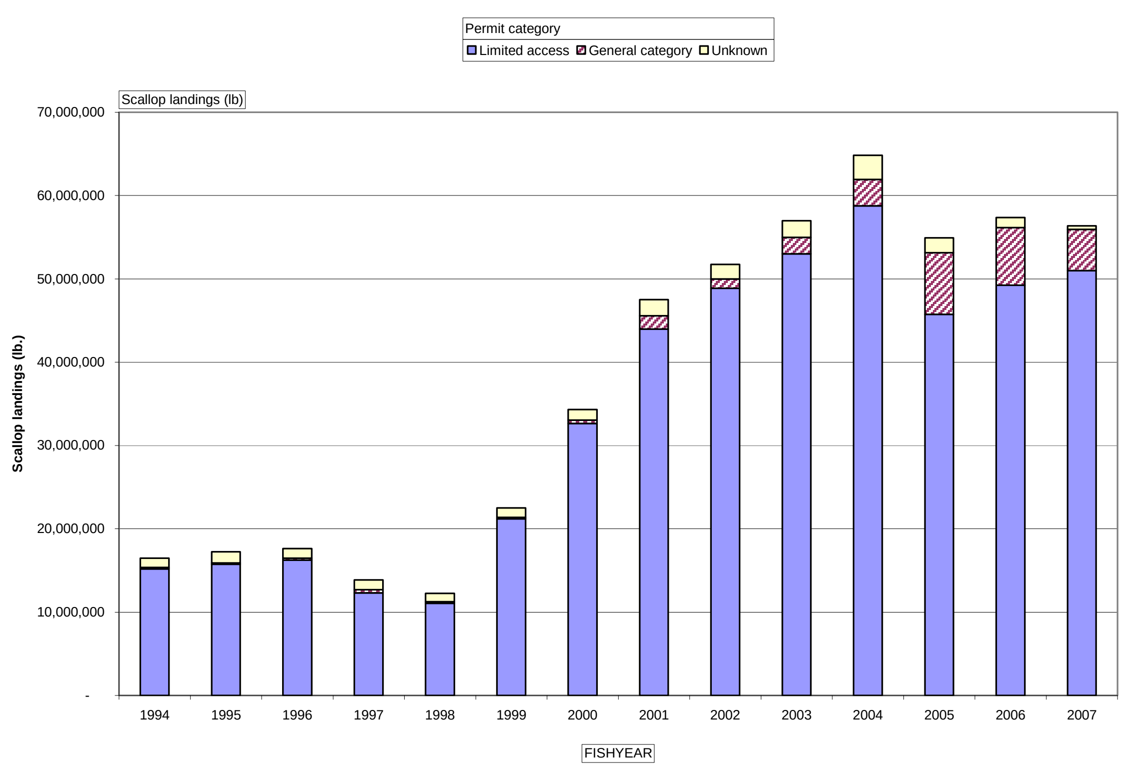
4.4.1 Introduction

This document describes the trends in landings, revenues, prices, producer surplus and profits for the sea scallop fishery since 1994, and as such, it provides a background for the economic analyses that will be conducted for Amendment 15 options. These preliminary empirical analyses will be revised with the updated data and extended to include the trends in employment, consumer surplus, and total economic benefits for the scallop fishery.

4.4.2 Trends in Landings, prices and revenues

In the fishing years 2002-2007, the landings from the northeast sea scallop fishery stayed above 50 million pounds, surpassing the levels observed historically (Figure 17). The recovery of the scallop resource and consequent increase in landings and revenues was striking given that average scallop landings per year were below 16 million pounds during the 1994-1998 fishing years, less than one-third of the present level of landings. The increase in the abundance of scallops coupled with higher scallop prices increased the profitability of fishing for scallops by the general category vessels. As a result, general category landings increased from less than 0.4 million pounds during the 1994-1998 fishing years to more than 5 million pounds during the last three fishing years (2005-2007), peaking at 7 million pounds in 2005 or 13.5% of the total scallop landings.

Figure 17. Scallop landings by permit category and fishing year (dealer data)



Data source and uncertainties: Figure 17 is based on information obtained from the dealer database. The permit categories were not always identified correctly in the dealer data, such that some limited access landings were recorded incorrectly as ‘‘general category”. Based on the data review done in 2006, some corrections were made to the outlier data items. State of Connecticut landings were shown as a sum of landings by all vessels regardless of the permit category. For that reason, the composition of landings in terms of the permit category cannot be identified for the ‘unknown” category. The landings from Connecticut will be reported by permit after 2007 on (Greg Power e-mail).

Figure 18 shows that total fleet revenues for the limited access vessels tripled from about $100 million in 1994 to over $300 million in 2007 in inflation-adjusted 2006 dollars. Scallop ex-vessel prices increased after 2001 as the composition of landings changed to larger scallops that in general command a higher price than smaller scallops. However, the rise in prices was not the main factor that led to the increase in revenue in the recent years compared to 1994-1998 and in fact, the inflation adjusted ex-vessel price of scallops in 2007 was lower than the price in 1994. The increase in total fleet revenue was mainly due to the increase in scallop landings and the increase in the number of active limited access vessels during the same period. Figure 19 shows that average landings and revenue per limited access vessel more than doubled in recent years compared to the period 1994 -1998. The number of active vessels increased by 50 % (from about 220 in 1994 to 346 in fishing year 2007) resulting in tripling of total fleet scallop landings and revenue in 2007 compared to 1994 (Figure 19).

Figure 18. Trends in total scallop landings, revenue and ex-vessel price by fishing year (limited access fishery only)

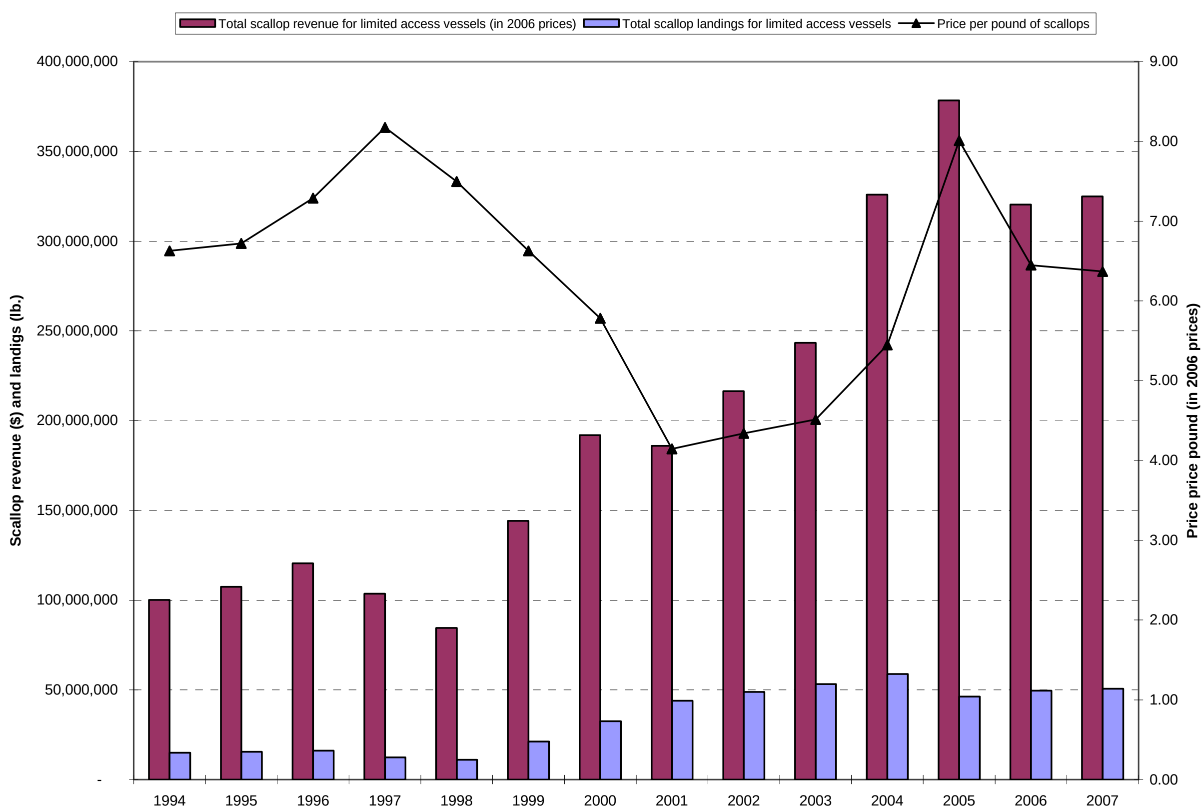
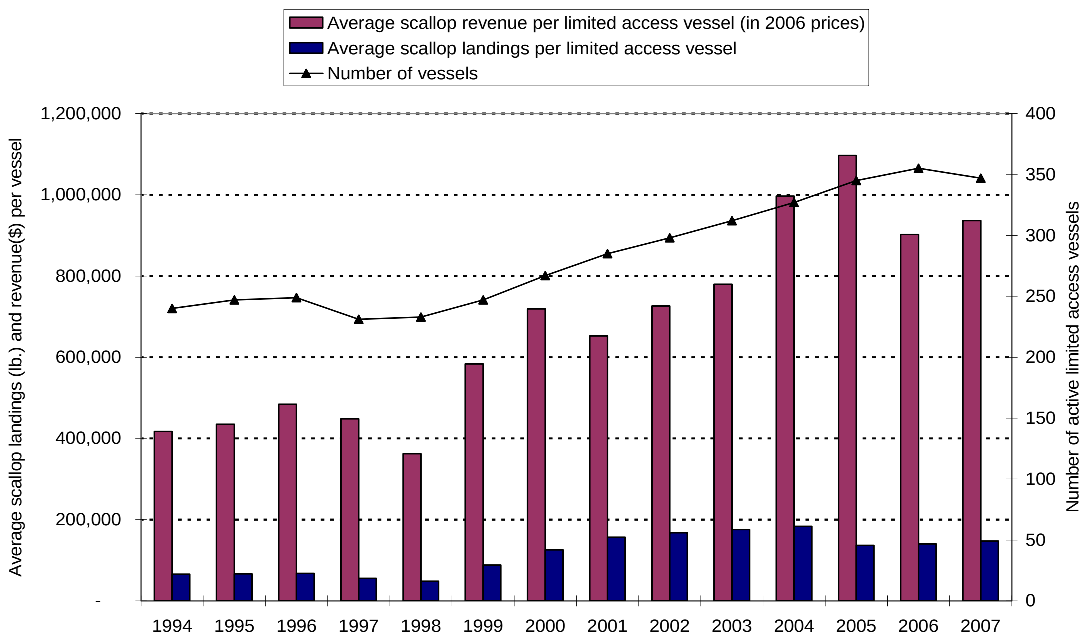


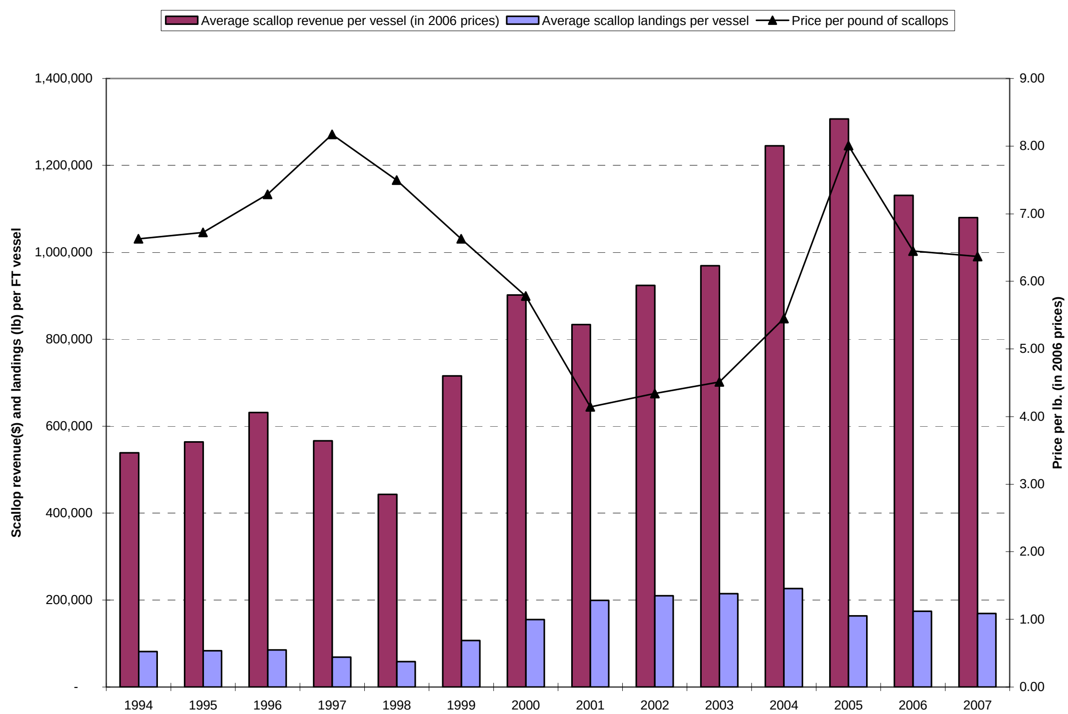
Figure 19. Trends in average scallop landings and revenue per full time vessel and number of active vessels (including full-time, part-time and occasional vessels)



The trends in revenue per full-time vessel were similar to the trends for the fleet as a whole. The following analyses show the trends for 124 full-time vessels that were active in the scallop fishery for 14 years; that is, for every year from fishing year 1994 to the end of fishing year 2007. In addition, each vessel in this group used more than 50% of their DAS allocation, and average HP was 904 and GRT was 167 for this group of vessels. This group was selected so that the average trends will not be biased by including vessels that participated in the fishery only a few years, mainly in the recent years. For example, there were about 56 full-time vessels that were active for 4 years or less as of the 2006 fishing year. These vessels had a lower fishing power (smaller HP and GRT) and consequently had lower revenues and profits than the 124 full-time vessels included in the sample. Including these smaller vessels would reduce the average profits and revenues in the recent years relative to the earlier fishing years and would underestimate the increase in average profit per full-time vessel in recent years. Similarly, the full-time vessels that used less than 50% of their DAS allocation either because of choice or because of data inaccuracies are not included in the sample group of full-time vessels, because including them would either underestimate the average revenue or trip costs per vessel, resulting in lower profits in the first and higher profits in the second case.

Figure 20 shows that average scallop revenue per full-time vessel in the sample of 124 vessels doubled from about $538,000 in 1994 to over 1,080,000 in 2007 despite the fact that inflation adjusted ex-vessel price per pound of scallops was slightly higher in 1994 ($6.60 per pound) compared to the ex-vessel price in 2007 ($6.40 per pound). In other words, the doubling of revenue was the result of the doubling of the average scallop landings per vessel in 2007 (over 169,000 pounds) from its level in 1994 (over 81,500 pounds). The total fleet revenue for all the limited access vessels more than tripled during the same years as new vessels became active. Average scallop revenue per full-time vessel peaked in the 2005 fishing year to over $1.3 million as a result of higher landings combined with an increase in ex-vessel price to about $8.00 per pound of scallops.

Figure 20. Trends in average scallop landings and revenue per full time vessel (sample of 124 vessels)



4.4.3 Trends in effort

4.4.3.1 Trends in DAS-used

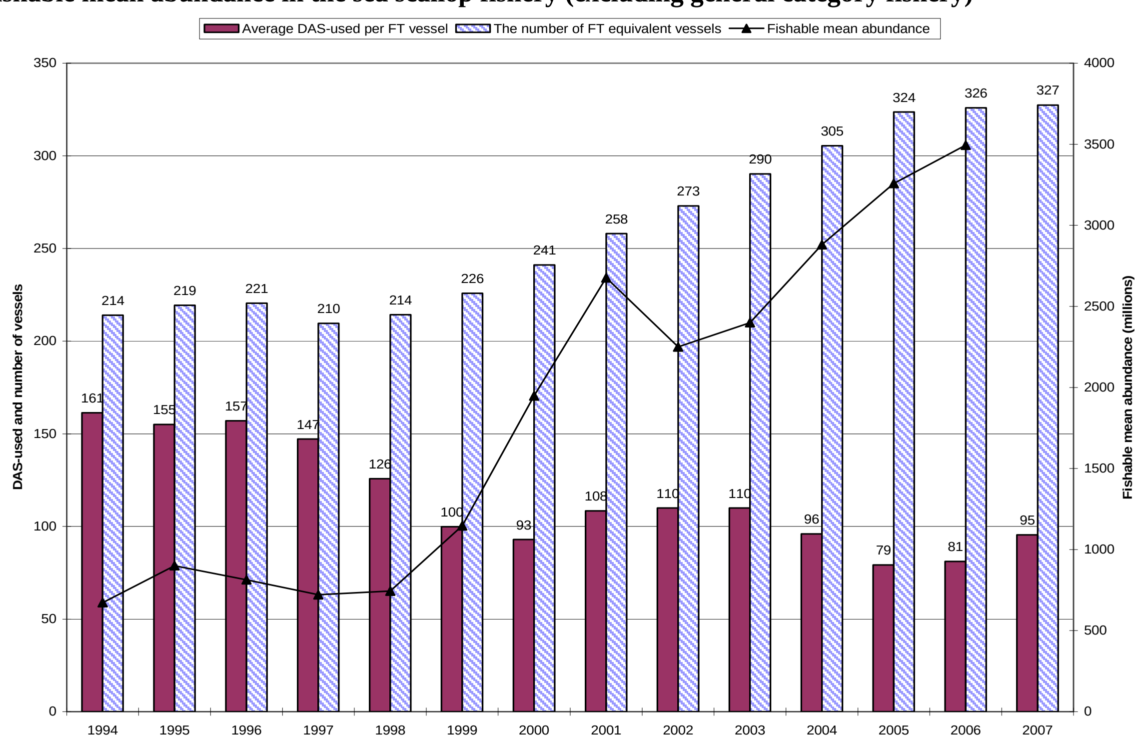
There has been a steady decline in the total DAS used by the limited access scallop vessels from the 1994 to 2001 fishing years as a result of the effort-reduction measures of Amendment 4 (1994) and Amendment 7 (1999)). DAS allocations during this period were reduced almost by half from 204 DAS in 1994 to 120 DAS for the full-time vessels and in the same proportions for the part-time and occasional vessels from their base levels in 1994 (Table 18). As a result, DAS used reached the lowest levels of about 22,550 days in the 1999 and 2000 fishing years from about 34,000 days in 1994, even though the number of full-time equivalent vessels increased during these years from 214 vessels in 1994 to 241 vessels in 2000 (Figure 21). Average DAS used per full-time vessel declined from 161 days in 1994 to 93 days in 2000. The low levels of resource abundance discouraged many vessels from fishing for scallops during those years.

Table 18. DAS and trip allocations per full-time vessel

Year	Allocations based on the Management Action	Total DAS Allocation (1)	Estimated Open area DAS allocations (2)	Access area trip allocations (3)	DAS charge or equivalent per access area trip (4)	Equivalent (estimated) DAS allocation for access areas (5)
1994	Amendment 4	204	None	None		None
1995	Amendment 4	182	None	None		None
1996	Amendment 4	182	None	None		None
1997	Amendment 4	164	None	None		None
1998	Amendment 4	142	None	None		None
1999	Amendment 7, Framework 11	120	90 to 120	3	10	0 to 30
2000	Framework 13	120	60 to 120	6	10	0 to 60
2001	Framework 14	120	90 to 120	3	10	0 to 30
2002	Framework 14	120	90 to 120	3	10	0 to 30
2003	Framework 15	120	90 to 120	3	10	0 to 30
2004	Framework 16	126	42 (MAX.62)	7	12	84
2005	Framework 16	100	40 (MAX.117)	5	12	60
2006	Framework 18	112	52	5	12	60
2007	Framework 18	111	51	5	12	60

(1) Total DAS allocation per full-time vessel represents a rough estimate for years 2004-07 since DAS is allocated for open areas only. DAS allocation for access areas is estimated by assuming an equivalent 12 days-at-sea allocation for each access area trip with a possession limit of 18,000 pounds

Figure 21. Average DAS-used per full-time vessel, the number of full-time equivalent active vessels and fishable mean abundance in the sea scallop fishery (excluding general category fishery)

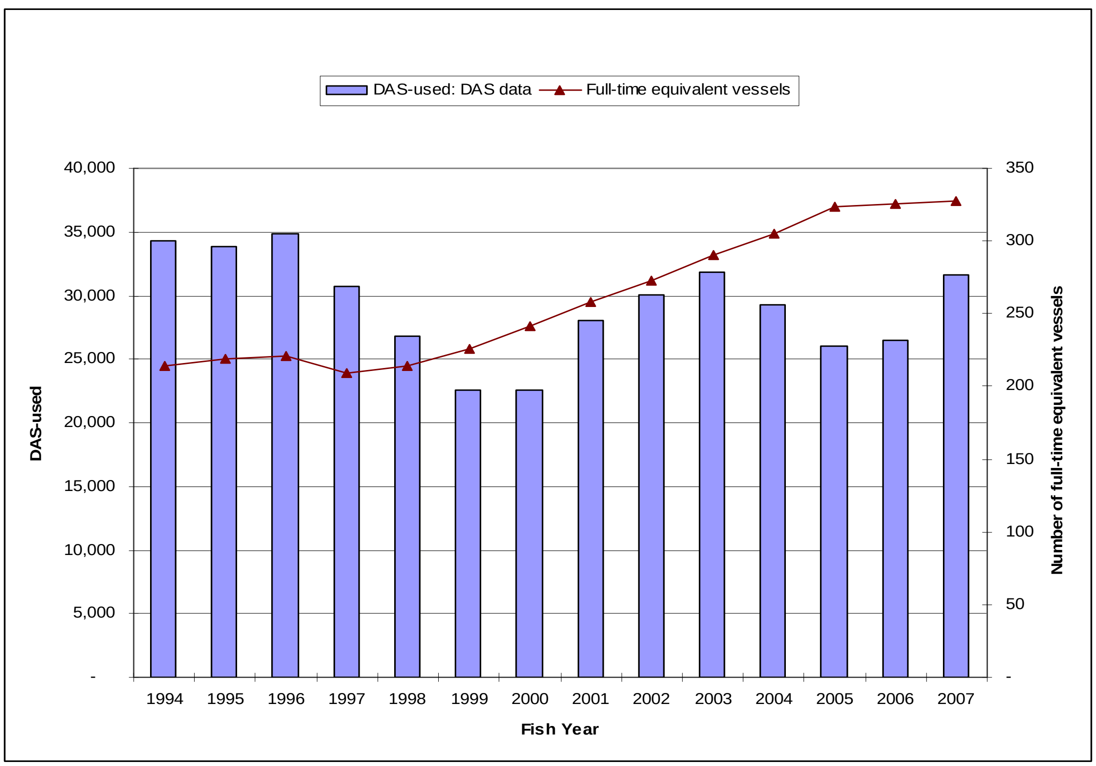


DAS Data sources: Reporting changes cause uncertainty in comparing trends in DAS-used.

1994-2003	SOLE	Enforce.FISHYY
2004-05	CUDA1	DAS.trips

After fishing year 2000, fishing effort started to increase as vessels used more DAS and more limited access vessels participated in the sea scallop fishery. The increase in total effort was mostly due to the increase in the number of vessels. The DAS used per full-time vessel increased to 110 days during the 2002 and 2003 fishing years from 93 days in 2000. This level was still significantly lower than the DAS used in the mid-1990s (over 150 days, Figure 22). During those years there was no change in the total DAS allocations (120 DAS per full-time vessel). The recovery of the scallop resource and the dramatic increase in fishable abundance after 1999 increased the profits in the scallop fishery, thus leading to an increase in participation by limited access vessels that had been inactive during the previous years. Georges Bank closed areas were opened to scallop fishing starting in 1999 by Framework 11 (CAII) and later by Framework 13 (CAII, CAI, NLS), encouraging many vessel owners to take the opportunity to fish in those lucrative areas. Frameworks 14 and 15 provided controlled access to Hudson Canyon and VA/NC areas. As a result, 49 new full-time equivalent vessels became active in the sea scallop fishery after 2000 during the next three fishing years. The total number of full-time equivalent vessels reached 290 in 2003 and total fishing effort by the fleet increased to 31,800 days in 2003 from about 22,600 in 2000 (Figure 6).

Figure 22. Total DAS-used and the number of active (full-time equivalent) vessels in the sea scallop fishery



Total fishing effort (DAS-used) declined after 2003 even though the number of active vessels increased to 326 vessels in 2006 from 290 vessels in 2003. With the implementation of Amendment 10 (2004) the limited access vessels were allocated DAS for open areas and a number of trips for the specific access areas with no open area trade-offs. The open area allocations were reduced to 42 DAS in 2004 whereas full-time vessels were allocated 7 access area trips in the same year (Table 18, Framework 16). Even though total DAS equivalent allocations remained around the same levels during 2005-2007 (at about 110 equivalent days, Table 18), the fishing effort, i.e., fleet DAS used increased in the 2007 fishing year as many vessels took their unused 2005 HCA trips in that year. If not for those HCA trips, the total effort in the scallop fishery would probably have stayed constant during 2005-2007 with almost all qualified limited access vessels participating in the fishery.

4.4.3.2 Effort by open and access areas

Until 2004, DAS were allocated for the whole fishing area. Starting with Framework 16, DAS were allocated for open areas only, and trips were allocated for access areas instead of DAS. The unused Georges Bank access area trips could be transferred to open areas if the access areas were closed due to reaching the yellowtail flounder annual TAC. For example, a vessel that has taken two of three access trips may fish for 12 additional DAS in the open areas (totaling 42 + 12 = 54 DAS for the fishing year). In 2004, the DAS allocation for open areas without access trips was 62 days, meaning that a vessel could transfer no more than 20 DAS from a closed access area to open areas. So a vessel that has taken only one of three trips or has not yet fished in an access area may transfer no more than 20 DAS to the open areas, totaling 62 open area DAS for the fishing year. Table 18 provides the maximum number of DAS that could have been used in open areas due to transferring DAS from unused controlled access trips. DAS transfers were allowed only for the Georges Bank access areas and would exclude Mid-Atlantic access areas. As a result of these transfers and carry-over DAS being used by some vessels, average open area DAS-used by full-time vessels were about 52 days in 2004, and 44 days in 2005, higher than the base open area allocations in either year.

Table 19. DAS-used and the number of trips by full-time vessels by area

AREA	DATA	FISHING YEAR			
		2004	2005	2006	2007
ACCESS	Allocated number of trips	7	5	5	5
	Average DAS-used per vessel	45	37	30	49
	Average number of trips per vessel	6	5	5	8 *
	Average trip length	8	8	6	6
	Total number of trips	1636	1371	1386	2390
	Total DAS-used	12864	11039	8681	15492
	Number of full-time vessels fished	289	302	289	317
OPEN	DAS allocation per vessel	42	40	52	51
	Average DAS-used per vessel	52	44	54	46
	Number of trips	8	8	7	6
	Average trip length	8	7	8	9
	Total number of trips	2214	2360	2261	1749
	Total DAS-used	15328	13656	16915	14620
	Number of full-time vessels fished	293	312	317	319
ALL AREAS	Average DAS used per vessel	97	81	84	95
	Total DAS-used	28192	24695	25596	30112
	Total number of active vessels	293	312	317	319

(*) Because of carry-over trips taken in HCA in 2007, number of trips is greater than the number of allocated trips. See Table 21

Framework 16 allocated 4 trips to HCA in 2004 and 3 trips to HCA in 2005 (18,000 pounds each). Because the catch rates were lower than expected in this area, many vessels chose to delay taking their 2005 access trips. Table 21 shows that only 237 out of 312 active full-time vessels took some of their trips to HCA in 2005, averaging about 2.5 trips per vessel. Framework 18 extended the Hudson Canyon access program – such that vessels that did not take their HCA trips could take them in either 2006 and/or 2007. Many of these vessels postponed taking those trips until 2007. The number of trips shown could be larger than allocated since some of these trips are compensation trips. The use of HCA trips in 2007 is the major reason behind the increase in total effort in 2007 compared to 2006 given that DAS allocations, number of access area trip allocations and the number of active vessels were similar in each year.

Table 21 shows that about 5,500 DAS were used in HCA in 2007 which is almost equal to the difference in total effort in the 2005 and 2006 fishing years. It also explains why on the average more access area trips were taken per vessel in 2007 (average of 8, Table 2) than the 5 trips per vessel allocated by FW18. Again, the inclusion of the compensation trips probably overestimates the number of HCA and other access area trips per vessel in Table 19 and Table 21.

Table 20. Framework 18 DAS and access area trip allocations

Framework 18 allocations	Open area DAS per FT vessel	Controlled access area trips	Elephant Trunk	Hudson Canyon	Delmarva	Total DAS per FT vessel
DMV - 20K open area DAS in 2006 and 2007 (Proposed Alternative)						
2006	52	1 CAI, 2 CAII, 2 NLS (60 DAS)	Closed	2005 trips	Open	112
2007	51	1 CAI, 1 NLS, 3 ETA (84 DAS)	5 trips*	2005 trips	Closed	111

*Originally F18 allocated 5 trips to ETA but this was later reduced to 3 by emergency action.

Table 21. DAS-used and the number of trips by full-time vessels in Hudson Canyon Access Area

Fishyear	Number of trips per vessel	Average DAS-used per vessel	Total DAS-used	Total number of trips	Number of full-time vessels fished
2004	4.1	34.0	9734	1163	286
2005	2.6	26.1	6181	605	237
2006	1.7	12.2	709	99	58
2007	2.8	24.0	5501	633	229

4.4.3.3 Trends in effective fishing effort and vessel characteristics

Figure 7 shows the number of limited access vessels by permit category. The fishery is primarily full-time, with a small number of part-time and few occasional permits. The number of full-time vessels has been on the rise since 1997 but seems to have leveled off around 320 beginning in 2005. Of these permits, the majority are dredge vessels, with a small amount of full-time small dredge and full-time trawl vessels (Figure 8).

Figure 23. Number of limited access vessels by permit category

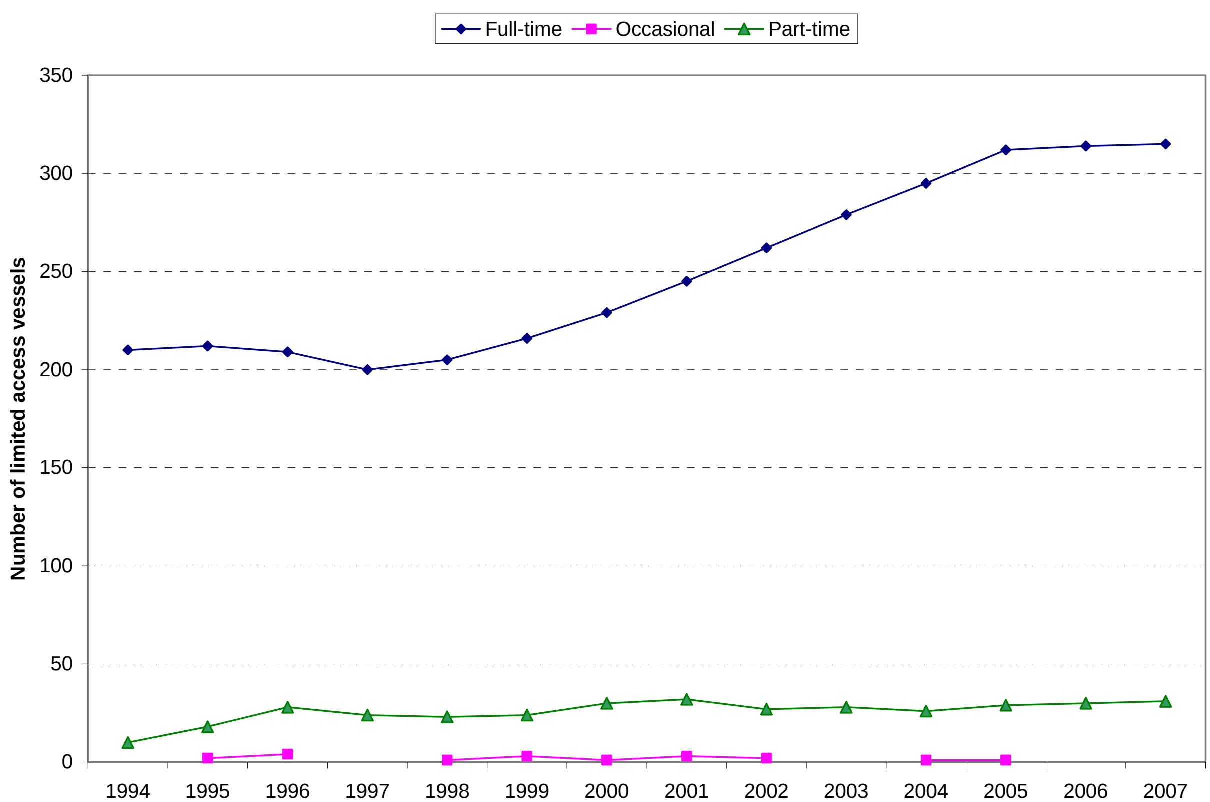
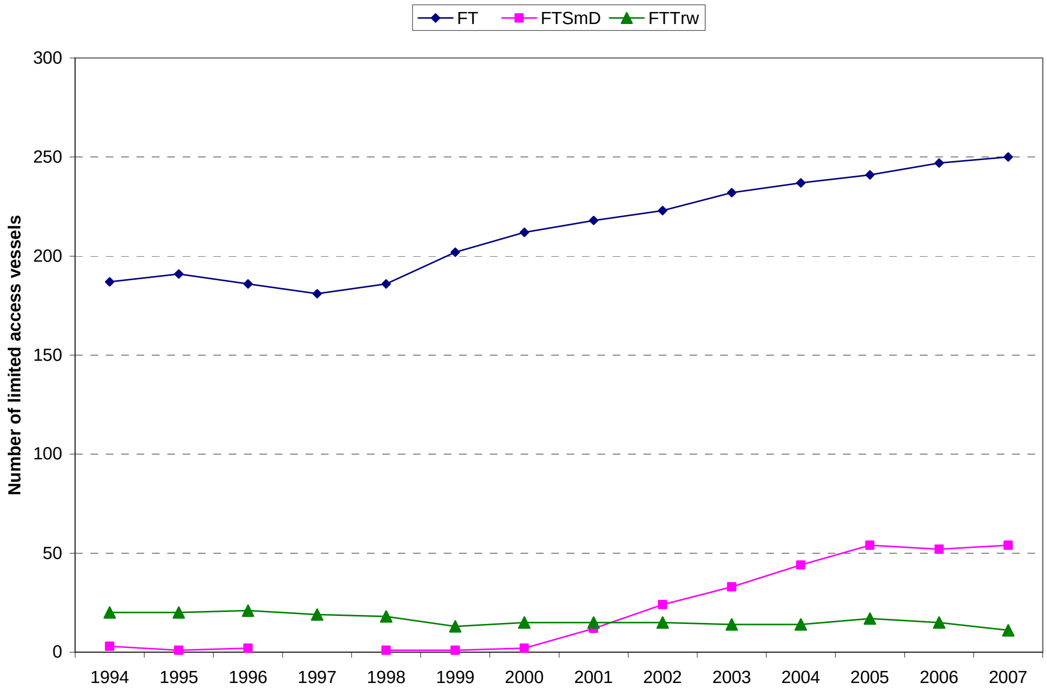


Figure 24. Number of full-time vessels by permit category



Horsepower of permitted vessels in the limited access fleet ranges from <500 hp to greater than 1000 hp. The majority of the small dredges had a horsepower of less than 500. The overall fleet horsepower average has been on the rise but, like fleet size, shows signs of leveling off in the most recent years of data (Figure 9).

Figure 25. Number of limited access vessels by horsepower (including part-time and occasional vessels)

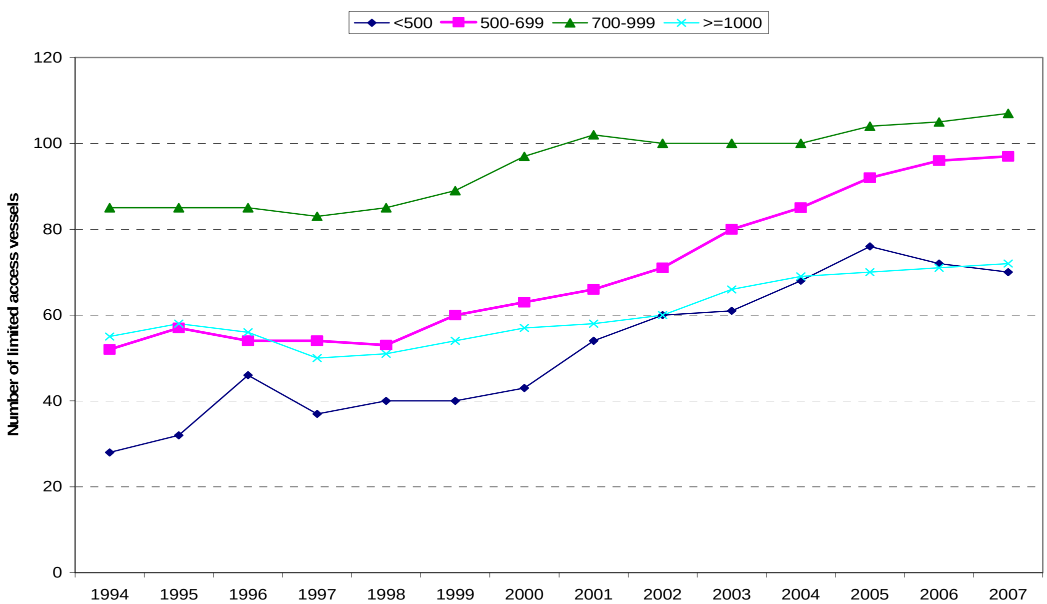


Table 22. Number of limited access vessels by years active

Number of vessels	Years Active				
FISHYEAR	<5 years	5-9 years	10-13 years	14 years	Grand Total
1994	28	22	40	150	240
1995	22	24	51	150	247
1996	20	24	55	150	249
1997	6	22	53	150	231
1998	1	28	54	150	233
1999	3	35	59	150	247
2000	4	47	66	150	267
2001	4	67	64	150	285
2002	3	79	66	150	298
2003	4	92	66	150	312
2004	27	88	62	150	327
2005	55	86	54	150	345
2006	75	84	46	150	355
2007	84	79	34	150	347

Average HP, GRT and crew declined slightly from 1994 to 2007 because more small vessels became active in the fishery, reducing marginally the rise of HP-weighted DAS used compared to the total DAS used in 2007 (Figure 26). There is a slight difference in trend for fishing effort weighted by horsepower from the total fleet DAS used as shown in Figure 27.

Figure 26. Average HP, GRT and crew size of limited access vessels

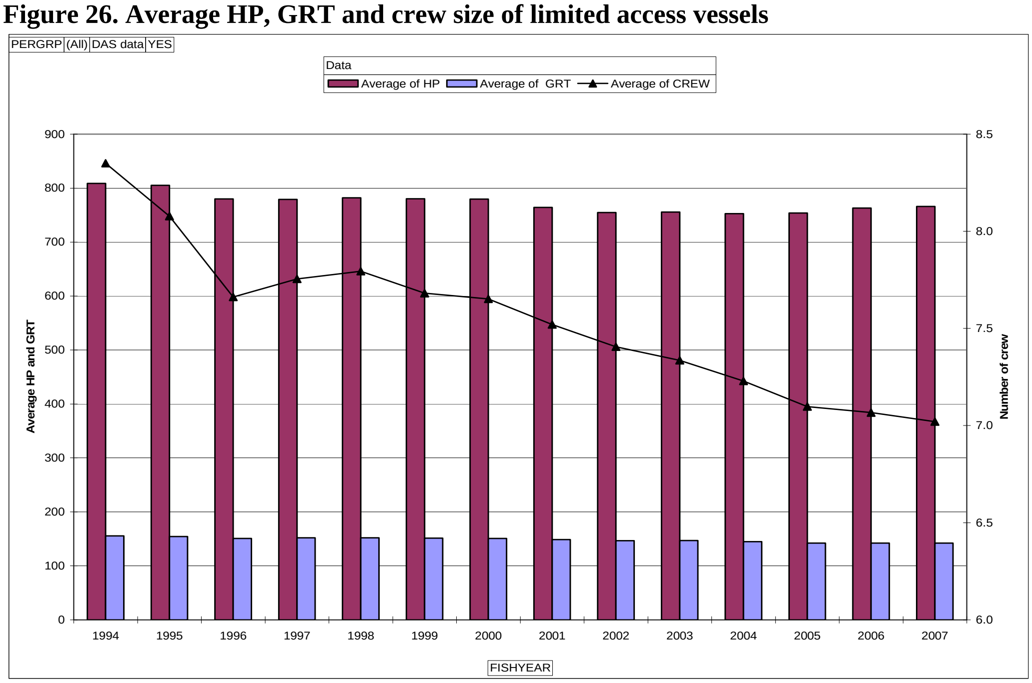
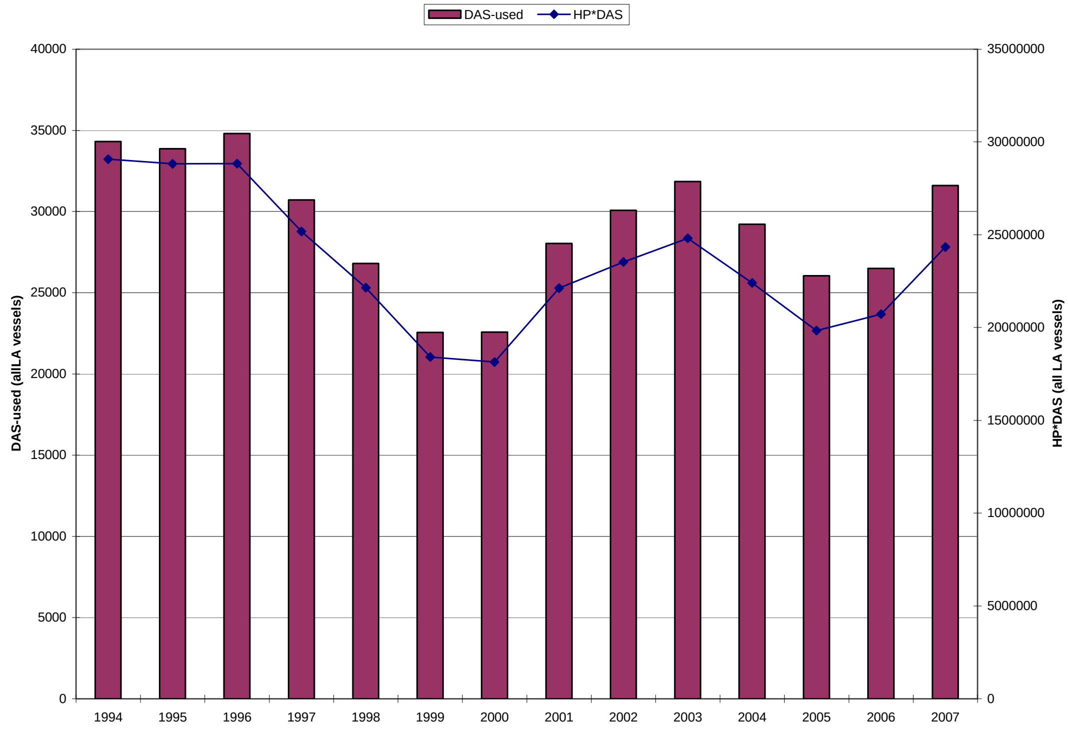


Figure 27. Trends in fishing effort by limited access vessels



4.4.4 Trends in BIOMASS, LPUE and participation

The annual average LPUE increased constantly after 1998 as the scallop resource recovered and fishable mean biomass increased from about 750 million in 1998 to over 3500 million in 2006 (Figure 28). Average LPUE for a full-time vessel increased from 540 pounds per DAS in 1994 to over 2000 pounds per DAS in 2004, but declined afterwards to 1,700 pounds per DAS in 2007 (Table 23). The increase in scallop abundance provided incentive for new limited access vessels to participate in the fishery especially after the 1999 fishing year, which potentially had a negative impact on the LPUE per vessel due to the increased competition for scallops, although the extent of this impact requires more analysis.

Figure 28. Fishable biomass, LPUE (annual landings/ DAS) and number of limited access vessels (all vessels)

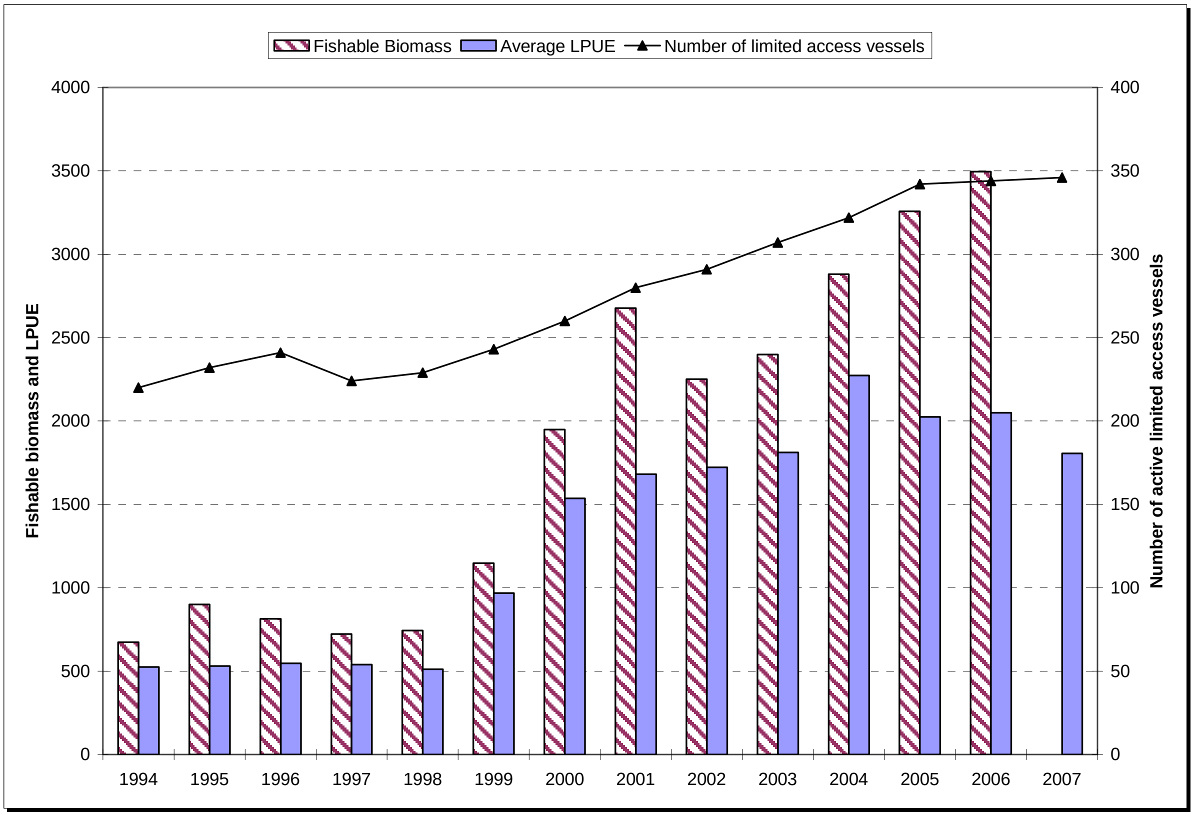


Table 23. Trends in LPUE for full-time vessels (including small dredge and scallop trawls) and fishable mean abundance

FISHYEAR	FT vessels that landed an average of less than 400 pounds of scallops per DAS as an average per year (Group A)	FT vessels that landed 400 pounds or more scallops per DAS as an average per year (Group B)	Average LPUE per full-time vessel (includes all vessels in Groups A and B)	Average LPUE per full-time vessel that landed 400 pounds or more scallops per DAS (Group B)	Maximum LPUE (Rounded numbers) All FT vessels)	Fishable mean abundance * (Whole stock, all sizes, millions)
1994	87	117	437	543	970	673
1995	57	148	471	540	850	900
1996	65	137	474	549	900	813
1997	107	87	414	537	1500	722
1998	97	103	416	517	750	744
1999	6	200	943	963	1800	1147
2000	Less than 5	219	1487	1504	2700	1948
2001	Less than 5	237	1604	1623	2700	2677
2002	Less than 5	254	1627	1638	3700	2250
2003	Less than 5	269	1691	1713	4700	2399
2004	6	284	2083	2124	4500	2881
2005	Less than 5	304	1856	1866	4700	3258
2006	9	302	1868	1918	4000	3495
2007	Less than 5	307	1693	1714	3800	NA

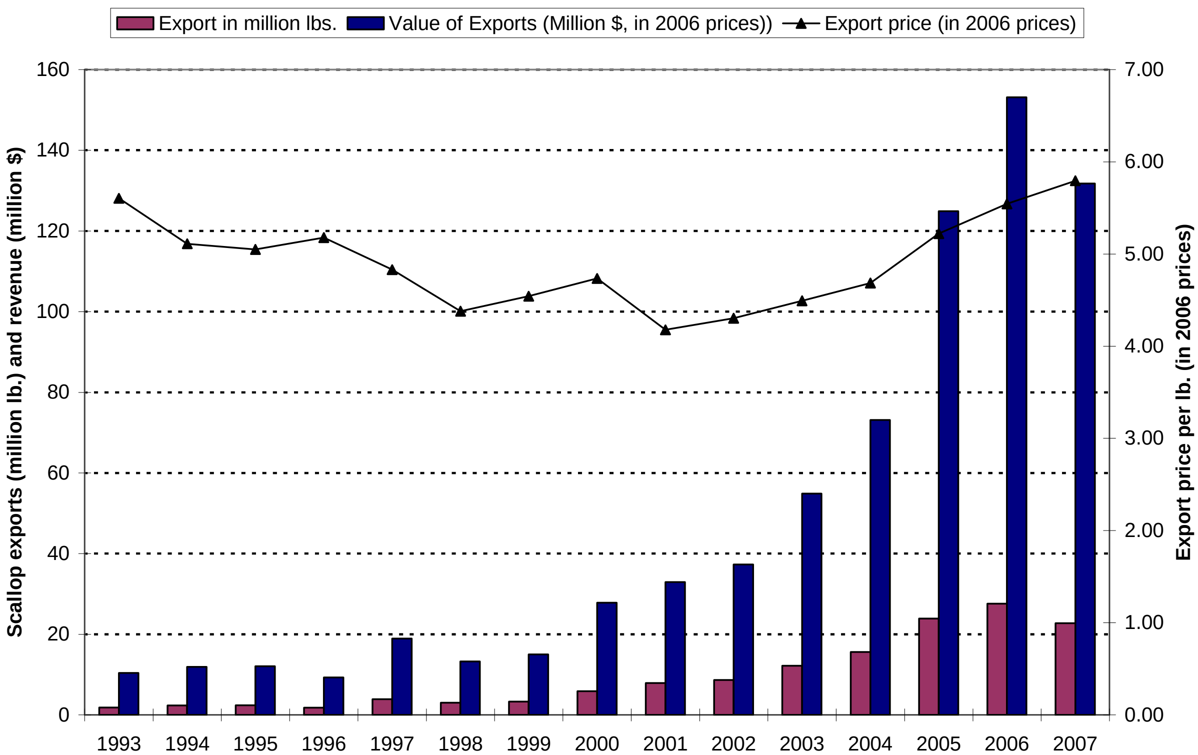
* 45th Stock Assessment Report for Atlantic Sea Scallops (Sept, 2007), Table B5-5, p.183.

4.4.5 Trends in foreign trade

4.4.5.1 Exports

Figure 29 shows exports from New England and Mid-Atlantic ports combined and includes fresh, frozen and processed scallops. The exports from all other states and areas totaled only about $1 million in 2006 and 2007, and thus were not considered significant.

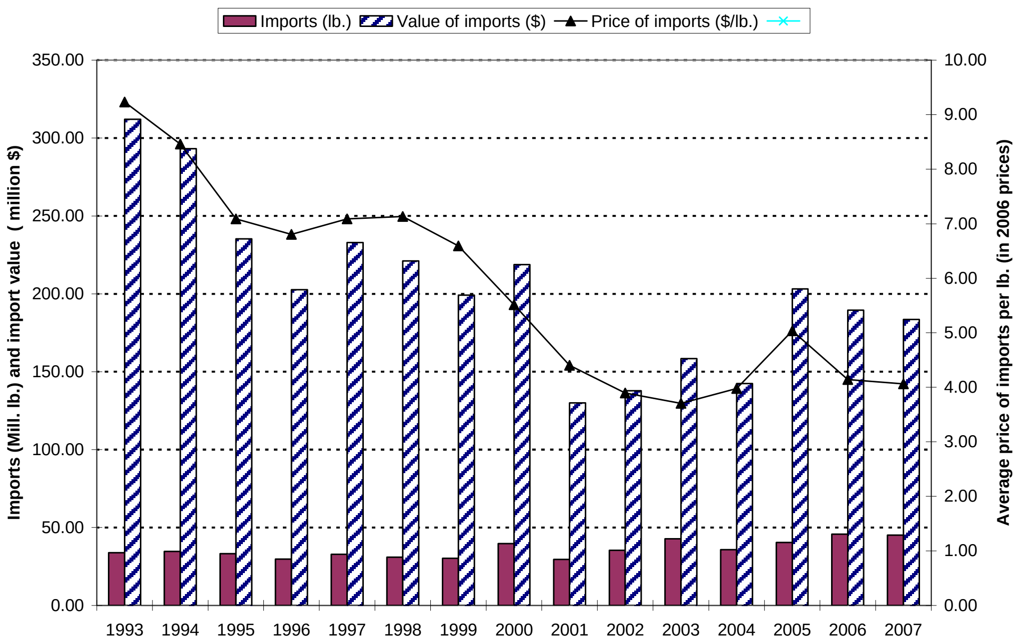
Figure 29. Scallop exports from New England and Mid-Atlantic (by calendar year)



4.4.5.2 Imports

Figure 14 shows the imports and imported value along with price per pound. The poundage of imports has been very constant over the years, but price and value have fluctuated somewhat. The most recent value data is close to the average for the time series but appears to be declining, while the price has been falling since the start of the time series with the exception of a slight rise in 2004-2005.

Figure 30. Imports, value of imports and import price of scallops (by calendar year)



4.4.5.3 The Trends in fishing by gear type

Table 24 through Table 9 describe general category landings by gear type. These tables are generated by VTR data and since all VTR records do not include gear information, the number of vessels in these tables will differ from other tables that summarize general category vessels and landings from dealer data. Primary gear is defined as the gear used to land more than 50% of scallop pounds. Most general category effort is and has been from vessels using scallop dredge and other trawl gear (

Table 24). The number of vessels using scallop trawl gear increased through 2006 but has declined in recent years. In terms of landings, most scallop landings under general category are with dredge gear (Table 2), with significant amounts also landed by scallop trawls and other trawls. Table 9 shows the percent of general category landings by primary gear and year. The percentages of scallop landings with other trawl gear in 2008 and 2009 were the highest they have been since 2001, but still significantly less than dredge.

Table 24. Number of general category vessels by primary gear and fishing year

FISHING YEAR	DREDGE, OTHER	DREDGE, SCALLOP	MISC	TRAWL, OTHER	TRAWL, SCALLOP
1994	1	33	4	42	1
1995	4	91	5	48	4
1996	7	101	13	49	1
1997	6	118	9	55	*
1998	10	100	8	52	1
1999	10	87	3	61	5
2000	7	78	9	91	3
2001	4	122	7	118	6
2002	3	147	3	104	9
2003	6	155	2	116	17
2004	8	217	10	183	35
2005	26	280	3	183	60
2006	29	366	9	159	65
2007	26	280	4	125	30
2008	9	129	5	66	21
2009	8	117	1	53	22

* = value unknown.

Table 25. General category scallop landings byprimary gear (pounds)

FISHING YEAR	DREDGE, OTHER	DREDGE, SCALLOP	MISC	TRAWL, OTHER	TRAWL, SCALLOP
1994	111	144,139	260	9,564	2,601
1995	4,812	501,910	1,146	43,585	11,797
1996	1,352	578,884	3,314	19,460	1,644
1997	3,253	682,270	3,465	30,227	*
1998	6,049	334,930	2,443	19,677	3,750
1999	18,322	236,482	599	17,537	3,970
2000	6,446	303,168	1,411	173,827	8,179
2001	91,939	1,254,153	6,518	404,709	28,276
2002	21,888	1,266,144	919	74,686	41,977
2003	22,614	1,590,575	484	171,511	196,376
2004	36,260	2,624,753	2,259	487,620	373,980
2005	198,736	4,934,735	1,441	744,027	892,154
2006	198,400	5,607,142	8,386	418,708	599,508
2007	142,044	4,517,800	724	226,131	395,683
2008	87,186	2,593,870	1,502	528,252	287,362
2009	63,368	1,940,047	400	574,555	211,598

* = value unknown.

Table 26 - Percentage of general category scallop landings by primary gear

FISHING YEAR	DREDGE, OTHER	DREDGE, SCALLOP	MISC	TRAWL, OTHER	TRAWL, SCALLOP
1994	0.07%	92.00%	0.17%	6.10%	1.66%
1995	0.85%	89.11%	0.20%	7.74%	2.09%
1996	0.22%	95.74%	0.55%	3.22%	0.27%
1997	0.45%	94.86%	0.48%	4.20%	*
1998	1.65%	91.30%	0.67%	5.36%	1.02%
1999	6.62%	85.40%	0.22%	6.33%	1.43%
2000	1.31%	61.49%	0.29%	35.26%	1.66%
2001	5.15%	70.24%	0.37%	22.67%	1.58%
2002	1.56%	90.08%	0.07%	5.31%	2.99%
2003	1.14%	80.27%	0.02%	8.66%	9.91%
2004	1.03%	74.46%	0.06%	13.83%	10.61%
2005	2.94%	72.88%	0.02%	10.99%	13.18%
2006	2.90%	82.07%	0.12%	6.13%	8.77%
2007	2.69%	85.53%	0.01%	4.28%	7.49%
2008	2.49%	74.15%	0.04%	15.10%	8.21%
2009	2.27%	69.54%	0.01%	20.59%	7.58%

* = value unknown.

4.4.5.4 Trends in scallop landings by port

The landed value of scallops by port landing fluctuated from 1994 through 1998 for many ports. During the past five years, six ports brought in the most landed value: New Bedford, MA; Cape May, NJ; Newport News, VA; Barnegat Light/Long Beach, NJ, Seaford, VA, and Hampton, VA (Table 27). In addition to bringing in the most landed value, in 1994 scallop landings represented more than 30% of the total landed value for New Bedford, MA and Cape May, NJ, and more than 65% of the total landed value for Newport News and Hampton, VA (Table 28). This increased in 2008 to 74% and 84% for New Bedford, MA and Cape May, NJ, respectively, and 93% and 84% for Newport News and Hampton, VA, respectively.

Landed value has increased steadily from 1999-2008; but, some leveling off is apparent in recent years (Table 4). In the most recent two years of data (2007-2008), 43% of ports saw a decrease in the percentage of landed scallop value to total landed value (Table 26). However, many of these decreases are very small, on the order of 1-3%.

Between 2003 and 2005, 10 ports increased their landed value for scallops, potentially from an increase in general category landings. The average landed value has increased from $2 million in 1994 to a peak of $12 million in 2005. In 2006-2008, the average landed value has hovered between $9 and $10 million.

Table 27. Landed value of scallops (in thousands of dollars) by port of landing, FY 1994-2008.
* Includes only ports of landings with landed value of scallops in excess of $100,000 during FY2008. X = confidential data, with landings that are greater than 100,000 but less than 1.25 million, X* = less than 70,000. Data run August 7, 2009, based on dealer weighout data YTD.

Port and County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Bedford MA (Bristol County)	30981	36553	48436	45514	34687	70554	88491	80357	96011	104664	150121	206784	210517	211847	172603
Cape May NJ (Cape May County)	9360	8874	8656	6945	5588	9765	14158	18626	20237	28530	46530	51421	21619	45517	55522
Newport News VA (Newport News City)	9289	11917	13457	11173	11275	15207	23092	25535	30494	37361	48424	39467	22708	33363	37328
Barnegat Light/Long Beach NJ (Ocean County)	2653	2727	3007	3105	2693	3941	6733	6753	8071	10021	15641	21367	16651	16694	17275
Seaford VA (York County)	0	0	0	5553	4543	6540	11168	10465	11841	13043	18572	16364	11701	15340	14401
Hampton VA (Hampton City)	12425	7863	6346	3258	4557	5084	8289	9195	13803	19012	19978	14147	9180	15513	13620
Fairhaven MA (Bristol County)	0	0	0	0	0	0	0	0	0	0	0	5280	10103	8892	9166
Point Pleasant NJ (Ocean County)	315	532	1401	2207	1590	1854	3784	3197	3530	3973	3523	8574	7544	8751	8119
Stonington CT (New London County)	0	0	232	2573	2717	3302	3459	4944	5669	7463	10363	7402	4997	7680	5243
Wildwood NJ (Cape May County)	7	14	X*	0	X*	0	120	1246	2056	2194	3557	3942	2113	3690	3836
Ocean City MD (Worcester County)	11	24	43	5	15	25	118	79	99	212	174	4871	5631	2815	3504
Point Lookout NY (Nassau County)	0	0	0	0	0	0	0	0	0	0	21	33	X*	1075	3001
Avalon NJ (Cape May County)	0	0	0	0	0	0	0	0	0	0	0	X	1563	3468	2808
New London CT (New London County)	0	0	0	0	0	843	817	943	886	1026	1203	1736	1465	X	2588
Chatham MA (Barnstable County)	0	0	X*	0	0	0	X*	588	117	409	1927	2996	3154	2056	1715
Atlantic City NJ (Atlantic County)	15	1	0	0	1	0	0	X*	0	0	382	2308	2048	2706	1518
Other Connecticut (Not-Specified County)	700	1665	0	0	0	0	0	0	0	0	0	0	0	96	1421
Point Judith RI (Washington County)	1	58	4	7	X*	242	734	596	83	274	622	4638	7358	2835	1371
Montauk NY (Suffolk County)	X*	X*	X*	X*	0	7	6	8	0	1	435	1367	1878	2187	1346
Engelhard NC (Hyde County)	0	0	0	0	0	X*	X*	X*	0	140	22	124	311	709	817
Newport RI (Newport County)	23	229	101	784	534	447	700	X*	3	X*	1382	8412	13070	6031	747
Hampton Bays NY (Suffolk County)	X*	5	5	22	6	53	426	454	94	155	533	1588	846	422	574
Belford NJ (Monmouth County)	X*	X*	X*	21	X*	3	2	X*	X*	X*	X*	33	X*	16	548
Other Atlantic NJ (Atlantic County)	387	0	0	0	0	0	0	0	0	0	0	134	874	1017	542
Chincoteague VA (Accomack County)	2	0	X*	0	X*	7	210	803	1115	1957	4058	11892	7253	1153	489
New Haven CT (New Haven County)	0	0	X*	0	X*	0	0	0	0	0	0	0	0	0	X
Gloucester MA (Essex County)	X*	X*	232	357	104	161	1014	1543	783	557	682	1217	890	487	352
Sandwich MA (Barnstable County)	23	37	284	128	243	213	157	218	249	266	136	243	403	707	337
Provincetown MA (Barnstable County)	45	24	92	97	114	57	120	2130	540	648	637	1684	1046	595	320
Other Cape May NJ (Cape May County)	0	0	0	0	0	0	0	0	X*	0	0	X*	825	104	X
Indian River DE (Sussex County)	0	0	0	0	0	0	0	0	0	0	0	X*	114	1	245
Wellfleet MA (Barnstable County)	0	X*	X*	70	X*	23	X*	66	32	112	47	284	64	X*	244
Other Monmouth NJ(Monmouth County)	0	0	0	0	0	0	0	0	0	0	0	X*	X	X	X
Hyannisport MA (Barnstable County)	0	0	0	0	0	0	0	0	0	0	30	648	473	262	222
Addison ME (Washington County)	0	0	0	X	X	0	0	0	X	0	X	X	49	268	151
Nantucket MA (Nantucket County)	5	X*	8	X*	1	0	X	X*	X*	2	58	282	187	195	129

Harwich Port MA (Barnstable County)	0	0	0	0	0	0	0	590	110	318	462	770	115	171	X
Wanchese NC (Dare County)	0	0	0	X*	0	31	64	1350	1023	262	382	75	127	X*	X
Shinnecock Hills NY (Suffolk County)	0	0	0	0	0	0	0	0	0	0	X*	317	210	44	118
Bucks Harbor ME (Washington County)	0	0	0	0	0	0	0	0	0	3	0	0	X	0	111
Barnstable MA (Barnstable County)	0	0	0	0	0	0	0	0	0	0	31	184	607	326	108
Falmouth MA (Barnstable County)	0	0	0	0	0	0	X*	0	X*	X*	X*	71	36	235	X

Table 28. Percentage of landed value of scallops to total landed value by port of landing, FY 1994-2006

* Includes only ports of landings with landed value of scallops in excess of $100,000 during FY2008. Data run August 98, 2009, based on dealer weighout data YTD.

Port Name	County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
NEW BEDFORD	BRISTOL	39	41	45	44	36	53	57	53	58	58	70	75	77	76	74
CAPE MAY	CAPE MAY	33	33	35	29	23	44	59	68	69	76	75	81	71	80	80
NEWPORT NEWS	NEWPORT NEWS (CITY)	67	71	76	73	73	79	86	84	89	92	92	94	92	90	93
BARNEGAT LIGHT/LONG BEACH	OCEAN	28	29	32	30	26	30	47	47	57	60	73	78	73	69	75
SEAFORD	YORK	.	.	.	95	94	98	99	100	100	100	100	100	99	99	100
HAMPTON	HAMPTON (CITY)	71	66	63	47	55	61	73	75	82	83	76	74	74	78	84
FAIRHAVEN	BRISTOL	.	.	.	.	.	0	0	0	0	0	0	65	90	90	87
POINT PLEASANT	OCEAN	2	5	10	13	10	10	21	17	18	18	19	39	34	38	40
STONINGTON	NEW LONDON	.	.	24	39	38	35	36	52	67	77	82	71	66	78	68
WILDWOOD	CAPE MAY	0	0	0	0	0	0	3	21	32	32	51	82	75	90	96
OCEAN CITY	WORCESTER	0	0	1	0	0	0	2	1	1	3	0	42	45	26	35
POINT LOOKOUT	NASSAU	.	.	.	.	.	.	.	0	0	0	3	4	0	58	80
AVALON	CAPE MAY	.	.	.	.	.	.	.	.	.	.	0	99	99	98	98
NEW LONDON	NEW LONDON	.	.	0	0	0	21	32	24	21	22	21	29	34	39	73
CHATHAM	BARNSTABLE	0	0	0	0	0	0	1	5	1	4	18	19	19	14	11
ATLANTIC CITY	ATLANTIC	0	0	0	0	0	0	0	0	0	0	2	12	8	10	8
OTHER CONNECTICUT	NOT-SPECIFIED	1	4	0	0	0	0	0	0	0	0	0	0	0	24	46
POINT JUDITH	WASHINGTON	0	0	0	0	0	0	2	2	0	1	2	12	16	8	4
MONTAUK	SUFFOLK	0	0	0	0	0	0	0	0	0	0	3	9	11	12	9
ENGELHARD	HYDE	.	.	0	0	0	0	0	2	0	5	1	5	8	10	12
NEWPORT	NEWPORT	0	2	1	10	7	5	8	0	0	0	16	59	64	49	12
HAMPTON BAYS	SUFFOLK	0	0	0	0	0	1	4	5	1	2	8	23	12	7	12
BELFORD	MONMOUTH	0	0	0	1	0	0	0	0	0	0	0	1	2	1	17
OTHER ATLANTIC	ATLANTIC	12	0	0	0	0	0	0	0	0	0	0	6	35	38	27
CHINCOTEAGUE	ACCOMACK	0	0	0	0	0	0	10	33	39	47	54	78	75	27	14
NEW HAVEN	NEW HAVEN	.	.	0	0	0	0	0	0	0	0	0	0	0	0	85
GLOUCESTER	ESSEX	0	0	1	1	0	1	2	4	2	1	2	2	2	1	1
SANDWICH	BARNSTABLE	1	1	8	3	9	6	3	4	4	4	2	4	9	20	11
PROVINCETOWN	BARNSTABLE	2	1	4	4	4	2	3	38	13	19	18	35	28	17	10
OTHER CAPE MAY	CAPE MAY	0	0	0	0	0	0	0	0	1	0	0	1	35	8	22
INDIAN RIVER	SUSSEX	.	.	0	0	0	0	0	0	0	0	0	11	23	0	47
WELLFLEET	BARNSTABLE	.	0	16	23	35	31	7	34	11	25	7	9	2	4	7
OTHER MONMOUTH	MONMOUTH	0	0	0	0	0	0	0	0	0	0	0	1	2	46	4
HYANNISPORT	BARNSTABLE	.	.	.	.	.	.	.	.	.	.	9	19	20	10	9
ADDISON	WASHINGTON	.	.	.	.	.	0	0	0	0	0	0	0	1	5	4
NANTUCKET	NANTUCKET	8	1	3	1	1	0	15	0	0	0	9	19	12	9	9
HARWICH PORT	BARNSTABLE	0	0	0	0	0	0	0	9	2	14	19	25	6	14	10
WANCHESE	DARE	.	.	0	1	0	0	0	13	11	3	3	1	1	0	1
SHINNECOCK HILLS	SUFFOLK	0	0	0	0	0	0	0	0	0	0	4	45	31	6	15
BUCKS HARBOR	WASHINGTON	0	0	0	0	0	0	0	0	0	1	0	0	42	0	3
BARNSTABLE	BARNSTABLE	.	.	0	0	0	0	0	0	0	0	2	11	29	19	5
FALMOUTH	BARNSTABLE	0	0	0	0	0	0	0	0	17	9	0	7	3	14	6

Table 29. Landed Value of scallops, linked to Vessel Homeport, ranked by fishing year 2008.
Table only includes ports with either more than $1M in 2008 landed value, or more than $250K in landed value with at least 10% port total scallops. X = confidential, less than 1M; XX = confidential, more than 1M. Data run, August 9, 2009.

Port	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
NEW BEDFORD	28300	32429	39317	31568	25804	44363	59779	65845	79089	88962	126049	159634	145917	156801	145392
CAPE MAY	6979	7453	7528	7957	5876	10546	16725	17891	23178	30267	46347	63443	59236	72497	62532
NEWPORT NEWS	1840	2250	2547	3263	3495	9017	12438	14089	16328	16788	22516	24306	20803	21774	18929
BARNEGAT LIGHT	3041	3370	3297	2821	2335	4406	6676	6978	7811	9853	15276	19351	15873	16626	16503
NORFOLK	14803	15818	16234	14093	10970	14765	18015	14287	16563	17464	20074	13893	11111	12474	11390
NEW BERN	X	X	X	X	837	2322	2650	3292	4235	6431	7885	7747	8314	12106	10785
WANCHESE	46	14	3	1	485	1	816	2769	3378	4401	5707	6652	4990	7053	6559
NEW LONDON	0	0	0	0	0	0	X	0	0	X	X	2296	4389	3131	5799
FAIRHAVEN	2708	3245	4453	4318	3720	6776	11794	6628	7133	7214	9021	10669	8406	7503	5415
POINT PLEASANT	953	977	1179	1504	1016	1386	2232	2374	2588	2938	3896	6835	6441	5532	5043
LOWLAND	6	120	445	0	X	963	1466	1786	2176	2897	3834	6114	4439	4579	4692
SEAFORD	X	X	X	0	0	0	0	X	2399	3452	3874	4551	2693	5540	4603
STONINGTON	0	1	0	536	73	0	X	698	1471	852	1270	3	59	464	4337
HAMPTON	4113	4413	4001	3014	2602	3704	4998	4103	4318	3742	6815	3576	5424	5213	4030
ATLANTIC CITY	X	X	X	X	X	0	X	X	0	2	96	3657	3484	3945	3154
ORIENTAL	X	X	174	X	890	1627	1776	1260	2059	3688	4397	7161	4572	4333	3151
POINT PLEASANT BEACH	X	0	0	0	0	X	X	X	X	X	456	1147	720	1589	2725
CAPE CANAVERAL	X	X	X	X	X	X	X	X	XX	1673	2380	3651	2574	2260	2441
MONTAUK	X	0	X	1	0	3	65	19	6	X	116	1206	386	2535	2386
BEAUFORT	42	X	X	X	0	X	X	244	256	67	289	1953	855	1473	2240
BARNSTABLE	2227	1968	1368	650	396	384	891	939	970	798	1152	2017	2649	2476	2164
CARROLLTON	X	X	X	X	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
WILDWOOD	4	5	149	X	X	X	805	1001	843	792	1855	2464	1559	1952	1776
GLOUCESTER	171	11	317	372	251	986	636	597	757	846	1681	2262	1654	1387	1449
BAYBORO	X	X	X	X	X	X	X	671	998	1512	2141	809	1235	1643	XX
BEDFORD	X	X	X	X	X	X	X	XX	X	XX	XX	XX	XX	XX	XX
BOSTON	265	334	454	454	162	449	512	706	880	1021	639	XX	1037	719	XX
CHATHAM	0	0	0	0	0	X	0	296	42	273	478	1285	1557	1723	1120
MANAHAWKIN	0	0	0	0	0	0	0	0	0	0	0	XX	XX	XX	XX
SOUTHWEST HARBOR	168	405	521	482	282	763	1086	590	529	674	X	XX	XX	XX	XX
TREMONT	X	X	X	338	226	X	X	X	554	787	1051	XX	XX	XX	X
AURORA	X	X	X	X	X	X	X	X	X	XX	XX	XX	XX	XX	X
SUFFOLK	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X
PLYMOUTH	X	X	X	66	12	X	X	X	126	X	253	1568	845	1678	960
NEWPORT	X	X	X	X	X	X	X	X	X	X	X	X	891	X	X
OCEAN CITY	0	0	0	0	0	0	0	0	X	0	X	X	X	X	X
KEY WEST	X	0	0	X	0	0	0	0	X	X	X	X	X	X	X
JACKSONVILLE	X	0	0	X	X	X	X	X	X	0	X	1414	XX	X	X
TILGHMAN ISLAND	0	0	0	0	0	0	0	0	0	0	0	590	859	483	800
OWLS HEAD	X	235	87	X	X	X	X	516	395	371	347	682	487	239	745
OCEAN CITY	X	11	1	X	0	X	7	23	27	14	583	1906	1887	737	725
HAMPTON BAYS	3	4	19	7	5	7	320	307	42	80	398	1235	763	379	509
WESTPORT	0	0	0	0	0	0	0	0	0	0	30	420	491	555	421
SWAN QUARTER	0	0	X	X	X	X	827	X	X	749	1509	2775	941	444	404
PROVINCETOWN	15	27	72	86	36	72	96	1867	352	351	391	1495	932	811	381
TOMS RIVER	0	0	0	0	0	0	0	X	X	X	X	0	X	X	X
NANTICOKE	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X
POINT LOOKOUT	0	0	X	X	0	X	0	0	0	0	19	X	X	X	X
GLOUCESTER POINT	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X
GALLOWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X
SCRANTON	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X
BELMAR	X	0	0	0	0	0	0	0	0	0	0	187	250	X	X
HULL	0	0	0	0	0	0	0	X	X	X	X	X	X	X	X
NEW YORK	0	0	0	X	0	X	X	X	X	X	X	0	X	0	X

The largest numbers of permitted limited access scallop vessels currently are in the ports of New Bedford, MA and Cape May, NJ, which represent 37% and 19% of the total, respectively (Table 31). Of the 348 permitted limited access vessels in 2009, 203 originate from New Bedford, MA and Cape May, NJ. Although the number of permitted limited access vessels has only increased from 308 in 1994 to a peak of 380 in 2005 and New Bedford has always had the largest number of permitted limited access vessels, the port with the next greatest number of contributors shifted from Norfolk, VA (18% in 1994 to 3% in 2009) to Cape May, NJ (9% in 1994 to 19% in 2009).

In addition to having the greatest number of permitted limited access scallop vessels, New Bedford, MA also has the greatest number of general category scallop vessels. Cape May, NJ, Barnegat Light, NJ, and Gloucester, MA also have high numbers of general category scallop vessels. Generally, ports that had a higher number of general category scallop vessels from 1994-2004, such as New Bedford, Gloucester, and Chatham, have seen a significant decrease in these vessels in recent years (Table 24).

Table 30

Homeport	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Bedford, MA (Bristol county)	94	91	79	75	73	78	81	96	105	110	115	130	136	136	137	136
Cape May, NJ (Cape May county)	33	31	31	33	33	34	38	39	45	53	58	72	71	75	70	67
Newport News, VA (Newport News City)	8	9	10	10	12	17	19	21	21	21	22	23	19	19	18	18
Barnegat Light, NJ (Ocean county)	9	9	9	9	8	8	10	10	9	11	13	12	11	11	11	11
New Bern, NC (Craven county)	1	2	2	4	4	6	6	8	8	8	8	13	13	14	11	11
Norfolk, VA (Norfolk City)	65	67	63	58	51	42	35	27	27	27	22	13	12	11	11	11
Wanchese, NC (Dare county)	4	3	2	2	2	1	4	8	7	7	6	6	8	8	8	8
Lowland, NC (Pamlico county)	6	6	7	6	6	8	7	7	7	8	9	8	8	8	7	7
Hampton, VA (Hampton City)	15	15	11	11	8	7	6	6	6	6	7	5	7	7	7	6
Seaford, VA (York county)	1	1	1	0	0	0	0	2	3	4	4	5	6	5	5	6
Beaufort, NC (Carteret county)	6	6	3	2	1	1	1	1	1	0	0	0	0	1	2	5
Fairhaven, MA (Bristol county)	12	13	10	10	13	12	15	11	9	9	8	9	8	6	5	5
New London, CT (New London county)	0	0	0	0	0	1	1	1	1	1	1	3	5	5	5	5
Point Pleasant, NJ (Ocean county)	6	6	5	5	4	4	4	4	4	4	4	4	4	4	6	5
Oriental, NC (Pamlico county)	2	2	3	2	4	5	4	5	5	7	9	9	14	11	7	4
Stonington, CT (New London county)	3	3	5	6	6	4	5	7	7	8	8	4	4	5	4	4
Atlantic City, NJ (Atlantic county)	0	0	0	0	0	0	0	0	0	0	0	1	2	2	3	3
Montauk, NY (Sufflolk county)	1	0	0	0	0	0	0	0	0	0	0	1	0	2	3	3
Narragansett, RI (South county)	2	2	3	3	3	4	4	3	3	3	2	3	4	4	3	3
Barnstable, MA (Barnstable county)	12	9	9	4	2	1	1	1	1	1	2	2	2	2	2	2
Bayboro, NC (Pamlico county)	1	1	1	3	1	2	2	2	4	3	3	2	3	2	2	2
Cape Canaveral, FL (Brevard county)	3	4	4	3	3	1	2	3	2	2	2	2	2	2	2	2
Carrollton, VA (Isle Of Wight county)	2	3	2	1	2	2	3	2	2	2	2	2	2	2	2	2
Owls Head, ME (Knox county)	2	3	2	2	2	2	3	3	3	2	2	2	2	2	2	2
Plymouth, MA (Plymouth county)	2	0	0	0	0	0	0	0	0	0	1	2	3	3	2	2
Swan Quarter, NC (Hyde county)	1	1	1	1	1	2	2	2	3	3	3	3	1	1	2	2
Wildwood, NJ (Cape May county)	5	5	4	3	3	2	2	2	2	2	2	2	4	2	2	2
Bedford, MA (Middlesex county)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Boston, MA (Suffolk county)	1	1	2	3	3	2	2	2	2	2	1	1	1	1	1	1
Essex, CT (Middlesex county)	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Jacksonville, FL (Duval county)	1	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1
Key West, FL (Monroe county)	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1
Manahawkin, NJ (Ocean county)	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Newport, NC (Carteret county)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ocean City, MD (Worcester county)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Point Pleasant Beach, NJ (Ocean county)	0	0	0	0	0	1	1	1	1	1	1	1	2	1	2	1
Poquoson, VA (York county)	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	1
Southwest Harbor, ME (Hancock county)	6	3	4	3	2	2	2	2	2	2	1	1	1	1	1	1

Suffolk, VA (Suffolk (City) county)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Tremont, ME (Hancock county)	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Westport, MA (Bristol county)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 32Although the largest increases have been from many ports in NC, they have increased from 1 or no permitted general category scallop vessels to only about 6 or 7, which results in a 600-700% increase. Regardless of this increase, these ports only had a landed value for scallops of $311,000 or less. Other ports that saw an increase of 300% in general category vessels, such as Chincoteague, VA and Barnegat Light, NJ, had a landed value of $7.3 million and $16.9 million, respectively (Table 27). Although some ports such as New Bedford and Gloucester have experienced a decline in the number of general category scallop vessels, the simultaneous increase in permitted limited access boats has aided to increase the landed value of scallops in those ports to $202.5 million and $812,000 respectively. As Table 33 shows, the general category fleet is not homogeneous, but varies over space and time, with some ports showing a general category fleet that mirrors limited access vessels in size (for example Atlantic City NJ), and others showing a fleet of smaller-scale vessels (such as Fairhaven, MA). Thus impacts to the general category fishery as a whole can be experienced differently in different ports.

Table 31. Permitted limited access scallop vessels, by homeport, 1994-2009.

Homeport	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Bedford, MA (Bristol county)	94	91	79	75	73	78	81	96	105	110	115	130	136	136	137	136
Cape May, NJ (Cape May county)	33	31	31	33	33	34	38	39	45	53	58	72	71	75	70	67
Newport News, VA (Newport News City)	8	9	10	10	12	17	19	21	21	21	22	23	19	19	18	18
Barnegat Light, NJ (Ocean county)	9	9	9	9	8	8	10	10	9	11	13	12	11	11	11	11
New Bern, NC (Craven county)	1	2	2	4	4	6	6	8	8	8	8	13	13	14	11	11
Norfolk, VA (Norfolk City)	65	67	63	58	51	42	35	27	27	27	22	13	12	11	11	11
Wanchese, NC (Dare county)	4	3	2	2	2	1	4	8	7	7	6	6	8	8	8	8
Lowland, NC (Pamlico county)	6	6	7	6	6	8	7	7	7	8	9	8	8	8	7	7
Hampton, VA (Hampton City)	15	15	11	11	8	7	6	6	6	6	7	5	7	7	7	6
Seaford, VA (York county)	1	1	1	0	0	0	0	2	3	4	4	5	6	5	5	6
Beaufort, NC (Carteret county)	6	6	3	2	1	1	1	1	1	0	0	0	0	1	2	5
Fairhaven, MA (Bristol county)	12	13	10	10	13	12	15	11	9	9	8	9	8	6	5	5
New London, CT (New London county)	0	0	0	0	0	1	1	1	1	1	1	3	5	5	5	5
Point Pleasant, NJ (Ocean county)	6	6	5	5	4	4	4	4	4	4	4	4	4	4	6	5
Oriental, NC (Pamlico county)	2	2	3	2	4	5	4	5	5	7	9	9	14	11	7	4
Stonington, CT (New London county)	3	3	5	6	6	4	5	7	7	8	8	4	4	5	4	4
Atlantic City, NJ (Atlantic county)	0	0	0	0	0	0	0	0	0	0	0	1	2	2	3	3
Montauk, NY (Sufflolk county)	1	0	0	0	0	0	0	0	0	0	0	1	0	2	3	3
Narragansett, RI (South county)	2	2	3	3	3	4	4	3	3	3	2	3	4	4	3	3
Barnstable, MA (Barnstable county)	12	9	9	4	2	1	1	1	1	1	2	2	2	2	2	2
Bayboro, NC (Pamlico county)	1	1	1	3	1	2	2	2	4	3	3	2	3	2	2	2
Cape Canaveral, FL (Brevard county)	3	4	4	3	3	1	2	3	2	2	2	2	2	2	2	2
Carrollton, VA (Isle Of Wight county)	2	3	2	1	2	2	3	2	2	2	2	2	2	2	2	2
Owls Head, ME (Knox county)	2	3	2	2	2	2	3	3	3	2	2	2	2	2	2	2
Plymouth, MA (Plymouth county)	2	0	0	0	0	0	0	0	0	0	1	2	3	3	2	2
Swan Quarter, NC (Hyde county)	1	1	1	1	1	2	2	2	3	3	3	3	1	1	2	2
Wildwood, NJ (Cape May county)	5	5	4	3	3	2	2	2	2	2	2	2	4	2	2	2
Bedford, MA (Middlesex county)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Boston, MA (Suffolk county)	1	1	2	3	3	2	2	2	2	2	1	1	1	1	1	1
Essex, CT (Middlesex county)	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Jacksonville, FL (Duval county)	1	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1
Key West, FL (Monroe county)	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1
Manahawkin, NJ (Ocean county)	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Newport, NC (Carteret county)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ocean City, MD (Worcester county)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Point Pleasant Beach, NJ (Ocean county)	0	0	0	0	0	1	1	1	1	1	1	1	2	1	2	1
Poquoson, VA (York county)	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	1
Southwest Harbor, ME (Hancock county)	6	3	4	3	2	2	2	2	2	2	1	1	1	1	1	1
Suffolk, VA (Suffolk (City) county)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Tremont, ME (Hancock county)	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Westport, MA (Bristol county)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 32. Permitted general category scallop vessels, by homeport, 2005-2009. All ports that had at least 1 GC permit in 2009 are included.

Port	County	State	2005	2006	2007	2008	2009
NEW BEDFORD	PLYMOUTH	MA	86	88	83	67	72
CAPE MAY	SUFFOLK	MA	30	48	54	25	28
BARNEGAT LIGHT	HANCOCK	ME	29	30	31	28	27
GLOUCESTER	HANCOCK	ME	38	49	55	23	26
POINT PLEASANT	WASHINGTON	ME	17	22	24	14	15
PROVINCETOWN	PLYMOUTH	MA	14	16	15	11	11
HAMPTON BAYS	BARNSTABLE	MA	13	21	21	7	10
NEW BERN	PLYMOUTH	MA	5	6	5	5	10
NARRAGANSETT	DARE	NC	37	44	50	5	8
CHATHAM	OCEAN	NJ	23	27	29	7	7
STONINGTON	BRISTOL	MA	16	19	15	5	7
BELHAVEN	SAGADAHOC	ME	12	9	8	5	6
SEABROOK	CARTERET	NC	2	4	9	4	6
SOUTH BRISTOL	WICOMICO	MD	6	8	7	6	6
BEAUFORT	BEAUFORT	NC	14	14	14	4	5
ENGELHARD	CRAVEN	NC	7	8	7	5	5
LOWLAND	GLOUCESTER	VA	5	5	5	2	5
OCEAN CITY	SUSSEX	DE	12	17	15	4	5
PORTLAND	CARTERET	NC	24	22	19	6	5
RYE	DUVAL	FL	3	6	8	3	5
BOSTON	MONMOUTH	NJ	13	11	13	3	4
HAMPTON	SUFFOLK	NY	7	7	6	4	4
MONTAUK	ROCKINGHAM	NH	17	17	20	5	4
NEWBURYPORT	NEWPORT	RI	6	7	5	4	4
POINT PLEASANT BEACH	WASHINGTON	ME	3	3	2	5	4
PORT CLYDE-TENANTS HARBOR	DARE	NC	2	2	6	4	4
PORTSMOUTH	CARTERET	NC	12	12	12	6	4
ROCKPORT	CUMBERLAND	NJ	3	5	5	4	4
SCITUATE	SUFFOLK	NY	8	7	8	4	4
NEW YORK	DUVAL	FL	2	3	3	2	3
NORFOLK	YORK	ME	7	7	5	3	3
TILGHMAN ISLAND	NEW LONDON	CT	7	10	9	3	3
WANCHESE	NEWPORT	RI	14	13	10	4	3
WILDWOOD	CAPE MAY	NJ	5	5	6	4	3
WOODS HOLE	NASSAU	NY	3	4	5	5	3
ATLANTIC CITY	ATLANTIC	NJ	20	22	17	2	2
FRIENDSHIP	WASHINGTON	ME	2	3	3	3	2
KENNEBUNKPORT	ATLANTIC	NJ	0	0	0	2	2
MARSHFIELD	HAMPTON (CITY)	VA	2	3	3	2	2
MILLVILLE	SUFFOLK	NY	1	3	4	2	2
MOUNT DESERT	CUMBERLAND	ME	1	1	1	3	2
NEW LONDON	SUFFOLK	NY	6	8	6	2	2
NEWPORT NEWS	YORK	ME	6	5	6	2	2
SACO	WASHINGTON	ME	0	1	2	2	2
SALISBURY	SUSSEX	NJ	1	2	3	2	2

SHALLOTTE	CHARLESTON	SC	2	2	2	2	2
STEUBEN	MONMOUTH	NJ	2	3	3	2	2
SWAN QUARTER	CRAVEN	NC	5	9	7	2	2
WELLFLEET	NEWPORT NEWS (CIT	VA	5	4	5	2	2
WILMINGTON	CAPE MAY	NJ	6	6	5	2	2
YORK HARBOR	NEW CASTLE	DE	0	1	1	2	2
BARNSTABLE	OCEAN	NJ	9	9	9	1	1
BATH	OCEAN	NJ	2	3	3	1	1
BELMAR	PAMLICO	NC	2	2	1	1	1
BREMEN	BEAUFORT	NC	2	4	3	1	1
CAPE CANAVERAL	SUFFOLK	MA	7	6	5	2	1
CAPE MAY COURT HOUSE	BARNSTABLE	MA	1	1	1	1	1
CHEBEAGUE ISLAND	FAIRFIELD	CT	0	2	0	1	1
CUSHING	CAPE MAY	NJ	2	2	2	1	1
CUTLER	CAPE MAY	NJ	2	3	5	2	1
EAST CENTRAL WASHINGTON	CUMBERLAND	ME	1	1	1	1	1
EASTPORT	MOBILE	AL	0	2	2	1	1
FAIRHAVEN	KNOX	ME	6	6	4	2	1
GLOUCESTER COURTHOUSE	HANCOCK	ME	0	0	0	1	1
GREEN HARBOR-CEDAR CREST	WICOMICO	MD	0	2	4	1	1
HAMPTON FALLS	WASHINGTON	ME	1	1	1	1	1
HARPSWELL	DUKES	MA	8	14	16	1	1
HARWICH PORT	HYDE	NC	5	8	6	0	1
HULL	BRISTOL	MA	1	1	1	1	1
KITTERY	SAGADAHOC	ME	5	6	6	1	1
LEWES	CARTERET	NC	3	3	3	1	1
LUBEC	PAMLICO	NC	9	7	4	2	1
LYNN	PLYMOUTH	MA	0	0	0	1	1
MACHIASPORT	SUFFOLK	NY	6	6	7	3	1
MANAHAWKIN	SUFFOLK	NY	0	0	0	1	1
MARSHALLBERG	ROCKINGHAM	NH	1	1	2	1	1
MONTVILLE	HANCOCK	ME	0	0	0	1	1
MOREHEAD CITY	CUMBERLAND	ME	1	1	1	1	1
NANTICOKE	BARNSTABLE	MA	1	2	2	1	1
NASSAWADOX	MONMOUTH	NJ	1	2	1	1	1
NEPTUNE	PAMLICO	NC	1	1	1	1	1
NEWPORT	WASHINGTON	ME	12	13	12	1	1
OCEAN BLUFF-BRANT ROCK	SUSSEX	DE	2	1	2	1	1
ORIENTAL	CUMBERLAND	ME	5	13	8	1	1
OWLS HEAD	PAMLICO	NC	3	6	5	3	1
PHIPPSBURG	WASHINGTON	ME	0	1	1	1	1
PLYMOUTH	HILLSBOROUGH	FL	8	9	12	1	1
POINT LOOKOUT	ESSEX	MA	1	2	2	1	1
PORT NORRIS	PLYMOUTH	MA	7	7	7	2	1
RICHLANDS	SUFFOLK	NY	0	0	0	0	1
ROCKLAND	CUMBERLAND	NJ	4	7	3	1	1
SCRANTON	NEW LONDON	CT	1	1	1	2	1
SOUTH THOMASTON	WASHINGTON	RI	0	1	0	1	1
SOUTHAMPTON	WASHINGTON	RI	1	1	1	1	1
SOUTHPORT	NORTHAMPTON	VA	0	0	0	1	1
SPRUCE HEAD	MONMOUTH	NJ	0	0	0	0	1
SWAMPSCOTT	BRISTOL	MA	2	1	1	1	1
TANGIER	NEW LONDON	CT	1	1	1	1	1
TOMS RIVER	NEW YORK	NY	0	1	1	1	1

TOWNSEND	NEW YORK	NY	2	2	3	2	1
TREMONT	ESSEX	MA	1	0	1	1	1
WAKEFIELD-PEACEDALE	NEW CASTLE	DE	3	3	3	1	1
WEST SAYVILLE	SUFFOLK	NY	0	0	0	0	1
WESTPORT	PLYMOUTH	MA	7	7	7	1	1
WINTER HARBOR	WORCESTER	MD	3	5	6	2	1

Table 33. Average GRT (gross registered tons), average length, and number of permitted scallop vessels by top 20 homeports, 1994-2008.

Homeport	Permit		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Atlantic, NC	Limited access	Avg. Length	78	81	81	81	81	81	81	81	81	81	81	81	81	.	.
		Avg. GRT	168	168	168	168	168	168	168	168	168	168	168	168	168	.	.
		No. permits	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0
	General Category	Avg. Length	73	70	70	68	68	68	63	63	63	63	63	54	63	.	.
		Avg. GRT	108	108	108	100	100	100	75	75	75	75	75	48	75	.	.
		No. permits	3	3	3	4	4	4	1	1	1	1	1	2	1	0	0
Atlantic City, NJ	Limited access	Avg. Length	.	.	.	.	.	.	.	.	.	.	.	75	75	75	75
		Avg. GRT	.	.	.	.	.	.	.	.	.	.	.	125	121	123	123
		No. permits	.	.	.	.	.	.	.	.	.	.	.	1	2	3	3
	General Category	Avg. Length	59	56	54	64	62	60	61	78	83	81	77	81	83	59	59
		Avg. GRT	73	62	62	99	90	84	90	124	145	139	121	119	128	68	68
		No. permits	5	6	5	7	9	12	11	18	23	22	26	35	37	2	2
Aurora, NC	Limited access	Avg. Length	75	75	75	75	75	83	68	73	73	56	73	73	73	68	.
		Avg. GRT	116	116	116	116	116	133	114	125	125	85	125	125	125	114	.
		No. permits	2	2	2	2	2	1	1	2	2	3	2	2	2	1	0
	General Category	Avg. Length	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		Avg. GRT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		No. permits	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Barnegat Light, NJ	Limited access	Avg. Length	69	69	69	69	69	69	65	65	69	68	68	67	67	67	67
		Avg. GRT	117	117	117	117	110	110	97	97	108	107	107	102	101	101	101
		No. permits	9	9	9	9	8	8	10	10	9	11	13	12	11	11	11
	General Category	Avg. Length	63	59	50	58	60	52	51	52	52	53	52	49	50	55	56
		Avg. GRT	91	79	44	63	73	53	48	56	54	54	50	38	40	57	58
		No. permits	9	14	10	12	11	27	35	48	51	59	63	63	62	28	27
Barnstable, MA	Limited access	Avg. Length	79	82	81	68	70	70	78	78	78	78	70	70	70	70	70
		Avg. GRT	128	141	133	80	96	90	89	89	89	89	76	76	76	76	76
		No. permits	11	9	9	4	2	1	1	1	1	1	2	2	2	2	2
	General Category	Avg. Length	45	42	41	39	40	43	40	40	41	42	42	39	40	42	42
		Avg. GRT	42	36	33	29	27	31	26	25	25	26	27	21	23	27	27
		No. permits	21	25	23	20	22	22	23	29	29	23	22	19	16	1	1
Cape Canaveral, FL	Limited access	Avg. Length	73	72	72	73	73	81	83	79	76	76	76	76	76	76	76
		Avg. GRT	136	132	132	136	136	175	160	142	140	140	140	140	140	140	140
		No. permits	3	4	4	3	3	1	2	3	2	2	2	2	2	2	2
	General Category	Avg. Length	81	.	.	.	.	.	.	.		74	67	69	65	74	68
		Avg. GRT	175	.	.	.	.	.	.	.	.	108	93	98	92	108	111
		No. permits	1	.	.	.	.	.	.	.	.	2	8	10	9	2	1
Cape May, NJ	Limited access	Avg. Length	82	82	83	82	81	80	80	80	78	74	74	74	75	77	77
		Avg. GRT	151	152	155	149	148	146	145	146	143	132	130	128	131	135	133
		No. permits	33	31	31	33	33	34	38	39	45	53	58	72	71	70	67
	General Category	Avg. Length	77	78	78	67	72	67	63	60	61	54	56	52	55	68	73
		Avg. GRT	126	130	137	109	122	104	92	88	81	65	63	56	62	93	118
		No. permits	30	28	28	29	26	36	42	43	42	48	63	73	82	25	28

			1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Fairhaven, MA	Limited access	Avg. Length	86	87	88	89	89	91	89	89	87	87	90	89	89	98	98
		Avg. GRT	158	158	160	166	164	171	172	166	158	158	168	162	161	185	185
		No. permits	12	13	10	10	13	12	15	11	9	9	8	9	8	5	5
	General Category	Avg. Length	43	42	45	43	42	43	46	45	45	46	46	46	45	80	94
		Avg. GRT	31	29	36	31	29	31	38	42	40	41	39	34	32	155	192
		No. permits	22	19	21	27	28	22	22	23	26	30	27	26	27	2	1
Hampton, VA	Limited access	Avg. Length	78	78	77	77	77	76	77	77	77	76	76	75	75	62	73
		Avg. GRT	152	152	152	152	154	152	162	162	162	160	158	140	124	89	112
		No. permits	15	15	11	11	8	7	6	6	6	6	7	5	7	7	6
	General Category	Avg. Length	67	.	.	42	62	62	39	46	39	62	.	73	73	45	45
		Avg. GRT	97	.	.	17	61	61	25	44	25	61	.	114	116	25	25
		No. permits	1	.	.	1	1	1	3	4	3	1	.	3	4	1	1
Lowland, NC	Limited access	Avg. Length	73	73	73	73	73	74	73	73	73	72	75	77	78	81	81
		Avg. GRT	92	92	97	92	92	107	106	106	106	102	103	112	114	118	118
		No. permits	6	6	7	6	6	8	7	7	7	8	9	8	8	7	7
	General Category	Avg. Length	68	66	66	66	66	66	66	66	66	62	73	70	69	78	82
		Avg. GRT	75	73	73	73	73	73	73	73	73	73	103	99	92	95	105
		No. permits	7	2	2	2	2	2	2	2	2	2	5	7	7	2	5
New Bedford, MA	Limited access	Avg. Length	87	88	87	87	87	87	86	85	84	84	85	82	82	84	84
		Avg. GRT	172	173	174	174	176	175	173	169	164	163	164	153	154	158	160
		No. permits	94	91	79	75	73	78	81	96	105	110	115	130	136	137	136
	General Category	Avg. Length	66	66	67	69	68	68	66	66	66	65	64	61	61	78	75
		Avg. GRT	101	102	103	110	109	107	103	101	103	102	98	94	96	140	133
		No. permits	160	156	146	146	118	113	117	123	123	124	128	130	128	67	72
New Bern, NC	Limited access	Avg. Length	84	73	71	73	73	75	77	75	77	79	79	83	76	81	81
		Avg. GRT	198	89	89	94	94	103	115	106	114	113	113	122	114	122	121
		No. permits	1	2	2	4	4	6	6	8	8	8	8	13	13	11	11
	General Category	Avg. Length	75	.	75	.	67	.	.	67	.	.	43	69	60	79	70
		Avg. GRT	81	.	81	.	79	.	.	97	.	.	18	98	80	113	90
		No. permits	1	.	1	.	1	.	.	1	.	.	1	5	6	5	10
New London, CT	Limited access	Avg. Length	.	.	.	.	.	86	86	86	86	86	86	83	81	81	81
		Avg. GRT	.	.	.	.	.	147	147	147	147	147	147	188	168	168	168
		No. permits	.	.	.	.	.	1	1	1	1	1	1	3	5	5	5
	General Category	Avg. Length	73	73	61	53	49	50	51	54	52	56	53	54	54	50	50
		Avg. GRT	125	125	85	65	55	55	59	63	52	57	49	52	52	30	30
		No. permits	3	3	5	7	9	9	8	11	10	8	11	10	10	2	2
Newport News, VA	Limited access	Avg. Length	76	78	79	79	79	79	79	78	78	78	79	79	77	78	78
		Avg. GRT	131	138	143	148	149	149	148	146	146	145	142	143	140	141	141
		No. permits	8	9	10	10	12	17	19	21	21	21	22	23	19	18	18
	General Category	Avg. Length	.	.	52	50	69	64	64	.	63	63	52	56	67	55	55
		Avg. GRT	.	.	42	42	92	88	88	.	86	86	52	74	101	51	51
		No. permits	.	.	1	1	4	1	1	.	1	1	2	8	5	2	2

			1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Norfolk, VA	Limited access	Avg. Length	77	79	79	78	79	79	78	79	80	80	81	79	80	80	80
		Avg. GRT	137	138	138	138	136	133	132	133	135	137	140	139	139	141	141
		No. permits	65	67	63	58	51	42	35	27	27	27	22	13	12	11	11
	General Category	Avg. Length	66	63	66	69	70	63	59	60	60	57	55	52	51	81	81
		Avg. GRT	85	75	84	92	92	77	76	74	72	62	57	48	46	129	129
		No. permits	41	35	26	30	21	20	14	18	20	18	17	16	14	3	3
Oriental, NC	Limited access	Avg. Length	71	71	70	73	76	75	76	75	66	68	79	80	67	72	79
		Avg. GRT	101	101	108	121	127	126	127	123	100	99	115	118	94	102	123
		No. permits	2	2	3	2	4	5	4	5	5	7	9	9	14	7	4
	General Category	Avg. Length	.	.	.	.	70	69	69	70	65	65	68	68	59	40	40
		Avg. GRT	.	.	.	.	109	105	105	109	88	88	92	88	74	23	23
		No. permits	.	.	.	.	2	3	3	2	4	4	10	9	15	1	1
Point Judith, RI	Limited access	Avg. Length	85	85	76	76	76	80	80	76	76	76	82	81	79	78	78
		Avg. GRT	175	175	149	149	149	161	161	149	149	149	166	164	157	151	151
		No. permits	1	1	3	3	3	4	4	3	3	3	2	3	4	3	3
	General Category	Avg. Length	59	58	60	58	59	57	57	56	57	56	56	56	55	46	62
		Avg. GRT	73	74	78	73	74	71	70	67	70	70	67	68	67	31	91
		No. permits	71	76	72	82	78	81	76	79	80	84	87	90	93	5	8
Point Pleasant, NJ	Limited access	Avg. Length	75	75	79	79	83	83	83	82	82	82	82	82	82	71	76
		Avg. GRT	108	108	120	120	131	131	131	122	122	122	122	122	122	94	106
		No. permits	6	6	5	5	4	4	4	4	4	4	4	4	4	6	5
	General Category	Avg. Length	49	52	52	55	53	50	48	49	48	51	53	56	56	64	66
		Avg. GRT	48	53	53	60	59	47	43	45	44	48	51	56	56	78	79
		No. permits	24	20	20	21	25	27	29	33	34	31	35	37	41	14	15
Seaford, VA	Limited access	Avg. Length	86	86	82	.	.	.	.	83	87	84	84	86	87	87	87
		Avg. GRT	125	125	181	.	.	.	.	141	154	147	147	143	142	145	148
		No. permits	1	1	1	.	.	.	.	2	3	4	4	5	6	5	6
	General Category	Avg. Length	42	42	.	.	.	.	.	88	.	.	.	50	50	.	.
		Avg. GRT	6	6	.	.	.	.	.	135	.	.	.	48	48	.	.
		No. permits	1	1	.	.	.	.	.	1	.	.	.	1	1	.	.
Wanchese, NC	Limited access	Avg. Length	102	108	123	123	85	80	78	79	78	80	81	81	81	81	81
		Avg. GRT	150	148	143	143	164	129	136	143	145	151	152	152	151	151	151
		No. permits	4	3	2	2	2	1	4	8	7	7	6	6	8	8	8
	General Category	Avg. Length	76	76	75	70	74	68	65	63	59	57	54	54	54	66	73
		Avg. GRT	122	122	129	107	122	99	91	87	75	67	63	63	63	92	115
		No. permits	10	11	9	12	10	14	14	15	18	22	26	32	30	4	3

5.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

5.1 SCALLOP RESOURCE

5.1.1 No Action

In the alternatives for area rotation management and for open area DAS allocations, “No Action” is exactly what it implies: no additional action will be taken and so the measures and allocations that are specified in the present regulations (CFR §648, Sub-part D) are maintained.

Under “No Action,” the trip allocations for access areas would roll over from FY 2009. In terms of Mid-Atlantic access areas, full-time vessels would receive 3 Elephant Trunk Access Area (ETA) trip and one trip in Delmarva. As for Georges Bank access areas, Closed Area I is scheduled to open in 2010, but no trips would be allocated because none were allocated in 2009; Closed Area II is scheduled to be closed, and NL is scheduled to be open, but again since no trips were allocated in 2009, no trips would be allocated in 2010. In addition, under “No Action,” the Hudson Canyon Access Area would remain closed.

In terms of open areas, under “No Action”, limited access scallop vessels would receive the same allocation designated for FY2009 had the IFQ program been fully implemented, resulting in the DAS fleet receiving 94.5 % of the allocated total target TAC rather than the 90% allocated to this fleet during the “transition period” to IFQs. This allocation would result in 42 DAS for full-time limited access scallop vessels.

Impacts of No Action on the scallop resource would be minimal, except fishing levels would be higher in ETA than the projected biomass in that area can support. Three trips would likely lead to high fishing mortality in that area. On the other hand, No Action includes no access into areas on GB, so F would be lower in that area than the biomass can support so optimizing potential yield in that area would not result. Overall DAS allocations are within the range being considered for this action, higher than some scenarios and lower than others. Not closing the Channel under No Action would reduce the potential yield from that area in the near and long term.

Status quo for this action is considered to be the scenario that has an overall fishing mortality of 0.20 and does not include a new closure in the Channel (NCLF20). This scenario is considered the status quo because in recent actions the Council has set F at 0.20 to prevent overfishing and account for uncertainty in projections and management measures in the fishery. Therefore, this scenario would be consistent with how the Council has been setting specifications for this fishery in the last few years with a handful of access area trips and then DAS set to meet an overall F. No new closed area would be implemented under status quo.

5.1.2 Summary of biological projections for management scenarios considered in this action

The biological impacts for this action are based on results from an updated version of the SAMS (Scallop Area Management Simulator) model. This model has been used to project abundances and landings to aid management decisions since 1999. SAMS is a size-structured model that forecasts scallop populations in a number of areas. In this version of the model, Georges Bank was divided into the three access portions of the groundfish closures, the three no access portions of these areas, a proposed closure area in the South Channel, the remainder of the South Channel, the Northern Edge and Peak, and the Southeast Part of Georges Bank (Figure 31). The Mid-Atlantic was subdivided into six areas: Virginia Beach, Delmarva, the Elephant Trunk Access Area, the proposed new version of the Hudson Canyon South Access Area, New York Bight South, and Long Island. For this framework these areas were then merged into the three YT stock boundaries because the Council needs to know the projected scallop catch by YT stock area for allocation decision related to YT bycatch TACs in Framework 22.

It is important to note that this model is based on fishing mortality by area and the inputs are not fishery-based in terms of DAS, etc. The simulation does not model individual vessels or trips; it models the fleet as a whole. The output of the model is then used to eventually compute individual DAS allocations after set-asides are removed, general category landings, etc.

Overall four main scenarios are under consideration:

1. No closure in Channel, Overall F = 0.20 (status quo)
2. No, closure in Channel, Overall F = 0.24
3. S. Channel closure, Overall F = 0.20
4. S. Channel closure, Overall F = 0.18

Overall F was reduced to 0.18 for last alternative because the new closure had unpredictable model effects on the overall F, so a lower value (0.18) was made an alternative instead of higher F strategies (F=0.20 or F=0.24).

The following table gives the four alternatives and the resulting landings and DAS associated with each. Again, these may change as the PDT refines these alternatives.

Table 34 – Summary of scenarios considered in the biological projections for Framework 21

2010		CL1	CL2	NLS	ET	Dmv	HC	Sch	IndvDAS*
NCF20		closed	closed	1	2	1	closed	open	29
NCF24		closed	closed	1	2	1	closed	open	38
CF18		closed	closed	1	2	1	closed	closed	42
CF20		closed	closed	1	2	1	closed	closed	51

** The full-time individual DAS value is based on an estimate of 340 active full-time equivalent limited access vessels out of ??? limited access permits in 2009. These values have removed TAC for general category allocations and set-asides.*

Overall, allocations in 2010 are lean compared to the last few years because there are only four access area trips, and reduced DAS to accommodate that Ftarget has been exceeded in recent years and overall F should be lower. Access area trip allocations are expected to return to five per year after 2010. Another reason DAS allocations are lower in 2010 is that the LPUE function has been changed (higher) so the chance of exceeding Ftarget is lower. The PDT discussed that it will not be popular to close a new area and allocate fewer access area trips in the same year. However, it was also discussed that the growth rate in the Channel is ~80%, and not closing it will prevent the fishery from gaining that high growth potential. It was also discussed that closing this area will make managing YT bycatch and minimizing impacts on EFH on GB easier because when the area reopens scallop catch rates will be higher, so time gear is fishing will be less in the Channel compared to that area being fished as an open area.

Figure 32 is a chart of the cod HAPC under consideration in the Habitat Omnibus Amendment.

The SAMS model provides projected exploitable biomass estimates, scallop landings, average LPUE, DAS used and bottom area swept by area. All of these projections are described in the following tables and figures. The analyses focus on projections from 2010-2016 because those are the years that the impacts of a new closure would be apparent. If the Channel is closed in 2010, it will likely remain closed until 2013, and would be a controlled access area for about three years (until 2016). Therefore, both the short and long term impacts of this closure and various levels of overall F can be compared. After year one, the model uses the same assumptions for allocations in 2011-2016. Therefore, the only difference between the overall performance of the scenarios is the year 1 allocations (closing the Channel area compared to not closing it and setting Ftarget at various levels). For this analysis Ftarget has been set at F=0.24 in 2011 through 2016 assuming the same area rotation and DAS schedule except for the closure in the channel.

Figure 31- SAMS model areas, with statistical areas and stratum boundaries on Georges Bank and the Mid-Atlantic

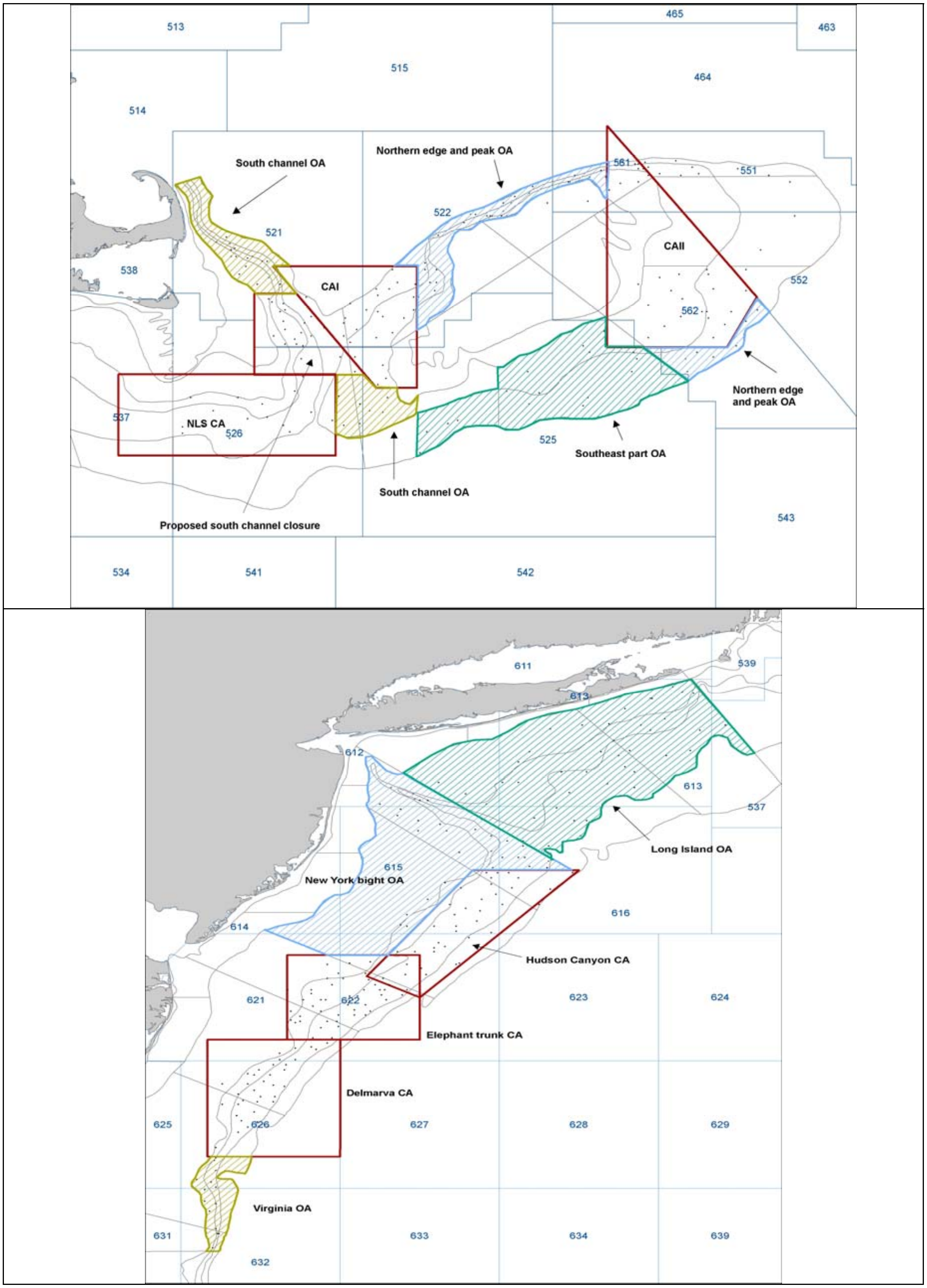
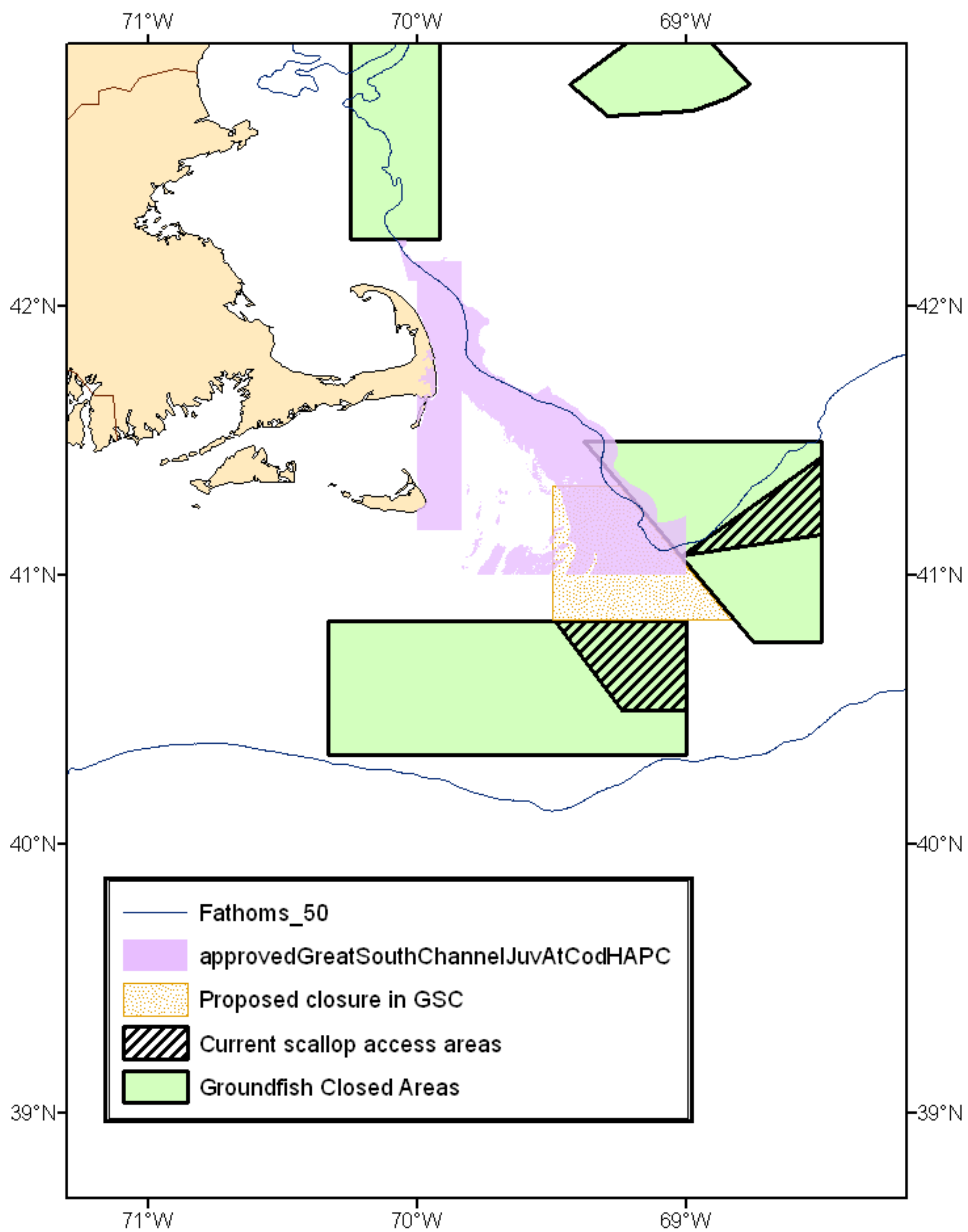


Figure 32 – Approved GSC Juvenile Cod HAPC in Draft EFH Omnibus Amendment (shaded area in Channel) with proposed scallop rotational area in the Channel (gray outline between CA1 and NL)



5.1.2.1 Projected exploitable biomass by area

Exploitable biomass is similar for all 4 scenarios in 2010 when the fishery begins (assumed to be on March 1, 2010) (Table 35). In the short term (2010-2012) NCLF20 scenario has slightly higher exploitable biomass, but in the long-term CLF18 has the highest exploitable biomass compared to all the other scenarios (Table 36). From 2013 and the next several years the Channel area reopens as an access area CLF18 has exploitable biomass values close to 200,000 mt (440 million pounds) (Figure 33).

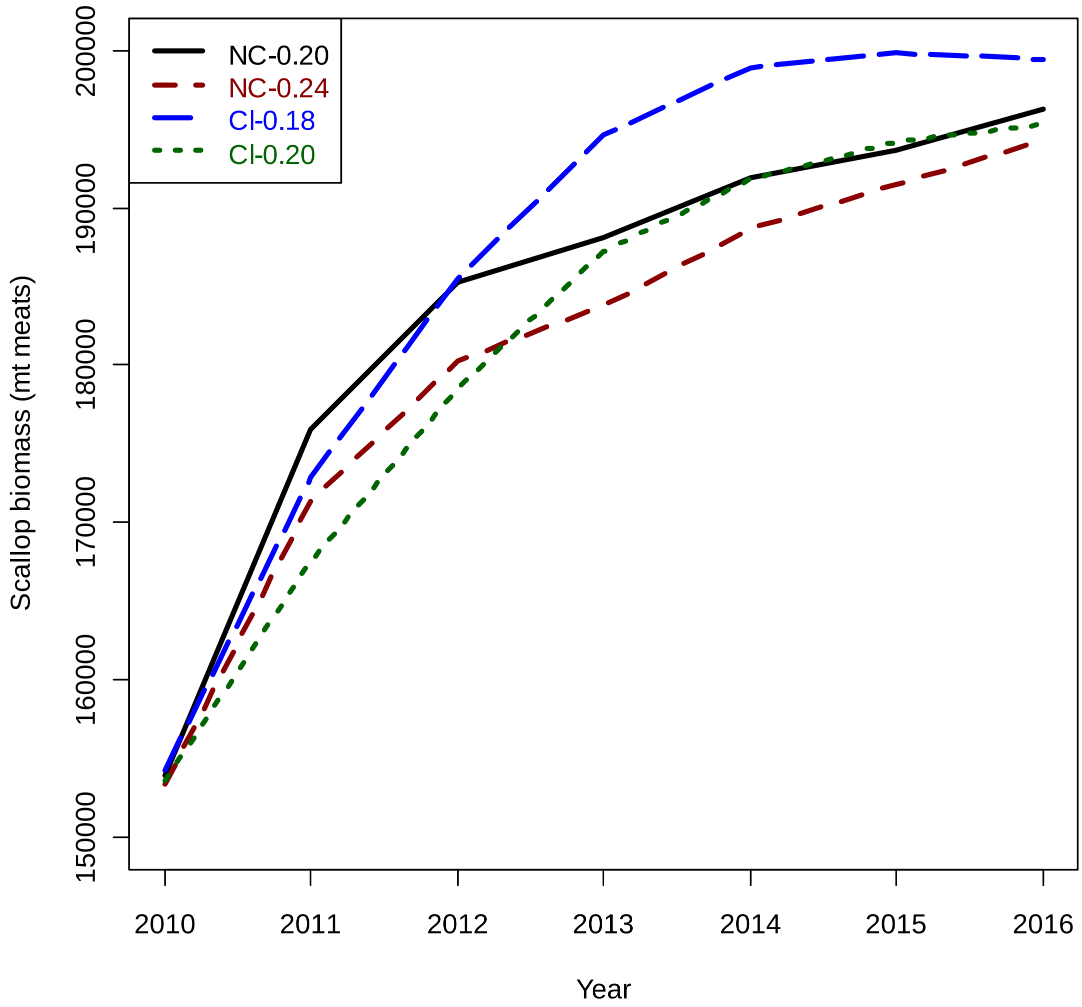
Table 35 – Total projected 2010 scallop exploitable biomass by scenario and SAMS area (million pounds)

	SAMS Area	CLF18	CLF20	NCLF20	NCLF24
GB	SEP	7,996,939	7,994,905	7,994,905	7,995,297
	CL1-Acc	5,152,688	5,150,632	5,154,936	5,149,326
	CL1-NA	26,646,696	26,644,779	26,644,613	26,647,754
	CL2-Acc	18,518,741	18,527,926	18,528,725	18,532,356
	CL2-NA	26,253,795	26,252,070	26,252,356	26,250,891
	NEP	3,327,247	3,326,040	3,327,114	3,326,651
	NLS-Acc	16,642,768	16,640,233	16,641,296	16,640,117
	NLS-NA	362,183	359,803	356,078	369,451
	Sch-Cl	8,297,443	8,296,732	8,297,988	8,296,462
	Sch-Op	7,216,634	7,220,332	7,210,105	7,208,750
MA	DMV	35,599,631	35,584,704	35,601,344	35,581,833
	ET	35,962,635	35,903,413	35,944,783	35,906,587
	HCS	31,272,209	31,253,772	31,263,575	31,250,356
	LI	20,195,864	20,190,938	20,192,122	20,190,111
	NYB	11,695,008	11,689,752	11,691,074	11,690,589
	VB	858,860	883,049	858,045	858,756
All	All	256,015,847	255,935,654	255,975,420	255,911,652

Table 36 – Total exploitable biomass by year and scenario (2010-2016)

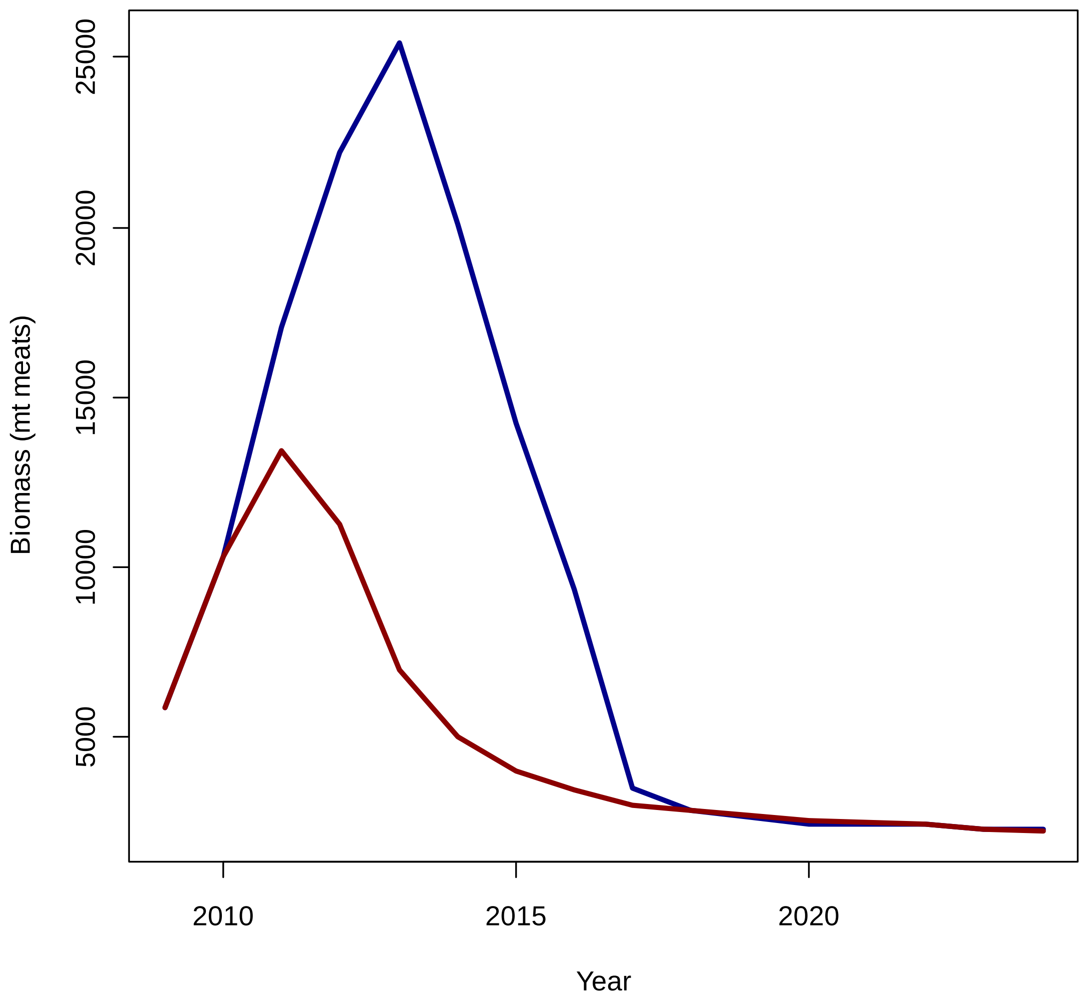
	Biomass			
year	**nc20**	**nc24**	**cl18**	**cl20**
2010	153,912	153,396	154,212	153,566
2011	175,935	171,345	172,854	167,573
2012	185,267	180,230	185,439	178,499
2013	188,053	183,770	194,641	187,274
2014	191,951	188,596	198,823	191,774
2015	193,688	191,471	199,817	194,184
2016	196,258	194,343	199,384	195,258
Cum. 2010-2016	1,285,064	1,263,151	1,305,170	1,268,128

Figure 33 - Comparison of projected scallop exploitable biomass for the scenarios under consideration (2010-2016)



Exploitable biomass projections for the channel area alone are much higher from 2010-2016 if the area is closed compared to if it is left open. Exploitable biomass is projected to peak around 25,000 mt in 2013 if the area is closed compared to a peak of 14000 mt if the area is left open (Figure 34).

Figure 34 - Comparison of projected scallop exploitable biomass for the channel closed area if closed (BLUE) compared to if it is left open (RED) for 2010-2016



5.1.2.2 Projected scallop landings by area

Projected landings are highest for CLF20, and lowest for NCLF20 in 2010 (Table 37). Projected landings are higher for the two options that do not close the channel for the short term, 2011-1012. But by 2013, when the Channel area is proposed to reopen catch levels are higher for the two alternatives that propose closing that area in this action. The CLF18 option has higher landings once the area reopens compared to all the other scenarios. From about 2013-2016, CLF18 has 2-4 million higher landings each year compared to the alternatives that do not close the area. For the entire seven year period CLF18 has 5-10 million more pounds of landings. NCLF24 and CLF20 have about the same total landings for the same time period, about 426 million pounds, and NCLF20 projects 5 million more landings than those two scenarios and 5 million pounds less than CLF18 (Table 38).

Table 37 – Total projected 2010 scallop landings by scenario and SAMS area (million pounds)

	SAMS Area	CLF18	CLF20	NCLF20	NCLF24
	SEP	1,539,896	1,864,303	644,813	880,966
	CL1-Acc	1,449,885	1,447,505	1,452,563	1,445,929
	CL1-NA	0	0	0	0
	CL2-Acc	0	0	0	0
	CL2-NA	0	0	0	0
	NEP	1,553,324	1,793,951	732,439	970,575
	NLS-Acc	4,440,322	4,436,861	4,438,233	4,436,630
	NLS-NA	0	0	0	0
	Sch-Cl	0	0	6,324,350	8,162,894
GB	Sch-Op	5,604,364	6,677,541	2,448,815	3,306,424
	DMV	5,883,429	5,874,542	5,884,427	5,872,839
	ET	11,369,924	11,314,184	11,353,113	11,317,215
MA	HCS	0	0	0	0
	LI	9,807,177	11,431,691	4,521,638	6,027,102
	NYB	7,222,800	8,180,879	3,576,734	4,681,753
	VB	265,273	458,267	111,087	152,374
All		49,146,495	53,489,565	41,499,110	47,265,755

Table 38 – Total scallop landings by year and scenario (2010-2016)

	Landings			
year	**nc20**	**nc24**	**cl18**	**cl20**
2010	41,499,116	47,264,780	49,146,996	53,488,876
2011	62,221,124	60,435,884	58,873,248	57,178,372
2012	68,661,212	65,915,028	60,984,680	57,980,628
2013	64,861,516	62,569,356	66,397,704	63,748,496
2014	67,307,956	65,474,228	68,672,232	66,073,716
2015	65,275,868	64,074,688	68,381,304	65,864,336
2016	61,019,944	60,627,632	63,307,696	62,084,476
Cum. 2010-2016 (mt)	430,846,736	426,361,596	435,763,860	426,418,900

Figure 35 - Comparison of projected scallop landings for the scenarios under consideration (2010-2016) in mt

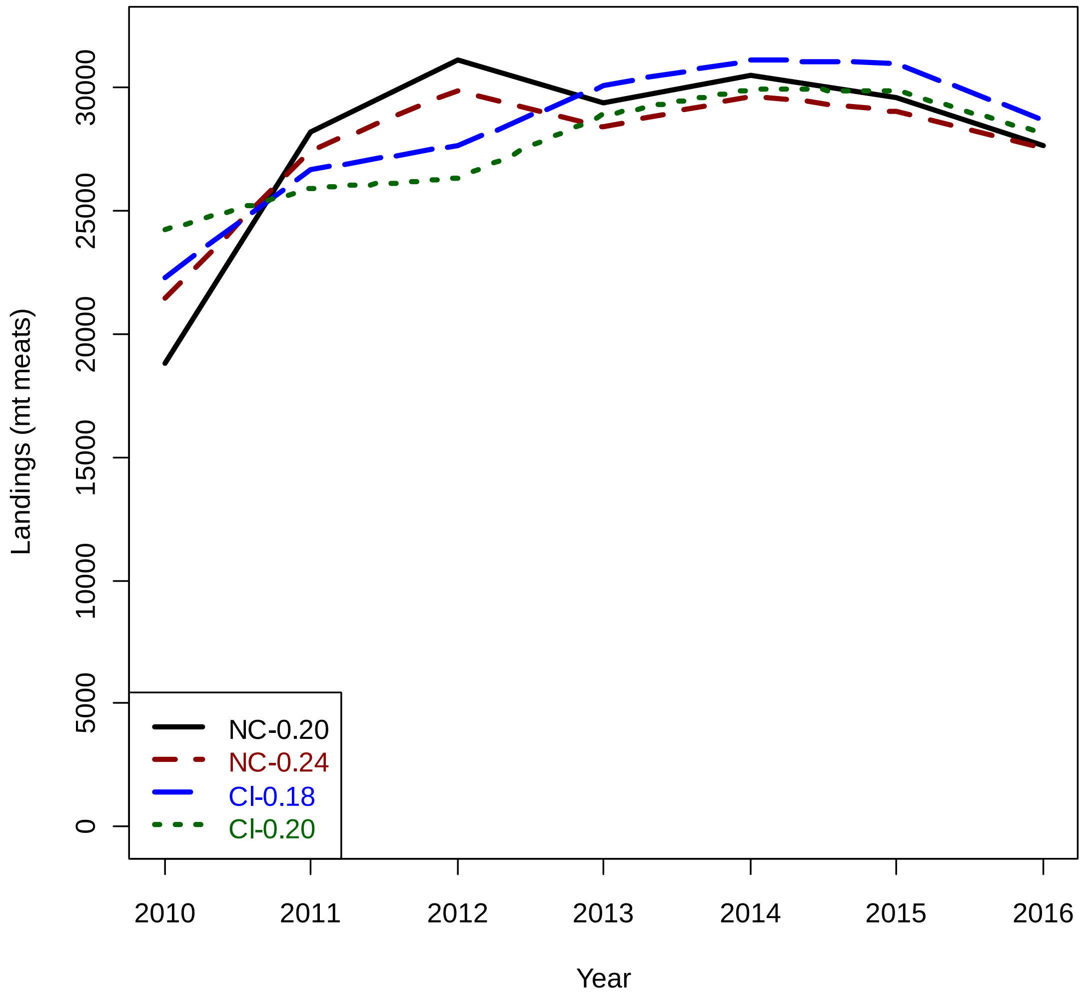
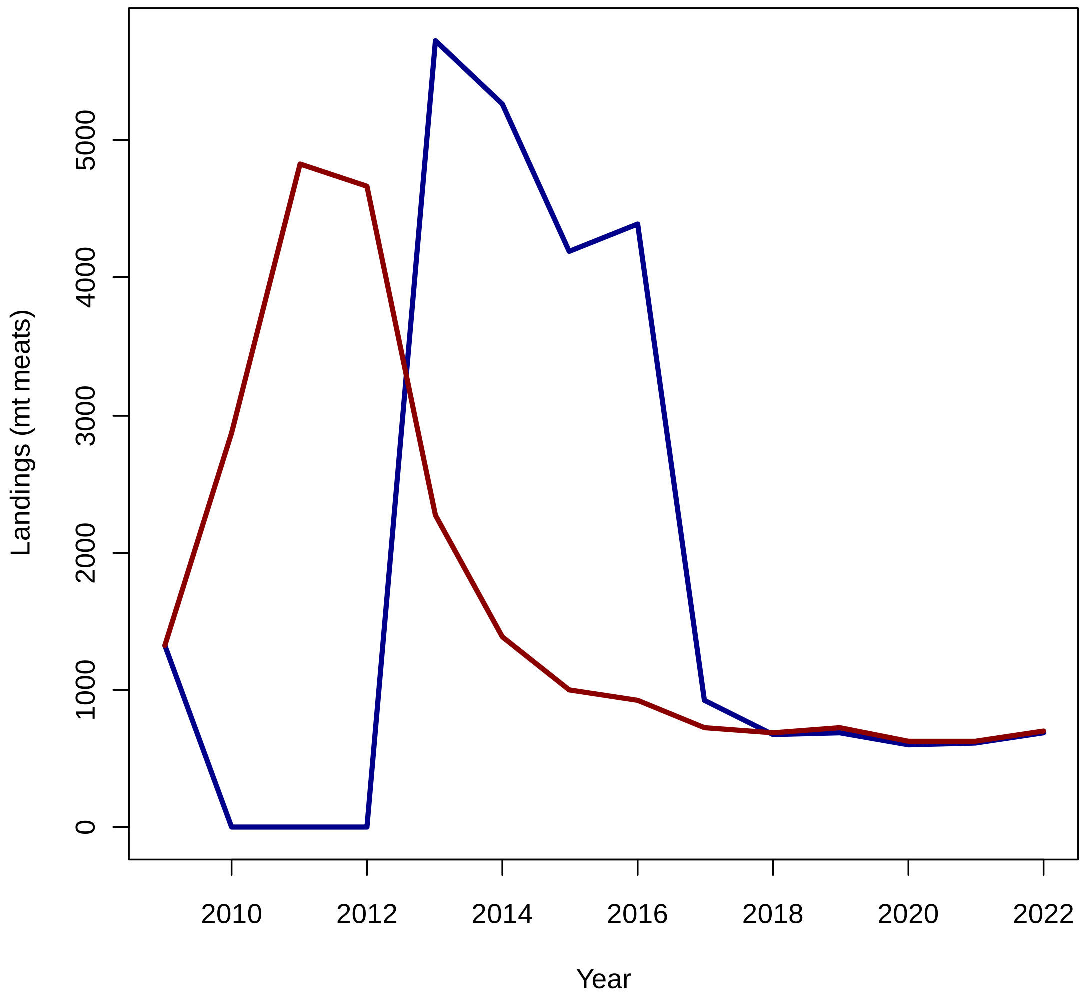


Figure 36 compares the projected catch from the Channel area if it is closed in this action, compared to if it is left open. Again, for 2010-2012 catch is higher from that area if left open, and declines quickly after 2012. If closed catch will be higher in 2013 (over 5000 MT or 12 million pounds). Table 39 shows that for the entire seven year period CLF18 and CLF20 have highest catch for this area, just over 43 million pounds, 4-5 million pounds more than the scenarios that do not close the channel.

Table 39 – Projected landings from the channel closure area for 2010-2016 (pounds)

Scenario	CLF18	CLF20	NCLF20	NCLF24
Sreg	Sch-Cl	Sch-Cl	Sch-Cl	Sch-Cl
2010	0	0	6,324,350	8,162,894
2011	0	0	10,631,639	9,696,570
2012	0	0	10,286,768	9,222,142
2013	12,625,906	12,611,134	4,992,418	4,575,366
2014	11,605,432	11,596,434	3,043,856	2,875,972
2015	9,242,468	9,256,789	2,191,426	2,097,056
2016	9,679,417	9,722,478	2,037,620	1,982,443
Grand Total	43,153,224	43,186,835	39,508,078	38,612,444

Figure 36 - Comparison of projected scallop landings for the channel closure area if closed BLUE) compared to if left open (RED) for 2010-2016 (mt)



5.1.2.3 Projected LPUE

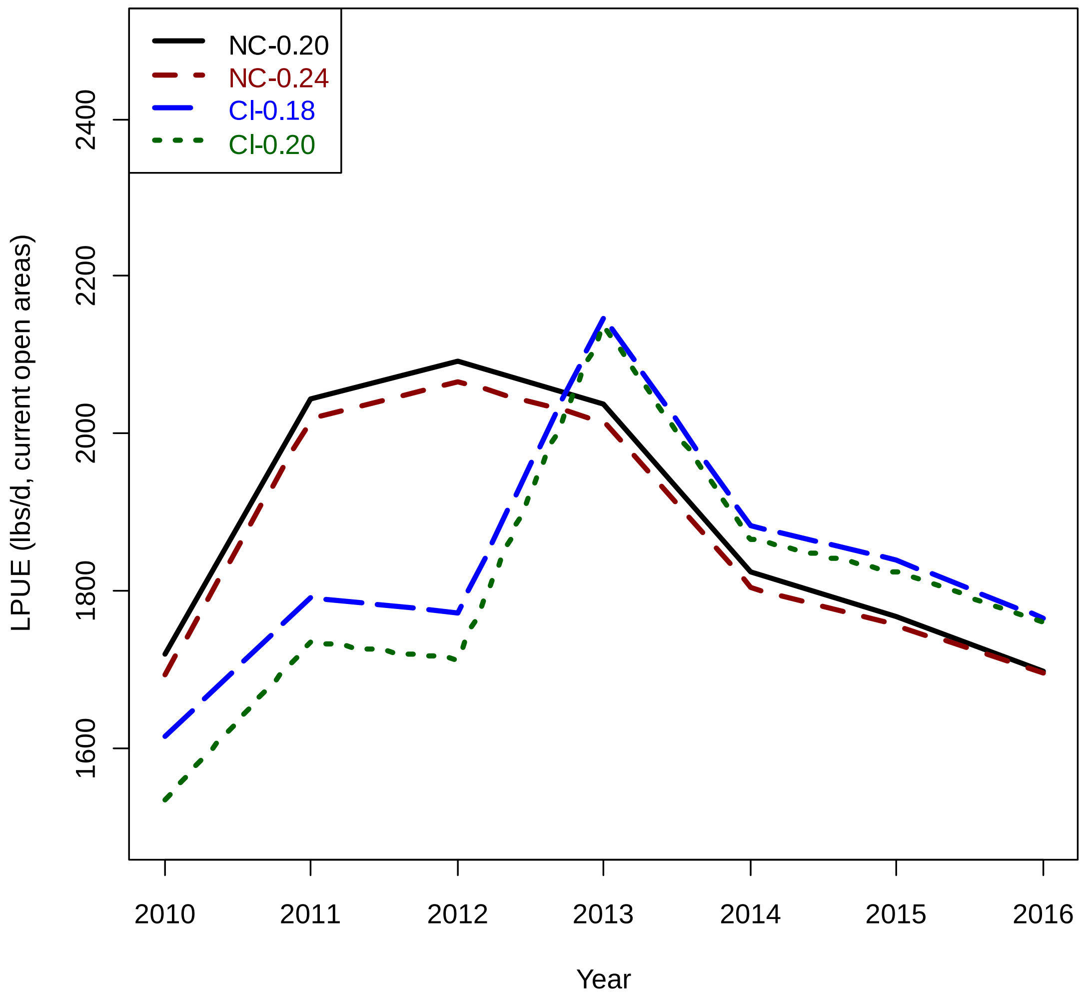
In 2010 overall LPUE is estimated to be between 1,671 and 1,885 depending on the scenario. It is much higher in access areas compared to open areas. LPUE values are similar for the scenarios in access areas, so LPUE are compared in this section for open areas only. In FY2010-2012 LPUE is higher for the two options that do not close the channel; this is primarily because those scenarios allocated fewer open area DAS, so F in open areas is lower providing more catch per DAS.

The closure has two immediate effects: it reduces F and forces fishing effort elsewhere. The first effect causes there to be more open area days at a given fishing mortality with a closure than without. Even when F is reduced down to F = 0.18, there are still more open area days than at F=0.24 without a closure, and they are concentrated in a smaller area.

In years 1-3 average LPUE is lower for the scenarios that do not close the area in the Channel, because DAS allocations are lower. In 2013 and beyond, when the Channel area reopens, LPUE is lower for the two scenarios that close the area in the Channel. LPUE peaks in 2012 for these scenarios and then declines for the reminder of the time series. On the other hand, LPUE estimated in open areas are lower for the two scenarios that close the channel, again since these options allocate more DAS to make up for the closed area. When more DAS are allocated fishing mortality is higher in open areas and LPUE values decline. CLF20 allocated the more DAS (51 per vessel) and that alternative performs the worst in terms of LPUE.

After 2013 when the channel reopens F in open areas is reduced again since more F coming from channel access area. So LPUE will increase for the two scenarios that close the channel after 2013. Average LPUE for open areas remain higher for the next few years while the Channel is an access area for the two scenarios that close the channel in FW21.

Figure 37 – Comparison of projected LPUE in open areas for the scenarios under consideration (2010-2016)



5.1.2.4 Projected DAS used by area

Projected DAS used in 2010 vary depending on the scenario. CLF20 has the highest projection of overall DAS used of over 32,000. This is due to the fact that this scenario allocates the most DAS of any other scenario (54 per FT vessel). NCLF20 has the lowest, and it also has the lowest DAS allocation of 29 DAS. By 2011, DAS used amounts are similar, and in the longer term NCLF20 has slightly higher DAS used projections, followed by CLF18.

Table 40. Projected DAS used by area for 2010

Reg	Sreg	CLF18	CLF20	NCLF20	NCLF24
GB	SEP	1,953	2,502	737	1,032
	CL1-Acc	674	674	673	675
	CL1-NA	0	0	0	0
	CL2-Acc	0	0	0	0
	CL2-NA	0	0	0	0
	NEP	1,112	1,360	464	631
	NLS-Acc	1,612	1,608	1,612	1,608
	NLS-NA	0	0	0	0
	Sch-Cl	0	0	3,917	5,097
	Sch-Op	3,673	4,431	1,561	2,118
MA	DMV	2,647	2,635	2,647	2,631
	ET	6,157	5,993	6,076	6,024
	HCS	0	0	0	0
	LI	6,101	7,517	2,517	3,437
	NYB	4,048	4,916	1,764	2,373
	VB	207	380	79	111
All Total		28,189	32,020	22,053	25,740

5.1.2.5 Projected bottom area swept by area

Evaluating projected area swept is useful for comparing potential impacts on non-target species and EFH because it relates to the estimated area swept by scallop gear under each alternative. The two options that do not close the channel have lower area swept, and DAS allocated for Year 1 (2010) (Table 41). If the Channel is closed area swept is expected to increase for MA open areas (LI, NYB, and VB). Bottom area for the open portion of the Channel will also be higher in the short term for the two options that close the channel. Once the Channel opens in 2013, the two options that close the Channel now have lower total bottom area swept compared to the two scenarios that leave it open in this action.

From 2010-2016, the amount of time the Channel would be closed and re-opened as an access area total bottom area swept is lowest for the two scenarios that leave the channel open (Table 42). Area swept does decline for the two options that close the channel after 2013 when the channel reopens, but the reduction is not that dramatic because those scenarios also allocate higher DAS. The closure has two immediate effects: it reduces F and forces fishing effort elsewhere. The first effect causes there to be more open area days at a given fishing mortality with a closure than without. Even when F is reduced down to F = 0.18, there are still more open area days than at F=0.24 without a closure, and they are concentrated in a smaller area. This is what causes the additional area swept. To eliminate an increase in area swept from the closure an even lower overall F would need to be applied (i.e. F=0.16).

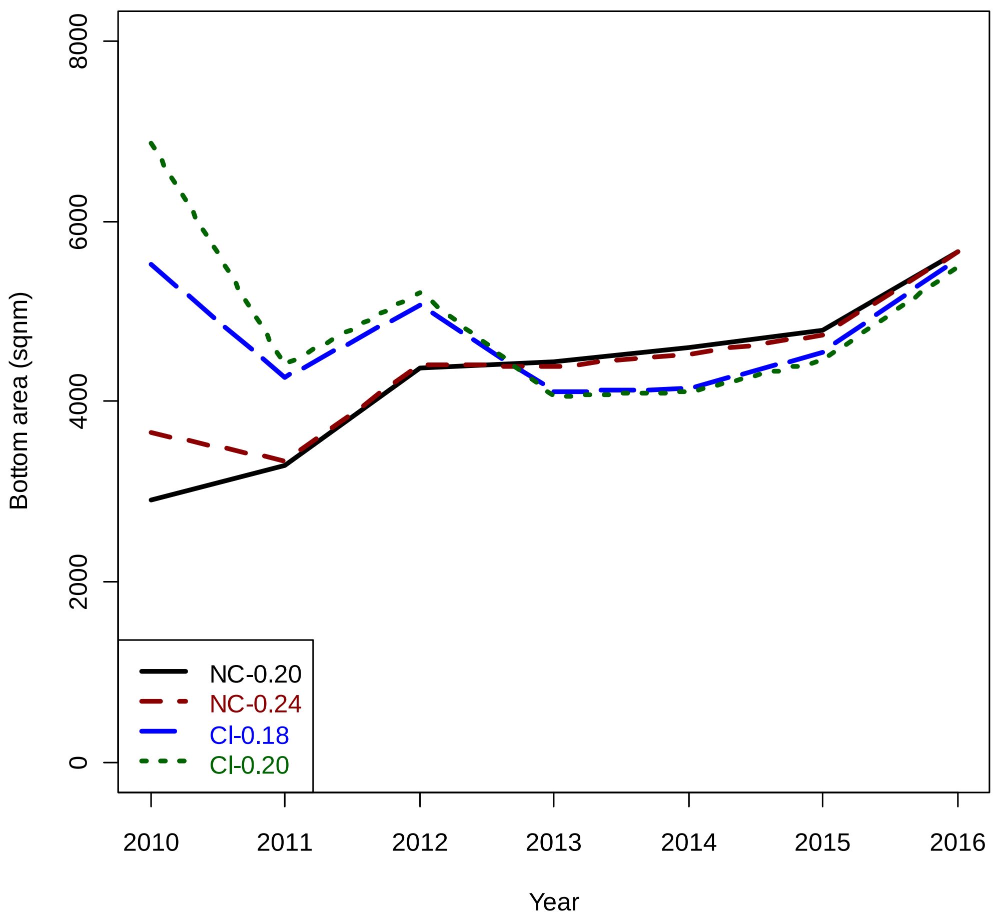
Table 41. 2010 Projected bottom area swept (sq. nautical miles)

Reg	Sreg	CLF18	CLF20	NCLF20	NCLF24
GB	SEP	748	964	275	388
	CL1-Acc	142	143	141	143
	CL1-NA	0	0	0	0
	CL2-Acc	0	0	0	0
	CL2-NA	0	0	0	0
	NEP	299	393	105	150
	NLS-Acc	162	163	163	163
	NLS-NA	0	0	0	0
	Sch-Cl	0	0	203	290
	Sch-Op	459	585	169	239
MA	DMV	173	173	173	173
	ET	690	699	694	696
	HCS	0	0	0	0
	LI	1,738	2,278	612	874
	NYB	1,034	1,377	353	508
	VB	65	84	23	33
All Total		5,515	6,864	2,916	3,663

Table 42 – Total bottom area swept by year and scenario (2010-2016)

	AreaSwept			
year	**nc20**	**nc24**	**cl18**	**cl20**
2010	2,916	3,663	5,515	6,864
2011	3,301	3,351	4,263	4,401
2012	4,375	4,400	5,068	5,211
2013	4,446	4,386	4,116	4,059
2014	4,597	4,536	4,152	4,114
2015	4,797	4,746	4,551	4,458
2016	5,665	5,662	5,590	5,484
Cum. 2010-2016	30,097	30,744	33,255	34,591

Figure 38 – Comparison of projected area swept for the scenarios under consideration (2010-2016)



5.1.2.6 Overall comparison of the scenarios

In the short term (2010-2012) NCLF20 scenario has slightly higher exploitable biomass, but in the long-term CLF18 has the highest exploitable biomass compared to all the other scenarios (Table 36). Not surprisingly, exploitable biomass projections for the channel area alone are much higher from 2010-2016 if the area is closed compared to if it is left open (Figure 34). For the entire seven year period (2010-2016) CLF18 has 5-10 million more pounds of landings compared to the other scenarios. NCLF24 and CLF20 have about the same total landings for the same time period (426 million pounds) and NCLF20 projects 5 million more landings than those two scenarios and 5 million pounds less than CLF18 (Table 38). **Therefore, CLF18 has the highest cumulative exploitable biomass and projected landings for 2010-2016 compared to the other alternatives. On the other hand, NCLF24 has both the lowest cumulative exploitable biomass and projected landings for 2010-2016.**

Overall the closure has two immediate effects: it reduces F and forces fishing effort elsewhere. The first effect causes there to be more open area days at a given fishing mortality with a closure than without. Even when F is reduced down to F = 0.18, there are still more open area days than at F=0.24 without a closure, and they are concentrated in a smaller area. That is why LPUE is lower and area swept is higher for the two options that close the channel at first. After the Channel opens in 2013 LPUE is higher and area swept is lower for the two scenarios that close the Channel. The differences are not that large since the only difference in the figure is for the channel area alone, all other aspects of the scenarios are identical in those years (Ftarget of 0.24). **In summary, over the seven years LPUE is slightly higher and area swept is slightly lower for the two options that close the channel, but that is not the case at all in 2010-2012 while the channel is closed because DAS allocations are substantially higher for these scenarios to compensate for the closure.** This is an artifact of a system where the target fishing mortality is set for all areas combined (open, closed, and access areas). Having a fixed overall fishing mortality target under area rotation is very problematic and causes issues like this. Amendment 15 is considering an alternative to change the overfishing definition to address this problem.

Note: The Scallop Committee passed the following motion on 11/03/09.
Motion 2: Preble/Alexander: Eliminate the scenario that would close the Great South Channel and have an F of 0.20 (CLF20). **Vote: 9:0:0, motion carries unanimously**.

Rationale/Discussion: This alternative increases DAS and has a negative impact on F in open areas. It is a bad move economically and will cause more problems with YT bycatch. In terms of the closure it was pointed out by an audience member that many vessels in the fleet can't fish in the Channel, not enough horsepower. Another raised concern about closing the channel before the habitat process is complete, which is considering a cod HAPC in this area. Another commented that the channel is a great seed producing area, but not ideal as an access area because scallops do not seem to get very large there. There is a front there, tons of predators in the area and he does not believe the ecology in that area would allow for the gains we expect from closing an area for three years.

5.1.3 measures for Limited access vesseLS

This framework includes the specific access area schedule and DAS allocation s for all limited access scallop vessels. Four different scenarios are under consideration: 2 that propose closing a new area in the South Channel for area rotation and 2 without. Two options are considered for each at different overall F values.

In general, alternatives with higher open area DAS have higher estimates for DAS used and bottom contact time. In addition, LPUE in open areas is lower for these alternatives compared to the scenarios that allocate fewer DAS. Overall F is estimated to be the same for all scenarios over time, but since there is currently not much biomass in open areas, higher F rates in these areas are not beneficial for the scallop resource in open areas.

One-percent of the estimated TAC for each access area and open area DAS would be set-aside to help fund observers. In addition, 2% of the estimated TAC for each access area and open area DAS would be set-aside to fund scallop-related research. The percent of TAC and total DAS set aside for observers and research would be removed before allocations are set for limited access and general category fisheries. Overall, setting aside TAC to help defray the cost of observers and collect scallop resulted research improves overall management of the Scallop FMP which ultimately has beneficial impacts on the scallop resource.

Georges Bank Access Areas
If the YT flounder bycatch TAC is reached in Nantucket Lightship, limited access vessels are permitted to use access area trips at a compensation rate in open areas. Analyses suggest that the compensation for Nantucket Lightship in 2010 would be ?? DAS. Since the compensation rates are determined by estimating an equivalent level of mortality, the overall impacts of this alternative on the scallop resource are expected to be neutral. For example, the number of scallops harvested in ?? DAS in open areas in 2010 is expected to be equal to the number of scallops harvested on one 18,000 pound access area trip in Nantucket Lightship.

Mid-Atlantic Access Areas
The seasonal closure in ETA that will rollover under this framework (September 1-October 31) is expected to have positive impacts on the scallop resource by reducing effort in that area when scallop shell height-to-meat weight ratios are lower. In the Mid-Atlantic, the southern range of the scallop resource, there is a seasonal cycle in meat yield that increases from March to July and then declines until October-November (Schmitzer, 1988). Therefore, reducing effort in that area during September and October will reduce mortality. Framework 18 assessed the seasonal differences in meat count for this time period in the Mid-Atlantic (See Section 5.1.1.2.7 of Framework 18; NEFMC, 2005).

The seasonal closure alternatives under consideration for Delmarva under the RPM alternatives (September 1-October 31 or October 1- October 31) are expected to have positive impacts on the scallop resource for the same reasons described above for ETA.

Other Measures
If the LAGC IFQ program is not fully implemented before March 1, 2010 the LAGC fishery is allocated 10% of the total projected scallop catch during the transition period to ITQs, compared to 5%. The FW21 management scenarios include a specific DAS allocation to the LA fishery based on that sector of the fleet being allocated 95% of the projected catch. Regulations require that if the transition period is extended for another year LA DAS must be reduced by an equivalent amount to prevent overfishing. The needed DAS reductions per scenario are described in Table ???. Overall, there are no expected differences of impacts on the scallop resource if the limited access fishery lands these scallops or the general category fishery. These vessels do tend to fish in different areas and sometimes seasons, but overall impacts on the scallop resource should be neutral.

5.1.4 Measures for General category vessels

5.1.4.1 Measures if IFQ program is delayed

5.1.4.1.1 Quarterly hard-TAC for transition period to limited entry (FY2008)

If the IFQ program is delayed and is not implemented before March 1, 2010 the general category fishery will continue to be managed under a quarterly hard TAC for 2010. All LAGC IFQ permits and permits under appeal will be permitted to fish under general category rules and would be allocated 10% of projected scallop catch. The total general category allocation (open and access areas) will be divided into four quarters. Since there is an overall TAC, this alternative is not expected to have impacts on the scallop resource. The proposed allocations are higher during the spring and summer (Quarters 1 and 2) when meat weights are larger.

If the LAGC IFQ program is fully implemented before March 1, 2010 then general category qualifiers will receive an individual fishing quota based on their contribution to historical landings. IFQs will not be area-specific; a vessel can choose to participate in an access area program and landings will be removed from their individual allocation. Vessels will be permitted to catch that quota in any area available (open areas or access areas) until the fleetwide allocation is harvested. In general, this alternative is not expected to have impacts on the scallop resource. The impacts of the overall IFQ program were assessed in Amendment 11, and in general this alternative is expected to have positive impacts on the scallop resource compared to the No Action alternative for Amendment 11 (no limited entry program).

This action includes a 70,000 pounds hard-TAC for the NGOM. Vessels that qualify for a LAGC NGOM permit can fish up to 200 pounds a day in this area. Once the TAC is reached, no scallop vessels are permitted to fish in the NGOM area. Because all scallop fishing is prohibited once the TAC is reached, this alternative is expected to have beneficial impacts on the scallop resource, provided the TAC is set at the appropriate level and is effectively monitored. In the long run, when an assessment of this area is available, the hard TAC should help prevent overfishing of the scallop resource in this area.

This action includes a 50,000 pound target TAC for vessels with an incidental LAGC permit. Vessels that qualify for a LAGC incidental permit are permitted to land up to 50 pounds of scallop meats per fishing trip. Considering mortality from incidental catch in a more direct way could have indirect benefits on the scallop resource by taking this source of mortality into account before allocations are made to the fishery. The PDT will review this estimate and revise it if expected mortality from incidental catch changes in the future.

5.1.5 consideration of new rotational area in the great south channel

Amendment 10 defines the criteria for closing an area to protect young scallops. Under adaptive area rotation, an area would close when the expected increase in exploitable biomass in the absence of fishing mortality exceeds 30% per year and re-open to fishing when the annual increase in the absence of fishing mortality is less than 15% per year. Identification of areas would be based on a combination of the NEFSC dredge survey and available industry-based surveys. The boundaries are to be based on the distribution and abundance of scallops at size; ten-minute squares are the basis for evaluating continuous blocks that may be closed. The guidelines are intended to keep the size of the areas large enough and regular in shape to be effective, while allow a degree of flexibility. The Council and NMFS are not bound to closing an area that meets the criteria and the Council and NMFS may deviate from the guidelines to achieve optimum yield.

If any areas qualify, the area would close to all scallop vessels and vessels would not be permitted in that area until a later date when biomass estimates project higher yields. The Council is not required to implement these rotational closed areas just because they meet the criteria recommended in Amendment 10 for new closures, but they should be considered.

Results from the 2009 survey suggest that small scallops have settled in parts of the Great South Channel. The PDT recommended consideration of an area to the north of the Nantucket Lightship closed area and west of Closed Area I; the top left coordinate of the polygon is 41 20’ N and 69 30’ W and the bottom left coordinate is 40 50’N and 68 50’W (Figure ???). Recruitment on GB has been below average since 2001 and has only improved in the last few years. High numbers of small scallops (<70 mm) were caught on 2007, 2008 and 2009 survey tows in this area. The SMAST video survey of this area also found high scallop recruitment in this area.

Physical area of proposed closure

Approximately 18% of the total "South Channel" region (from A10 boundaries) would be included in the proposed GSC closure, which meets the rotational closure criteria from A10. In comparison to open areas on Georges Bank the closure is 11% of the total Georges Bank open area.

Table 43 – Physical area comparison of open versus closed with proposed GSC area

Region	Area km^2	% of Area Contained in Proposed GSC Closure
Proposed GSC Closure	2332	
A10 South Channel Region	13129	18
A10 South Channel Region - excluding Proposed GSC Closure	10797	22
Georges Bank Open Area	20310	11
Georges Bank Open Area - Excluding Proposed GSC Closure	17978	13

Biomass

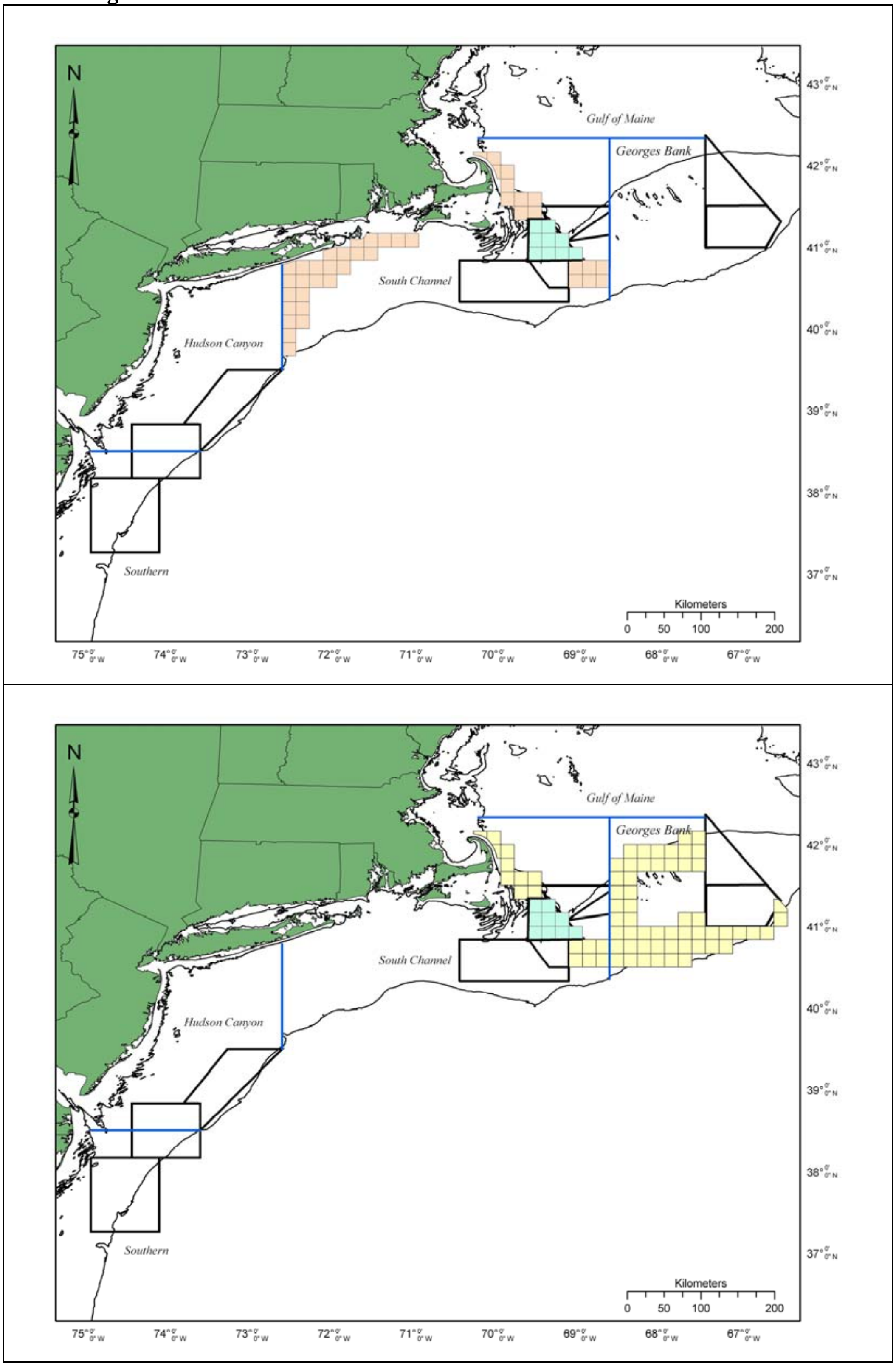
If time permits the PDT may analyze the total amount of exploitable biomass in the proposed closure compared to both the South Channel area and what percent of the total open area on GB is within this area using data from the combined biomass estimates from 2009. For the time being, based on data provided by SMAST approximately 8% of the exploitable biomass on all of Georges Bank and 35% of the exploitable biomass in open areas of Georges Bank is within this area.

Overall

In order to get a sense of expected impacts from this closure, it is useful to compare the projected exploitable biomass and LPUE estimates for the alternatives that close the area and the alternatives that do not. In the short term NCLF20 scenario has slightly higher exploitable biomass, but in the long-term CLF18 has the highest exploitable biomass compared to all the other scenarios. Exploitable biomass in open areas in the Channel is hit relatively hard for the two scenarios that close the Channel for the next few years. One the other hand, by 2013 exploitable biomass in the closure in the Channel is about 4 times greater compared to if the area was left open (6,000 MT if open compared to 24,000 MT if closed). In the long-term, CLF18 is expected to have higher exploitable biomass than the other scenarios, but closing the proposed area in the GSC would increase overall bottom area swept since that area includes some of the higher LPUE areas left in open areas. In addition, this closure is expected to have some displacement effects since there are limited areas left that the fishery can use open area DAS.

As with any rotational closure, it is more beneficial to harvest scallops after they have reached their growth potential to maximize yield. Therefore, since there are small scallops in that area, if they are given several years to grow, then fewer scallops will be harvested in the future, thus reducing mortality with positive benefits on the resource. In addition, this area includes a concentration of small scallops that have not shown up on Georges Bank in recent years and could produce an access area akin to the NL in the near future if managed like an access area.

Figure 39 – Area of proposed closure compared to A10 boundaries for area rotation for the South Channel and Georges Bank



5.1.6 Compliance with reasonable and prudent measure in recent biological opinion

5.1.6.1 Alternatives to comply with RPM

5.1.6.1.1 Restrict the number of open area DAS an individual vessel can use in the Mid-Atlantic during a certain window of time

This alternative would set a maximum on the number of allocated open area DAS each limited access vessel can use in the area defined as the Mid-Atlantic during the time periods under consideration (June 16-October 14 or June 15-October 31). There are also two options for what area would be closed (the entire area defined by the term and condition, or a smaller area for the month of June and the entire area for the remainder of the turtle season selected).

It is difficult to predict the impacts of this measure on the scallop resource because impacts are based on how vessels react to this restriction. If vessels respond by fishing in similar areas but shift effort to times of the year with greater meat weight yields (spring and summer) then impacts on the resource will be minimal, even positive. But if vessels fish these open area DAS in times of the year that have lower meat weight yields impacts on the resource will be negative. In addition, if vessels fish on GB during this season instead, impacts on F in that area may be higher than expected in the biomass projections.

In terms of the season alternatives, if the restriction is extended into late October that is actually good for the scallop resource, provided effort from those two weeks are used during more productive months. In terms of the area alternatives, less restrictions in the month of June are good for the scallop resource because that is a time of year with very high meat weight yields, so fishing that time of year helps optimize yield.

This alternative will have more impacts the more DAS it impacts. Overall, the lower the percent of effort shift from the turtle season to the rest of the year the more impacts will be minimized on the resource because effort shifts are expected to have impacts on F that are difficult to predict.

5.1.6.1.2 Restrict the number of access area trips in the Mid-Atlantic that can be used during a certain window of time

This alternative would restrict the number of allocated access area trips that can be taken in the Mid-Atlantic during the two time periods under consideration.

It is difficult to predict the impacts of this measure on the scallop resource because impacts are based on how vessels react to this restriction. If vessels respond by fishing in similar areas but shift effort to times of the year with greater meat weight yields (spring and summer) then impacts on the resource will be minimal, even positive. But if vessels fish AA trips in times of the year that have lower meat weight yields impacts on the resource will be negative. The Council could consider reducing the possession limit on access area trips to taken during the turtle season minimize impacts on fishing mortality. Because vessels get a possession limit with compensation trips, if it takes more scallops to harvest 18,000 pounds there is nothing in the regulations to reduce that additional potential impact of this RPM.

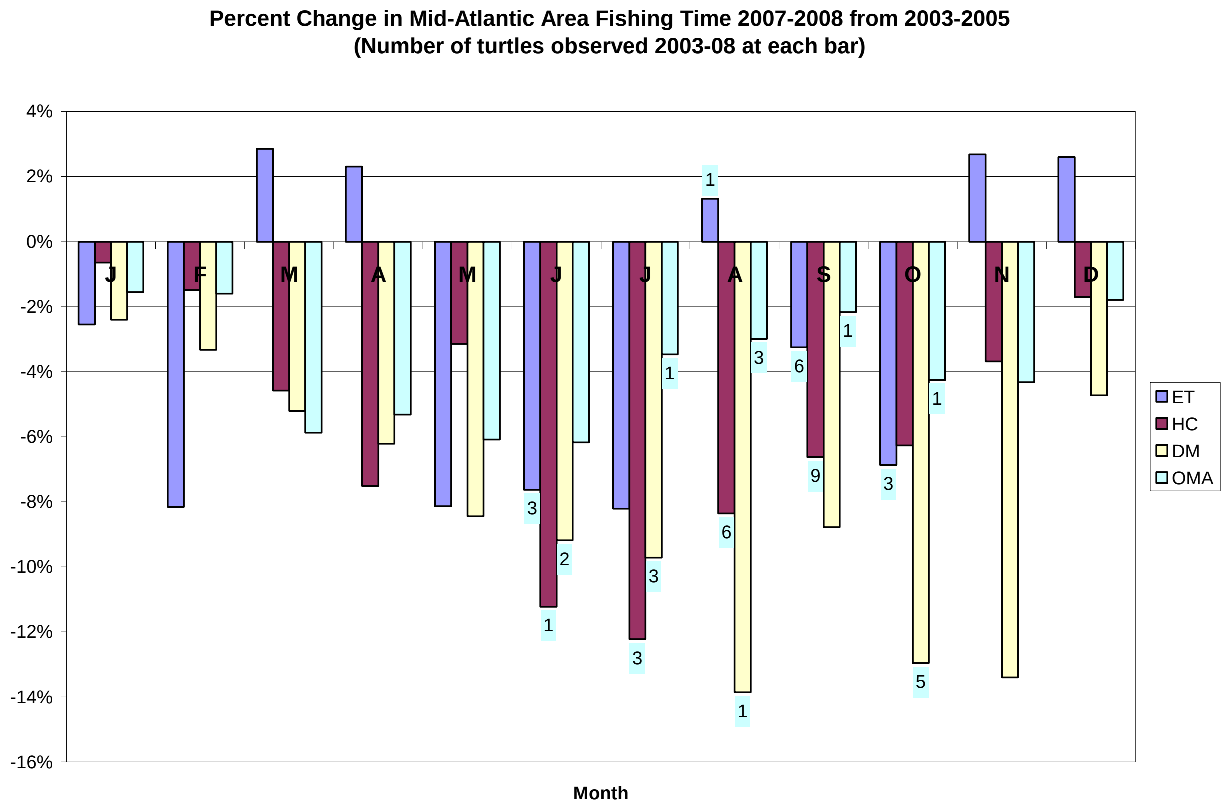
In terms of the season alternatives, if the restriction is extended into late October that is actually good for the scallop resource, provided effort from those two weeks are used during more productive months. This alternative will have more impacts the more trips that are impacted by the RPM. Overall, the lower the percent of effort shift from the turtle season to the rest of the year the more impacts will be minimized on the resource because effort shifts are expected to have impacts on F that are difficult to predict.

5.1.6.1.3 Consider a seasonal closure for Delmarva

This alternative would consider a seasonal closure of the entire access area to both general category and limited access scallop vessels for either the months of September and October or October only.

Both seasons under consideration are expected to have beneficial impacts on the scallop resource if effort is shifted into other times of the year similar to recent behavior changes from the two-month seasonal closure of ETA. In the Mid-Atlantic, the southern range of the scallop resource, there is a seasonal cycle in meat yield that increases from March to July and then declines until October-November (Schmitzer, 1988). Therefore, reducing effort in that area during months of lower meat weight yields will reduce mortality. IN 2007 and 2008, effort in the Mid-Atlantic increased in March, April, August, November and December compared to overall fishing time in years before that (Figure 40). Meat weights are lower in November and December compared to the annual average, but higher in March, April and August. So if effort from Sept and/or Oct is primarily shifted into months with higher meat weight yields, impacts on F may be reduced, having beneficial impacts on the scallop resource.

Figure 40 – Percent change in Mid-Atlantic area fishing time by month in recent years compared to 2003-2005



5.1.6.1.4 Reduce possession limits in ETA and/or Delmarva to reduce fishing time per trip

This alternative would reduce the possession limit for any MA trip taken during the turtle season (June16-Oct14 or June15-Oct31). As currently written this alternative would not permit a vessel to harvest that remaining catch outside the turtle window.

This alternative would have beneficial impacts on the scallop resource since effort levels would be lower. The FMP would potentially not achieve optimum yield because catch that should have been harvested based on biological projections would not be, but that would increase scallop stock biomass. It is not clear how much the possession limit would change yet from this alternative, so if it is a small amount vessels may still fish, but if it is onerous enough vessels may decide not to fish at all during this season. If this measure causes vessels to change their seasonal fishing patterns considerably so that they do not take AA trips during this time period that could have negative consequences on the scallop resource if all the trips that normally occur in June – August occur in times of the year with lower meat weights.

5.1.7 Improvements to the observer set-aside program

5.1.7.1 Prohibit vessels from not paying for observers

This alternative would prohibit a vessel from fishing until all outstanding bills were paid by not issuing a permit to fish in a fishing year after an outstanding bill is due. This alternative would not have direct impacts on the scallop resource. If this ultimately improves the overall coverage of the scallop fishery there may be indirect benefits on the resource from improved information and monitoring of the fishery and resource.

5.1.7.2 Limit the amount of observer compensation general category vessels can get per observed trip in access areas

This alternative would create a ceiling to discourage overages by limiting the amount of compensation to two fishing days, whatever the daily compensation rate is for an access area. This alternative would not have direct impacts on the scallop resource. If this ultimately improves the overall coverage of the scallop fishery there may be indirect benefits on the resource from improved information and monitoring of the fishery and resource.

5.2 ESSENTIAL FISH HABITAT

5.2.1 Consistency with Omnibus EFH Amendment 2

Introduction

Beginning in early 2008, NEFMC habitat staff, committee members, and plan development team members commenced work on Phase 2 of the Essential Fish Habitat Omnibus Amendment 2. The purpose of this phase is to identify fishing impacts to EFH across all NEFMC plans, and develop management alternatives to minimize those impacts. The analytical tool being developed for this purpose, called the Swept Area Seabed Impact, or SASI, model, combines fishing effort data with habitat vulnerability in a spatial context. **The primary assumption of the SASI model is that area of seabed swept by a particular fishery or subcomponent of a fishery is a proxy for seabed impact, and that seabed impact is a proxy for impacts to EFH.**

The SASI model includes a qualitative vulnerability assessment of the impacts of each type of fishing gear on the structural components of fish habitat. Vulnerability incorporates both the susceptibility of seabed habitat components to fishing gears, and the ability of those habitat components to recover from impact. Once completed, the results of this vulnerability assessment will be used to scale quantitative area swept estimates. Another assumption of SASI is that habitat impacts may vary by habitat type and gear type. Habitat types are defined based on seabed substrate (mud, sand, granule-pebble, cobble, or boulder dominated) and environmental energy (high or low natural seabed disturbance).

While EFH Omnibus Amendment efforts are ongoing such that the SASI model cannot yet be used to analyze the alternatives proposed in Framework 21 to the Atlantic Sea Scallop FMP, the following assessment assumes, consistent with SASI, that area swept can be used as a proxy for EFH impacts. Thus, the following assessment of EFH impacts compares area swept estimates between the various fishing effort/area rotation scenarios, with less area swept serving as one indication that a scenario would result in fewer impacts to EFH. Other alternatives are discussed qualitatively.

The following EFH impacts analysis references area swept estimates generated by the scallop PDT. These are broadly consistent with preliminary SASI model results, with the primary difference being that SASI model estimates would also be conditioned by contact of scallop dredges with the seabed and the vulnerability of various habitat types, as defined by their substrate, energy, and constituent features. In lieu of SASI's more formal vulnerability assessment approach and comparison , the following paragraphs summarize the results of fifteen scientific studies that have examined the seabed impacts of New Bedford-style scallop dredge gear. In EFH Omnibus Amendment 2, this research forms the foundation of the vulnerability assessment that evaluates the susceptibility and recovery of various habitat features to/from scallop dredge impacts.

Literature summary
Broadly speaking, there are two types of scallop dredge impact studies. The type first compares fished and unfished areas, with varying levels of sophistication in their experimental design that range from a qualitative comparison between fished and unfished areas that are otherwise similar, to a formal before/after control/impact study. Such comparative studies of scallop dredge impacts include Asch and Collie (2007), Auster et al. (1996), Collie et al. (1997), Collie et al. (2000), Collie et al. (2005), Hermsen et al. (2003), Langton and Robinson (1990), Lindholm et al. (2004), Link et al. (2005), and Stokesbury and Harris (2006). The second type of study examines the direct effects of experimental tows on seabed habitats. These include Caddy (1968), Caddy (1973), Mayer et al. (1991), Murawski and Serchuk (1989), Sullivan et al. (2003), and Watling et al. (2006). Not all studies address recovery.

Five studies, including Asch and Collie (2007), Collie et al. (1997), Collie et al. (2000), Collie et al. (2005), and Hermsen et al. (2003) examined the same shallow (40-50 m) and deep (80-90 m) disturbed and undisturbed sites in and around Georges Bank Closed Area II. Substrates at the study sites were pebble and cobble pavements with some overlying sand, and the environment was high energy. Collie et al. (1997), Collie et al. (2000), Collie et al. (2005) examined the area using benthic sampling, video, and still photos. They found significantly higher total densities, biomass, and species diversity in undisturbed sites, but also in deeper water (i.e., effects of fishing could not be distinguished from depth effects). In addition, six species were abundant at undisturbed sites, but rare or absent at disturbed sites. Although the percent cover of tube-dwelling polychaetes, hydroids, and bryozoans was significantly higher in deep water, there was no disturbance effect. Five years after fishing was eliminated from the area, there were significant shifts in species composition and signficant increases in abundance, biomass, production, and epifaunal cover (Collie et al. 2005).

Hermsen et al. (2003) sampled benthic macrofauna using a Naturalists dredge with a 6.4 mm liner eight times over seven yr period: two yrs prior to closure, just after closure, and five yrs after closure. They found that production remained markedly lower at shallow disturbed site over course of study than at nearby recovering site, where it increased over 12-fold from before closure to 5 yrs after closure. At the deep sites, production remained signficantly higher at undisturbed sites. Sea scallops and sea urchins dominated production at shallow recovering site; a soft-bodied tube-building polychaete dominated production at the deep, undisturbed site.

Asch and Collie (2007) analyzed still photographs (N=386) for percent cover of colonial epifauna and the abundance of non-colonial organisms. Prior to closure, multiple gear types were fished in the study area. At shallow sites, cover of all epifauna except hydroids significantly differed by disturbance regime. Sponges and bushy bryozoans showed significantly higher percent cover at undisturbed sites, while encrusting bryozoans and *Filograna implexa* showed significantly higher percent cover at disturbed sites. At shallow sites, there were many significant between year variations as well. At deep sites, the percent cover of *F. implexa* and hydroids was significantly higher in undisturbed areas, while other taxa showed no differences by disturbance regime. For non-colonial epifauna, depth contributed more to differences in species composition than disturbance. Higher species richness at was observed at undisturbed sites, but the difference was only significant at shallow sites. In terms of recovery, at shallow sites, several taxa showed changes in abundance beginning two years after the closed area was established. Increases in abundance of *P. magellanicus*, *Pagurus* spp., *S. droebachiensis*, and *Asterias* spp. occurred between the 1994 closure and 2000.

Auster et al. (1996) studied fishing effects at three sites in the Gulf of Maine. First, inside vs. outside video transects were taken at the Swans Island site, which had been closed 10 years. Substrates at the site included sand and cobble. In cobble habitat (N=12-13 transects per treatment), there was signficantly lower cover of emergent epifauna and sea cucumbers in the fished area; in sand habitat (N=17-18 transects per treatment), there was signficantly lower cover of sea cucumbers and biogenic depressions in the fished area. Next, submersible dives were conducted before and after fishing on Jeffreys Bank. Results were qualitative: loss of mud veneer, reduction in epifaunal species, including sponges (quantified but no statistical tests), and movement of boulders. Finally, a gravel and sand site with depths ranging from 32-43m was observed on Stellwagen Bank, where daily fishing was evidenced by trawl/dredge tracks. Based on a small number of video transects, they observed a positive relationship between the hydrozoan *Corymorpha penduala* and shrimp in 1993, and fewer areas with hydrozoans and wide distribution of tunicate *Molgula arenata* in 1994.

Langton and Robinson (1990) conducted a before/after fishing comparison of the abundance and distribution of three species on Fippenies Ledge in the Gulf of Maine, but the possible effects of trawling were not evaluated. Submersible observations made 1 yr apart, before and after commercial dredging of Fippennies Ledge. Jeffreys Ledge was observed once, after dredging. Three species dominated both sites – *Placopecten magellanicus, Myxicola infundibulum,* and *Cerianthus borealis*. After dredging at Fippennies Ledge, densities of all three were reduced. Authors observed that Jeffreys Ledge site was similar to post-fishing Fippennies Ledge.

Using video and still photos taken along transects, Lindholm et al. (2004) compared relative abundance of seven microhabitats at 32 stations located inside and outside an area closed for 4.5 yrs to bottom trawls and dredges (Closed Area II). The found a significantly higher incidence of rare sponge and shell fragment habitats inside the closed area, but no significant differences for 6 more common habitat types in both fished and unfished areas in mobile (<60m) or immobile

(>60m) sand habitats. Inside the closed area, sponges and biogenic depressions were numerically more abundant in immobile sand habitats.

Link et al. (2005) fished inside and outside of Closed Areas I and II with a #36 Yankee otter trawl to sample nekton and benthic community. Benthic macroinvertebrate species richness did not vary by inside vs. outside the closure, but did vary by habitat type. After five years of closure, they did not see an increase in biomass and abundance for most species.

Stokesbury and Harris (2006) examined the effect of scallop dredging in isolation, albeit in areas that were previously trawled. Their study was conducted entirely within portions the Georges Bank closed areas, which had been closed to trawling since 1994, but opened to scalloping at various intervals beginning in 1999. This study compared the same areas before and after fishing to estimate the impacts of fishing as compared to changes due to natural disturbance at the scale of the fishery. Experimental BACI study (counts of fish and marcoinvertebrates > 40 mm in video images) in areas that were opened to scallop fishing in 2000/01 and control areas that have remained closed since 1994; exp 1 compared northern portion of CAII (closed) with NLCA (open), exp 2 compared open and closed portions of CAI; both sites in each experiment had similar tidal current velocities, impact areas in both experiments deeper with more sand than control areas. Changes in density in areas impacted by limited fishing are similar to changes in control areas; in both experiments bryozoans/hydrozoans increased S after fishing, while sponges decreased in impact and control areas (S so in exp1), and sand dollars decreased NS in impact portion of CAI, with NS increases in closed area. Temporal changes in open and closed areas (before-before and after-after) and shifts in sediment composition between surveys indicate that fishing affected the epibenthic community less than natural environmental conditions. Recovery was not addressed.

Caddy (1968) employed divers to observe geological impacts of two tows during a scallop dredge efficiency study in the Northumberland Strait, Gulf of St. Lawrence. The water depth was 20 m and the substrate was mud. They observed 3 cm deep drag tracks produced by the skids, smooth ridges between them produced by the dredge rings, and dislodged shells in the dredge tracks. Using a submersible, Caddy (1973) observed sediment resuspension <1 hr after single dredge tows. The study site, Chaleur Bay, Gulf of St. Lawrence, Canada, had a depth of 40-50 m and a sand/gravel substrate, with occasional boulders.

Murawski and Serchuk (1989) made underwater observations of a dredge track immediately after fishing in the Mid-Atlantic Bight. They observed few damaged scallops in the tow path, which indicated low incidental mortalility (<5%). Sullivan et al. (2003) estimated the effects of experimental dredging on habitat structure for yellowtail flounder. Effects were evaluated using a submersible to conduct pre-dredge and post-dredge surveys (2d, 3mo, 1yr after impact) at 3 sites (2 within Hudson Canyon closed area), with multiple control and dredge treatments at each site. Sites were located in the New York Bight, at depths ranging from 45-88 m on sand substrate. Dredging reduced physical heterogeneity such that the frequency of sand waves, tube mats, and biogenic depressions was decreased relative to control plots. Typical post-dredge landscapes (<2d) consisted of extensive patches of clean, silty sand, interspersed with regular striations of shell hash, with abundant mobile epifauna such as sand dollars typically dislodged or buried under a thin layer of silt. Despite the vigorous reworking of surficial sediments, the overall impact of the dredge appeared to extend no deeper than 2-6 cm below the sediment surface. A significant decrease in available benthic prey was observed at 3 months following a series of major natural perturbations (Hurricanes Dennis, Floyd, and Gert). No evidence of a dredging impact of any kind apparent after 3 months and 1 year; however, major disturbance of seabed at two shallower sites caused by hurricanes 2 months after experimental dredging.

Mayer et al. (1991) examined the effect of commercial dragging on sedimentary organic matter along the Maine coast, in a high energy mud area with a 20 m depth. The scallop dredge mixed some surficial organic matter into subsurface sediments, while some material was exported from the drag site. Phospholipid analysis indicated decreases in various classes of microbiota, with relative increases in the contribution of anaerobic bacteria to the microbial community. Similarly, Watling et al. (2001) evaluated effects on macrofauna (mostly infauna) 1 day, 4 months, and 6 months after dredging in an unexploited area of the Damariscotta River, Maine. Dredging occurred on silty sand substrate at a depth of 15 m. They noted a loss of fine surficial sediments; lowered food quality of sediment; reduced abundance of some taxa; no changes in number of taxa; significant reductions in total number of individuals 4 months after dredging. Within 6 months, there was no recovery of fine sediments, but full recovery of benthic fauna and food value.

5.2.2 Impacts of proposed alternatives on physical environment and Essential Fish Habitat

The Framework 21 no action alternative would maintain fishing levels from 2009, including both access area trips and open area DAS, with the exception that no areas access areas would open on Georges Bank because CAII was scheduled to be closed in 2010, and although Closed Area I and the NL were both scheduled to open in 2010, no trips would be allocated because none were allocated in 2009. The Hudson Canyon Access Area would remain closed.

DAS allocations for Limited Access vessels would depend on the status of the LAGC ITQ program. If the program is fully implemented before March 1, 2010, full-time limited access scallop vessels would receive 42 DAS to use in open areas, part-time vessels would receive 17 DAS, and occasional vessels would receive 3 DAS. If the limited access general category IFQ program is not fully implemented before March 1, 2010, the total allocation for the general category sector is set to 10% of the target scallop catch compared to 5% under IFQs, and these vessels would fish under quarterly hard TACs. This would reduce open area DAS for Limited Access scallop vessels to 37 DAS full-time, while part-time and occasional vessels would receive 15 and 3 open area DAS, respectively.

The alternatives proposed in this framework are divided into two categories below: (1) those that affect the amount and/or location of fishing effort, and therefore may increase or decrease impacts to EFH as compared to the status quo, and (2) those which are primarily administrative in nature and therefore are unlikely to result in impacts to EFH.

5.2.2.1 Alternatives that affect the amount or location of fishing

The following alternatives would influence the magnitude, timing, and location of effort in the scallop fishery. These alternatives could have varying impacts on EFH as compared to the status quo alternative, as discussed below.

Great South Channel rotational area
Preliminary results from the 2009 survey suggest that small scallops have settled in parts of the Great South Channel. A rotational management area is being proposed north of the Nantucket Lightship closed area and west of Closed Area I; the top left coordinate of the polygon is 41 20' N and 69 30' W and the bottom left coordinate is 40 50'N and 68 50'W. This area meets the general guidelines specified in Amendment 10 for the creation of new rotational management areas. If this area is closed, it would likely reopen for access trips during fishing years 2013-2015.

Discuss why area was proposed as an HAPC and how much of the HAPC the closure would cover. What would area swept in the channel be under the closure and no closure scenarios over time?

Allocation scenarios
Four allocation scenarios are under consideration in this framework: (1) No closure in Channel, Overall F = 0.20 (status quo); (2) No closure in Channel, Overall F = 0.24; (3) S. Channel closure, Overall F = 0.20; (4) S. Channel closure, Overall F = 0.18. Access area allocations are the same for all four scenarios: one trip in Nantucket Lightship, 1 trip in Delmarva and 2 trips into Elephant Trunk. Overall, allocation alternatives under consideration for 2010 are lower than recent years for two primary reasons: (1) there are only four access area trips in 2010 compared to five in recent years, and (2) overall effort has to be cut back by about 20% because preliminary estimates of F for 2009 are close to F=0.30, which is above the overfishing threshold of 0.29, and well above the target F of 0.20. Broadly speaking, this is expected to reduce impacts to EFH in comparison with the no action alternative.

Exploitable biomass, landings, and area swept under the two closure scenarios (F=0.18, F=0.20) vs. the scenarios without the closure (F=0.20, F=0.24) are compared in the scallop resource impacts section. The two options that do not close the channel have both lower area swept and lower number of DAS allocated during 2010. If the Channel is closed, area swept in open areas of both Georges Bank and the Mid-Atlantic is assumed to increase. However, once the Channel opens in 2013, the two options that close the Channel result in reduced area swept. Cumulatively, for the next six fishing years 2010-2011 through 2015-2016, total area swept is lowest for the two scenarios that leave the channel open. However, cumulative total landings are estimated to be highest for the scenario that establishes a new access area and sets overall F at 0.18. The differences between the various scenarios are minimal. An area swept summary table from the scallop resource impacts section is reproduced below.

Table 44 – Total bottom area swept (nm^2) by year and scenario (2010-2016)

Fishing year	GSC closure F=0.18	GSC closure F=0.20	No GSC closure F=0.20	No GSC closure F=0.24
2010	5,515	6,864	2,916	3,663

2011	4,263	4,401	3,301	3,351
2012	5,068	5,211	4,375	4,400
2013	4,116	4,059	4,446	4,386
2014	4,152	4,114	4,597	4,536
2015	4,551	4,458	4,797	4,746
2016	5,590	5,484	5,665	5,662
Cum. 2010-2016	33,255	34,591	30,097	30,744

Adjustments when yellowtail flounder catches reach 10% TAC limit
This alternative specifies the number of open area days at sea allocated for each trip not taken before the NL access area closes due to yellowtail bycatch. This could lead to increases in area swept, and thus increases to impacts on EFH, if more bottom time is used on DAS in the open areas as compared to the bottom time required to harvest the trip limit during an access area trip. This alternative can be more fully evaluated for impacts to EFH once the open area exchange rates for the NLCA and CAI are identified.

Compliance with reasonable and prudent measure in recent biological opinion
The following four alternatives were proposed in order to comply with a recent biological opinion on sea turtle takes in the scallop fishery. In all cases, whether or not the change constitutes a more than minor impact is assessed based on the percent change in effort shift caused by a specific limitation on effort, and the resulting impact that shift would have on overall fishing mortality.

- Restrict the number of open area DAS an individual vessel can use in the Mid-Atlantic during a certain window of time
- Restrict the number of access area trips in the Mid-Atlantic that can be used during a certain window of time
- Consider a seasonal closure for Delmarva
- Reduce possession limits in ETA and/or Delmarva to reduce fishing time per trip

As described in the impacts to the scallop resource section of the document, the effects of these types of restrictions are difficult to evaluate because they rely on assumptions about changes to fleet behavior. Ignoring possible shifts in effort to Georges Bank, if effort is reduced in the Mid-Atlantic Bight during times of year when meat yields are lower, benefits to EFH might result because the same weight of scallops can be caught more efficiently (i.e. with less area swept). However, if substantial effort shifts to open areas on Georges Bank, or if only access area fishing is modified and effort shifts into open areas in the Mid-Atlantic, localized overfishing could result, with inefficient harvest and greater area swept for a given weight of scallops landed.

5.2.2.2 Measures not expected to impact EFH

The following measures either relate to very low amounts of scallop catch relative to the resource as a whole, or are primarily administrative in nature. In either case, any impacts to EFH are expected to be minimal.

NGOM TAC

This action considers a separate hard TAC of **70,000 pounds** for LAGC vessels fishing in the NGOM area for 2010. Vessels qualifying for a permit to fish in this area are subject to a 200 lb trip limit. When the TAC is reached, the area is closed. In 2008 and 2009, less than 15% of the NGOM TAC was landed.

Incidental catch estimation
Amendment 11 included a provision that the Scallop FMP should consider the level of mortality from incidental catch and remove that from the projected total catch before allocations are made. For the proposed action, the PDT recommends taking VTR landings analyzed in FW19 as a starting point for an estimate of mortality from incidental catch and increasing that to 50,000 pounds to account for an expected increase due to measures implemented by Amendment 11.

TAC set-asides for observers (1%) and research (2%)
This alternative specifies the set-asides for observers and research in each of the three access areas that would be open in FY 2010.

Research priorities for 2010 and recent RSA announcement
This alternative is administrative in nature and would not have impacts on EFH, except to the extent that any research conducted benefits future EFH-related analysis.

Improvements to the observer set-aside program
Two alternatives propose changes to the observer set-aside program. One would prohibit vessels from not paying for observers, while the second would limit the amount of observer compensation general category vessels can get per observed trip in access areas.

5.3 PROTECTED RESOURCES

5.3.1 Analysis of more than minor impact

There is no official guidance on how to define more than a minor change. We know that based on ESA regulations, a reasonable and prudent measure, along with the term and condition that implement it, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes. But, how to define a minor change is not specified. After the biological opinion of the scallop fishery came out in 2008 the Scallop Committee requested that the PDT provide an analysis that would help identify what is more than a minor change in the scallop fishery.

The scallop fishery is managed under an adaptive rotational management plan. A substantial portion of total fishing effort is allocated into specific areas to maximize yield. Outside constraints on how effort is allocated and used over time or space can have impacts on the overall effectiveness of the program and fishing mortality. **Therefore, the PDT recommends that the threshold for more than a minor change should be based on an amount of "effort shift" imposed by the RPM and Term and Condition.** Spatial and/or temporal shifts in effort can increase overall fishing mortality, and depending on the nature and extent of the effort shift imposed by the RPM, more than minor changes can result if fishing mortality increases causing noticeable changes in yield, landings and revenue.

In terms of this biological opinion, the premise is to limit scallop fishing effort during the time of year and area where the overlap of turtles and scallop fishing activity is most likely to occur. Under area rotation, fishing effort is allocated in certain areas when yield is expected to be higher, and shifting that effort to other times and areas can reduce landings per unit of effort, and thus can have impacts on EFH, bycatch, revenue loss etc, and most importantly for this purpose, will increase fishing mortality. In both the short and long term, increases in fishing mortality that are more than a small amount will cause more than a minor change in the fishery.

Based on scallop meat weight analysis by month, it is shown that there are seasonal effects on relative fishing mortality (See Appendix I for more information). In general, the highest meat weights in the Mid-Atlantic are from April through August. About 40% of all fishing in Mid-Atlantic access areas and open areas has occurred between the months of June-October. If effort is limited during that period to reduce impacts on turtles, then that effort will be displaced to the other months of the year when meat weights are lower. Depending on the season and amount of effort that is displaced, the change in yield is expected to vary by 5-10% based on changes in average meat weights by month.

The PDT developed a model that estimates changes in fishing mortality, effort shift and impacts on revenue when limitations are placed on the scallop fishery by season and/or area. This model was first developed to assess whether the original term and condition was reasonable and prudent (more than a minor change), but it has also been used more recently to asses whether the alternatives to comply with the revised RPM developed in Framework 21 are expected to have more than a minor change on the scallop fishery. The differences in fishing mortality, yield and revenue impacts can be compared.

In addition to the primary threshold for more than minor (percent change in effort shift), the PDT included a description of other factors that should also be considered when identifying a more than minor change that would also be affected by a shift of effort including: concern about safety at sea (shift to winter months), changes in bycatch (i.e. fluke bycatch increases in winter months because it overlaps with the scallop fishery offshore), revenue impacts because of reduced catch and changes in price, costs, markets, supply, etc., impacts on ability of observer program to maintain coverage from surges and shifts in effort, and general impacts of altering rotational area management and compromising the ability to achieve optimum yield.

5.3.1.1 Description of model used to assess more than minor change

A model was developed to estimate changes in fishing mortality, effort shift and impacts on revenue when limitations are placed on the scallop fishery by season and/or area. It includes several important assumptions that are described below.

5.3.1.1.1 Model Assumptions

1) **<u>The seasonal composition of open area effort</u>**

Updated analyses have been completed for the two season alternatives in FW21 based on dealer data from 2004-2008 fishing years. The first time period alternative in FW21 is June 16-October 14 and the estimate of landings from that shorter time period is 28.6%. Available catch data is summarized by month only, so an assumption was made that total catch in June and October was evenly distributed by week, and half of June and October landings were included in this estimate only. For the second time period alternative (June 15 – October 31) an estimate of two additional weeks of catch from October included for a total of 31.9% (See Table 45). The model assumes that effort will be distributed by these percentages in 2010 as well.

2) <u>Effort displacement for open areas and access areas: 100%</u>

It is assumed that if open area DAS in the Mid-Atlantic are limited by some amount, all vessels will use their remaining DAS at other times or in the GB open areas. The current estimate of open area DAS vary by management scenario in FW21 from 30-51 DAS.

In 2010 it is estimated that full-time vessels will be allocated 3 access area trips in the Mid-Atlantic (1 in Delmarva and 2 in ETA). Since these pounds cannot be landed from other areas, it is highly likely that the vessels will attempt to take their access area trips during months when the areas are open to fishing, outside the turtle season. So this model assumes that 100% of AA trips will be taken outside of the turtle season. It is noted that assuming 100% displacement is high, and it reflects the best case scenario in terms of potential impacts. The PDT discussed that it may not be realistic that all vessels will take multiple trips in the months outside the proposed turtle windows.

3) <u>Open area effort distribution between Georges Bank and Mid-Atlantic</u>

Updated analyses suggest that 44% of total open area effort was used on Georges Bank and 56% in Mid-Atlantic open areas. These percentages are based on the mean of landings from 2005-2008. Landings from 2004 were not included in the estimate because that year is an anomaly and does not reflect expected catch distribution for 2010. Specifically, recruitment has improved on GB in recent years, so catch in that area is expected to increase compared to the Mid-Atlantic, which is experiencing lower recruitment. Catch in Mid-Atlantic open areas was higher in 2004 than any year and many vessels opted to take open area DAS instead of access area trips in Hudson Canyon that year, so the PDT decided not to use 2004 in the range of data to determine an expected trend in open area catch (See Table 46).

4) <u>The seasonal composition of access area effort</u>

In order to assess the potential impacts of the RPM alternatives the PDT evaluated the amount of effort that has taken place in access areas during the turtle seasons under consideration in FW21. Catch in Hudson Canyon and ETA were analyzed from 2004-2008 since these are the two access areas that were open in recent years. Delmarva has been closed to the scallop fishery since 2008, and was an open area before that, so fishing behavior in that area cannot be used directly to analyze trends in the fishery in MA access areas by month.

Hudson Canyon was open in 2004, 2005, 2006 and 2007. However, catch was very low in both 2005 and 2006 so these years were not included to get a trend of catch by month. Elephant Trunk was open in 2007 and 2008. The catch by month for these two areas were combined and the updated estimate of catch in MA access areas for both time periods: **for June16-Oct14 approximately 27.4% of MA AA effort is expected to occur and for June 15-October 31 it is 28.3%** (Table 47).

It should be noted that monthly effort patterns from HC in 2004 are very different than what is expected in 2010. In 2004 there were three access areas open on GB and they all opened on June 15 – so effort is lower in these months in the MA when vessels likely fished in AA on GB. In 2010 there is only one AA trip on GB so some effort will move from the MA in June and July after the opening in NL, but general trends of effort in the MA will likely be higher in June and July in 2010 then in 2004 when there were three trips allocated on GB starting on June 15. Similarly, in 2007 and 2008 there was only one GB AA trip (same as in 2010) so less effort shift from MA to GB during June and July in these years because there was only one GB AA trip.

Table 45 – Limited access open area catch in the Mid-Atlantic by month

Sum of METRIC_TONS			FISHING_YEAR					% by month				
MONTH	OPEN	SOUTH	2004	2005	2006	2007	2008	2004	2005	2006	2007	2008
1 Total			132	158	77	119	43	1.1%	2.0%	1.7%	2.9%	1.1%
2 Total			310	219	43	344	239	2.5%	2.8%	1.0%	8.5%	6.2%
3 Total			1210	998	859	208	343	9.9%	12.7%	19.5%	5.1%	8.8%
4 Total			1499	1434	1512	397	729	12.2%	18.2%	34.3%	9.8%	18.8%
5 Total			1767	1837	790	877	874	14.4%	23.3%	17.9%	21.6%	22.5%
6 Total			1618	1488	345	446	615	13.2%	18.9%	7.8%	11.0%	15.9%
7 Total			1206	540	17	261	330	9.8%	6.8%	0.4%	6.4%	8.5%
8 Total			1270	264	33	347	217	10.4%	3.3%	0.7%	8.6%	5.6%
9 Total			1023	393	179	404	182	8.3%	5.0%	4.1%	10.0%	4.7%
10 Total			1144	240	295	364	217	9.3%	3.0%	6.7%	9.0%	5.6%
11 Total			849	172	113	176	44	6.9%	2.2%	2.6%	4.3%	1.1%
12 Total			233	142	151	112	47	1.9%	1.8%	3.4%	2.8%	1.2%
Grand Total			12261	7885	4414	4055	3880					

% of open area catch in MA during turtle season						Mean
June16-Oct14	39.8%	26.1%	12.4%	34.9%	29.5%	28.6%
June 15-Oct 31	44.5%	27.7%	15.8%	39.4%	32.3%	31.9%

Table 46 – Limited access catch by area (north of RPM line versus south)

Sum of METRIC_TONS		FISHING_YEAR						
ACCESS_AREA	**N/S**	**2004**	**2005**	**2006**	**2007**	**2008**		**Grand Total**
OPEN	N	1204	3105	5715	3701	3066		16791
	S	12261	7885	4414	4055	3880		32495
	U	564	305	363	263	319		1814
OPEN Total		14029	11295	10492	8019	7265		51100

	2004	**2005**	**2006**	**2007**	**2008**
N	8.9%	28.3%	56.4%	47.7%	44.1%
S	91.1%	71.7%	43.6%	52.3%	55.9%

	Mean	(2005-2008 only)	
N	37.1%	44.1%	**Assumption used for open area**
S	62.9%	55.9%	**catch - north v. south**

Table 47 – Catch in Mid-Atlantic access areas by month (ETA and HC)

						% by month				
Sum of METRIC_TONS			FISHING_YEAR			HC	HC+ET	ET		
MONTH	ET+ HC		2004	2007	2008	2004	2007	2008		Mean
1 Total			74	351	482	1.1%	4.1%	5.3%		3.5%
2 Total			225	273	301	3.3%	3.2%	3.3%		3.3%
3 Total			554	2019	1740	8.1%	23.7%	19.3%		17.0%
4 Total			988	1665	1886	14.4%	19.5%	20.9%		18.3%
5 Total			1019	1234	641	14.8%	14.5%	7.1%		12.1%
6 Total			1374	793	784	20.0%	9.3%	8.7%		12.7%
7 Total			1042	312	698	15.2%	3.7%	7.7%		8.9%
8 Total			666	538	870	9.7%	6.3%	9.6%		8.5%
9 Total			430	121	76	6.3%	1.4%	0.8%		2.8%
10 Total			264	122		3.8%	1.4%	0.0%		1.8%
11 Total			159	568	816	2.3%	6.7%	9.0%		6.0%
12 Total			74	534	739	1.1%	6.3%	8.2%		5.2%
Grand Total			6869	8530	9033	100.0%	100.0%	100.0%		100.0%

% of AA catch in MA during turtle season

June16-Oct14	43.0%	16.7%	22.5%	27.4%
June 15-Oct 31	45.0%	17.5%	22.5%	28.3%

5) Monthly fishing effort for Delmarva AA

For RPM Alternative #3 we need to make an assumption about how much effort would take place in Delmarva during September and October if no RPMs are implemented. The PDT first evaluated fishing effort by month in HC and assumed the fishing behavior would be similar in Delmarva. Effort in ETA cannot be used because that area already has a two month closure imposed for turtles, so no effort takes place in ETA in Sept and Oct. Based on fishing effort in HC in 2004 and 2007 10.9% of all HC effort occurred in Sept and Oct, and 4.9% in just October – the two time period alternatives under consideration (See Table 48).

However the PDT discussed that fishing patterns in HC from 2004 and 2007 are not expected to be reflective of monthly fishing effort trends in Delmarva. So instead the PDT evaluated monthly catch from VTR data from the Delmarva area in 2004-2006 before the area was closed. Catch from all limited access trips (dredge and trawl) were summarized by month and 19% of all catch was landed during Sept and Oct, and 11% for just October (Table 49). The PDT decided that these values would be the best estimate of fishing behavior by month for the Delmarva access area if no RPMs were imposed in the fishery. It was noted that these may even be low because ETA trips are prohibited in Sept and Oct already, so it is likely that vessels would take their AA trips in Delmarva during those months when ETA is closed.

Delmarva has only been open as an access area in FY2009. Catch data by month are not available yet for the Delmarva area, especially in September and October 2009. However, the PDT expected effort levels to be higher especially in October when weather is cooler (lower incidental catch mortality), vessels have already taken AA trips on GB, and open area catch rates are declining so vessels would be expected to take trips in AA that have a possession limit rather than fish open areas. **The model used the assumption that 19% of all Delmarva trips would be taken in Sept and Oct if no RPM imposed, and 11% in October based on the distribution of fishing effort in the Delmarva region in 2004-2006 before it was an access area.** The PDT does expect usage in Delmarva in FY2009 to be higher for both these months and if data from this fishing year becomes available before the November Council meeting the PDT will use those values.

Table 48 – Percent of catch from Hudson Canyon AA in 2004 and 2007

	2004	2007	Mean
Sept+Oct	10.1%	11.7%	10.9%
Oct	3.8%	5.9%	4.9%

Table 49 - Total Monthly Tons Landed in Delmarva Spatial Area 2004-2006 by all Limited Access Scallop Dredge and Scallop Trawl Vessels

	Sum	PctSum
	scaltons	scaltons
month		
1	168.59	2.27
2	259.72	3.5
3	612.82	8.25
4	946.62	12.74
5	978.64	13.18
6	789.87	10.63
7	583.01	7.85
8	761.45	10.25
9	581.85	7.83
10	844.65	11.37
11	691.87	9.31
12	208.62	2.81

6) Changes in meat weight by season

Shifting effort from one season to another will affect catch and fishing mortality due to changes in seasonal meat weights (See Section 5.3.1.1.2 for more information). Some months will have higher losses and some lower depending on the length of the closure and when effort is displaced. The impacts of this loss on landings, fishing mortality and revenues would depend on which of the four FW21 management scenarios are selected and which RPM season is adopted.

The estimated change in meat weight from one season to another has been calculated for the various time periods under consideration in FW21 RPM alternatives using new projections of LPUE. The model used the assumption that if effort shifted from June16-Oct14 to the remainder of the year, average meat weight would decline by 4.4%. And for the other time period, average meat weight would decline by 2.7% if effort moved from June 15-Oct 31 to remainder of the year. This factor is then combined with the amount of effort expected in each turtle season used to estimate the projected LPUE for each season and FW21 scenario alternative. For example, FW21 projections estimate that average LPUE for the year will be 1,883 pounds per DAS in the open areas in the Mid-Atlantic. LPUE during June16-Oct14 would be 1,800 and 1,832 for the other season (Oct15-June15); a difference of 4.4% and 2.7%. So shifting effort from the first season to the second will reduce landing for the shifted DAS by 4.4% and 2.7% respectively. The two other time periods considered are specific to the Delmarva area (Alternative 3). If a seasonal closure is implemented for September-October the meat weight assumption is 5% greater in other months of the year. Lastly, if the area is closed for the month of October only, meat weights will be 11% higher in the other months of the year on average compared to October alone.

Table 50 – Scallop meat weight conversions for shifting effort from one season to another

Meat Wt Change	
Jun15Oct15 to Oct16Jun15	-0.0440
Jun15Oct31 to Nov1Jun15	-0.0270
Sept1-Oct31 to Nov1-Aug31	+0.050
Oct1Oct31 to Nov1Sept30	+0.0110

5.3.1.1.2 Effects of sea scallop management on meat-weight yields in the Mid-Atlantic

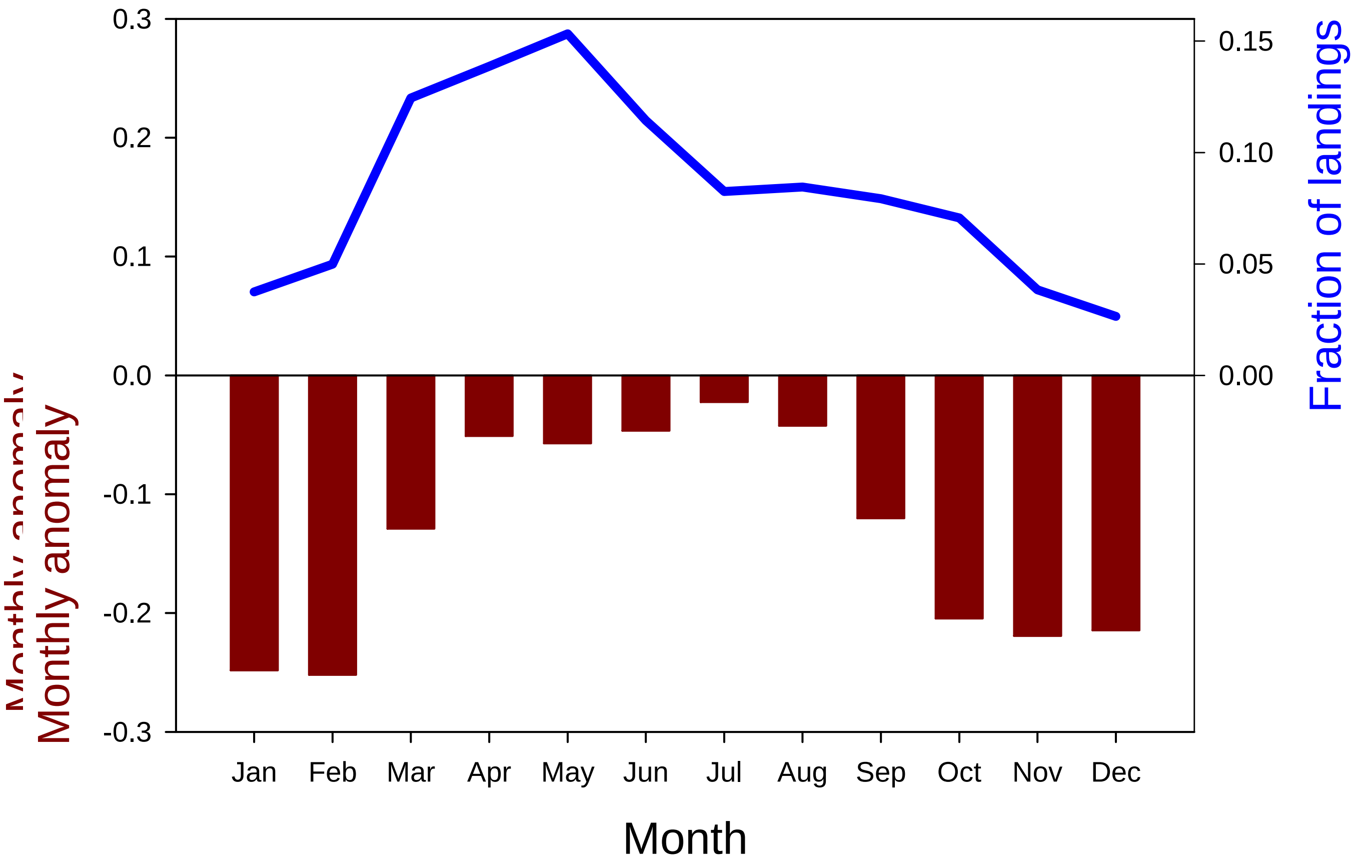
The PDT analyzed seasonal changes in scallop meat-weight yields to assess the potential impacts of restricting effort in the Mid-Atlantic during the time windows identified in the turtle biological opinion (June-October and May-November). Meat weights in the Mid-Atlantic are highest in July and decrease rapidly after the animals have spawned in September. Meat weights remain lower through the winter and grow again in the spring. From April through August, meat weights are highest. Scallop landings also vary by season to take advantage of this pattern as well as other factors such as weather and price.

Seasonal meat weight variations can be quantified by comparing shell height/meat weight (volume) data collected by observers on commercial vessels to that collected on the annual research vessel survey conducted in the Mid-Atlantic in July, when meat weights are the highest. The seasonal meat weight anomaly is defined as $(MW_{observed} – MW_{rv}) / MV_{rv})$. The smaller the anomaly, the closer the yield is to maximum yield from July when the survey collects meat weights. Figure 1 depicts the fraction of landings by month from 2001-2006 and the monthly meat weight anomaly. For some months like November – February, scallop yields are over 20% less than if they were harvested in July. Yields from March and September are over 10% less; the other months are less than 5% less. Not surprisingly, catch in the Mid-Atlantic is highest in March-July.

An analysis of the effects of seasonal effort displacements require an assumption as to when the displaced effort will be used. The PDT assumed that displaced effort will redistribute itself proportionally to the mean fraction of landings that have occurred historically (2001-2007) in each month. The seasonal closure in the Elephant Trunk Area from September 1 through October 31 actually has a positive impact on yield because the area is closed when meat weights are lower after spawning. This two month seasonal closure is expected to have a meat weight gain of about 7% because the Sept-Oct anomaly is 16% and the anomaly for the other months is 9%, a difference of 7%. If that closure remains in place and an additional restriction is placed on the fishery for June-August, that would cause a loss of yield over 10%. For example, if 1 trip (6.0 million pounds) was shifted from June-August to Nov-May, the loss would be 600,000 pounds because the Jun-Aug anomaly is 3.8% and Nov-May is 14%, a difference of about 10%. The PDT considered this approach for both seasonal windows in the biological opinion and concluded that any version of seasonal effort shift is expected to result in losses in meat weights of between 5-10%, likely reducing long-term yields and economic gains. Thus, neither option provided by the RPM is economically beneficial for the industry nor are they biologically beneficial to the scallop resource.

If area rotation intends to increase yield per scallop, displacing effort from the spring and summer is not beneficial and likely hampers the FMPs effectiveness in achieving OY. Restricting access in September and October when meat weights are lower is beneficial for both scallops and turtles, and perhaps that season could be expanded to provide more benefit for turtles. But, limiting access in months when meat weights are highest (i.e. spring and summer) is not ideal when one goal of area rotation is to promote fishing when yield per unit of effort is highest. Fishing during May should be encouraged, given its combination of good weather, good meat yields, and no or low probability of turtle takes.

Figure 41 – Fraction of scallop landings in the Mid-Atlantic by month (2001-2006) and monthly meat weight anomaly



5.3.1.2 Threshold for more than minor

After the original RPM was drafted and the Council was requested to evaluate and consider the RPM the Scallop Committee requested that the PDT identify a method for assessing whether the RPM would impose more than a minor impact on the scallop fishery. The model described above is what was used, but a value still needs to be identified in terms of how much effort shift, or change in fishing mortality is reasonable.

Last year staff presented a threshold of effort shift and change in fishing mortality (F) of 0.01 as a possible threshold for more than a minor change. An increase in fishing mortality of 0.01 is equivalent to a 12% effort shift multiplied by the assumed 8% loss of yield when effort is shifted from June-Oct to Nov-May (0.12*0.08 = 0.0096). A threshold could be set anywhere, but the PDT identified 0.01 because it is 5% of the current fishing mortality target. This threshold is what was recommended for the specific time period and associated meat weight changes from the biological opinion last year (June1-Oct31 and an estimated loss of 8% yield shifting effort from that period to the remaining months of the year).

It is important to note that in this Framework there are four different seasons under consideration and each have a different meat weight change – so the same 0.01 change in F threshold cannot apply to all seasons. For example, the time period of June15-Oct31 has a meat weight change of -4.4 when effort is shifted to the remainder of the year. A similar 12% effort shift multiplied by that meat weight conversion comes out to 0.005 (about half of 0.01 because -4.4 is about half of -8.0). On the other hand, the shortest time period under consideration in the one month closure of Delmarva (Oct1-Oct31). The meat weight change for that month compared to the rest of the year is actually positive because meat weights are poor that time of year, so shifting effort from October to the rest of the year would increase meat weight by 11%. Multiplying an 11% increase in meat weight with the same 12% shift of effort would cause a change of F equal to 0.013, but this time in the positive direction, overall F would decline by that amount.

Therefore, for this framework having the same overall value of change in F is not useful since the time periods and measures under consideration are very different. Instead it may be more useful to consider the amount of effort shifting from the Mid-Atlantic during the turtle season to the remainder of the year and what that expected impacts on catch and revenue are. Percent effort shift is actually the original factor the PDT identified originally as what should be the threshold for more than a minor change. Ultimately, identifying what is more than minor is a policy decision, but ESA stipulates that, “a reasonable and prudent measure, along with the term and condition that implement it, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes.

Ultimately, when the Scallop Oversight Committee considered all this related to the original biological opinion in 2008 the Committee decided that identifying a precise threshold for more than minor is not preferred; instead, during development of FW21, the PDT should evaluate what limit on effort will not result in more than a minor impact on fishing mortality or the fishery using updated information and considering all the issues described above such as concern about safety at sea, changes in bycatch, revenue impacts because of reduced catch and changes in price, costs, markets, supply, etc., impacts on ability of observer program to maintain coverage from surges and shifts in effort, and general impacts of altering rotational area management and compromising the ability to achieve optimum yield.

The next section assesses the RPM alternatives currently in FW21 compared to status quo – what is currently expected for 2010. A summary of potential impacts of each RPM is assessed separately. **Again, there is no threshold set in stone, but the PDT presented and the Committee agreed that a measure that causes more than 10% of effort to shift from the Mid-Atlantic during the various turtle seasons under consideration would be a reasonable threshold for more than a minor change.**

The Committee supported 10% to be used in this action because these analyses are based on assumed fishing behavior responses and historical fishing patterns, so impacts could be very different if the fishery responds differently than assumed. Specifically, if effort shifts mostly to November and December than impacts on F will actually be higher than the results suggest, having greater impacts on fishing mortaltiy and ultimately the fishery from increased mortality. If effort shifts only to the summer when meat weights are higher impacts on F will be reduced, thus overall impacts from the measure may be lower or even positive in some cases. Ultimately, the Committee voiced that 10% seems to be a reasonable level of effort shift to use as a standard since actual impacts could be higher or lower. For the alternatives under consideration that limit DAS or number of access area trips, a 10% effort shift is equivalent to an estimated loss in landings of about 50-100,000 pounds and $400-700,000 dollars. Overall, the Committee seemed comfortable that this level of impact was reasonable and would not have more than minor impacts on the fishery overall.

However, when the Committee reviewed impacts of measures with higher amounts of effort shift (18%-23% from some of the RPM alternatives) the associated impacts on landings and revenue were higher, 100,000 pounds to over 200,000 pounds and $1-2 million dollars of lost revenue. Additional issues were identified with these measures making them unreasonable or having more than minor impacts because they are expected to have high distributional impacts on the fleet; some will be impacted greatly and others not at all. Ultimately, since these impacts are difficult to predict because they are based on changes in fishing behavior and issues not in the model such as changes in price, and other unknowns, implementing something that could have the potential to have much higher impacts on F due to effort shifting into seasons with lower meat weight yields is risky and could have more than minor impacts on F and the fishery. In addition, the Committee voiced that shifting 10% of effort from that area and season is a considerable amount of total effort and should have beneficial impacts on turtles and that is an important element of this process.

Therefore, the tables below provide the results for shifting 10% of effort in the MA during the turtle season under consideration to the remainder of the year. The tables also provide the results if all effort expected to happen in the MA in the turtle season for that RPM is shifted (100%) to provide a sense of the maximum value of potential impacts on effort, F, landings and revenues.

5.3.1.3 Assessment of current RPM alternatives in FW21

The PDT met in the summer and fall of 2009 to begin developing possible RPM alternatives and to evaluate whether the alternatives are expected to have more than a minor impact on the scallop fishery. The PDT reviewed the preliminary analyses of the model developed last year on October 15, 2009.

In summary, the model allows the PDT to estimate changes in fishing mortality, effort shift and impacts on revenue when limitations are placed on the scallop fishery by season and/or area. The assumptions above are included and the DAS and access area allocations are inputs into the model. The model estimates the expected effort by season based on historical trends, and evaluates what the impacts are from various constraints put on the fishery from the different RPM alternatives. Figure 42 is an example of the model used for Scenario 1 (No closure in the channel and overall F=0.20) and RPM Alternative 1 (limit on DAS) for the turtle season June 15-October 31. The example is showing the results on effort, F, landings and revenue if 10% of the effort expected to occur in the MA during the turtle season is shifted to the remainder of the year. Very briefly, the assumptions about the fishery and meat weight changes by season are on the top of the first page of the model. The DAS allocation for this scenario is 30 DAS, circled in red. The expected DAS used and needed reductions during this season are also circled in red. The impacts of this RPM are on the second page of the model: the % shift of effort, change in fishing mortality, and impacts on landings and revenue are all circled in red. The model was run for all 4 FW21 scenarios, two time periods, and 4 RPM alternatives. The specific results are described below for each RPM alternative.

Before the results for each RPM alternative are evaluated, the differences in DAS, landings and other factors by area and season are described for the four FW21 scenarios *without* RMP measures. Therefore, the specific impacts of each RPM can also be compared to each FW21 scenario separately.

Figure 42 – Example of model used to evaluate RPM alternatives (Example is for NCLF20 scenario for the time period of June15-Oct31)

Number of vessels	340	**LPUE adjustment: Meat-weight change**		**Restrict open area DAS in Mid-atlantic**	
Price estimate for 2010	7.31	Open area adj.Turtle win	101.90%	**option A**	All areas
LPUE in all open areas in 2010	**1720**	Open area adj.Rest	99.10%	**option B**	PDT will determine
LPUE in all open GB areas in 2010	**1599**	Access area adj.Turtle win	102.0%	option A	June 16 to Oct.14
LPUE in all open MA areas in 2010	**1883**	Access area adj.Rest	99.2%	option B	June 15 to oct.31
Trip costs Per Day-at-sea	1600	**LPUE-GB access**	2576		
Possession limit	18000	**LPUE-MA access**	2007		
Effort time in Displacement Open areas	100%				
Effort time in Displacement Access areas	100%				
Scenario	**NCLF20**	**% of Effort**		**% of Effort**	
		44%	56%	32%	68%
OPEN AREAS	**Open area Totals**	**Georges Bank open**	**Mid-Atlantic Open**	**Mid.At. June15 -Oct 31**	**Mid.At. Nov 1 to June 14**
Status Quo - F21: 2010					
Total open area DAS	9,713	4283	5429	1732	3697
DAS per vessel	**29**	**13**	**16**	**5**	**11**
Open area landings	**17,072,037**	6,849,068	10,222,969	3,323,314	6,899,654
Open area revenue	**124,796,592**				
RPM MEASURES				**50%**	
Total open area DAS	9,713	4283	5429	866	4563
DAS per vessel	29	**13**	**16**	**3**	**13**
Open area landings	**17,026,378**	6,849,068	10,177,310	1,661,657	8,515,653
Decline in landings	**(45,659)**				
% decline in open area landings	**-0.27%**				
Open area revenue	**124,462,826**				
Decline in open area revenue	**(333,766)**				
% decline in open area revenue	**-0.27%**				

ACCESS AREAS	Total access areas	GB access areas	MA access areas	Mid.At. June15 -Oct 31	Mid.At. Nov 1 to June 14
				% of Effort	
				28.30%	72%
Status Quo - F21: 2010					
Trips per vessel	**4.0**	**1**	**3**	**0.8**	**2.2**
Total trips	1360	340	1020	289	731
Total access area landings	24,480,000	6,120,000	18,360,000	5,195,880	13,164,120
Total access area revenue	178,948,800	44,737,200	134,211,600		
Estimated DAS-used	11,526	2,376	9,150	2538	6612
RPM MEASURES				**0%**	
Trips per vessel	**4.0**	**1**	**3**	**0.8**	**2.2**
Total trips	1,360	340	1,020	289	731
Total access area landings	24,480,000	6,120,000	18,360,000	5,195,880	13,164,120
Decline in total landings	-				
% decline in total landings	**0%**				
Total access area revenue	178,948,800	44,737,200	134,211,600	37,981,883	96,229,717
Decline in revenue	-				
% Decline in revenue	**0%**				
Estimated DAS-used	11,526	2,376	9,150	2538	6612

Scenario	NCLF20		Seasonal Distribution of Effort		Scenario	NCLF20		
Shift in Effort (DAS) and Change in F	**Restricted window**		**Rest of the year**	**Total**	**STATUS QUO**	**June-Oct**	**Nov-May**	**Total**
Status Quo	**DAS**							
GB open	2,325	1,958		4,283	GB open	3,788,392	3,103,132	6,849,068
GB access	2,376			2,376	GB access	6,236,280		6,236,280
MA-open	1,732	3,697		5,429	MA-open	3,323,314	6,899,654	10,222,969
MA-access	2,538	6,612		9,150	MA-access	5,195,880	13,164,120	18,360,000
All areas	8,971	12,268		21,239	All areas	18,543,866	23,166,906	41,668,317
% of total	**42%**	**58%**			**% of total**	**45%**	**56%**	
					% of Total Landings	3,708,773	3,309,558	
RPM					Monthly landings			
GB open	2,325	1,958		4,283	GB open	3,788,392	3,103,132	6,849,068
GB access	2,376	-		2,376	GB access	6,236,280	-	6,236,280
MA-open	866	4,563		5,429	MA-open	1,661,657	8,515,653	10,177,310
MA-access	2,538	6,612		9,150	MA-access	5,195,880	13,164,120	18,360,000
All areas	8,105	13,134		21,239	All areas	16,882,209	24,782,905	41,622,658
% of total	**38%**	**62%**		-	**% of total**	**41%**	**60%**	(45,659)
Change in effort	(866)	866		-	Monthly landings	3,376,442	3,540,415	
Historical Average	**54%**	**46%**			Historical average	**53%**	**47%**	
Change in % effort from hist.avg.	16.12%	7.06%						
% Shift in Effort to Rest	**9.653%**							
Change in F	**0.003**							

Economic Impacts			
Options	**STATUS QUO**	**RPM**	**% Change**
Total landings	41,668,317	41,622,658	-0.1%
Decline in landings		45,659	
DAS-used in open areas	9,713	9,713	0.0%
DAS-used in access areas	11,526	11,526	0.0%
Total DAS-used	21,239	21,239	0.0%
LPUE	1,962	1,960	-0.1%
Change in price		0%	
Price	7.31	7.31	
Total Revenue	304,595,399	304,261,633	-0.1%
Decline in Tot. Revenue	**0**	**(333,766)**	
Change in cost per DAS		0%	
Cost per DAS	1600	1,600	
Total trip costs	33,981,907	33,981,907	0.0%
Total fixed costs	60,253,440	60,253,440	0.0%
Producer Surplus	270,613,492	270,279,725	-0.1%
Crew income	**133,545,562**	**133,361,991**	**-0.1%**
Boat Share	**137,067,930**	**136,917,735**	**-0.1%**
Fleet Profits	**76,814,490**	**76,664,295**	**-0.2%**
Decline in fleet profits		**(150,195)**	

- ***Summary of results for all 4 FW21 scenarios without RPM alternatives***

This section summarizes the projected landings, revenue, DAS, and effort used in specific areas before RPM measures are adopted. The results of each RPM measure can be compared to these results and that is how the overall threshold of more than minor is determined. Specifically, the change in F and % effort shift from the turtle season to the other months of the year are assessed by comparing the results in this section with the specific impacts of the RPM measures that limit DAS, access area effort, or a seasonal closure of Delmarva.

Table 51 – Summary of results for each FW21 scenario without RPMs

	NCLF20	CLF20	NCLF24	CLF18
Overall F	0.20	0.20	0.24	0.18
Total landings	41.7	51	47.1	47.3
Total Revenue	326.1	350	344.4	337.2
Average Price	$7.31	$7.25	$7.27	$7.28
OA landings	17.1	26.4	22.4	22.6
OA Revenue	124.8	191.1	162.6	164.6
Total DAS	9713	17313	12973	14187
FT DAS	29	51	38	42
Est. DAS in GB	4283	7635	5721	6257
Est. DAS in MA	5429	9678	7252	7931
Est. DAS in MA (June15-Oct31)	1732	3087	2313	2530
Est. DAS in MA (Nov1-June14)	3697	6591	4939	5401
# of AA trips per FT vessel	4	4	4	4
# of MA AA trips per FT vessel	3	3	3	3
Total MA AA trips	1020	1020	1020	1020
Est. Total MA trips from Jun15-Oct31	289	289	289	289
Est. Total MA trips from Nov1-June14	731	731	731	731
Est. DAS used in MA Jun15-Oct31	2539	2539	2539	2539
Est. Das used in MA Nov1-Jun14	6615	6615	6615	6615
Total AA landings	24.5	24.5	24.5	24.5
Total AA Revenue	178.9	177.5	177.9	178.2

- ***Results of RPM Alternative 1 – Restrict the # of open area DAS an individual vessel can use in the Mid-Atlantic during a certain window of time***

The first RPM alternative (limit DAS in open areas) does not seem to qualify as an RPM if considered for the fleet overall. When the impacts are assessed for the fleet overall, limiting effort by even a small amount during either season (June16-Oct14 or June15-Oct 31) would result in available DAS much lower than a normal trip length. This is driven by the fact that the historical average of open area effort in the Mid-Atlantic is less than one average length trip. From June16-Oct 14, 29% of mid-Atlantic open area effort is expected to occur. For the FW21 scenario with the lowest open area DAS allocation (no closure and F=0.20) the model estimated that 5 of the total 30 allocated open area DAS would be used per vessel on average in the Mid-Atlantic during that season if no RPMs were implemented (5 DAS equals 29% of 30 DAS) (See

Figure 42). The PDT discussed that limiting vessels to any amount equal to or below the *average* projected effort for the fleet would essentially be equivalent to a 100% reduction because vessels would not make a trip in open areas if the maximum is less than 5 DAS for this example.

The summary of impacts on DAS, F, effort shift, and reduction in landings and revenue are described in Table 52. Each FW21 scenario has been set so that 10% of projected effort in the MA during the turtle season is shifted to the remainder of the year. The table also provides the same information if all effort (100%) expected to happen in the MA in the turtle season for that RPM is shifted to provide a sense of the maximum value of potential impacts on effort, F, landings and revenues. For an effort shift of 10% the # of DAS reduced in the MA during the turtle window is a range of 866-1235 depending on the scenario and season. This is equivalent to about a 40-55% reduction of total DAS used in that area and season. When that amount of DAS is shifted to the other seasons of the year there are impacts on landings and revenue based on reduced average meat weight yields from one season to the other. It is also important to note that the model assumes 0% change in price from this effort shift. It is possible that there would be higher prices during the restricted season since supply will be less, but there will be more supply in the other season so prices will likely decline.

Table 52 – Summary of results for RPM Alternative 1 for each FW21 management scenario

Scenario		NCF20		CF20		NCF24		CF18	
Season		June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31
% Effort shift = 10%		10%	10%	10%	10%	10%	10%	10%	10%
FT DAS allocated		29	29	51	51	38	38	42	42
Total DAS allocated		9,713	9,713	17,313	17,313	12,973	12,973	14,187	14,187
DAS in MA during turtle season PRE RPM		1,575	1,732	2,807	3,087	2,103	2,313	2,530	2,530
DAS in MA during turtle season POST RPM		709	866	1,684	1,852	1,157	1,272	1,391	1,391
# DAS reduced by RPM		866	866	1,123	1,235	946	1,041	1,138	1,138
% reduction in DAS if 10% Effort shift		55%	50%	40%	40%	45%	45%	45%	45%
Change in F if 10% effort shift		0.004	0.003	0.004	0.003	0.004	0.003	0.004	0.003
Reduction in landings if 10% effort shift		73,380	45,659	79,162	54,182	78,148	53,488	77,824	53,266
Reduction in revenue if 10% effort shift		$536,410	$333,766	$573,927	$392,821	$568,136	$388,858	$566,555	$387,776
If 100% of DAS used in MA during turtle season eliminated		100%	100%	100%	100%	100%	100%	100%	100%
DAS reduced if 100% DAS reduction		1,575	1,732	2,807	3,087	2,103	2,313	2,300	2,530
% Effort shift if100% DAS reduction		18.1%	19.3%	23.9%	25.4%	21.8%	22.4%	21.9%	23.3%
Change in F if 100% DAS reduction		0.008	0.005	0.011	0.007	0.010	0.006	0.010	0.007
Reduction in landings if 100% DAS reduction		133,419	91,318	197,906	135,456	173,662	118,862	172,941	118,369
Reduction in revenue if 100% DAS reduction		$975,292	$667,533	$1,434,817	$982,053	$1,262,525	$864,128	$1,259,012	$861,724

Some PDT members felt that these results suggested that the first alternative is not reasonable and prudent. Others suggested that the PDT could explore other ways to approach this alternative on a more individual basis that would reduce effort overall in open areas in the Mid-Atlantic for some vessels that historically fish in that area and season. Evaluating averages across the fleet in this manner is very misleading in terms of estimating fishing effort in specific areas and seasons, because these averages reflect higher effort levels from some vessels and no effort from other vessels. Specifically, the five DAS average is misleading because it is an average for the fleet and some vessels from southern ports likely take more than one trip during this time period, while most vessels from the north probably take no trips in the Mid-Atlantic during this time period or the entire year.

Therefore, the PDT decided to evaluate the distribution of DAS used in the Mid-Atlantic during the summer and fall to evaluate if there was a maximum DAS value that could be identified that would limit DAS in that area and time, but was based on more individual effort patterns compared to average for the fleet which includes many vessels that do not fish in that time and area at all. The alternative would still limit DAS based on a comparable reduction produced by the model results for the fishery overall. From the example above, a 40-55% reduction in DAS used or a total of 866-1235 DAS for that time and area would be equivalent to an effort shift of 10% from MA during turtle season to the remainder of the year. Since all vessels do not fish in that area and time the limit would effectively only impact vessels that tend to fish in that area and time period, so the maximum would be higher than the fleet average of DAS used in that area and time of 5-10 DAS for the four FW21 scenarios.

Out of about 340 limited access vessels, 143 used DAS in the Mid-Atlantic from during the months of June – October based on 2008 VTR data. Therefore, approximately 200 vessels did not use any DAS in the Mid-Atlantic during that window of time, explaining why the fleetwide average is so low (5-10 DAS). Of the 143 vessels that did use DAS in the Mid-Atlantic during the turtle season the DAS used ranged from 2-47. The maximum DAS used in this analysis is 47 DAS (maximum allocation of 37 DAS plus 10 DAS carryover).

If the Council still wants to limit DAS as an RPM alternative, it is possible to identify a DAS maximum for a season that would be higher than the fleet average (5-10 DAS) but still be expected to reduce DAS in that area by a similar amount because some vessels that typically use more than the maximum would be restricted to a lower amount. For example, for the FW21 scenario that allocated 30 DAS (NLF20) the fleetwide DAS reduction that would comply with the PDT threshold for more than minor equates to 866 DAS used in the Mid-Atlantic. Based on the historical usage of DAS in 2008, if vessels were limited to 17 DAS during June-October, a total of 870 DAS would be reduced. This restriction is not expected to impact the 200 vessels that did not fish in the Mid-Atlantic during this time period, and should not impact the 82 vessels that used 17 or less DAS in the Mid-Atlantic from June-Oct. That leaves approximately 61 vessels that took more than 17 DAS that would be limited to 17 under this alternative and would have to use those DAS in other areas or seasons. Overall, these data show that a reduction well above the fleetwide average of DAS used will still reduce DAS used in the Mid-Atlantic during the turtle season. For example, a restriction of no more than 20 DAS would reduce days fished by about 25%, and a restriction of 11 DAS would reduce days fished by about 50% compared to 2008 levels (See Table 53).

Figure 43 – Number of LA vessels and DAS used in Mid-Atlantic from June-October (2008 VTR data)

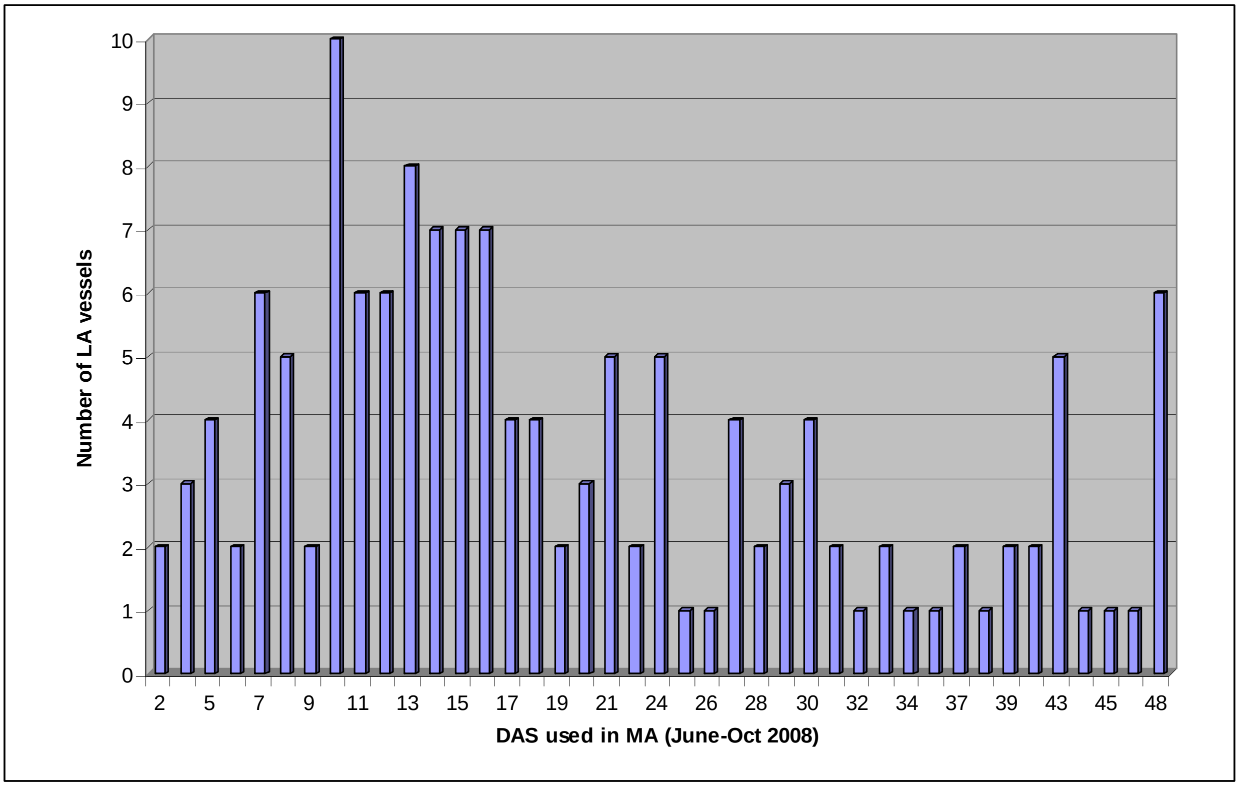


Table 53 – Number of vessels and DAS absent in the MA from June-Oct 2008 with percent of DAS reduction compared to 2008 for each DAS value

DAS absent in 2008	# vessels	DAS used	Cum DAS used	% DAS used in MA reduced compared to 2008
0	200	0		100.0%
2	2	4	4	90.0%
3	3	9	13	85.1%
5	4	20	33	75.5%
6	2	12	45	70.9%
7	6	42	87	66.3%
8	5	40	127	61.9%
9	2	18	145	57.7%
10	10	100	245	53.5%
11	6	66	311	49.7%
12	6	72	383	46.1%
13	8	104	487	42.8%
14	7	98	585	39.7%
15	7	105	690	36.8%
16	7	112	802	34.2%
17	4	68	870	31.8%
18	4	72	942	29.6%
19	2	38	980	27.5%
20	3	60	1040	25.5%
21	5	105	1145	23.6%
23	2	46	1191	20.1%
24	5	120	1311	18.4%
25	1	25	1336	16.9%
26	1	26	1362	15.5%
27	4	108	1470	14.0%
28	2	56	1526	12.7%
29	3	87	1613	11.5%
30	4	120	1733	10.4%
31	2	62	1795	9.4%
32	1	32	1827	8.5%
33	2	66	1893	7.7%
34	1	34	1927	6.9%
35	1	35	1962	6.1%
37	2	74	2036	4.6%
38	1	38	2074	4.0%
39	2	78	2152	3.3%
41	2	82	2234	2.2%
43	5	215	2449	1.3%
44	1	44	2493	0.9%
45	1	45	2538	0.7%
46	1	46	2584	0.4%
47+	6	282	2866	0.0%

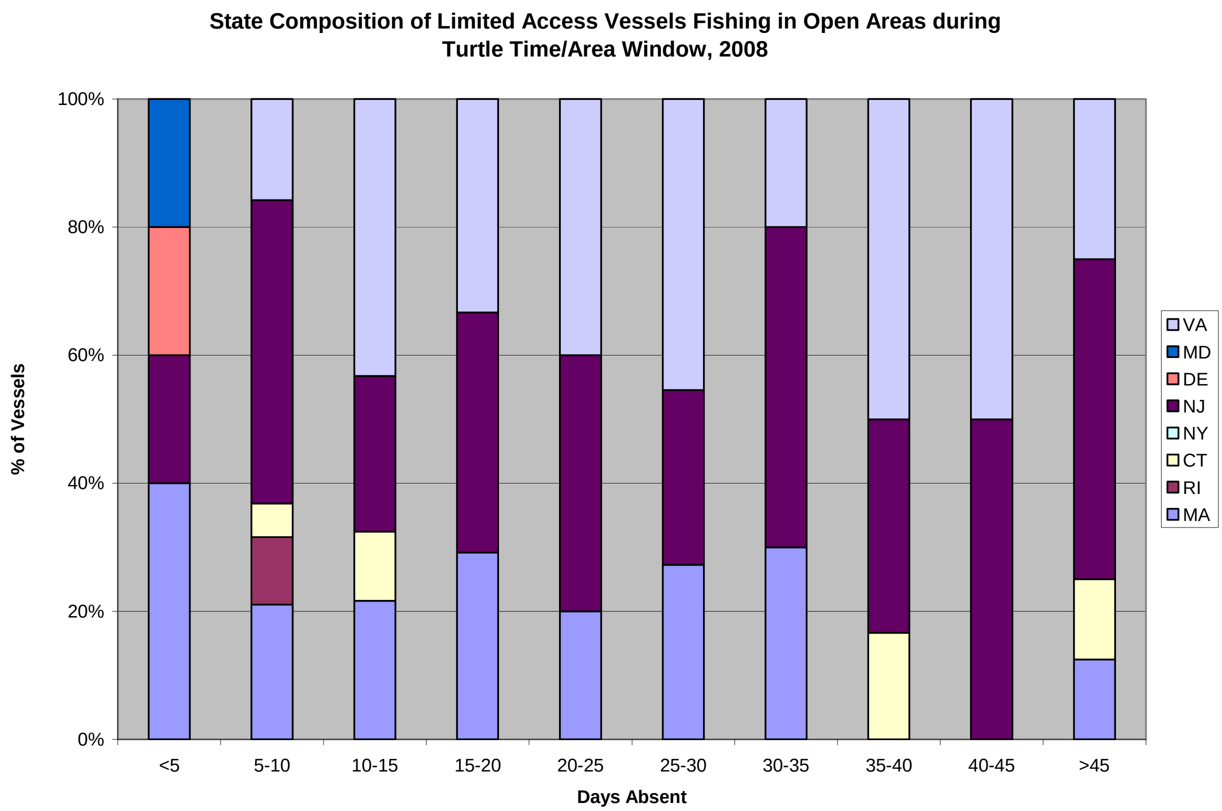
The PDT recognized that this RPM will have very different distributional impacts on the fleet; high for vessels that historically fish in that area and season and zero impacts on vessels from the north that never use DAS in that area and season. The number of DAS absent per LA vessel were evaluated using 2008 VTR data. Of the 143 vessels that used some DAS in this area and season, the majority of vessels were from Virginia and New Jersey, about 50 from each state. About 30 vessels were from either Massachusetts or Rhode Island. The majority of these vessels used 10-20 DAS in the Mid-Atlantic during this time period and the only states with vessels that used more than 20 DAS in this area and season are Virginia, New Jersey, Connecticut, and Massachusetts (Figure 44).

Table 54 – Number of vessels that fished in Mid-Atlantic by homeport state during turtle season of June-October (based on DAS absent from 2008 VTR data)

# DAS absent	Homeport State				
	MA/RI	CT	NJ	DE/MD	VA
<10	8	*	10	*	3
10-15	8	4	9	0	16
15-20	7	0	9	0	8
20-25	3	0	6	0	6
25-30	3	0	3	0	5
30-35	3	0	5	0	*
35-40	0	*	*	0	3
40-45	0	0	4	0	4
>45	*	*	4	0	*

* *Represents more than zero but less than 3 vessels. Inserted to preserve data confidentiality.*

Figure 44 – Percent of vessels and DAS absent by homeport state



- ***Results of RPM Alternative 2 – Restrict the # of access area trips an individual vessel can use in the Mid-Atlantic during a certain window of time***

The PDT also discussed the results for Alternative 2 (limit number of access area trips that can be taken in the Mid-Atlantic during various seasons). This alternative does not seem to qualify as an RPM if considered for the fleet overall. When the impacts are assessed for the fleet overall, limiting effort on MA AA trips by even a small amount during either season (June16-Oct14 or June15-Oct 31) would result reducing MA AA trips to less than half a trip in most cases. This is driven by the fact that the historical average of MA AA trips taken in the Mid-Atlantic is less than one trip per vessel.

The summary of impacts on DAS, F, effort shift, and reduction in landings and revenue are described in Table 55. Each FW21 scenario has been set so that 10% of projected effort in the MA during the turtle season is shifted to the remainder of the year. The table also provides the same information if all effort (100%) expected to happen in the MA in the turtle season for that RPM is shifted to provide a sense of the maximum value of potential impacts on effort, F, landings and revenues. For an effort shift of 10% the # of MA AA trips are expected to decline from 279-289 to 154-188 depending on the scenario and time period. Estimated DAS used on those shifted trips is in the order of 849-1151 DAS, the equivalent of 35-45% of all effort in the MA during the turtle season. When that amount of DAS is shifted to the other seasons of the year there are impacts on landings and revenue based on reduced average meat weight yields from one season to the other. It is also important to note that the model assumes 0% change in price from this effort shift. It is possible that there would be higher prices during the restricted season since supply will be less, but there will be more supply in the other season so prices will likely decline.

The impacts on catch and revenue for this alternative are driven by the fact that possession limits are reduced in the time period outside the turtle season because meat weights decline. So in order to prevent fishing mortality from increasing in those areas possession limits are reduced in the model to account for changes in average meat weight differences. The differences are not very large, 500 pounds per trip, but that is what is driving the impacts. Since F can be controlled in this approach (possession limit can be reduced) actual F may not increase from this approach if the RPM is accompanied with a reduction in possession limit. Therefore, the change in F in these results is a relative change in F if the possession limit were not reduced. If the possession limit is not reduced in the other season then F will increase overall and economic impacts would be lower than these results because vessels would still be allowed to land up to their possession limit.

Table 55 - Summary of results for RPM Alternative 2 for each FW21 management scenario

Scenario		NCF20		CF20		NCF24		CF18	
Season		June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31
% Effort shift = 10%		10%	10%	10%	10%	10%	10%	10%	10%
Total MA AA trips		1020	1020	1020	1020	1020	1020	1020	1020
# trips in MA during turtle season PRE RPM		279	289	279	289	279	289	279	289
Est. DAS used in MA during turtle season PRE RPM		2,426	2,541	2,416	2,529	2,425	2,539	2,442	2,557
# trips in MA during turtle season POST RPM		182	188	154	159	168	173	154	159
Est. DAS used in MA during trutle season POST RPM		1,577	1,651	1,329	1,391	1,455	1,524	1,343	1,406
# DAS reduced by RPM		849	889	1,087	1,138	970	1,016	1,099	1,151
% reduction in DAS if 10% Effort shift		35%	35%	45%	45%	40%	40%	45%	45%
Change in F if 10% effort shift		0.005	0.003	0.004	0.003	0.004	0.003	0.005	0.003
Reduction in landings if 10% effort shift		80,993	49,101	104,134	63,130	92,564	56,116	104,134	63,130
Reduction in revenue if 10% effort shift		$592,059	$358,928	$754,972	$457,693	$672,940	$407,963	$758,096	$459,586
If 100% of DAS used in MA during turtle season eliminated		100%	100%	100%	100%	100%	100%	100%	100%
DAS reduced if 100% DAS reduction		2,426	2,541	2,416	2,529	2,425	2,539	2,442	2,557
% Effort shift if100% DAS reduction		28.0%	28.3%	20.6%	20.8%	24.3%	24.6%	23.3%	23.5%
Change in F if 100% DAS reduction		0.013	0.008	0.010	0.006	0.011	0.007	0.011	0.006
Reduction in landings if 100% DAS reduction		231,409	140,289	231,409	140,289	231,409	140,289	231,409	140,289
Reduction in revenue if 100% DAS reduction		$1,691,600	$1,025,513	$1,677,715	$1,017,095	$1,682,343	$1,019,901	$1,684,658	$1,021,304

Similar to the alternative above, it could also be possible that limiting the number of trips vessels can take during the turtle season will still reduce effort during that time despite the fact that the average number of trips taken in lower than one per vessel. If the restriction is based on historical effort patterns of vessels *individually* compared to *on average* a more accurate picture of the actual number of trips taken during the turtle season can be considered. For example, for the Elephant Trunk area (since data for ETA and Delmarva opening in 2009 are not available yet) about 14% of all vessels took at least one trip in ETA during the turtle season in 2007 and about 75% in 2008 (Table 56). The two years are quite different: in 2007, most vessels took no trips during that time, probably both because of the rush in the beginning of the year since the area had been closed for 3 years, and the fact that there were 2 AA trips on GB that year (opening date June 15). In 2008, there were quite a few more vessels that took 1-3 trips into the Elephant Trunk during that time. This year is also different because there was only one GB AA trip and vessels got 4 trips allocated in ETA compared to 3 in 2007.

When the mean of these two years are combined, about 45% of all vessels took at least one trip in ETA during the turtle season. If a limit of one ETA trip is imposed for 2010, that would shift an average of 165 trips from the turtle season according to these data. A limit of 2 ETA trips during the turtle season would shift about 76 trips from the turtle season to the remainder of the year. It is difficult to say if the same fishing patterns will exist in 2010 with 2 ETA trips and one Delmarva trip but the analyses suggest that some amount of effort will shift with a limit of 1 or 2 trips since many vessels did not take any ETA trips during the turtle season for both years.

Table 56 – Summary of vessels that took trips in ETA in 2007 and 2008 during turtle season

#trips	2007	2008	MEAN
0	285	87	186
1	25	99	62
2	13	62	37.5
3	6	62	34
4	2	19	10.5
5+	0	14	7
Total # vessels	331	343	337
Total # of trips ET allocated	993	1372	1182.5
% of vessels that took at least 1 trip in window	13.9%	74.6%	44.8%
Total # of trips taken in window	77	555	316
% of total trips taken in window	7.8%	40.5%	26.7%
shift of trips from max of 1 trip	31	299	165
shift of trips from max of 2 trips	10	142	76

The PDT discussed that Alternative 2 could be modified another way as well; vessels could decide to use only a portion of an access area trip during the turtle season and the rest outside of the turtle season, then impacts could be reduced as compared to Alternative 4 that just removes those pounds from the fishery. A combination of Alternative 2 and 4 may be more workable if some effort is allowed during the turtle season to limit total effort, but allow the rest of that trip to be harvested in combination with other access area trips. The analyses suggest that a possession limit of 8,000 or 9,000 pounds during the turtle window would limit effort to a level that would not have more than a minor impact on the fishery if the other pounds for that trip could be harvested outside the turtle window.

These analyses do not include information about changes in costs associated with shorter and longer trips as a result of this restriction. Another issue is that in 2010 the fishery is going to be allocated 2 ETA trips and one in Delmarva. It seems that it would not be economically viable for most vessels to go to Delmarva twice for 9,000 pounds each. However, if a vessel wanted to harvest 9,000 pounds during this time period from ETA and harvest the additional 9,000 pounds on their next trip to ETA that may be more viable. However, some vessels may not be able to hold that many scallops or may not want to extend trips that long to harvest 27,000 pounds on one trip. It is not clear to the PDT what amount of poundage would be viable for vessels to want to take advantage of this alternative. If the wrong amount is selected then the alternative would essentially cause no vessels to take any trips during the window and that is expected to have more than minor impacts on the fishery. When 100% of AA trips are restricted from the turtle season, the impact on F ranges from 0.006 to 0.13 depending on the scenario and about 20-28% of effort is expected to be shifted, well above the 10% threshold presented in the previous tables (Table 55).

- ***Results of RPM Alternative 3 – Consider a seasonal closure for Delmarva access area***

This alternative is impacted by the fact that ETA is already closed in September and October to reduce impacts on turtles, and it has been since it opened in 2007. Therefore, the historical average of MA effort in AA during these time periods is very low. Of all total 1020 trips allocated in 2010 to MA access areas, 680 of them are for ETA thus could not be fished during either of these months to start with. Therefore, only the 340 trips allocated for Delmarva could be used during these months. That is why the projected amount of trips used in the MA during these two months is either 64/1020 trips in Sept and Oct or 37 tips in October. This is based on an assumption that at least 19% of all Delmarva trips will take place in Sept-Oct and 11% in October only based on historical catch levels by month in the Delmarva region before it was an access area. This RPM proposes that Delmarva also be closed for this time period, essentially a 100% reduction from the projected MA AA effort for those time periods. The results for completely closing Delmarva for these two time periods are summarized in Table 57.

These results are different than the previous two alternatives because these changes in landings and revenues are actually positive for the fishery compared to reductions because the meat yield differences between Sept/October are lower than the average of the rest of the year. Therefore, if effort is shifted from these two periods to the remainder of the year overall yield is expected to increase if effort patterns by season are similar to the recent past. In addition, the overall change in F is positive due to this meat weight gain.

Table 57 - Summary of results for RPM Alternative 3 for each FW21 management scenario

Scenario	NCF20		CF20		NCF24		CF18	
Season	Sept1-Oct31	Oct1-Oct31	Sept1-Oct31	Oct1-Oct31	Sept1-Oct31	Oct1-Oct31	Sept1-Oct31	Oct1-Oct31
Delmarva closure	100%	100%	100%	100%	100%	100%	100%	100%
Total MA AA trips	1020	1020	1020	1020	1020	1020	1020	1020
Total Estimated DAS used in MA DAS	9,347	9,347	9,347	9,347	9,347	9,347	9,347	9,347
# trips in MA during turtle season PRE RPM	64	37	64	37	64	37	64	37
Est. DAS used in MA during turtle season PRE RPM	611	373	609	372	610	373	613	375
# trips in MA during turtle season POST RPM	0	0	0	0	0	0	0	0
Est. DAS used in MA during trutle season POST RPM	0	0	0	0	0	0	0	0
# DAS reduced by RPM	611	373	609	372	610	373	613	375
% Effort shift if 100% DAS reduction	10.0%	7.0%	7.0%	5.0%	9.0%	6.0%	8.0%	6.0%
Change in F if 100% DAS reduction	-0.005	-0.007	-0.003	-0.005	-0.004	-0.006	-0.004	-0.006
GAIN in landings if 100% DAS reduction	55,256	66,247	55,256	66,247	55,256	66,247	55,256	66,247
GAIN in revenue if 100% DAS reduction	$403,921	$484,266	$400,606	$480,291	$401,711	$481,616	$402,264	$482,278

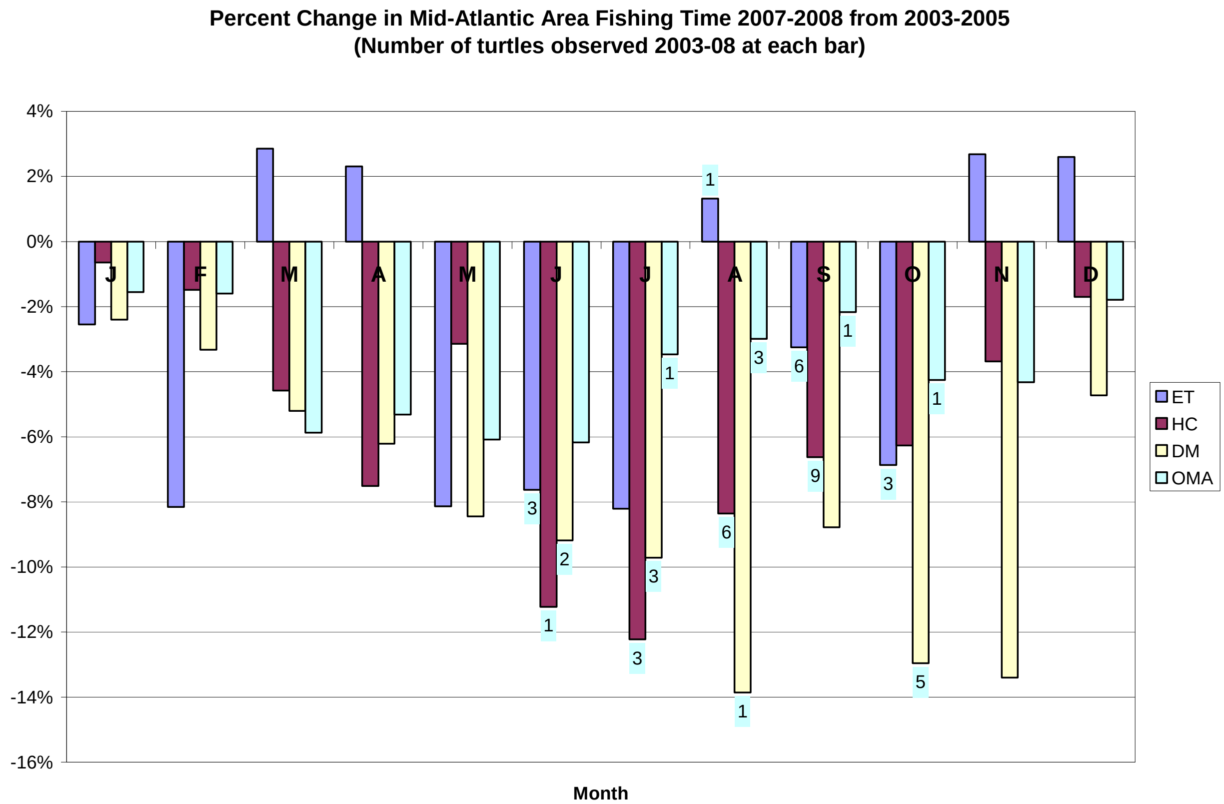
The assumptions used for changes in meat weight from trips shifted from either September-October or October only are a gain of 5% for the longer time period and 11% for the one month period. These values are weighted with historical catch in each period compared to the remainder of the year. The reason there is an increase in meat weight by shifting these trips is that meat weights in September and October are lower than some months like July and August, and if that effort is distributed evenly throughout the year meat weights will on average be higher compared to these two months alone (See Appendix 1 for more info on monthly meat weights).

However, based on effort shift patterns from the ETA seasonal closure of Sept-Oct we know that almost all the effort from Sept and Oct shifted to adjacent months (August, November and December) (Figure 40). There was also more effort in March and April, mostly from the pulse of effort that went into this area in 2007 since vessels were anxious to get in that area. If that same pattern is assumed to happen from a seasonal closure of Delmarva the change in meat weights would be 0.1% (compared to 5%) for Sept-Oct and 2% gain for October only, as compared to 11% if effort is distributed throughout the year (Table 58). The PDT used the annual assumptions because that is how the model is set up. The model is designed to estimate effort shifts from the closure period to the entire time period outside the closure and is weighted for historical catch for the entire period. The model is not capable of only assuming that effort will shift into a handful of months. Therefore, it should be noted that lower meat weight gains may be realized that the results presented for this alternative because effort is more likely to shift to adjacent months compared to the entire time period outside the window if trends are like the ETA closure in 2007 and 2008. Thus, economic gains that are described in the results for these two seasonal closure time periods from the increased meat weight values could be less than what is presented.

Table 58 – Expected change in meat weight if Delmarva trips are shifted from a seasonal closure

Closure Period	Change in MW if effort redistributed to all other months	Change in MW if effort redistributed to adjacent months only
Sept-Oct	5.0%	0.1%
Oct	11.0%	2.0%

Figure 45 – Percent change in Mid-Atlantic area fishing time by month in recent years compared to 2003-2005



- ***Results of RPM Alternative 4 – Reduce possession limits in ETA and/or Delmarva to reduce fishing time per trip***

Overall this alternative as written causes large economic impacts because this is the only option that does not allow vessels to recapture landings from the RPM restriction outside the turtle window. Specifically, because this alternative only reduces the possession of a MA AA trip if a vessel decides to fish during the turtle season and does not allow the vessel to catch those pounds on an additional trip, that catch is lost from the fishery completely. The estimated DAS reduction from this alternative is from shorter trips in AA because possession limits are reduced.

The two examples in the table below are setting effort shift to 10% and the other example is reducing the possession limit by 10% (i.e. an 18,000 pound trip would only be worth 16,200 pounds). This alternative is not really an effort shift since those pounds are never recaptured, it is actually the equivalent of a 10% loss of all catch from the MA during the turtle season. The change in F for this alternative is positive because effort is reduced and not fished outside the turtle window. Even the example below that shows the impacts of reducing the possession limit by only 10% still has high economic costs because 279-289 of the total 1020 MA AA trips are expected to be taken during the window, and if the possession limit for all those trips was reduced to 16,200 pounds total catch from those trips would be reduced by 1.8 million pounds and over $12 million dollars impact on revenue. The PDT identified that this alternative as written would cause more than a minor impact and reducing the possession limit would only be more workable as an RPM if those pounds could be harvested outside the window on a separate trip. That concept has been incorporated into Alternative 2 above.

Table 59 - Summary of results for RPM Alternative 4 for each FW21 management scenario

Scenario	NCF20		CF20		NCF24		CF18	
Season	June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31	June16-Oct14	June15-Oct31
% Effort shift = 10%	10%	10%	10%	10%	10%	10%	10%	10%
Total MA AA trips	1020	1020	1020	1020	1020	1020	1020	1020
# trips in MA during turtle season PRE RPM	279	289	279	289	279	289	279	289
Est. DAS used in MA during turtle season PRE RPM	2,428	2,541	2,417	2,530	2,427	2,540	2,444	2,558
# trips in MA during turtle season POST RPM	279	289	279	289	279	289	279	289
Est. DAS used in MA during trutle season POST RPM	1,578	1,652	1,208	1,265	1,456	1,524	1,344	1,407
# DAS reduced by RPM	850	890	1,208	2,530	970	1,016	1,100	1,151
% reduction in DAS if 10% Effort shift	35%	35%	50%	50%	40%	40%	45%	45%
Change in F if 10% effort shift	0.004	0.003	0.005	0.003	0.004	0.003	0.005	0.003
Reduction in landings if 10% effort shift	6,426,000	6,426,000	9,180,000	9,180,000	7,344,000	7,344,000	8,262,000	8,262,000
Reduction in revenue if 10% effort shift	$46,974,060	$46,974,060	$66,555,000	$66,555,000	$53,390,880	$53,390,880	$60,147,360	$60,147,360
If Possession Limit reduced by 10% on trips taken in MA during turtle season	10%	10%	10%	10%	10%	10%	10%	10%
DAS reduced if poss. Limit reduced by 10%	243	254	242	253	243	254	244	256
% Effort shift if poss. Limit reduced by 10%	3.0%	3.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Change in F if poss. Limit reduced by 10%	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Reduction in landings if poss. Limit reduced by 10%	1,836,000	1,836,000	1,836,000	1,836,000	1,836,000	1,836,000	1,836,000	1,836,000
Reduction in revenue if poss. Limit reduced by 10%	$13,421,160	$13,421,160	$13,311,000	$13,311,000	$13,347,720	$13,347,720	$13,366,080	$13,366,080

5.3.1.4 Additional analyses of scallop fishery trends

The sea scallop fishery is managed under an adaptive rotational management plan, where the fishing levels and the number of access trips vary widely from year to year. Under area rotation, allocations may vary by year and area, but the overall fishing mortality rate is designed to be more constant. The current overfishing threshold is F=0.29, and allocations are given so that level of F is not exceeded. In recent years, the target has been F=0.20. In a given year the limited access fishery is allocated open area DAS and access area trips. The number of open area DAS vary depending on how many access area trips are allocated because, to prevent overfishing, the overall fishing mortality cannot exceed a certain level. So in a year where several access area trips are allocated, open area DAS will be lower. Furthermore, in some years, many areas may be completely closed to fishing because those areas have high levels of small scallops. Thus, those areas are closed for several years and when they reopen, fishing mortality will be higher in that area.

With respect to the total allocated DAS, the allocations fluctuate yearly. These allocations are based on available biomass and mortality estimates, which vary depending on the expected biomass and how much fishing mortality is being allocated in access areas. In some years, open area effort may be lower because more effort is being allocated in access areas. When more effort is allocated in access areas, open area effort must be reduced to keep overall effort levels below overfishing thresholds. Comparing 2004 to 2009, the number of total DAS allocated has declined by 39%. The average DAS allocated from 2004-2007 was 19,182, which is about 29% more than the estimate of allocated DAS for 2009. However, this does not take into account the fact the FMP does not dictate where open area effort can be used. Most years, open area effort is split evenly between the Mid-Atlantic and Georges Bank, but that fluctuates depending on where catch rates are higher in the open areas.

Table 60 – Scallop DAS allocated and used in recent years

Year	Total DAS allocated	FT	PT	Occ	Total DAS used
2004	22462	42	17	4	15987
2005	15344	40	16	3	14436
2006	20343	52	21	4	17344
2007	18577	51	20	4	15192
2008	11410	35	14	3	
2009	13692	42	17	3	

Based on which access areas are open during which years, the number of trips varies greatly. Allocated numbers of trips are based on biomass estimates and the basic principles of area rotation. From 2004-2007 roughly 50% of access area trips were allocated to the Mid-Atlantic, except in 2006, when no trips (other than Hudson Canyon carry-over trips) were allocated (Table 61). Subsequently, for 2008-2009, 80% of the trips have been allocated to the Mid-Atlantic. In 2010 3 out of the 4 access area trips will be in the Mid-Atlantic.

Table 61 – Access area allocations from 2004-2009

Access Areas		GB			Mid-Atlantic		
	Total trips for FT	CA1	CA2	NL	HC	ET	Del
2004	7		2	1	4		
2005	5	1	1		3		
2006	5		3	2	carry-over		
2007	5	1		1	carry-over	3	
2008	5			1		4	
2009	5		1			3	1

5.3.1.4.1 Scallop effort in the Mid-Atlantic

Fishing effort in the Mid-Atlantic has changed over time. In general, total catch from the MA was very low from 1994 until more recently (Figure 46). From 2004-2007 about 60% of total catch from MA access areas and open areas. There is typically a peak in the spring until more recent years (2007 and 2008). The peak used to be May/June, and more recently it has shifted to April or even March. When the Elephant Trunk area was open in 2007 and 2008 more catch occurred during the early spring and later in the year compared to spring and summer in earlier years. This shift of effort, likely caused by the high amount of effort allocated to ETA and the two month turtle closure from Sept1-Oct 31) seems to have reduced scallop fishing during most of the year when turtles are expected to be in the Mid-Atlantic. Figure 47 shows that overall catch in the Mid-Atlantic has steadily reduced during both turtle seasons under consideration in FW21 from 50-60% to closer to 30% for both time periods. Figure 48 shows catch by area during the turtle season compared to other times of the year for 2004-2008 combined, and for all areas in the Mid-Atlantic (Elephant Trunk, Hudson Canyon, and open areas) more catch is during the months of November–May compared to June-October.

Figure 46 – Scallop landings in the Mid-Atlantic by month and year

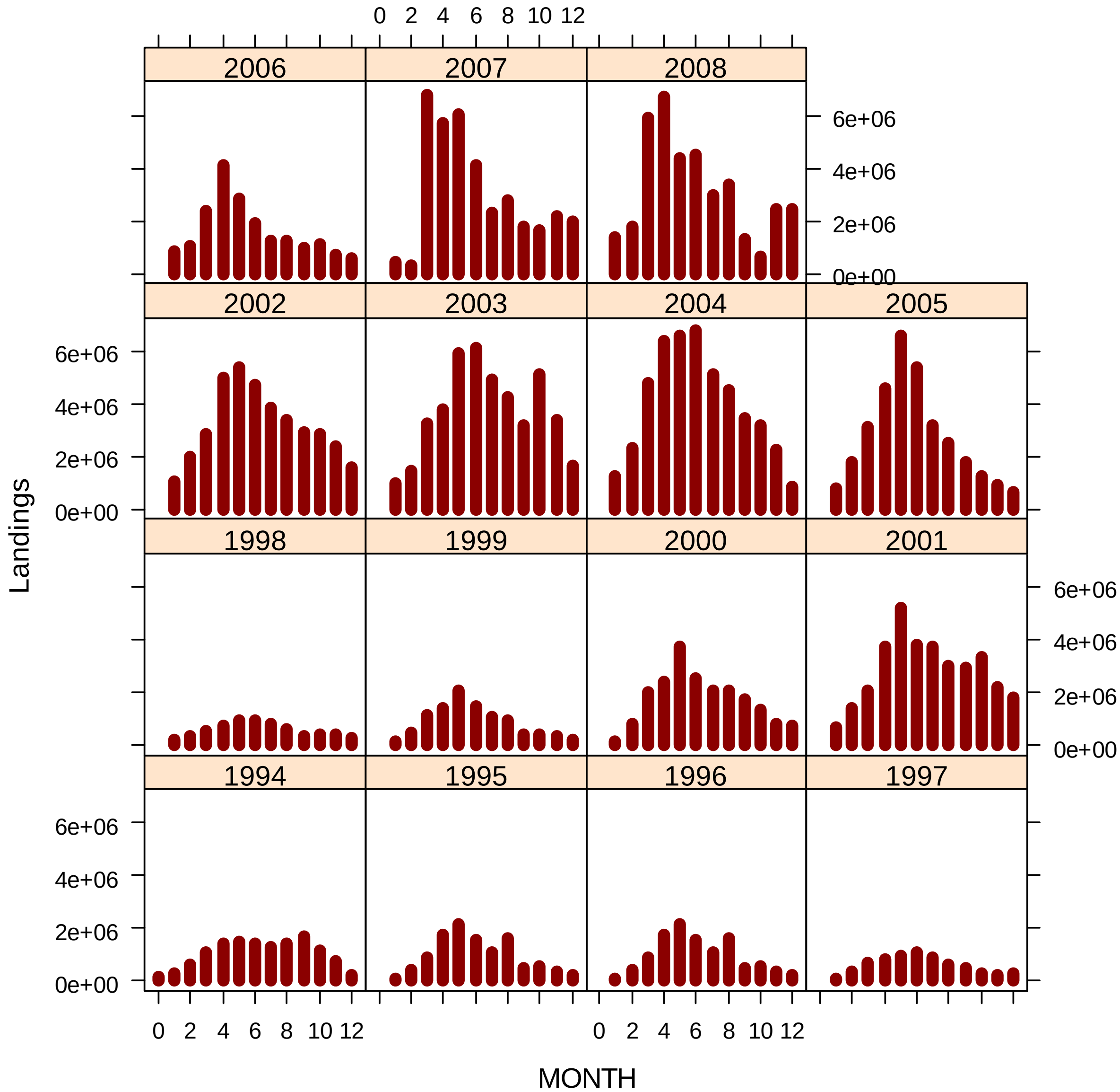


Figure 47 – Percent of Mid-Atlantic landings (open and access areas combined) for the two turtle seasons under consideration – June 16-Oct14 (dashed) and June15-Oct31 (solid)

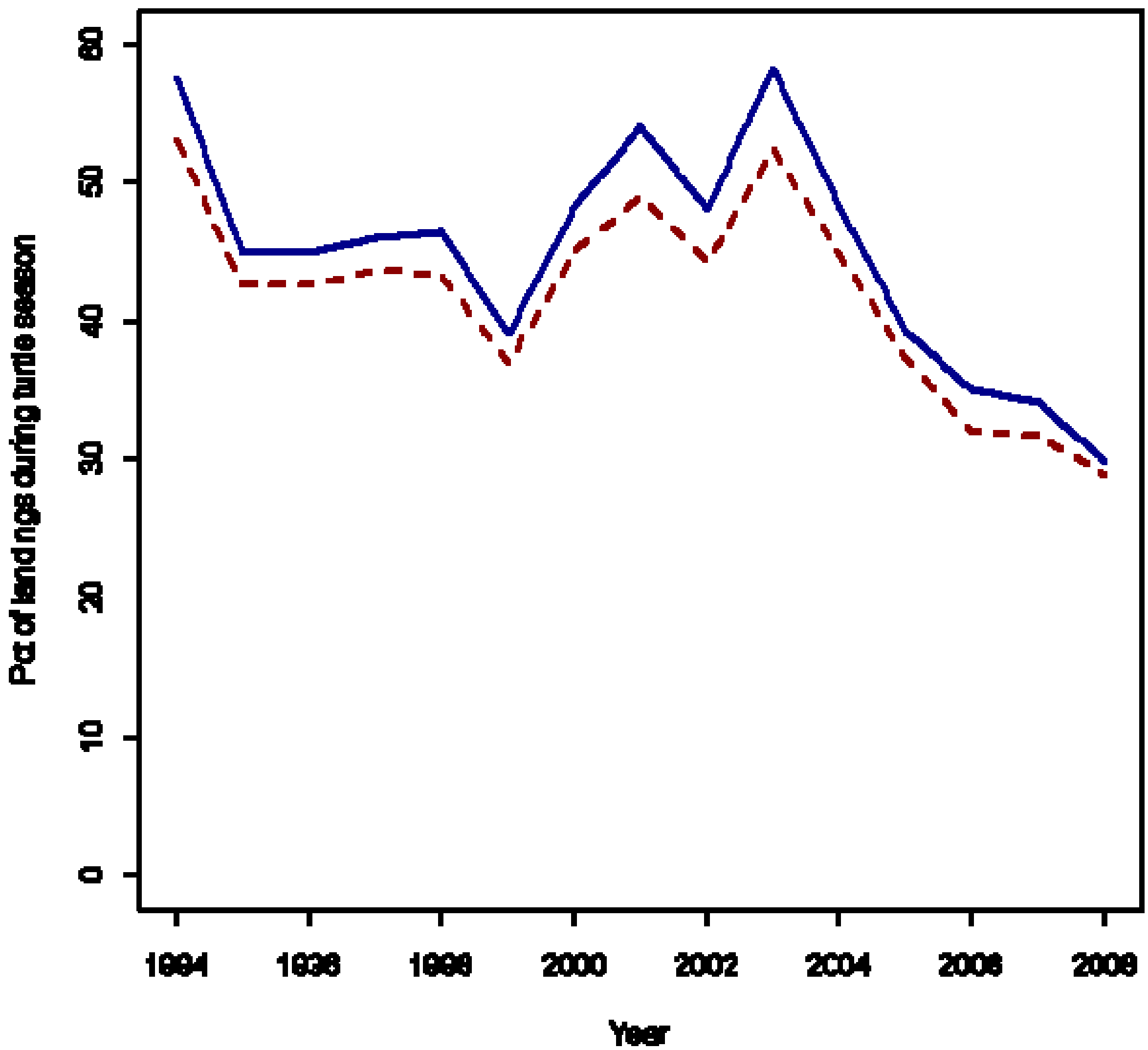
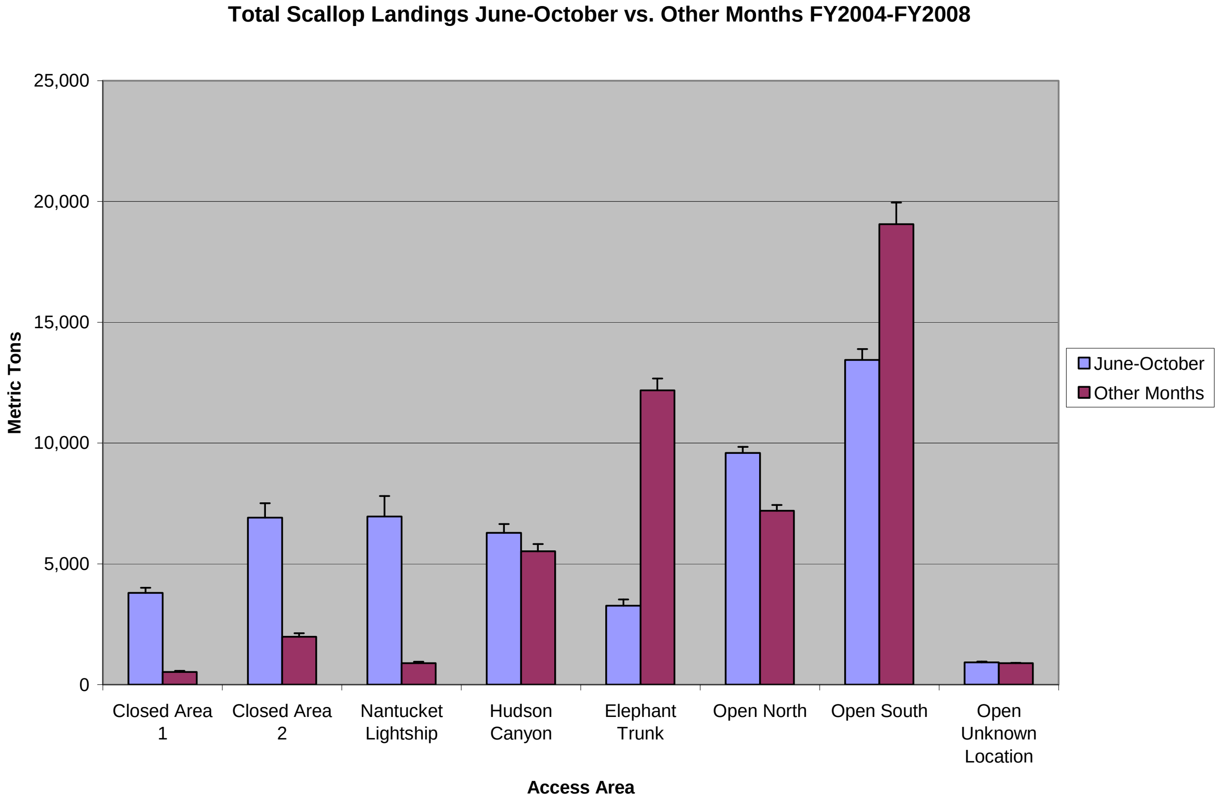


Figure 48 – Scallop landings during turtle season of June-October compared to the rest of the year



Fishing mortality peaked in the early 1990s, but has decreased substantially since then and, in general, has remained stable since 1999 (Figure 49). In recent years, fishing mortality has been higher for the Mid-Atlantic than for Georges Bank. Georges Bank saw a significant decrease in fishing mortality from 1993-1995 and has remained very stable since 1995. However, the Mid-Atlantic fishing mortality, although in decline, is not as stable as Georges Bank. The threshold for overfishing is F=0.29. The estimate of turtle takes was based on fishing effort levels in 2003 and 2004. Since 2004, F has been reduced by about 50% overall, as well as during the months of June-October, when turtles are more likely present in the Mid-Atlantic (Figure 50).

Figure 49 – Fishing mortality in the scallop fishery overall (and in Georges Bank and Mid-Atlantic) from 1983 -2006

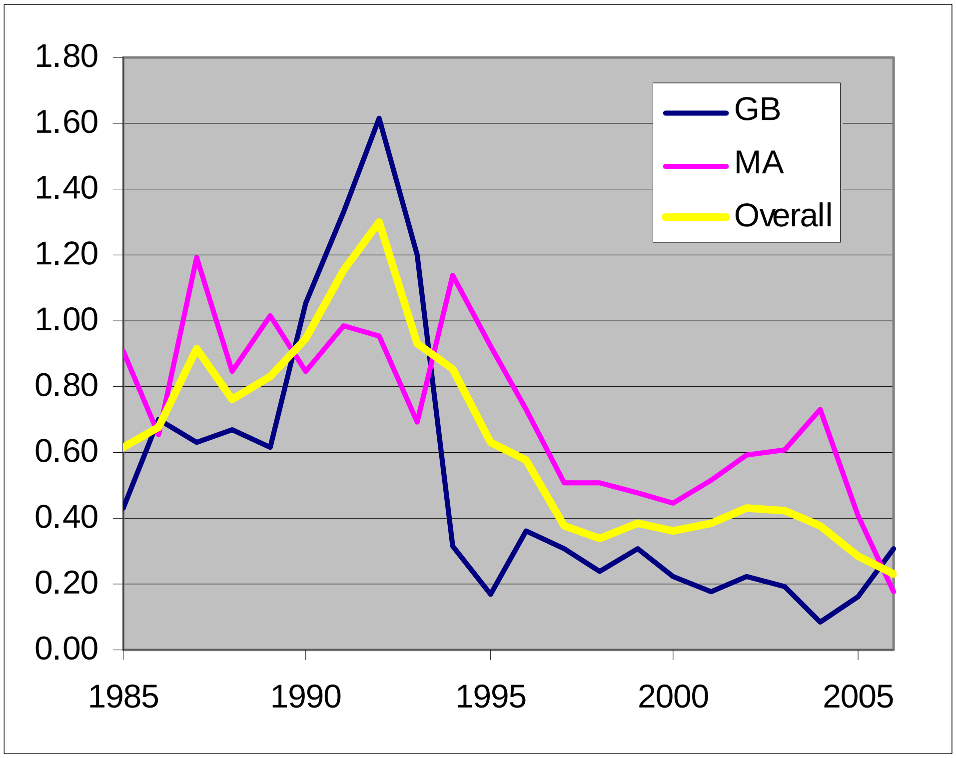
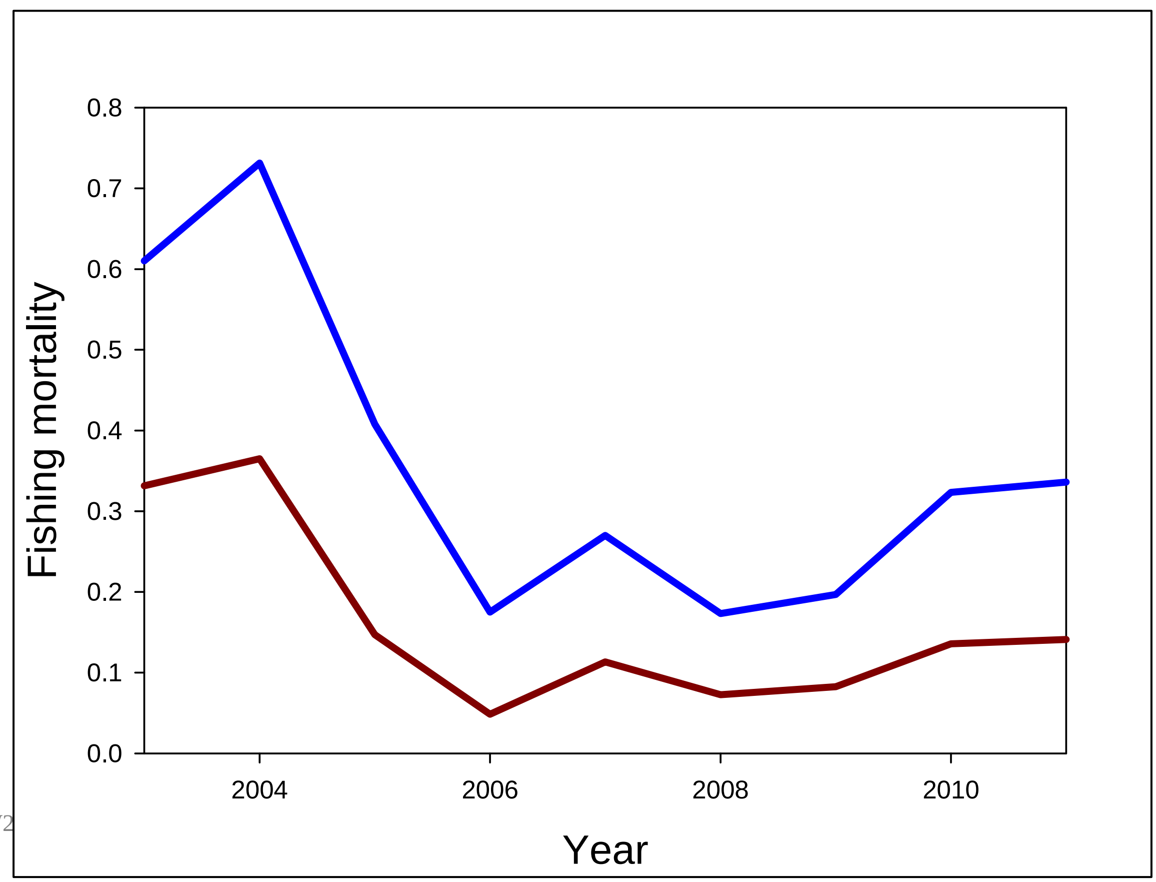


Figure 50 – Estimate of fishing mortality in the Mid-Atlantic (blue) and during the months of June-October (red). Fractions in projections assume June-October fishing mortality is 42% of annual F.
F estimates for 2003-2006 from SAW Report and projections for 2007-2011 from FW19 projections



5.3.1.5 Additional issues to consider

There are several other factors that would affect the change in prices for scallops, such as a change in import or export prices in response to changes in the seasonal composition of landings, the change in numbers of U10 or U12 scallops as a proportion of monthly landings, fluctuations in monthly disposable income, and changes in seasonal demand. Many of these factors are unknowns at this point, making it difficult to accurately estimate the impact of effort shifts on prices. For example, if more scallops are imported in response to lower domestic landings during the turtle window, the price of scallops may not increase during these months, or may increase by a negligible amount. In addition, the estimates of average annual price used in these analyses are based on 1999-2006 data and these are currently being updated. Preliminary results including 2007 and 2008 as well, suggest that differences in total landings projected in these scenarios are not expected to have a large impact. Therefore, price estimates may be more similar than presented ($6.87 compared to $7.81). While prices may be different this should not impact the overall results in terms of change or percent change in revenue impacts. There is no question that the uncertainties created by these shifts in the seasonal composition of effort and landings will make it difficult for vessel-owners to make their plans about where and when to fish and could possibly lead to reduced economic efficiency and to higher costs, reducing vessel profits further.

The analyses provided above do not take into account the distributional impacts of turtle measures and effort shifts for various ports, states, and vessels of different size categories. Because turtle measures will require a reduction in effort in the Mid-Atlantic areas, they are expected to have greater negative impacts on vessels homeported in the Mid-Atlantic areas, particularly those that are smaller vessels that have less mobility to travel to other fishing grounds and are more vulnerable to the weather conditions.

Overall, it needs to be said that that there are many unknowns about these types of measures in terms of what the outcomes will actually be. Impacts may be very different from these measures if assumptions made in these analyses are not realized. For example, if a seasonal closure in Delmarva shifts effort differently than it did in 2007 and 2008 from the ETA closure impacts on scallop fishing mortality, revenue, and turtles could be very different. If more effort is shifted into July and August that will reduce fishing mortality but could increase potential interactions with sea turtles. On the other hand if effort shifts primarily to months like November, December, March and April fishing mortality will be higher than projected and impacts on turtles will likely be more beneficial than projected because all these months are outside the turtle season. Vessels tend to fish to maximize potential revenues when yields are generally highest, but the market is unpredictable and behavior constantly adjusts. Therefore, it is very difficult to know in advance if measures such as these will ultimately have more than a minor impact on the fishery or not.

In addition to the primary measure of “more than minor” (percent change in effort shift) the PDT included a description of other factors that should also be considered when identifying a more than minor change that would also be affected by a shift of effort including:

- concern about safety at sea (shift to winter months),

- changes in bycatch (i.e. fluke bycatch increases in winter months when overlap with scallop fishery offshore),
- revenue impacts because of reduced catch and changes in price, costs, markets, supply, etc.,
- impacts on the ability of the observer program to maintain coverage from surges and shifts in effort, and
- general impacts of altering rotational area management and compromising the ability to achieve optimum yield.

5.3.1.6 Overall PDT input

The PDT did not identify any of these measures as preferred recommendations. Some felt the measures that focus on access area management may have lower distributional impacts. Some felt that more impacts could result from these measures then the analyses show due to all the unknown factors such as change in price and markets. Some raised concern about how these will ultimately impact turtles, positive or negative. Overall, how these measures fit in with the other issues in FW21 such as the potential new closed area in the Channel and YT allocation decisions in Framework 22 is very complex. Several outside factors such as these are likely to have combined impacts on area rotation that will be very difficult to predict.

5.3.2 Analysis of measures in FW21

See separate document that will be handed out at the Council meeting

5.4 ECONOMIC AND SOCIAL IMPACTS

See Separate document on Economic Impacts of FW21 with this mailing.