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

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
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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 measures required in recent turtle biological opinion and minor adjustments to the observer set aside program.

The proposed action includes a specific Acceptable Biological Catch (ABC) level as required by the reauthorized Magnuson Act (2007). For 2010 the ABC will be set at 29,578 mt (65.2 million pounds), including an estimated 3363 mt – 7.4 million pounds - for non-yield fishing mortality (discards and incidental mortality). Therefore, the overall ABC for the fishery, excluding discards and incidental mortality is 26,219 mt (57.8 million pounds).

Fishery specifications for 2010 are included in this action for both limited access and limited access general category vessels. Fishery allocations are based on an overall fishing mortality target of F=0.20 (Scenario NCLF20 – no new closure in the Channel and overall F of 0.20). Access areas available to the fishery this year include: Elephant Trunk, Delmarva, and Nantucket Lightship. This action considered closing a new access area in part of the Great South Channel, but that alternative was not selected as part of the final action. After mortality from access areas is accounted for, the open area DAS allocations are set so that the overall fishing mortality equals 0.20 for the proposed action. Under this target the open area DAS allocations are approximately 9,860 DAS for the fleet overall, equivalent to 29 DAS for full-time vessels, 12 DAS for part-time vessels and 3 DAS for occasional vessels.

The final action assumes that the IFQ program is fully implemented for the general category fishery before March 1, 2010. If it is delayed past March 1, 2010, this document includes measures for the LAGC fishery that would extend the “transition period” to IFQs through the 2010 fishing year, allocating 10% of the TAC to IFQ vessels. However, the Council’s final decision assumes that the IFQ program will be in effect before March 1. Therefore, all qualifying limited access general category vessels will be allocated a specific amount of the total general category allocation based on their qualifying contribution factor. The total general category allocation will be equivalent to 5% of the projected landings for 2010, which is 2.1 million pounds. Individual vessels will be allocated a set poundage they can fish from open areas or access areas if available. The general category fishery has been allocated 5% of projected catch from each access area as a total number of fleetwide trips. Once the fishery uses all trips in an access area the area is closed to general category fishing for the remainder of the year. All these measures were adopted under Amendment 11; this action only specifies the overall TAC for the 2010 fishing year and the number of access area trips available in 2010. The hard-TAC for vessels that qualify for a limited access Northern Gulf of Maine general category permit will remain at 70,000 pounds for 2010. Similarly, the target TAC for limited access incidental catch permits will remain at 50,000 pounds for 2010.

If approved, this action does include one new provisions for limited access general category vessels. Framework 21 allows IFQ vessels to lease portions of their annual allocation during the fishing year. Amendment 11 prohibited leasing portions of allocations, leasing was restricted to full allocation amounts.

A primary objective of this action is to include specific measures to comply with reasonable and prudent measures developed by NMFS in a recent biological opinion on this fishery regarding impacts on sea turtles. The proposed action includes a combination of measures considered including a two-month seasonal closure of the Delmarva access area from September 1-October 31 and a limit on the number of access area trips that can be taken in access areas within the Mid-Atlantic from June 15 through October 31. During this period, each vessel is restricted to taking 2 of the 3 allocated Mid-Atlantic access area trips in the Mid-Atlantic. Since both Mid-Atlantic access areas would now be closed from September 1-October 31 to reduce impacts on sea turtles (if approved), the trip limit is applicable from June 15 through August 31. It was also noted during the Council deliberations that the overall allocation decision related to keeping fishing mortality at 0.20 will also limit open area effort in the Mid-Atlantic compared to recent years and other allocation scenarios considered in this action with higher open area DAS amounts.

Lastly, this action includes a measure to improve the observer set-aside program by limiting the amount of compensation a general category vessel can receive on observed access area trips. The limit would be equivalent to the value of one day of compensation, regardless of trip length. So if a general category vessel fishes for more than one day in an access area, even a portion of an additional day, it would not be eligible for more than one day of compensation from the observer set-aside program. The compensation rate is set by NMFS in the final regulatins for each framework.

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

Acceptable Biological Catch (Section 2.3)

Acceptable Biological Catch for this fishery in 2010 will be set at 29,578 mt (65.2 million pounds), including an estimated 3363 mt – 7.4 million pounds - for non-yield fishing mortality (discards and incidental mortality). Therefore, the overall ABC for the fishery, excluding discards and incidental mortality is 26,211 mt (57.8 million pounds). 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.

This level was recommended by the Science and Statistical Committee (SSC) and various sources of scientific uncertainty were considered when setting this value. The Council did not consider any alternative ABCs in this action. The SSC presented their report to the Council regarding ABC for 2010 at the September 2009 Council meeting and the Council agreed with their findings based on analyses prepared by the Scallop PDT. ABC calculations were based on the assumption of uniform fishing, and in particular, that there were no EFH or rotational closures. This is consistent with the current FMP overfishing definition, which defines overfishing relative to a "whole stock" fishing mortality. Therefore, the ABC calculation gives what would be an appropriate catch if all areas were open. That is not the case in the plan since there are Groundfish mortality closed areas and EFH closed areas that are not accessible to the fishery, as well as scallop rotational areas that are only available to the fishery at certain times and effort is limited. Therefore, a lower fishing mortality target should be set to prevent overfishing in areas that are accessible, since all exploitable scallop biomass is not accessible to the fishery.

Allocation Scenarios (Section 2.4)
The Council considered four specific allocation scenarios for this action in addition to the No Action alternative. Two scenarios included closing a new access area in part of the Great South Channel and two did not include the closure. Various levels of overall fishing mortality were considered as well ranging from an overall F=0.18 to F=0.24. All four scenarios, as well as the No Action alternative include a total of four access area trips. All four scenarios included two trips in Elephant Trunk, one in Delmarva and one in Nantucket Lightship. The scenarios vary based on whether or not the new area is closed and how many open area DAS equate to the various fishing mortality targets.

Ultimately the Council selected a scenario that did *not* include a new closure in the Channel and an overall fishing mortality target of 0.20, the “NCLF20” scenario. This scenario includes 4 access area trips and 29 open area DAS for full-time limited access vessels. The Council ultimately selected this scenario for several primary reasons: 1) to reduce the risk of overfishing; 2) the short term economic impacts in 2010 are outweighed by long term benefits; and 3) the proposed action has fewer impacts on finfish bycatch and sea turtles compared to higher F scenarios. Below is a summary of the Council discussion and rationale related to this decision.

1. **Reduce the risk of overfishing**

All four scenarios were developed by the PDT to meet the goals of the FMP to prevent overfishing. The FMP requires that the stock-wide fishery mortality target be set at 80% of overfishing threshold (F=0.29). However, the PDT is authorized to recommend precautionary measures to prevent overfishing and ensure that optimum yield is achieved on a continuing basis. For example, in Framework 19 (specifications for 2008 and 2009) the PDT and Council also recommended a lower fishing mortality target of 0.20 to prevent localized overfishing in open areas and to account for other constraining issues on the fishery that lower optimum yield such as concerns about finfish bycatch. Setting the target fishing mortality rate at 0.20 also recognized that fishing mortality is not uniformly distributed in the scallop fishery (i.e. not all exploitable scallop biomass is accessible to the fishery) and, as such, is prone to localized overfishing.

As part of the framework analysis, the PDT prepared a SAFE Report to assess the current condition of the scallop resource. This evaluation included updated estimates of actual fishing mortality for 2008 and 2009. The results indicate that these actual fishing fishing mortality rates are at or just above the overfishing threshold of F=0.29, despite the fact Ftarget was set at 0.20 for those years. Based on the SAFE Report results in this action, the Council expressed concern that even with a target of 0.20 it appears overall fishing mortality was closer to 0.28 for 2008 and 0.30 for 2009. If F is higher than the threshold, overfishing is occurring. Thus, the Council determined that an overall reduction in fishing mortality is necessary in 2010 to ensure that overfishing ends, if in fact it is currently occurring. The status of the scallop resource is not officially changed until it is updated by a stock assessment or update report from the Science Center. The next scallop assessment is scheduled for Spring 2010.

Since FW19 the PDT has improved the assumptions and models used to set Ftargets primarily based on adjustments made to how fishing mortality is estimated from open area DAS. Modifications have been made based on work the PDT did for developing alternatives in Amendment 15 to comply with new annual catch limit (ACL) requirements. To take this into account, the FW21 analysis included an adjustment to the model for calculating DAS to more accurately reflect the landings per-unit-effort (LPUE) value. Therefore, it is likely that projected targets used in FW21 will be closer to realized landings and fishing mortality compared to projections used in previous frameworks. However, the Council was not comfortable supporting a higher F rate until these revised methods could be fully vetted through the assessment process this summer and other changes approved through the full amendment process within Amendment 15.

In addition to the new analyses done by the PDT in Amendment 15 to better quantify scientific and management uncertainty, Amendment 15 is also considering an alternative to revise the overfishing definition. The current overfishing threshold of 0.29 is based on an assumption that fishing mortality is spatially uniform. However, this does not fully reflect the the scallop fishery due to unfished biomass in closed areas and variable fishing mortality rates in access and open areas. The FMP has compensated for this by setting Ftarget much lower than Fthreshold. The new definition under consideration in Amendment 15 is more spatially-explicit, and allows different target Fs for the open areas and access areas that vary by area and time. The revised overfishing definition under consideration would address the need to use a low overall Ftarget to compensate for the fact that fishing effort is highly non-uniform and to help mitigate localized depletion of the scallop resource in the open areas. Because these modifications are still under consideration and may not be selected or approved in Amendment 15 until 2011, the Council must adhere to the current Fthreshold of 0.29 adopted by the Council in FW19 and based on the results of the most recent stock assessment (SAW45).

2. **Short term economic impacts in 2010 are significantly outweighed by long term benefits**

Once the Council decided not to close a new area in the Great South Channel, the status quo Ftarget alternative (F=0.20) performed the best in terms of longer term biological and economic impacts. From 2010-2016 the no closure and F=0.24 scenario (NCLF24) has the lowest projected biomass, landings, and economic revenues. The Council discussed that while the economic impacts of the proposed action (NCLF20) are substantial for 2010, these impacts are outweighed in 2011 and beyond.

The proposed action estimates a short-term loss of revenue of about $40 million in 2010 compared to the higher F alternative; total revenue for proposed action is estimated to be $304 million compared to $344 under higher F option for 2010. However, over the next several years the proposed action projects about 5 million more pounds landed with associated economic benefits. Specifically, the proposed action would result in higher revenues in the longer term (an average just under $12 million more each year from 2011 -2016 compared to the higher F option). Several Council members expressed that they were more comfortable with an additional cushion below Fthreshold in 2010 since long-term impacts on the fishery and society as a whole were highest for the proposed action.

The reason for higher revenues after 2010 is that a considerable portion of the current biomass is small scallops (less than 40 count). Some of these scallops will reach 30-count size during the 2010 fishing year, thus will be susceptible to 4-inch rings. Fishing on smaller scallops in 2010 will reduce the growth potential of recent year classes with above average recruitment, and reduce long term yield because these scallops have more yield potential left. In order to optimize yield per animal effort levels should be lower now until these scallops have time to grow; hence lower F in 2010 gives better long-term results.

In the short-term (i.e. fishing year 2010), landings, revenues and economic benefits for the proposed action could fall short of landings and economic benefits for the ‘No Action” alternative. As a result, revenues, producer and consumer surpluses, and total economic benefits for the proposed action will be lower than the levels for other alternatives in the short-term (2010), but will exceed the levels for other alternatives in the long-term with the exception of the new closure alternative with low *F* (CLF18). The proposed action will have positive long-term economic impacts and will increase the present value of total economic benefits to the nation by $86 million (at 7% discount rate) to $125 million (at 3% discount rate) compared to No Action.

Comparing impacts of the proposed action to FY2009 is useful to get an idea of immediate impacts, but in terms of comparing the options before the Council it is not realistic. Allocations and conditions in 2009 were not an option before the Council when setting 2010 specifications. None of the alternatives include five access area trips and revenue generated by the fishery in 2009 includes roughly 10 million pounds of additional catch above the estimates of projected catch for 2009. FW19 estimated total catch to be 46 million pounds in 2009. The fishing year is not over yet, but the SAFE report estimates that the total catch is expected to be closer to 56 million pounds.

The Council discussed that it would be desirable for the industry to maintain consistent landings from year to year, but this is difficult due to the high variability in scallop recruitment. Specifically, in 2000-2004 there was very high recruitment observed during 1998-2001 on Georges Bank and during 1998-2004 in the Mid-Atlantic, and that has provided increased catch and revenue for the fishery in recent years. However, in the middle of this decade recruitment has been average in the Mid-Atlantic and low on Georges Bank. As the large year classes have been fished down, they have not been fully replaced by the more limited mid-decadal year classes. Recruitment on Georges Bank has increased recently, but these scallops will still be small in 2010, so that yield per recruit would be optimized if harvesting would be delayed to 2011 and beyond, rather than in 2010.

Lastly, it was emphasized at the Council meeting that the reduced yield in 2010 will be a single year event. By 2011, the PDT expects that Hudson Canyon will be ready for reopening, Delmarva may support 1-2 trips, Elephant Trunk may have a trip left, and at least one trip in Georges Bank is expected. So higher catch levels are expected again in 2011 and beyond. Under area rotation it should be expected that modest variations in catch will occur, especially with highly variable recruitment events. In addition, maintaining conservative F levels should prevent the boom and bust pattern that used to exist in this fishery prior to limited entry, limits on effort and area rotation.

3. **Reduced impacts on finfish bycatch, sea turtles and EFH**

Finally, the proposed action also has lower area swept projections, which has implications for expected impacts on bycatch, sea turtles and EFH. Several Council members cited this as another reason they supported F=0.20 compared to F=0.24. The higher F option results in more YT bycatch in the scallop fishery - about 5% more of SNE YT in 2010, and that is more than some members could support at this time. In general less effort means less time gear is in the water, which translates into fewer impacts on bycatch, sea turtles, and EFH from less fishing time and reduced bottom contact time.

In summary, reducing effort in 2010 gives better long-term landings, and reduces bycatch of yellowtail flounder, reduces potential interactions with sea turtles, and reduces habitat impacts compared to higher F scenarios. Therefore, the Council's rationale for selecting this allocation scenario for 2010 is expected to optimize yield and reduce the risk of overfishing on a continuing basis, as required by MSA.

Measures for General Category vessels (Section 2.6)

This action includes specific allocations for the general category fishery in terms of number of fleetwide access area trips. The hard-TAC for the NGOM management unit is 70,000 pounds for 2010, and the target TAC for incidental permits is 50,000 pounds. This action also considered an alternative to allow partial leasing of general category IFQ allocations during the fishing year. The Council adopted this alternative to increase flexibility for general category qualifiers and improve overall economic profits of the IFQ program.

Consideration of a new rotational area in the Great South Channel (Section 2.7)

This action considered a new rotational area closure in part of the Great South Channel to protect strong recruitment in that area. After several years when scallops have grown and increased yield potential the area would reopen as a rotational access area with controlled access. The Council decided not to close this area at this time. At first the Council was cautious not to close a portion of the Channel because area rotation is the cornerstone of this FMP and has been a very successful strategy. During the final Council meeting it was noted that one consequence of area rotation is short term impacts from closing an area and shifting effort, but the long term gains from optimizing yield per recruit is what has allowed this program to be so successful. Ultimately, however the Council decided not to close the area because the timing is not right and there are too many concerns in this action in terms of what impacts would be from expected shifts of effort from the Channel to other areas.

Specifically, 2010 is the first year the scallop fishery will be allocated a fixed amount of yellowtail flounder as bycatch, and the new closure is expected to shift effort to the Mid-Atlantic with greater impacts on SNE/MA yellowtail flounder. In addition, this action is the first time the Council has been requested to adopt measures to comply with a reasonable and prudent measure related to sea turtles which requires NMFS to limit scallop effort in the Mid-Atlantic when turtles are likely to be present. Because the closure in the Channel is expected to shift effort to the Mid-Atlantic this is also problematic when this action is supposed to limit scallop effort in the Mid-Atlantic. Lastly, closing the channel area could have beneficial impacts on the EFH in that area for several years when scallop fishing would be prohibited. But the analyses suggest that increases in area swept in other areas would likely offset any beneficial impacts on EFH from the closure. It was also noted that part of this access area is within the boundaries of the proposed cod HAPC area under consideration in Phase II of the EFH Omnibus Amendment. Identifying part of the area as a scallop access area now could constrain future decisions of the Council related to fishing effort in that area in the future.

Overall the Council argued this is not the right time to close the channel because there are several actions in development and soon to be initiated that may address some of the present constraints. Specifically, Amendment 15 may address EFH boundary issues within closed areas on Georges Bank that would provide additional access into areas with higher catch rates, Phase II of the EFH Omnibus Amendment may revise EFH management all together, and the Council voted to initiate an action in 2010 that would consider measures to address yellowtail bycatch by scallop vessels. Until these matters are considered in other actions, it seemed premature to adopt something that could exacerbate these issues further.

In summary, the biological projections show that 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, and vessels are concentrated in a smaller area. That is why catch rates are lower and area swept projections are higher at first for the two options that close the channel. After the channel rotational area opens in 2013 catch rates are higher and area swept is lower for the two scenarios that close the channel area. However, the differences are marginal and the Council felt that the cumulative increases (benefits) in yield as a result of the closure was small compared to the immediate increases in area swept (costs) in the Mid-Atlantic that could have finfish bycatch and sea turtle impacts.

Alternatives to comply with the reasonable and prudent measure (RPM) in turtle biological opinion (Section 2.8)

This action includes alternatives to comply with the reasonable and prudent measure included in the recent biological opinion for the scallop fishery related to impacts on sea turtles. In summary, NMFS must limit the amount of allocated limited access scallop fishing effort that can be used in the Mid-Atlantic during the periods in which turtle takes have occurred, but the restrictions shall be limited to a level that will not result in more than a minor impact on the fishery. The Council considered a handful of measures to limit effort in this area from mid-June through the end of October. The measures ranged from limits on DAS or access area trips that could be used in that area and time period, seasonal closures of access areas in the Mid-Atlantic, and reduced possession limits in Mid-Atlantic access areas. After the Scallop Committee reviewed the preliminary analyses of the alternatives, some were considered more than minor due to high distributional impacts on vessels from the south compared to vessels from the north. One measure that was considered not more than minor was the seasonal closure in the Delmarva access area. Because this measure alone seemed to have neutral impacts on the fishery and possibly positive impacts on fishing mortality by shifting effort from time periods with lower meat weights to potentially higher meat weights, the Council was not confident this measure alone would be sufficient to meet the requirement of the RPM.

Therefore, at the November Council meeting the Council considered several "combined measures" of the alternatives already under consideration to ensure this action is compliant with the requirement to limit effort up to the point where impacts are more than minor. All three combined measures considered included the seasonal closure in Delmarva and some combination of limited effort within access areas in the Mid-Atlantic and during the turtle season. Ultimately the proposed action includes a combination of measures considered including a two-month seasonal closure of the Delmarva access area from September 1-October 31 and a limit on the number of access area trips that can be taken in access areas within the Mid-Atlantic from June 15 through October 31. Each vessel is restricted to taking 2 of the 3 allocated access area trips in the Mid-Atlantic. Since both Mid-Atlantic access areas are now closed from September 1-October 31 to reduce impacts on sea turtles, the limit is applicable for June 15 through August 31.

Limiting the maximum number of trips to two per vessel will move 358 DAS from the turtle window to the rest of the year, which constitutes about a 4.0% effort shift. There would be no loss in scallop revenue because the vessels will be allowed to land the same amount of pounds. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore fleet fishing costs will increase by $15,584. In addition, this measure will involve closure of DMV (Alternative 3) from September 1 through October 31. It is estimated that 64 DMV trips (6.7%) would normally take place during the months of September to October. The DAS used for these trips is estimated to be 563, and this effort will be removed from turtle window. This constitutes a 6.3% effort shift and an increase in *F* of 0.002 for the entire turtle window from June 15 to August 31. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore the fleet fishing costs will increase by $24,530 because of the DMV closure.

The net change in *F* of closing DMV (increase in *F* of 0.002) and limiting the number of trips to two trips per vessel during the June 15 – August 31 window (increase in *F* of 0.001) will be a net increase in *F* of 0.003. The combined measure will also result in a 10.3% shift of effort from the turtle window (June 15 – October 31) into the rest of the year, which is just above the recommended threshold level for a minor change based on the analyses prepared by the PDT for the original RPMs in FW21. Adding the increase in fishing costs due to the DMV closure to the increase in costs due to effort shifts from ETA during the turtle window, the total trip costs with this combined measure will increase by $40,115 for the scallop fleet. In summary, this final combined measure would limit scallop effort and not have more than a minor impact on the fishery. The Council also selected this measure because it does not have some of the timing and implementation issues identified for other combined measures.

It was also noted during the Council deliberations that the overall allocation decision related to keeping fishing mortality at F=0.20 will also limit open area effort in the Mid-Atlantic compared to recent years and other allocation scenarios considered in this action that had higher open area DAS amounts. That decision will indirectly limit the number of allocated open area DAS that could potentially be used in the Mid-Atlantic during the turtle season. The combination of these measures is expected to comply with the reasonable and prudent measure developed by NMFS in the recent biological opinion. Furthermore, these measures minimize impacts on sea turtles as required by MSA.

Improvements to the observer set-aside program (Section 2.9)
This action considered two measures to improve specific aspects of the observer set-aside program. The proposed action only includes one of these measures - to limit the amount of compensation a general category vessel can receive on observed access area trips. 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 is granted. Some vessels 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).

The proposed action will limit the compensation to the equivalent of one day of compensation, regardless of the length of the trip. The Council heard testimony that 400 pounds is presently more than enough to compensate for the costs of an observer on a general category access area trip and limiting the compensation per trip will help the total observer set-aside compensation pool last longer, reducing the chance of it running out before the end of the year. If the observer set-aside runs out before the end of the year vessels are required to pay for observers with no compensation awarded. Thus the Council supported inclusion of this alternative to eliminate potential abuse of the current program, limit compensation used per trip to help the set-aside last longer during the fishing year and to be more consistent with how compensation is presently used for limited access vessels.

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

Table 1 - Summary of all the alternatives in Framework 21; the proposed action is in bold face.

SECTION	ALTERNATIVES	DESCRIPTION
2.2	NO ACTION (page 17)	
2.2.1	No action	Trip allocations for access area would roll over from FY 2009. TACs would remain as estimated in A11 and FW19.
2.2.2	No action if IFQ program is not fully implemented by March 1, 2010	Allocation to the LAGC fishery is set at 10% instead of 5% under IFQs.
2.2.3	Measures in effect March 1, 2010 until FW21	ETA trips will be managed under the same regulations as 2009, OA days carry over until FW21 implemented.
2.3	**Acceptable Biological Catch**	**SSC recommends ABC = 29,578 mt (65.2 million lbs) in 2010.**
2.4	FW21 ALLOCATION SCENARIOS (page 21)	
	NCLF20	**Status Quo - No closure in Channel, overall F=0.20 DAS=29; 1 trip in NL, 1 trip in Delmarva, 2 trips in ETA**
	NCLF24	No closure in Channel, overall F=0.24 DAS=38; 1 trip in NL, 1 trip in Delmarva, 2 trips in ETA
	CLF20	New closure in Channel, overall F=0.20 DAS= 42; 1 trip in NL, 1 trip in Delmarva, 2 trips in ETA
	CLF18	New closure in Channel, overall F=0.18 DAS=51; 1 trip in NL, 1 trip in Delmarva, 2 trips in ETA
2.5	MEASURES FOR LIMITED ACCESS VESSELS (page 25)	
2.5.1.1	**Adjustments when YTF catch reaches 10% TAC Limit**	**The proposed action includes an allocation of a certain # of open area DAS for a full-time vessel if the Nantucket Lightship Area closes in 2010 due to the YT TAC being reached.**
2.5.1.2	**TAC set-asides for observers (1%) and research (2%)**	**The percent of TAC and total DAS set aside for observers (1%) and research (2%) would be removed before allocations are set for limited access and general category fisheries.**
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% so LA DAS have to be reduced - See Table 9 page 27.**
2.6	MEASURES FOR GENERAL CATEGORY VESSELS (page 28)	
2.6.1	Measures if IFQ program is delayed	
2.6.1.1	Quarterly hard-TAC for transition period to limited entry	
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**	**Yellowtail flounder bycatch TAC is shared between the two fisheries; therefore, once the TAC is reached the area closes for both fleets.**

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	**NGOM Hard-TAC**	**The PDT reviewed landings data from the VTR database and recommends that the hard-TAC for this area be 70,000 pounds for FY2010.**
2.6.5	**Estimate of catch from LA incidental permits**	**The PDT recommends this target TAC remain at 50,000 pounds. This catch is removed before allocations to LA and LAGC fisheries.**
2.6.6	**Allow leasing of partial general category IFQ allocations during the fishing year**	**IFQ would be lease-able in partial allocations (amounts greater than or equal to 100 lbs) during the fishing year.**
2.7	**CONSIDERATION OF NEW ROTATIONAL AREA IN THE GREAT SOUTH CHANNEL (page 30)**	
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 CAI	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 to protect seed scallops.
2.8	**ALTERNATIVES TO COMPLY WITH RPM (page 34)**	
2.8.1.1	Restrict number of OA DAS an individual can use in the Mid-Atlantic during a certain window of time	The restriction on DAS a vessel can use in the Mid-Atlantic
	Option A for Area	Would apply to all statistical areas south of the northern boundaries of statistical areas 612, 613, 533, 534, 541, 542, and 543 (see Figure 4).
	Option B for Area	Would apply to all statistical areas south of the northern boundaries of statistical areas 612, 613, 533, 534, 541, 542, and 543 July-October, and a subset of those areas for the month of June only.
	Option A for time window	June 16-October 14 - the full range of observed takes of turtles in scallop fishery.
	Option B for time window	June 15 - October 31 - slightly longer to recognize that turtle migration patterns change over time and one turtle was observed on a research trip near ETA in late October.
2.8.1.2	Restrict number of AA trips in the Mid-Atlantic that can be used during a certain window of time	The number of allocated access area trips that can be taken in the Mid-Atlantic during the two time periods under consideration would be restricted.
	Option A for time window	June 16-October 14 - full range of observed takes of turtles in scallop fishery.
	Option B for time window	June 15 - October 31 - slightly longer to recognize that turtle migration patterns change over time and one turtle was observed on a research trip near ETA in late October.
2.8.1.3	Consider a seasonal closure for Delmarva	The entire access area would close to both general category and limited access scallop vessels.
	Option A	September and October
	Option B	October only
2.8.1.4	Reduce possession limits in ETA and/or Delmarva	Possession limits would be reduced to cut back on effort, perhaps in the range of 10%.

2.8.1.5.1	Combined RPM 1: Reduced possession limit on any access area trip in ETA and/or Delmarva and seasonal closure of Delmarva		
2.8.1.5.2	Combined RPM 2: Limit number of ETA trips with a reduced possession limit and seasonal closure in Delmarva		
2.8.1.5.3	**Combined RPM 3: Limit the number of MA access area trips that can be taken during turtle window and seasonal closure in Delmarva.**	**Vessels would be limited to take** either 1 of 3 (Option A) or **2 of 3 (Option B) allocated access area trips allocated in Mid-Atlantic access areas. The Delmarva access area would also be closed from September 1 through October 31.**	
2.9	**IMPROVEMENTS TO THE OBSERVER SET-ASIDE PROGRAM (page 37)**		
2.9.1.1	No action	No changes would be made to the observer set-aside program.	
2.9.1.2	Provisions to discourage vessels owners from not paying deployed 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.	
2.9.2	**Limit the amount of observer compensation general category vessels can get per observed trip in access areas**	**This alternative would limit the amount of observer set-aside compensation for IFQ vessels fishing in an access area to the equivalent of one day of compensation, regardless of the length of the trip.**	

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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
ETA – Elephant Trunk Area
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 2.2.2). 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

The Atlantic Sea Scallop FMP management unit consists of the sea scallop *Placopecten magellanicus* (Gmelin) resource throughout its range in waters under the jurisdiction of the United States. This includes all populations of sea scallops from the shoreline to the outer boundary of the Exclusive Economic Zone (EEZ). While fishing for sea scallops within state waters is not subject to regulation under the FMP except for vessels that hold a federal permit when fishing in state waters, the scallops in state waters are included in the overall management unit. The principal resource areas are the Northeast Peak of Georges Bank, westward to the Great South Channel, and southward along the continental shelf of the Mid-Atlantic.

The Council established the Scallop FMP in 1982. A number of Amendments and Framework Adjustments have been implemented since that time to adjust the original plan. Amendment 4 was implemented in 1994 and introduced major changes in scallop management, including a limited access program to stop the influx of new vessels, a day-at-sea (DAS) reduction plan to reduce mortality and prevent recruitment overfishing, new gear regulations to improve size selection and reduce bycatch, a vessel monitoring system to track a vessel's fishing effort, and an annual framework adjustment process to allow certain measures to be modified in response to changes in the fishery including scallop abundance. Limited access vessels were assigned different DAS limits according to which permit category they qualified for: full-time, part-time or occasional. Amendment 4 established a planned reduction in the annual day-at-sea allocations for vessels with limited access scallop permits. Amendment 4 also created the general category scallop permit for vessels that did not qualify for a limited access permit. Although originally created for an incidental catch of scallops in other fisheries, and for small-scale directed fisheries, the general category fishery and fleet has evolved since its creation in 1994. The changes in the general category fishery are demonstrated in Section 4.4.

Also in 1994, Amendment 5 to the Northeast Multispecies FMP closed Closed Area I, Closed Area II, and the Nantucket Lightship Area to scallop fishing, because of concerns over finfish bycatch and disruption of spawning aggregations (See Figure 1).

In 1998, the Council developed Amendment 7 to the Scallop FMP, which was needed to change the overfishing definition, the day-at-sea schedule, and measures to meet new lower mortality targets to comply with new requirement under the Magnuson-Stevens Act. In addition, Amendment 7 established two new scallop closed areas (Hudson Canyon and VA/NC Areas) in the Mid-Atlantic to protect concentrations of small scallops until they reached a larger size. Amendment 7 further reduced the DAS allocations under a 10-year 'rebuilding' period. Framework Adjustments 12, 14 and 15 to the Scallop FMP later adjusted the DAS allocations upward to meet the Amendment 7 fishing mortality targets.

In 1999, Framework Adjustment 11 to the Scallop FMP allowed the first scallop fishing within portions of the Georges Bank groundfish closed areas since 1994. Scallop resource surveys and experimental fishing activities had identified areas where scallop biomass was very high due to no fishing in the intervening years. These surveys and experimental fisheries provided more precise estimates of total biomass as well as the distribution and amount of finfish bycatch and allowed the Council to open the southern part of Closed Area II.

In 2000, Framework Adjustment 13 to the Scallop FMP authorized full-time and part-time limited access vessels to take three trips in the southern part of Closed Area II during June 15 to August 14, 2000; one trip in the northeast corner of the Nantucket Lightship Area during August 15 to September 30, 2000; and two trips in the central part of Closed Area I from October 1, 2000 to January 31, 2001.

In 2001, Framework Adjustment 14 to the Scallop FMP implemented a new area access program to the Hudson Canyon and VA/NC Areas since scallop biomass had rapidly increased due to the enhanced survival of the strong 1997 and 1998 year classes, especially in the Hudson Canyon Area. Following the structure of the highly successful area access program for the Georges Bank closed areas in 2000; the framework adjustment allocated trips to limited access vessels and applied a scallop possession limit and a day-at-sea tradeoff. Unlike the Georges Bank closed area access program, however, Framework Adjustment 14 allowed vessels with general category scallop permits to land 100 pounds of scallop meats from the Hudson Canyon and VA/NC Areas.

Framework Adjustment 15 (2003) to the Scallop FMP continued the measures implemented in Framework Adjustment 14, but increased the Hudson Canyon and VA/NC Area scallop possession limit from 18,000 to 21,000 pounds per trip. This action was needed to achieve the objectives and fishing mortality target specified in Amendment 7, while the Council developed Amendment 10.

In 2004, Amendment 10 to the Scallop FMP introduced rotation area management and changed the way that the FMP allocates fishing effort for limited access scallop vessels. Instead of allocating an annual pool of DAS for limited vessels to fish in any area, vessels had to use a portion of their total DAS allocation in the controlled access areas defined by the plan, or exchange them with another vessel to fish in a different controlled access area. Vessels could fish their open area DAS in any area that was not designated a controlled access area. The amendment also adopted several alternatives to minimize impacts on EFH, including designating EFH closed areas, which included portions of the groundfish mortality closed areas. See Section

1.4 for a more detailed description of the rotational area management program implemented by Amendment 10.

Framework 16 to the Scallop FMP, implemented in November 2004, adjusted DAS allocations and defined the area rotation schedule for part of the 2004 fishing year and the 2005 fishing year. It also included: a) an access program for vessels with general category scallop permits with enhanced reporting requirements and a 2% TAC set-aside; b) yellowtail flounder TACs and provisions to minimize bycatch; c) changes in finfish possession limits to minimize bycatch and bycatch mortality; d) seasons when scallop fishing would be allowed to minimize bycatch and bycatch mortality; e) enhanced sea sampling to improve precision of bycatch estimates; f) provisions to enhance enforcement monitoring and compliance; and g) a dredge-only restriction for fishing in the access areas to minimize bycatch and bycatch mortality.

Framework 16 also attempted to make the habitat closed area boundaries implemented under Amendment 10 consistent with the areas later implemented under Amendment 13 to the Northeast Multispecies FMP. However, in August 2005, the Court, in Oceana v. Evans, ruled that any revisions to the boundaries under the Scallop FMP must be implemented under a full rule making process via an FMP amendment rather than through the abbreviated rule-making process used in a framework adjustment, and reinstated the EFH closed areas implemented under Amendment 10 to the Scallop FMP. Thus, the habitat closed area boundaries implemented under Amendment 10 are currently in effect. As a result, the remaining areas accessible to scallop vessels under the rotational area management program are substantially smaller in Closed Area I and the Nantucket Lightship Closed Area than anticipated until the court ruling.

Framework 17 to the Scallop FMP was implemented in the fall of 2005. The purpose of the action was to provide more complete monitoring of the general category scallop fleet by requiring that vessels landing more than 40 pounds of scallop meats use monitoring systems (VMS). It revised the broken trip adjustment provision for limited access scallop vessels fishing in the Sea Scallop Area Access Program, by eliminating the broken trip "penalty," which may have had a negative influence on vessel operator decisions and safety at sea.

Framework 18 was implemented on June 15, 2006, which set management measures for fishing years 2006 and 2007. Limited access vessels were allocated a specific number of open area DAS for each fishing year, as well as a maximum number of trips for different access areas depending on their permit category. Specifically, Closed Area II and Nantucket Lightship were open in 2006 under restricted access, and Nantucket Lightship and Closed Area I are open in 2007. General category vessels are also permitted to fish in these access areas with a 400 pound possession limit up to a total number of trips for that component of the fleet. Both areas are subject to a bycatch TAC of yellowtail flounder; when that bycatch TAC is projected to be caught, the area closes to all scallop fishing. The Elephant Trunk area also opens as a result of this action with specific allocation of trips, opening dates, and seasonal closures to reduce potential interactions with sea turtles. An area called Delmarva was closed under this action to protect small scallops found in that area; the area is projected to open in 2010. Other measures were included in the action such as measures related to unused 2005 Hudson Canyon trips, transfer of access area trips to open areas if access areas close early if the YT bycatch TAC is attained, elimination of crew size restrictions in access areas, access area trips exchange program changes, broken trip program changes, and allocations for set-aside programs (1% for observer program and 2% for research).

In June 2007 the Council approved Amendment 11 to the Scallop FMP and it was effective on June 1, 2008. The main objective of the action was to control capacity and mortality in the general category scallop fishery. Since 1999, there has been considerable growth in fishing effort and landings by vessels with general category permits, primarily as a result of resource recovery and higher scallop prices. This additional effort is likely a contributing factor to why the FMP has been exceeding the fishing mortality targets. Without additional controls on the general category fishery, there is a great deal of uncertainty with respect to potential fishing mortality from this component of the scallop fishery; thus, the potential for overfishing is increased.

Amendment 11 implemented a limited entry program for the general category fishery. Each qualifying vessel will receive an individual allocation in pounds of scallop meat with a possession limit of 400 pounds. Qualifying vessels will receive a total allocation of 5% of the total projected scallop catch. There is also a separate limited entry program for general category fishing in the Northern Gulf of Maine. In addition, Amendment 11 includes adjustments to the limited access scallop fleet fishing under general category rules. Another separate limited entry program for that fleet was adopted with the same qualification criteria as the limited entry general category permit. Qualifying vessels will also receive an individual allocation in pounds, and the entire category will receive 0.5% of the total projected scallop catch. In addition, a separate limited entry incidental catch permit was adopted that will permit vessels to land and sell up to 40 pounds of scallop meat per trip while fishing for other species. Other measures were included under Amendment 11 as well.

The Council approved Amendment 12 to the Scallop FMP in June 2007. This action is an omnibus amendment to all FMPs in the region and focuses on defining a standardized bycatch reporting methodology (SBRM). Section 303(a) (11) of the Magnuson-Stevens Fishery Conservation and Management Act requires that all FMPs include "a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery." The SBRM Omnibus Amendment will ensure that all FMPs fully comply with the act. Amendment 10 and Framework 16 to the Scallop FMP were submitted to NMFS several years ago, and in 2004 Oceana, an environmental organization, filed suit in the U.S. District Court challenging the SBRM elements of the FMP. The Court found the actions did not fully evaluate reporting methodologies, did not sufficiently address potentially important scientific evidence, and did not mandate a methodology for bycatch monitoring. Therefore, the Court remanded that the Secretary of Commerce take further action on the SBRM aspects of the Scallop FMP. SBRM is the combination of sampling design, data collection procedures, and analyses used to estimate bycatch and to determine the most appropriate allocation of observers across the relevant fishery modes. The Council worked with NMFS in development of the SBRM Omnibus Amendment since 2005 and final measures were selected in June 2007. Amendment 12 was implemented on February 27, 2008.

Scallop Amendment 13 was also approved by both the Council and NMFS in 2007, which re-activated the industry-funded observer program. Since 1999, vessels required to carry an observer are authorized to land more than the possession limit from trips in access areas, and in open areas, vessels are charged a reduced amount to help compensate for the cost of an observer. Observers were deployed through a contractual arrangement between National Marine Fisheries Service (NMFS) and an observer provider until June 2004. This arrangement was not renewed because of unresolved legal issues concerning the use of a contract to administer the industry-funded observer program. For some time, NMFS funded observers while a solution to this issue was investigated. As funding became insufficient, an interim rule went into effect that approved a new mechanism to use the observer set-aside funds through a non-contracted vendor. Amendment 13 was necessary to make this temporary mechanism part of the regulations. The Council selected final measures for that action at the February 2007 Council meeting and it was implemented on June 12, 2007. Amendment 13 also includes a provision to make changes to the observer set-aside program by framework action and the Council decided to address some issues raised with the current program in this framework action.

The Council initiated Phase 1 of the Essential Fish Habitat Omnibus Amendment in 2004. The primary purpose of Phase 1 is to review EFH designations, consider HAPC alternatives, describe prey species, and evaluate non-fishing impacts. This action is an amendment to all FMPs in this region, and is Amendment 14 to the Scallop FMP. The Council approved the DSEIS for Phase 1 at the February 2007 Council meeting, which then was submitted to NMFS in March 2007. The Council made final decisions on Phase 1 topics at their June 2007 meeting. Phase 2 of the EFH Amendment will begin in September 2007 and will consider the effects of fishing gear on EFH and move to minimize, mitigate or avoid those impacts that are more than minimal and temporary in nature. Phase 2 will also reconsider measures in place to protect EFH in the Northeast region. The entire Amendment (Phase 1 and Phase 2) is expected to be completed and implemented in 2010.

The Council also approved Framework 20 to the Scallop FMP at the June 2007 Council meeting and NMFS implemented that action in December 2007. Framework 20 considered measures to reduce overfishing for FY2007 through measures that were implemented by interim action earlier that year. At the November 2006 Council meeting, the Scallop PDT informed the Council that overfishing was likely to occur in 2007 under status quo measures implemented under Framework 18. The PDT presented several alternatives to reduce fishing mortality. The Council ultimately recommended that NMFS reduce the allocated number of trips for all scallop permit categories in the Elephant Trunk Access Area (ETA), delay the opening of the ETA, and prohibit vessels from possessing more than 50 bushels of in-shell scallops when leaving any controlled access area. NMFS agreed with the Council that the ETA has an unprecedented high abundance of scallops, which needs to be husbanded with precaution to effectively preserve the long term health of the scallop resource and fishery, and so implemented these measures by interim action.[1] This interim action became effective on December 22, 2006, and remained in effect until June 20, 2007 (180 days). This interim action was extended for an additional 180 days, but expired on December 26, 2007. Therefore, for the last two months of the 2007 fishing year (January-February 2008), management would revert back to status quo measures under FW18. Specifically, higher trip allocations would be granted in the Elephant Trunk Area for

[1] The interim rule published by NMFS on December 22, 2006 (**71 FR 76945**), included all measures recommended by the Council, except the prohibition on a vessel leaving an access area with more than 50 bu. of in-shell scallop was limited to the ETA only and not all access areas as recommended by the Council.

both limited access and general category fisheries. Therefore, the Council approved Framework 20 to extend the reduced fishing effort measures implemented by interim action through the end of the 2007 fishing year.

Measures for fishing year 2008 and 2009 were approved in Framework 19. Framework 19 included the fishery specifications for these two fishing years including the access area schedule, DAS allocations and general category measures. The general category fishery is still under transition to an IFQ program, so is allocated 10% of the total projected catch, until the IFQ program is fully implemented. Until that time the fishery is managed under quarterly hard TACs. The limited access fishery was allocated a series of access area trips and DAS allocations to achieve an overall F of 0.20. A new rotational area was closed to all scallop fishing (Hudson Canyon area) to protect small scallops. Other measures related to access area fishing were adopted including the continuation of eliminating the crew size restriction on access area trips and prohibiting all scallop vessels from "deckloading", and prohibition from leaving an access area with more than 50 bushels of in-shell scallop onboard.

The Council is currently working on Amendment 15. There are three goals of A15: 1) bring the Scallop FMP in compliance with new requirements of the re-authorized MSA; 2) address excess capacity in the limited access (LA) scallop fishery through potential permit stacking and leasing alternatives; and 3) consider measures to adjust several aspects of the overall program to make the scallop management plan more effective. The Council approved the range of alternatives and analyses in the DEIS at the September 2009 Council meeting. Public hearings are expected in the Spring on 2010, final action in June 2010, and implementation around March 1, 2011.

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 2. 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 2- 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	• Any vessel may fish with gear other than a scallop dredge or scallop trawl

Area type	Criteria for rotation area management consideration	General management rules	Who may fish
		is properly stowed. • Scallop bycatch must be returned intact to the water in the general location of capture.	• 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 target, i.e. as defined by the Council by setting the annual mortality targets for a re-opened area.	• 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, and TACs associated with the time-average annual fishing mortality target. • Transfers of scallops at sea would be prohibited	• Limited access vessels may fish for scallops only on authorized trips. • Vessels with general category permits will be allowed to target scallops or retain 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

The Council recommends the measures described in this section for Framework 21; these measures were approved at the November 2009 Council meeting. This action includes measures that set specifications for FY2010 as well as setting of acceptable biological catch as required by the reauthorized MSA, compliance with the first reasonable and prudent measure and term and condition required in the recent turtle biological opinion, area rotation adjustments, and other measures including allowance of partial leasing of general category IFQ and limiting observer compensation amounts for general category vessels in access areas. Table 7 describes the final measures included in the proposed action.

This action considered a potential new access area closure in the Great South Channel, but it was not selected as part of the proposed action. The overall allocation scenario selected by the Council to prevent overfishing in this action is “NCLF20”, or the scenario without the new closed area in the Channel and overall F set at 0.20. This scenario includes allocating one trip in Nantucket Lightship (NL), 2 trips in Elephant Trunk (ET), and one trip in Delmarva in 2010 (Table 3). The Hudson Canyon access area would remain closed (closed in 2008), and access would not be granted into either Closed Area I of II in 2010. The possession limits for each of the access area trips would be similar to the values presented in Table 4. Full-time vessels are only permitted to take the maximum number of allocated trips per area. However, for part-time permits, a vessel can decide if it wants to take both allocated trips in ET, one trip in ET and one in NL, or 1 in ETA and one in Delmarva. An occasional vessel can decide if it wants to take its one access area trip in ET, NL or Delmarva.

The proposed action would allocate 29 open area DAS in 2010 for full-time vessles, 12 for part-time and 3 for occasional vessels (Table 5) (Section 2.4). When all of these allocations are combined, as well as expected mortality from the general category fishery and other sources, the overall fishing mortality rate is expected to average F=0.20 for the entire resource (in closed, open and access areas).

Table 3 – Summary of scenarios considered in the biological projections for Framework 21

		CL1	CL2	NLS	ET	Dmv	HC	Open Area DAS*
NCLF20	2010	Closed	Closed	1 trip	2 trips	1 trip	Closed	29

** For full-time vessels*

Table 4 –Access area allocations and possession limits for proposed action

	2010		
	# of trips	Possession limit	Overall allocation in access areas for 2010
Full-time	4	18,000	72,000 (100%)
Part-time	2	14,400	28,800 (40%)
Occasional	1	6,000	6,000 (8.33%)

Note: Possession limits are based on a previous policy decision that a part-time permit receive an allocation equal to 40% of a full-time permit, and an occasional permit receive an allocation equal to 8.33% of a full-time permit.

Table 5 – Summary of open area DAS allocations under the proposed action

	Full-time	Part-time	Occasional
2010	**29**	**12**	**3**

Note: Open area allocations by permit type are based on a previous policy decision that a part-time permit receive an allocation equal to 40% of a full-time permit, and an occasional permit receive an allocation equal to 8.33% of a full-time permit. DAS allocations are rounded up to the nearest DAS.

Similar to allocations selected in Framework 19 for FY2008 and FY2009 the Council has selected to set the overall fishing mortality target at 0.20. The Council may adjust the values of the biomass and fishing mortality targets and thresholds by framework or amendment, based on updated analysis or upon recommendation of the Stock Assessment Workshop. A fishing mortality target is not a scientifically driven estimate, it is a policy decision. National Standard 1 requires the target to be below the threshold for precautionary purposes, but it does not specify how much below.

The current overfishing threshold of 0.29 is based on an assumption that fishing mortality is spatially uniform. In the scallop fishery, this assumption is not even close to being met due to unfished biomass in closed areas and variable fishing mortality rates in scallop access areas. In the case of highly non-uniform fishing effort, the fishing mortality that maximizes yield per recruit will be less than the spatially uniform target (0.29). For this reason, the PDT recommended that FW21 consider a scenario with a lower F, below the definition in Amendment 10 that says the fishing target should be set at 80% of the fishing threshold (80% of 0.29 is equivalent to F=0.23). The proposed action has a target at 0.20, recognizing that fishing mortality is not uniformly distributed in the scallop fishery, but is prone to localized overfishing.

This target was also selected because the lower F option gives better long-term landings and revenues, reduces bycatch of yellowtail flounder, reduces potential interactions with sea turtles, and reduces habitat impacts compared to higher F scenarios. Therefore, setting F_{target} at 80 percent of $F_{threshold}$ is not a requirement of the overfishing definition. Maintaining the F_{target} at F=0.20 is necessary to establish appropriate management measures to achieve optimum yield on a continuing basis.

Limited access vessels would still be allocated an open area DAS compensation for Georges Bank access area trips that were not taken due to the YT bycatch TAC being reached (2.5.1.1). Also, observer and research set-asides would still be removed from access areas and open area DAS as they currently are in the regulations (Section 2.5.1.2). For access areas, the set-aside percentages are removed before allocations are made to the fisheries, and in open areas, the set-asides are in the form of open area DAS, thus only apply to the limited access portion of open area DAS.

In terms of the Elephant Trunk Access area program the area would still open on March 1 and the seasonal closure to reduce potential interactions with sea turtles from September 1-October 31 would remain in effect. The Delmarva area will also open on March 1 and will also have the same seasonal closure to reduce potential impacts on sea turtles.

In terms of the general category fishery, several alternatives that are part of the proposed action are related to recommendations related to Amendment 11. These measures apply to both general category qualifiers as well as limited access vessels that qualify for a general category permit under Amendment 11. The total projected catch for the general category fishery is about 2.1 million pounds, 5% of the projected annual catch (Table 6). Total access area allocations for the general category fishery in 2010 are 1,377 trips in ETA and 714 trips in NL, and 713 trips in Delmarva. The document also includes specific measure if the IFQ program is not implemented before March 1 (Section 2.5.1.4).

In addition, Amendment 11 approved a hard-TAC for a Northern Gulf of Maine (NGOM) limited entry program. This action includes a NGOM hard-TAC for 2010 equal to 70,000 pounds (Section 2.4.1.3). This action also specifies the target TAC for incidental permits equal to 50,000 pounds (Section 2.6.5). This action also allows partial leasing of IFQ (Section 2.6.6) and limits the amount of compensation a general category vessel can receive on observed access area trips (Section 2.9.2).

Table 6 – General category allocations under the proposed action

	2010
Total TAC (5%)	2,096,434
ETA - # trips	1,377
Delmarva - # trips	714
NL - # trips	713
NGOM hard TAC	70,000 pounds
Incidental target TAC	50,000 pounds

This action also includes specific measures to comply with reasonable and prudent measures developed by NMFS in a recent biological opinion of this fishery regarding impacts on sea turtles (Section 2.8). The Council considered a range of alternatives that would limit the amount of allocated limited access scallop effort in the Mid-Atlantic during the summer and fall when turtles are more likely to interact with scallop fishing gear. The proposed action includes a combination of measures considered including a two-month seasonal closure of the Delmarva access area from September 1-October 31 and a limit on the number of access area trips that can be taken in access areas within the Mid-Atlantic from June 15 through October 31. Each vessel is restricted to taking 2 of the 3 allocated access area trips in the Mid-Atlantic. Since both Mid-Atlantic access areas are now closed from September 1-October 31 to reduce impacts on sea turtles, the limit is applicable for June 15 through August 31. It was also noted during the Council deliberations that the overall allocation decision related to keeping fishing mortality at F=0.20 will also limit open area effort in the Mid-Atlantic compared to recent years and other allocation scenarios considered in this action that have higher open area DAS amounts.

Overall the fishery will be allocated in a more direct way similar to Framework 19. Specifically, a total catch will be removed for incidental catch and general category fishing as well as observer and research set-aside programs. Figure 1 summarizes how catch will theoretically be allocated in 2010 under the proposed action. For example in 2010, the total projected catch is estimated at 41.5 million pounds. Fifty-thousand pounds will be removed from the top for incidental catch. Based on the projection model the TACs for access areas are: NL = 5.9 million pounds, ETA = 11.4 million pounds, and Delmarva = 5.9 million pounds.

The actual catch may vary from this TAC because vessels are allocated a specific number of trips (in round integers for the limited access fishery). Therefore, the projected TAC may be over or under harvested since trips are rounded up or down depending on projection results. In addition, some limited access vessels for example have the ability to take their allocated trips in any area that is open (part-time and occasional), so total catch per area will vary. Additionally, some vessels will not land their full allocation on every trip, and some set-aside for research and observers may not be used. Likewise all general category access area trips may not harvest 400 pounds per trip, and all trips may not be taken. Since the general category fishery is going to be allocated 10% of the total catch under the transition period, and 5% will be allocated from access areas, the remaining amount for the general category fishery will come from open areas. Again, these numbers are just estimates because the actual LPUE per open area DAS is uncertain and vary between vessels and areas; thus the open area catch may also be over or under compared to the projected TAC of 16.75 million lbs. for LA open area catch in 2010.

Figure 1 is illustrative in terms of how catch is expected to be allocated between the two fleets. This figure includes the TACs and trip allocations that are included in this proposed action. While these figures have been generated using total TACs estimated by area, they are not completely reflective of what the fishery will harvest because all access areas trips may not be taken and some may not reach the possession limit. In addition, the catch estimated from open area DAS is based on average catch per unit of effort data and may not be reflective of future fishing effort. As this document explains due to the way the scallop fishery is allocated access to the resource, a TAC for an area may be under or over harvested. For example, the model projects a 5.9 million TAC in 2010 in NL, but if all limited access vessels landed their full possession limit, all general category trips are taken and all observer and research set-aside is used the potential removal from that area will be closer to 6.6 million pounds. For allocation and implementation purposes, the TACs and allocations in these figures reflect the proposed action even if they are slightly different in some subsequent tables in this document.

Figure 1 – Summary of allocations for the scallop fishery under Framework 21 (2010)

ABC with discards 70,000 NGOM
65,200,000
7,414,146 (-minus discards)
ABC for fishery
57,785,854 (all areas)

Ftarget=0.20
41,510,840 (landings+set-asides+incidental)

50,000 (minus incidental)
41,460,840 (landings+set-asides)

Open
17,722,000

LA	16,747,290
GC	974,710

<u>Open Area</u>

RSA	334,946
Obs	167,473
LA TAC	16,244,871

Access

NL	**ETA**	**Del**	
5,890,796	11,353,113	5,884,427	(total TAC - landings and set-asides)
117,816	227,062	117,689	RSA
58,908	113,531	58,844	OBS
5,714,072	11,012,520	5,707,894	total TAC (landings)
5,428,369	10,461,894	5,422,499	LA
285,704	550,626	285,395	GC
714	1,377	713	# trips

Table 7 – Summary of the Proposed Action

SECTION	ALTERNATIVES	DESCRIPTION
2.3	Acceptable Biological Catch	SSC recommends ABC = 29,578 mt (65.2 million lbs) in 2010.
2.4	**FW21 ALLOCATION SCENARIOS (page 21)**	
	NCLF20	Status Quo fishing mortality target - No closure in Channel, overall F=0.20 DAS=29; 1 trip in NL, 1 trip in Delmarva, 2 trips in ETA
2.5	**MEASURES FOR LIMITED ACCESS VESSELS (page 25)**	
2.5.1.1	Adjustments when YTF catch reaches 10% TAC Limit	The proposed action includes an allocation of a certain # of open area DAS for a full-time vessel if the Nantucket Lightship Area closes in 2010 due to the YT TAC being reached. For NCLF20 the DAS adjustment is 5.4 DAS.
2.5.1.2	TAC set-asides for observers (1%) and research (2%)	The percent of TAC and total DAS set aside for observers (1%) and research (2%) would be removed before allocations are set for limited access and general category fisheries. For NCLF20 the set asides are just under 800,000 pounds for research and 400,000 pounds for observer set-aside.
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% so LA DAS have to be reduced. For NCLF20 DAS would be reduced by 3.5 for full-time vessels.
2.6	**MEASURES FOR GENERAL CATEGORY VESSELS (page 28)**	
2.6.1	Measures if IFQ program is delayed	
2.6.1.1	Quarterly hard-TAC for transition period to limited entry	See Table 16 for specific allocations by quarter.
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. Total trip allocation for NL = 714
2.6.2.1	Yellowtail flounder bycatch TAC	Yellowtail flounder bycatch TAC is shared between the two fisheries; therefore, once the TAC is reached the area closes for both fleets.

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. Total allocations equal 1,377 trips for ETA and 713 trips for Delmarva.
2.6.4	NGOM Hard-TAC	The PDT reviewed landings data from the VTR database and recommends that the hard-TAC for this area be 70,000 pounds for FY2010.
2.6.5	Estimate of catch from LA incidental permits	The PDT recommends this target TAC remain at 50,000 pounds. This catch is removed before allocations to LA and LAGC fisheries.
2.6.6	Allow leasing of partial general category IFQ allocations during the fishing year	IFQ would be lease-able in partial allocations (amounts greater than or equal to 100 lbs) during the fishing year.
2.7	**CONSIDERATION OF NEW ROTATIONAL AREA IN THE GREAT SOUTH CHANNEL (page 30)**	
2.7.1.1	No action	No new rotational area would close in this action in the Great South Channel vicinity.
2.8	**ALTERNATIVES TO COMPLY WITH RPM (page 34)**	
	Combined Alternative that would limit the number of MA access area trips that can be taken during turtle window and seasonal closure in Delmarva.	Vessels would be limited to take 2 of 3 allocated access area trips allocated in Mid-Atlantic access areas. The Delmarva access area would also be closed from September 1 through October 31.
2.9	**IMPROVEMENTS TO THE OBSERVER SET-ASIDE PROGRAM (page 37)**	
2.9.2	Limit the amount of observer compensation general category vessels can get per observed trip in access areas	This alternative would limit the amount of observer set-aside compensation for IFQ vessels fishing in an access area to the equivalent of one day of compensation, regardless of the length of the trip.

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 8 – 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 9 -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 10 – 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 the Council may not exceed the fishing level recommendations of its Science and Statistical Committee (SSC) in setting 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, including an estimated 3363 mt – 7.4 million pounds - for non-yield fishing mortality (discards and incidental mortality). Therefore, the overall ABC for the fishery, excluding discards and incidental mortality is 26,219 mt (57.8 million pounds).**

This level was recommended by the Science and Statistical Committee (SSC) and various sources of scientific uncertainty were considered when setting this value. The Council did not consider any alternative ABCs in this action. The SSC presented their report to the Council regarding ABC for 2010 at the September 2009 Council meeting and the Council agreed with their findings based on analyses prepared by the Scallop PDT. ABC calculations were based on the assumption of uniform fishing, and in particular, that there were no EFH or rotational closures. This is consistent with the current FMP overfishing definition, which defines overfishing relative to a "whole stock" fishing mortality. Therefore, the ABC calculation gives what would be an appropriate catch if all areas were open. That is not the case in the plan since there are Groundfish mortality closed areas and EFH closed areas that are not accessible to the fishery, as well as scallop rotational areas that are only available to the fishery at certain times and effort is limited. Therefore, a lower fishing mortality target should be set to prevent overfishing in areas that are accessible, since all exploitable scallop biomass is not accessible to the fishery.

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 were combined into a number of scenarios. The access area boundaries are depicted in Figure 2and Figure 3.

Overall four main scenarios are under consideration:

- No closure in Channel, Overall F = 0.20 (status quo Ftarget)
- No, closure in Channel, Overall F = 0.24
- S. Channel closure, Overall F = 0.20
- 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.

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 recommended 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.

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 based on results in this SAFE Report that fishing mortality for 2009 is estimated to be F=0.30, which is above the overfishing threshold of 0.29, and well above the target F of 0.20.

Figure 2 - Boundaries of scallop access areas within Multispecies closed areas on Georges Bank

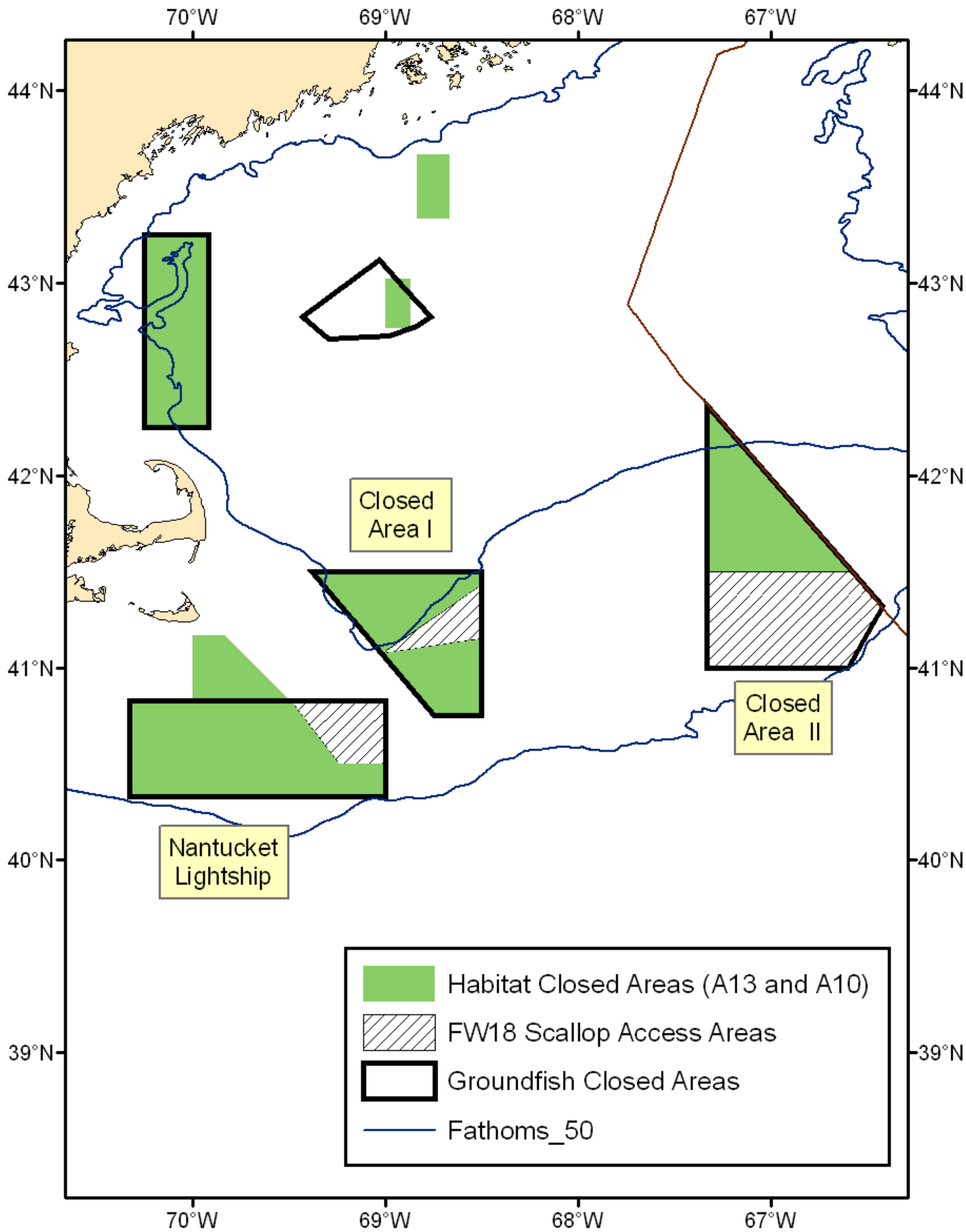
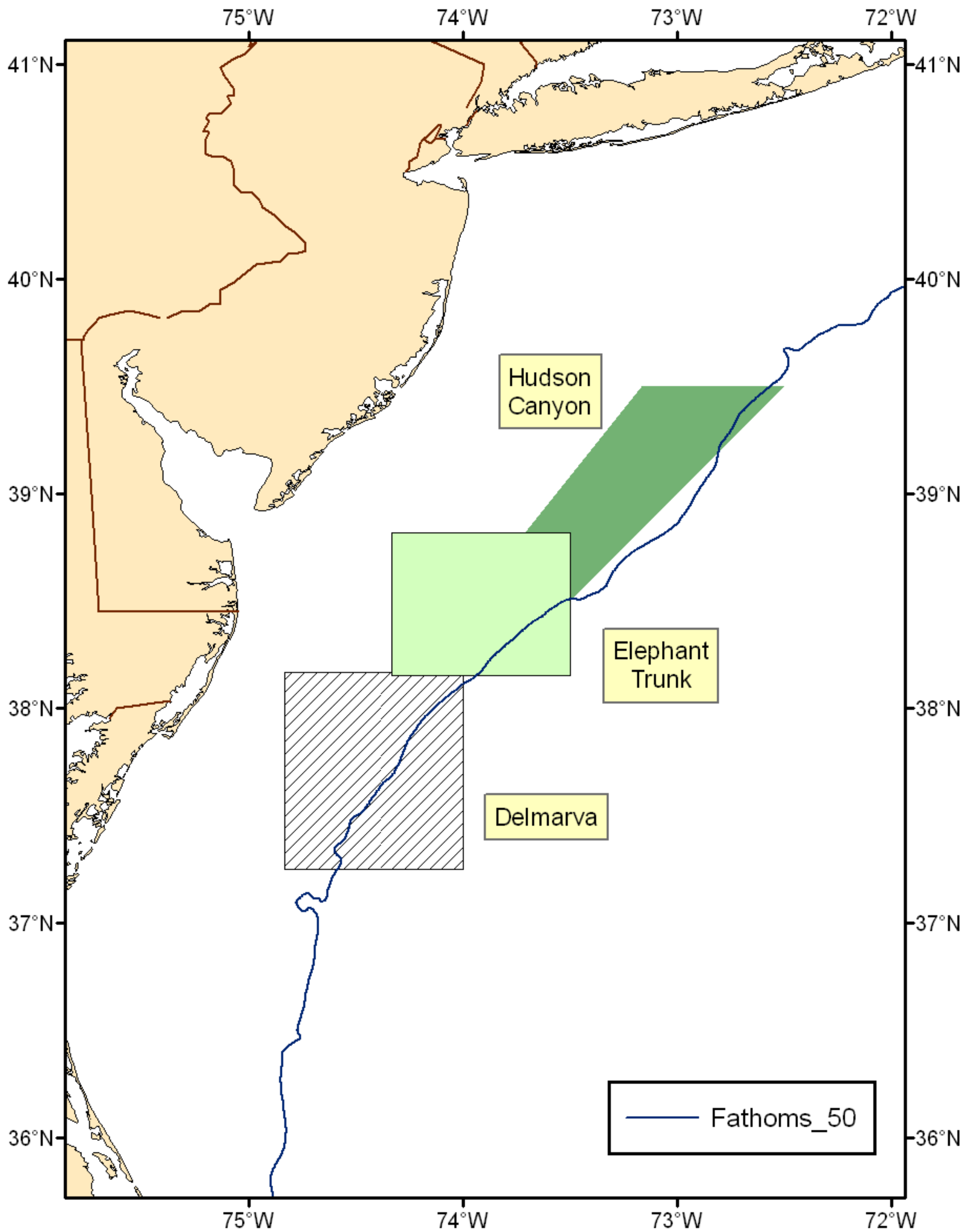


Figure 3 – Boundaries of scallop access areas in the Mid-Atlantic



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 2 and Figure 3).

Limited access vessels are also allocated a specific number of open area DAS in biennial frameworks to achieve optimum yield at the current 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/MA YT flounder is 468mt. Framework 44 to the Multispecies FMP is considering a range of YT allocations for the scallop fishery for 2010 – 2012. At the November 2009 Council meeting, the Council recommended to allocate 100% of the projected GB and SNE/MA YT ACL needed for the scallop fishery for FY2010 and 90% for 2011 and 2012. The YT ABC for 2010 is 493mt, and the ACL is 468mt.

Currently there is a YT TAC cap of 10% that can be used in access areas. In addition, Amendment 16 to the Multispecies FMP and A15 to the Scallop FMP imply that this 10% cap will come from the allocated SNE YT ACL (468 mt.). As a result, the limit of YT bycatch that can be used in the access area program in NL for FY2010 is 10% of 468mt, or 46.8 mt. No buffer for management uncertainty is applied to the scallop allocation of YT flounder in 2010, because it is not an ACL yet and no AMs are in place for 2010. In 2011 and beyond the Council decided to apply a buffer for management uncertainty to the sub-ACL allocated to the scallop fishery, so the sub-ACL will be reduced by 7%, the final allocation will be equivalent to 93%.

It should be noted that this allocation of yellowtail is not the full SNE YT allocation for 2010. The total SNE YT allocation proposed in FW44 for the scallop fishery in 2010 is 111mt of YT or 22.5% of the SNE YT ABC or 23.7% of the SNE YT ACL. Ten percent of the total YT ABC remains available to the scallop fleet in access area fishing, and the remainder is intended to cover YT bycatch from open area fishing within the SNE YT stock area from DAS and general category fishing. In addition, Framework 44 includes a buffer for management uncertainty, so it is likely that the scallop fishery will ultimately receive closer to 95% of 111mt in 2010 if that is approved in FW44.

Table 11 – Preliminary estimates of SNE YT TAC available for scallop access area program

	2008
SNE/MA YT ACL	468 mt
10% for scallop access program	46.8 mt (103,176 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 estimate of open area LPUE generated from the model for this scenario is 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. <u>The proposed action includes an allocation of 5.4 open area DAS for a full-time vessel if the Nantucket Lightship Area closes in 2010 due to the YT TAC being reached.</u>

Table 12 – 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 13 for a breakdown of the expected TAC that would be assigned for observers and research the proposed action for access areas.

Table 13 – Summary of research and observer set-asides in access areas for the proposed action (in million pounds)

	2010		
	NL	**ETA**	**Delmarva**
Total TAC	5,890,796	11,353,113	5,884,427
2% for research	117,816	227,062	117,689
1% for observers	58,908	113,531	58,844

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 9,860 DAS (29 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 10,152 DAS for 2010. Table 14 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 1,720 pounds per day from the biological model. If instead the total estimated catch by limited access vessels in open areas (16.7 million pounds)was divided by the total number of DAS allocated (9,860 DAS), the estimate of catch per DAS is about 1,700.

Table 14 – Summary of open area DAS set-asides for research and observers for the proposed action

	2010
"Total" DAS for open areas	10,152
Allocated DAS to the limited access fishery	9,860
DAS set-aside for research (2%)	203
DAS set-aside for observers (1%)	102

2.5.1.3 Research priorities for 2010 and recent RSA announcement

The RSA process was changed this year; the announcement for federal funding came out earlier than in previous years in an attempt to expedite the process. In the past the announcement came out after final decision on the Framework when final allocations were known. This resulted in delayed responses and made it very difficult for researchers to complete all compensation for research before the end of the fishing year. So instead, the announcement did not include the precise amounts of RSA available and did not require applicants to apply for a certain amount of RSA compensation in DAS and/or access area pounds. Instead, applicants included an estimate of what their research and compensation needs were in dollar values.

Applicants for 2010 RSA funds were due on August 31, 2009. The final selections have not been made yet but are expected before the start of the fishing year. The Council approved a list of priorities to be included in the federal funding notice for 2010 RSA proposals. This time the Council included several issues with higher priority. Proposals that focus on either assessing scallop abundance in access areas and methods to reduce bycatch were identified with highest priority. Proposals that focus on sea turtles and their interaction with the scallop fishery have been given medium priority, and all other items are listed as other with equal priority. The priorities are listed below.

HIGHEST PRIORITIES (not listed in order of importance):

- An intensive industry-based survey of each of the access areas (access areas in Georges Bank including Closed Area I, Closed Area II, and Nantucket Lightship, as well as Elephant Trunk, Delmarva, and Hudson Canyon). These surveys can then be used to estimate total allowable catches (TACs) under the rotational area management program if the data from these surveys are available by August 2010.
- Identification and evaluation of methods to reduce bycatch of all managed species (i.e., gear research).

MEDIUM PRIORITY:

- Identification of sources of sea turtle interactions and/or identification of ways to minimize interactions with sea turtles. Two priority topics identified include evaluation and analysis of factors affecting bycatch rates of sea turtles and development of scallop dredge and trawl operations that would reduce or eliminate the threat or harm of sea turtle interactions. Other issues related to sea turtle research include, but are not limited to: gear modifications or fishing techniques that may be used to reduce or eliminate the threat of sea turtle interactions without unacceptable reduction in scallop retention, using available and appropriate technology to quantify the extent that chain mats reduce turtle mortalities, comparison and analysis of turtle capture rates of similar gear in other fisheries, and turtle behavior.

OTHER PRIORITIES (not listed in order of importance):

- Other surveys, including areas not surveyed by the annual NMFS survey (i.e., federal waters in the Northern Gulf of Maine management area and Southern New England).
- Scallop biology, including studies aimed at understanding recruitment processes (reproduction, larval and early post-settlement stages), growth, natural mortality (including predation and disease), incidental gear mortality, and discard mortality.
- Identification and evaluation of methods to reduce habitat impacts, including, but not limited to: broader investigation of variability in dredging efficiency across habitats, times, areas, and gear designs; and research on habitat effects from scallop fishing and development of practicable methods to minimize or mitigate those impacts.
- Habitat characterization research including, but not limited to: video and/or photo transects of the bottom within scallop access areas and within closed scallop areas and in comparable fished areas that are both subject and not subject to scallop fishing before and after scallop fishing commences; development of high resolution sediment mapping of scallop fishing areas using Canadian sea scallop industry mapping efforts as an example process; identification of nursery and over-wintering habitats of species that are

vulnerable to habitat alteration by scallop fishing; and other research that relates to habitats affected by scallop fishing, including, but not limited to, long-term or chronic effects of scallop fishing on marine resource productivity, other ecosystem effects, habitat recovery potential, and fine scale fishing effort in relation to fine scale habitat distribution. In particular, projects that directly support evaluation of present and candidate EFH closures and HAPCs to assess whether these areas are accomplishing their stated purposes and to assist better definition of the complex ecosystem processes that occur in these areas.

- Improved information concerning scallop abundance and evaluation of the distribution, size composition, and density of scallops, including but not limited to: efforts to develop a cooperative industry-based resource survey, high resolution surveys that include distribution, biomass of exploitable size scallops, recruitment, mortality, and growth rate information, research that provides more detailed scallop life history information (especially on age and area specific natural mortality and growth) and to identify stock-recruitment relationships, intensive sampling on both sides of access boundaries for fishing year 2007 and in subsequent years to gauge the short-and long-terms effects of fishing on the resource.
- Scallop and area management research, including but not limited to: evaluation of ways to control predation on scallops; research to actively manage spat collection and seeding of sea scallops; social and economic impacts and consequences of closing areas to enhance productivity and improve yield of sea scallops and other species; and estimation of factors affecting fishing power for each limited access vessel.
- Research projects that would help calibrate the transition of the federal dredge survey, or projects that compare various survey techniques and methods that would assist with the current transition period of the federal scallop dredge survey.

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 15.

Table 15 – 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% converted to Total DAS	DAS Reduction
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)

The table below describes the quarterly hard TAC for the proposed action if the IFQ program is not in place before March 1, 2010. Note that Quarter 1 will likely close early before all access area trips are taken because the sum of all catch from access area trips is more than 35% of the annual catch.

Table 16 – Summary of general category catch and access area trips by quarter under the transition period to the IFQ program recommended under Amendment 11

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Option A*	**35%**	**40%**	**15%**	**10%**	**100%**
Estimated landings by area					
All areas (lb.)	733,752	838,574	314,465	209,643	2,096,434
Access area trips					
DMV	713				
ETA	1377				
NLS		714			

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 over 100 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 Framework 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.

Just under 300 vessels are expected to qualify for this permit in 2010.

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

2.6.6.1 No Action

Amendment 11 allowed for temporary and permanent IFQ transfers between permitted vessels but required that vessels transferring IFQ must transfer that allocation **in full prior to any fishing activity** (50 CFR 648.53(h)(5)) by the vessel transferring IFQ to another vessel. Under No Action, IFQ permitted vessels that do not have a limited access days-at-sea (DAS) permit will still be allowed to transfer only entire IFQ allocations.

2.6.6.2 Allowing for Partial IFQ Allocation Temporary Transfers

This alternative would allow for partial allocation transfers that would be leased from one vessel to another during a single fishing year and would not be carried over into a subsequent fishing year. A vessel could complete multiple leases of portions of its IFQ. This alternative would only apply to temporary transfers (leases) and not permanent transfers, which would still require the entire IFQ allocation to be transferred to a vessel permanently.

The Council clarified that the minimum for leasing should be the equivalent of 100 pounds. However, individuals that qualify for less than 100 pounds would still be permitted to lease that in full. Leasing does not have to be in increments of 100 pound blocks, that is only the minimum. For example, if a vessel qualifies for 1,250 pounds, it can lease 100 pounds or any amount greater than that up to 1,250 pounds. The current allowance of full transfers would still be allowed. Current IFQ allocations issued to vessels will be rounded up to 10 pounds.

The following provisions would not be changed by this alternative:

1) The lessor must not fish any of its IFQ allocation prior to transfer to another vessel. With the absence of true real-time monitoring of IFQ allocations, NMFS wants to take precaution with allowing for vessels to fish prior to leasing out IFQ allocation. In addition, this first year of IFQ implementation will be complicated by the delay in Framework 21 and will require NMFS to apply new IFQ allocations after the start of the fishing year. A vessel that has leased IFQ to another vessel may fish its remaining IFQ after the lease, but may not lease the remainder of its IFQ once it has began fishing under its IFQ.
2) This alternative will not change the end-of-year deadlines for when applications must be received. Completed transfer applications must be submitted to NERO at least 30 days before the date on which the applicants desire to have the IFQ effective on the receiving vessel. Applications for temporary transfers should be submitted at least 45 days prior to the end of the fishing year (i.e., mid-January) so that they will be processed in time for a vessel to use the transferred IFQ before the end of the fishing year in which the IFQ transfer was approved.
3) Partial IFQ leasing will still be subject to the 2 percent and 5 percent caps for total allowable catch and ownership, respectively.

4) Limited access days-at-sea vessels that also possess IFQ permits may not participate in temporary or permanent transfers.
5) Cost recovery for the transferred IFQ will be applied to the vessel that lands the transferred IFQ allocation.

If a vessel (lessor) leases its entire IFQ allocation to one or more vessels, any overages over the amount of the individual IFQ transfers would be the responsibility of the appropriate leasee. If a lessor transfers part of its IFQ allocation to either one or more vessels but retains some of its allocation, any overages of that vessel's remaining IFQ allocation would be the responsibility of the lessor.

Rationale: This alternative would allow for more flexibility to the IFQ program while also meeting the needs of the current monitoring system that will be used for the first time in the 2010 fishing year.

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 4). 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.

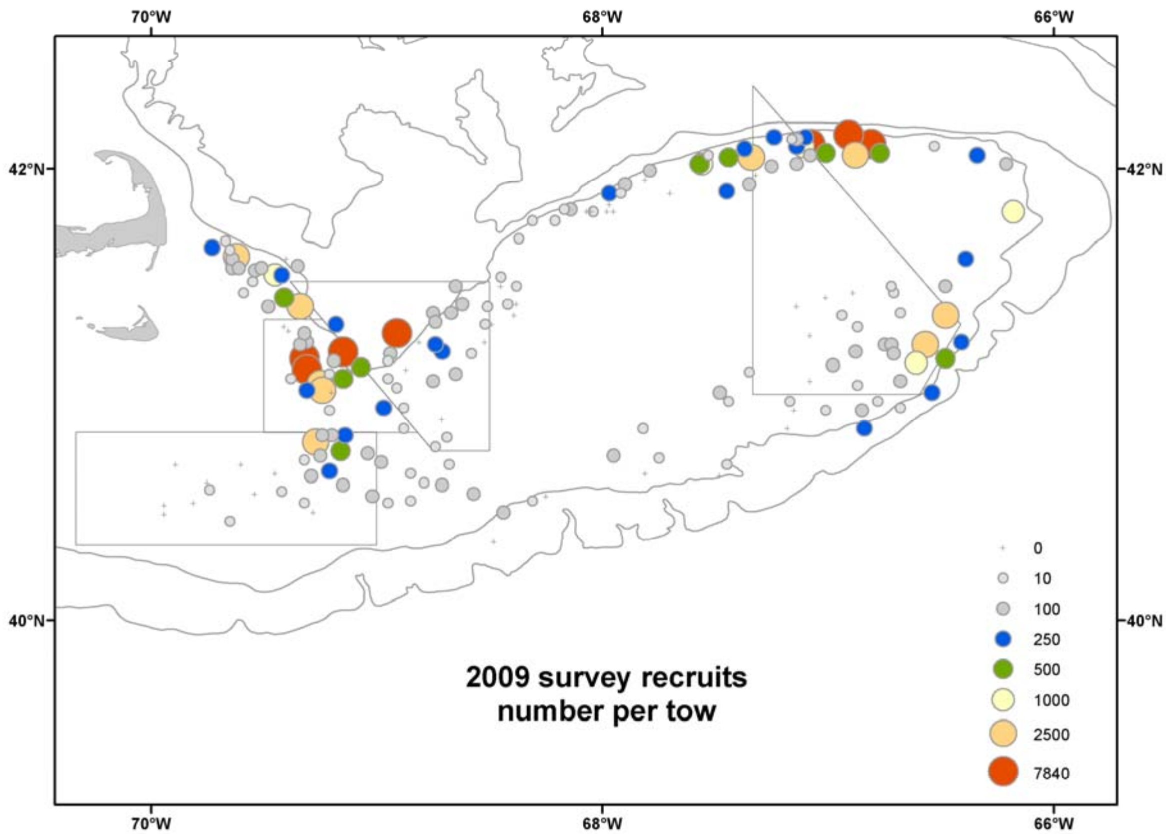
2.7.1.1 No Action

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 4).

Figure 4 – 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.[2] 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

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

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

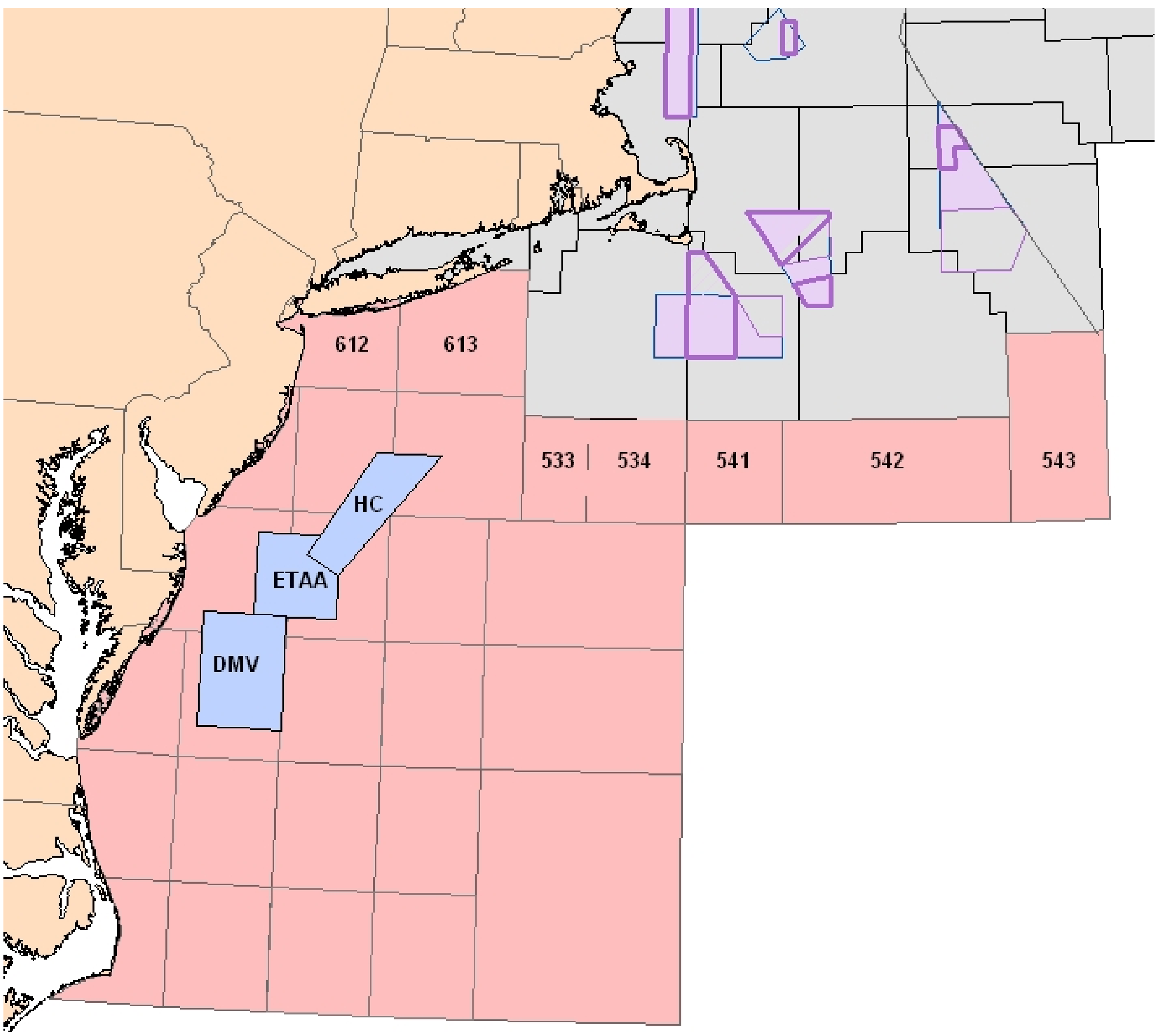
Terms and Conditions
In order to be exempt from the prohibitions of section 9 of the ESA, and regulations issued pursuant to section 4(d), NMFS must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

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 5 – 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.

- *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 5).

- *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 analyzed sea surface temperature data to determine if the area defined by the RPM could be refined at all to maximize benefits for turtles and minimize impacts on the fishery. The PDT considered 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. The 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. 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

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. 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*

- *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. Measures to comply with a reasonable and prudent measure cannot have more than a minor impact on the fishery.

2.8.1.5 Combined measures to further comply with RPM

The Council considered the handful of measures listed above to limit effort in this area from mid-June through the end of October. After the Scallop Committee reviewed the preliminary analyses of the alternatives (Section 5.3), some were considered more than minor due to high distributional impacts on vessels from the south compared to vessels from the north. One measure that was considered not more than minor was the seasonal closure in the Delmarva access area. Because this measure alone seemed to have neutral impacts on the fishery and possibly positive impacts on fishing mortality by shifting effort from time periods with lower meat weights to potentially higher meat weights, the Council was not confident this measure alone would be sufficient to meet the requirement of the RPM.

Therefore, at the November Council meeting the Council considered several "combined measures" of the alternatives already under consideration to ensure this action is compliant with the requirement to limit effort up to the point where impacts are more than minor. All three combined measures considered included the seasonal closure in Delmarva and some combination of limited effort within access areas in the Mid-Atlantic and during the turtle season. Ultimately the proposed action includes a combination of measures considered including a two-month seasonal closure of the Delmarva access area from September 1-October 31 and a limit on the number of access area trips that can be taken in access areas within the Mid-Atlantic from June 15 through October 31. Each vessel is restricted to taking 2 of the 3 allocated access area trips in the Mid-Atlantic. Since both Mid-Atlantic access areas are now closed from September 1-October 31 to reduce impacts on sea turtles, the limit is applicable for June 15 through August 31.

2.8.1.5.1 Combination of Delmarva seasonal closure in September and October as well as reduced possession limit on any access area trip in Elephant Trunk and/or Delmarva from June 15 through August 31

This alternative is a combination of RPM Alternative #3 Option B and RPM Alternative #4 in the current FW21 Draft EA. As Alternative #3 explains no vessels (LA or LAGC) would be permitted to fish in Delmarva from September 1 through October 31. In addition, limited access vessels that decide to use either of their two ETA access area trips (Option A) or their Delmarva trip (Option B) from June 15-August 31 would be permitted to do so, but the possession limit would be reduced. This alternative is different than Alternative #4 in that vessels would be permitted to take a subsequent trip outside the turtle season to recoup the difference on reduced possession limit during the turtle season. One or more subsequent trips could be taken between November 1, 2010 and February 29, 2011. Under Option A Delmarva trips could be taken anytime outside of Sept-Oct closure, and possession limit would remain the same. Under Option B both ETA and Delmarva trips taken during June15-Aug 31 would be subject to reduced possession limit.

For full-time vessels, they would be permitted to take one or both ETA access area trips with a 12,000 pound possession limit. If they decide to take one, they would be permitted to take two additional trips in ETA outside the turtle season. Those two additional trips would have a possession limit of 12,000 pounds each. Current broken trip provisions would still apply, so vessels could return to ETA outside the turtle season on more than two occasions if necessary. If that vessel decided to take two ETA trips from June 15-August 31 at 12,000 pounds each, they would only be permitted to take one additional trip with a 12,000 pound possession limit. Again, current broken trip provisions would still apply, so vessels could return to ETA outside the turtle season on more than one occasion if necessary.

As for the Delmarva area, vessels would be permitted to take one Delmarva trip at a reduced possession limit of 9,000 pounds for full-time permits during the turtle season. If a vessel decided to take a reduced trip in Delmarva from June 15-August 31 at 9,000 pounds each, they would only be permitted to take one additional trip with a 9,000 pound possession limit outside the turtle season. Again, current broken trip provisions would still apply, so vessels could return to Delmarva outside the turtle season on more than one occasion if necessary.

Rationale: This alternative is intended to limit scallop fishing in the Mid-Atlantic during the turtle season two ways: 1) prohibit vessels from taking trips in Delmarva in September and October completely, and 2) limiting effort in Elephant Trunk and or Delmarva between June 15 and August 31 by reducing the possession limit of those trips, which is likely to reduce the number of total access area trips taken during that season as well as reduce length of trips that do occur in that area by reducing the possession limit to 12,000 pounds and 9,000 pounds respectively.

2.8.1.5.2 Combination of Delmarva seasonal closure in September and October as well as a limiting the number of access area trips that can be taken in Elephant Trunk with a reduced possession limit if trip taken between June 15 through August 31

This alternative is a combination of RPM Alternative #3 Option B and RPM Alternative #4 in the current FW21 Draft EA. As Alternative #3 explains, no vessels (LA and LAGC) would be permitted to fish in Delmarva from September 1 through October 31. In addition, limited access vessels that decide to use either of their two ETA access area trips from June 15-August 31 would be permitted to do so, but the possession limit would be reduced to 14,000 pounds for full-time vessels, and by a similar amount for other permit categories. This alternative is different from Alternative #4 in that vessels would be permitted to harvest the difference in possession limit on their other ETA trip outside of the turtle season (from March 1-June 14 or November 1 – February 29).

Specifically, a vessel that decides to take their one trip permitted during the turtle season can do so at a reduced possession limit of 14,000 pounds. Then on a subsequent trip they can fish up to the possession limit for the second trip (18,000 pounds for full-time vessel) plus the difference from their trip during the turtle season of 4,000 pounds, for a total possession limit of 22,000 pounds on their trip outside the turtle window. Vessels do not have to fish during the turtle season, and if they decide not to would be limited to current possession limits of 18,000 pounds for each ETA trip.

Rationale: This alternative is intended to limit scallop fishing in the Mid-Atlantic during the turtle season two ways: 1) prohibit vessels from taking trips in Delmarva in September and October completely, and 2) limit effort in Elephant Trunk from June 15-August 31 by implementing a one trip maximum per vessel with a reduced possession limit to further reduce incentive to fish during the turtle season. These measures are likely to reduce the total number of access area trips taken during that season as well as reduce length of trips that do fish in that area by reducing the possession limit to 14,000 pounds.

2.8.1.5.3 Combination of Delmarva seasonal closure in September and October as well as a restriction on the number of access area trips in the Mid-Atlantic that can be used during June 15 through August 31

This alternative is a combination of RPM Alternative #3 Option B and RPM Alternative #2 in the current FW21 Draft EA. As Alternative #3 explains, no vessels (LA and LAGC) would be permitted to fish in Delmarva from September 1 to October 31. In addition, limited access vessels would be limited to either one (Option A) or two (Option B) total Mid-Atlantic access area trips from June 15-August 31, assuming both Delmarva and Elephant Trunk are closed for the months of September and October already. Vessels are allocated a total of three Mid-Atlantic access area trips in 2010: 2 in Elephant Trunk and 1 in Delmarva. This combined measure would limit vessels to using either one or two of their three allocated trips from June 15-August 31. No trips would be permitted in either area from September 1 – October 31. There would be no change in the possession limit for trips taken during the turtle season and current broken trip provisions would apply to all trips taken during and outside of the turtle season.

Rationale: This alternative is intended to limit scallop fishing in the Mid-Atlantic during the turtle season two ways: prohibit vessels from taking trips in Delmarva in September and October completely, and limiting effort in both Elephant Trunk and Delmarva from June 15-August 31 by implementing a maximum number of trips individual vessels can take during that time period (either one or two trips of the total three allocated). The second part of this alternative will limit the total number of trips that can be taken during the time of year when turtles are present. In the past there have been some vessels that use two or more of their total allocated Mid-Atlantic AA trips from June-October, so limiting the total amount of trips to two will reduce the number of trips that can take place in those areas during the turtle season. An equivalent of 1020 full-time Mid-Atlantic AA trips will be allocated in 2010. This alternative would limit the number of possible access area trips that could be taken during the turtle season to 340 or 680 depending on the option selected.

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 5.3.2.

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.

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

During development of this action there were no measures considered by the Council that did not remain as alternatives considered within this document. Some were raised at PDT or Committee meetings but they were never formally adopted by the Committee or Council for further consideration.

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

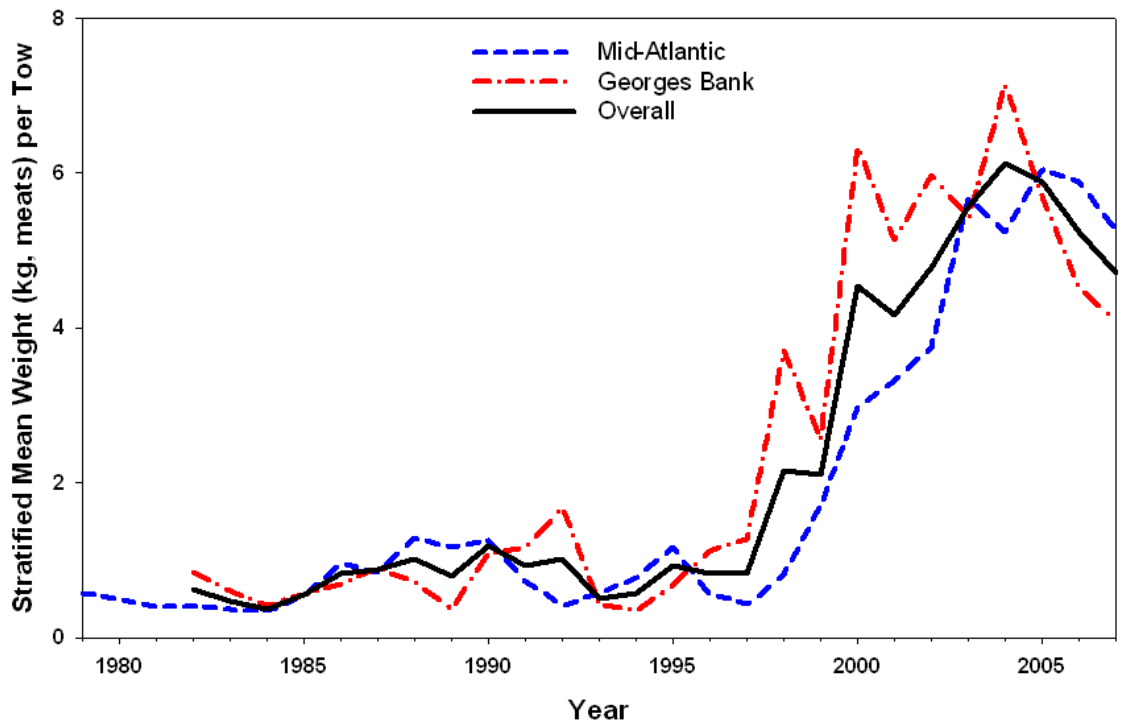
The primary source of data used in the biological component of the scallop assessment currently comes from the federal scallop survey. The scallop dredge survey has been conducted in a consistent manner since 1979. An 8-foot modified scallop dredge is used with 2" rings and a 1.5" liner. Tows are 15 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 6 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 6 - Trend in R/V Albatross stratified mean weight per tow from mid 1980s through 2006 by region.



4.1.2 Stock Status

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. Preliminary results suggest that F has increased again in both 2008 and 2009.

The preliminary estimates of F for the MA is estimated to be 0.38 and for GB it is 0.18, with an overall F of 0.28. The 2009 F in the MA is projected to be 0.42 and on GB 0.18, with an overall F of 0.30. The estimate for 2009 is very preliminary because that fishing year is not over yet so assumptions were made about catch for the remainder of the year, and both years are preliminary until the assessment is completed next year. Both of these estimates for 2008 and 2009 are substantially higher than the Ftarget of 0.20 from FW19. Therefore, it is likely that fishing mortality will need to be reduced in 2010 to end and prevent overfishing.

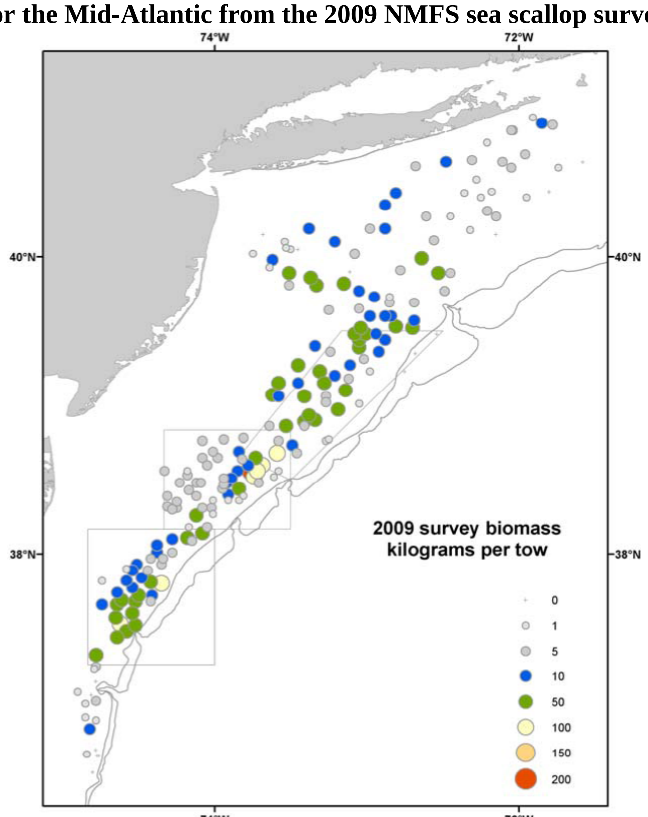
4.1.2.1 Biomass

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.

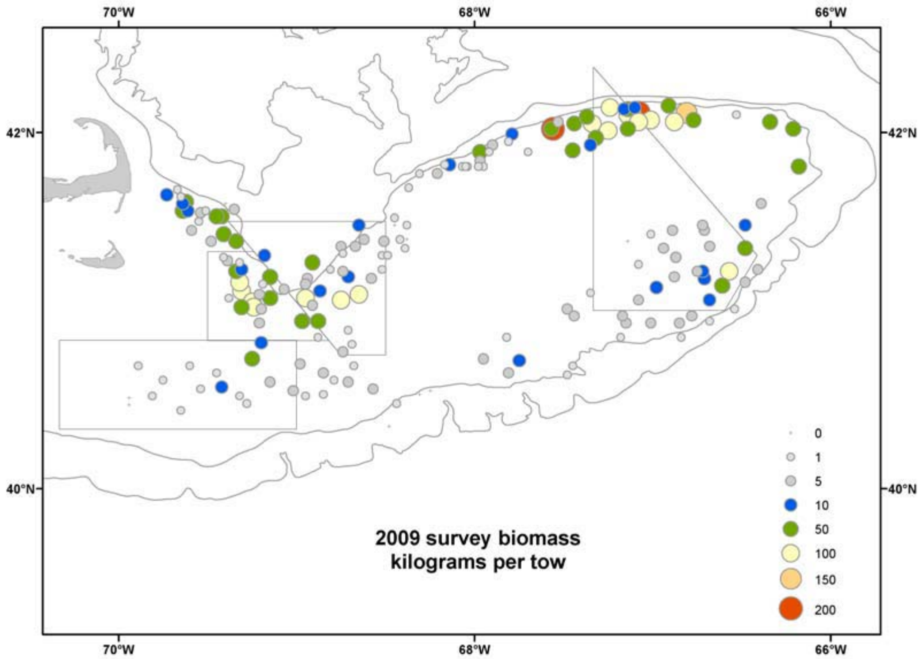
Biomass increased rapidly in the Mid-Atlantic Bight from 1998-2003 due to area closures, reduced fishing mortality, changes in fishery selectivity, and strong recruitment. Biomass in the Hudson Canyon area increased while it was closed from 1998-2001; likewise, biomass increased steadily in the ETA after 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 7. 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 8. 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 9 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 9. Distribution of scallop biomass by area in 2007 (left) and 2009 (right).

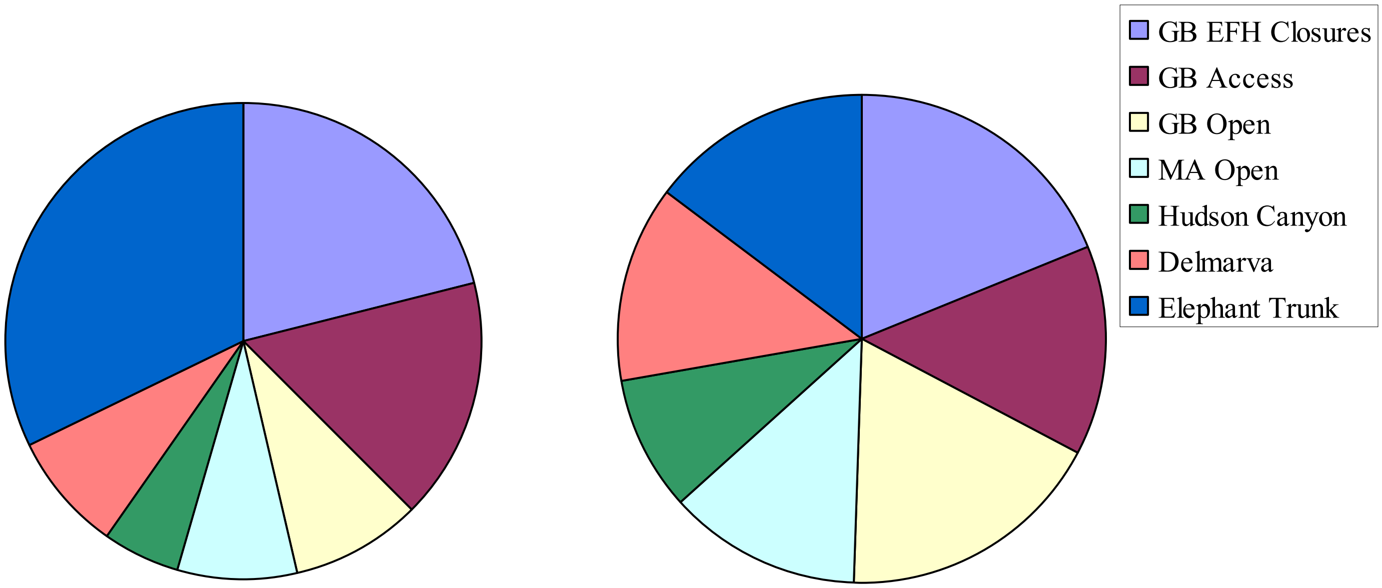
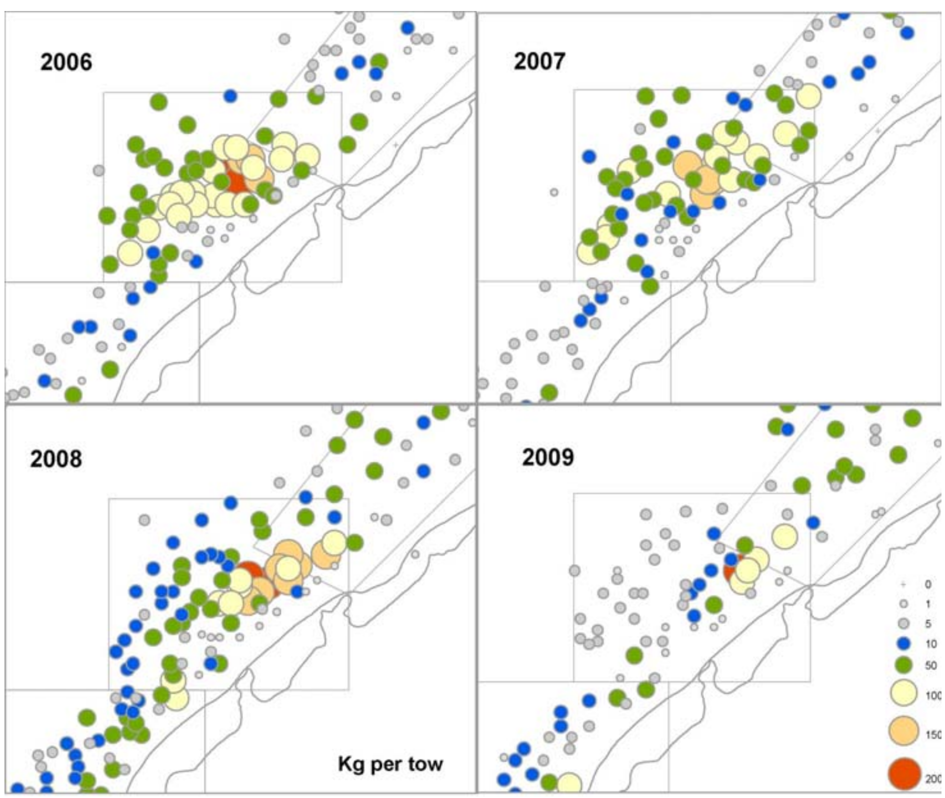


Figure 5. Reduction of ET Biomass from 2006-2009 surveys.



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

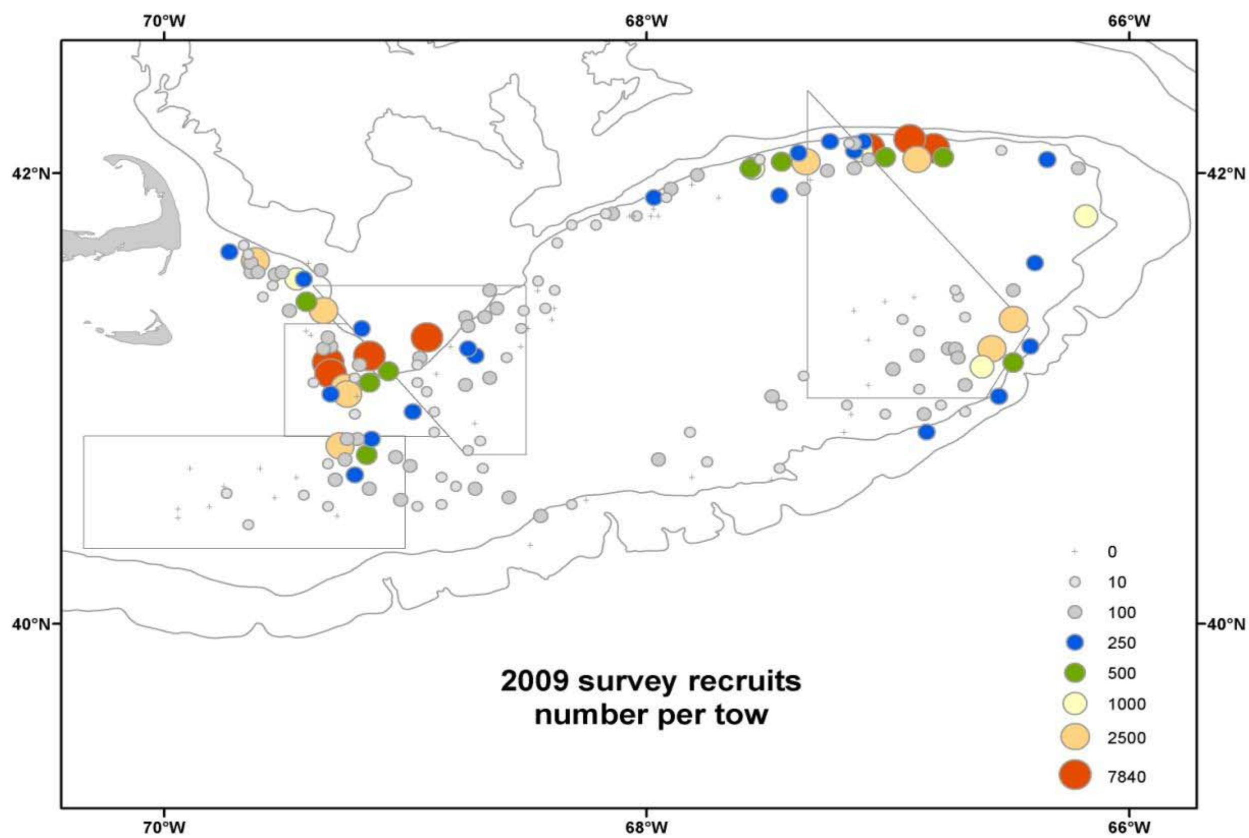


Figure 7. Recruitment in the Mid-Atlantic from the 2007 NMFS sea scallop survey

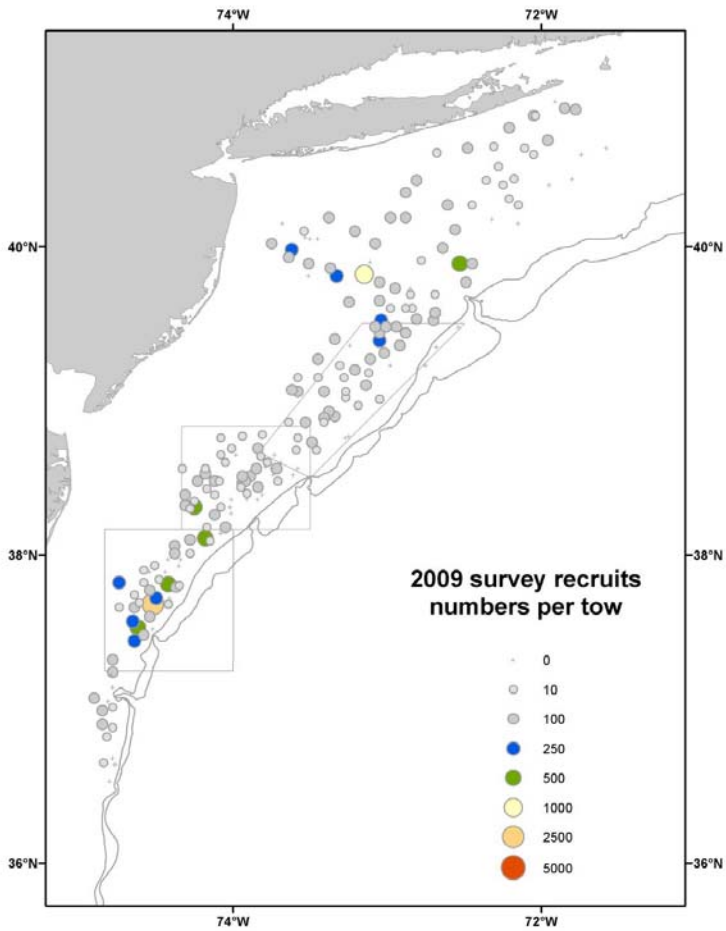
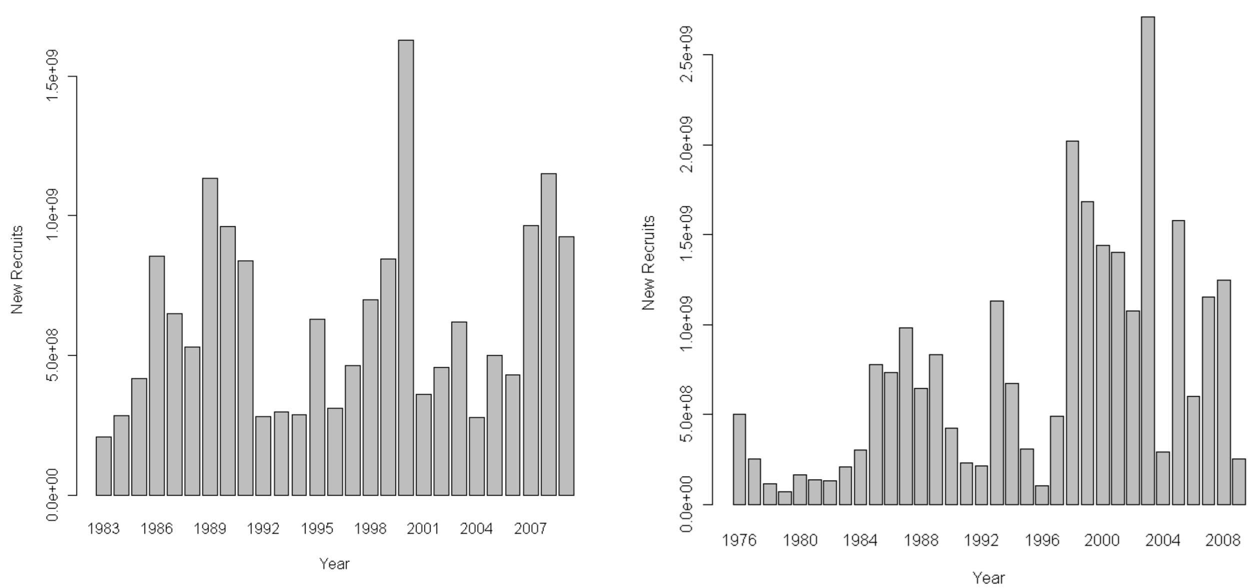


Figure 8. Recruitment patterns on Georges Bank (left) and the Mid-Atlantic (right).



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. 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.

Combined fishing mortality has steadily declined since the early 1990s. The most recent stock status update was prepared through FY2006 as part of SARC 45(NEFSC, 2007). SARC 45 estimated that overall fishing mortality in 2006 was 0.23, the lowest overall F in the 1982-2006 time series. That estimate for fishing mortality still applies for the fishery until the next assessment, scheduled for June 2010. However, the current CASA F_{max} estimate for 2008 is 0.28 and 0.30 for 2009. An overall fishing mortality of 0.30 is above the current threshold for overfishing (0.29), which was approved in the last stock assessment. These values are preliminary and will be reviewed and finalized in the stock assessment scheduled for June 2010.

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).

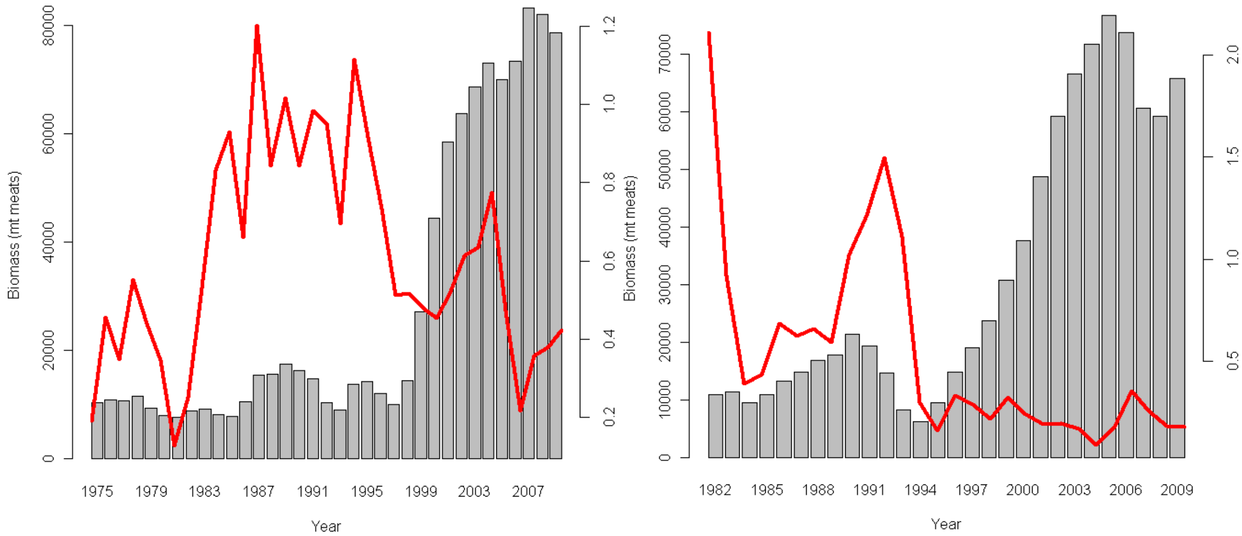
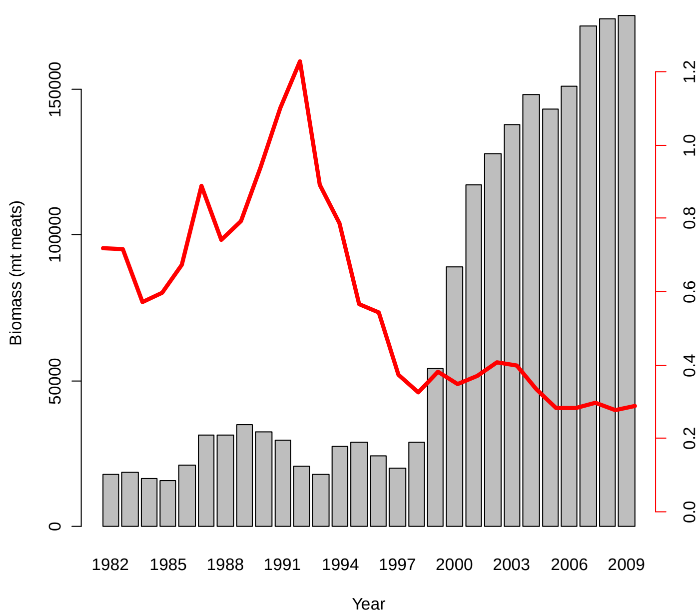


Figure 10 - Fishing mortality (red line) and biomass estimates (y^{-1}, gray bars) from the CASA model for sea scallop resource overall (Georges Bank and Mid-Atlantic combined)



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 11**,** Sherman et al. 1996). Four distinct sub-regions are identified: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope.[3]

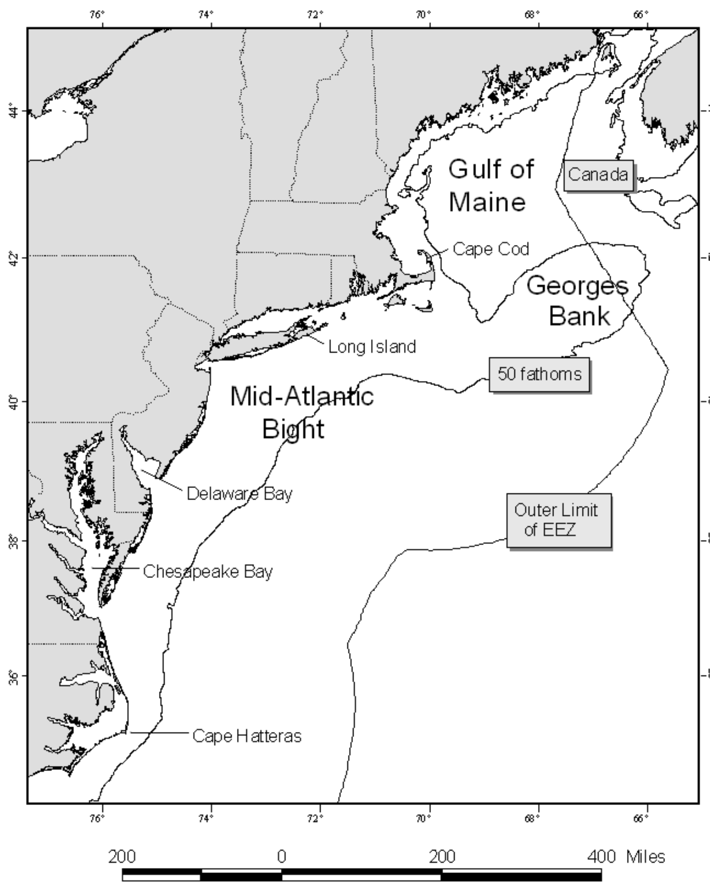


Figure 11 – Northeast U.S Shelf Ecosystem.

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.

[3] 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

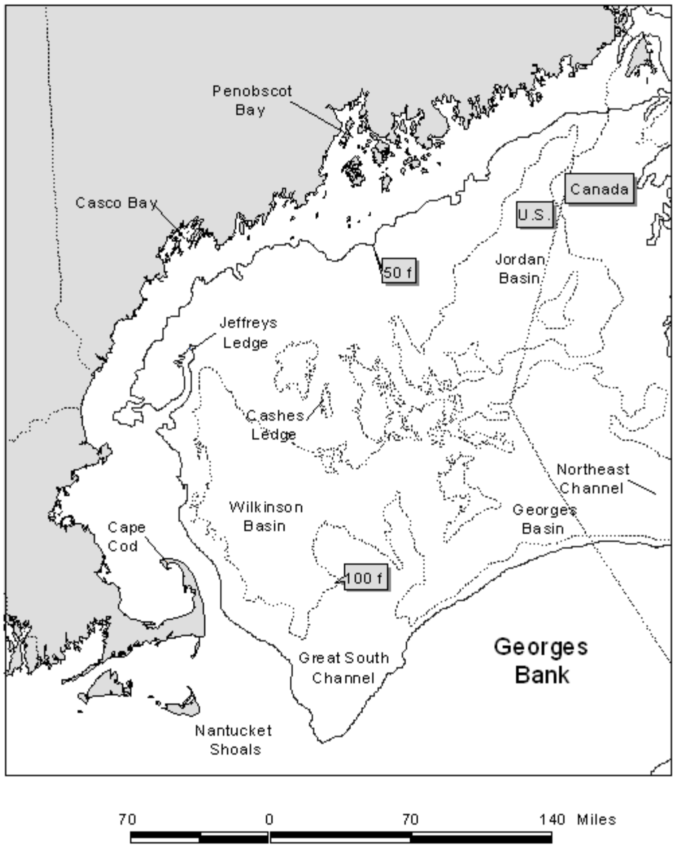


Figure 12 – Major features of the Gulf of Maine.

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 12). 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 13). 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.

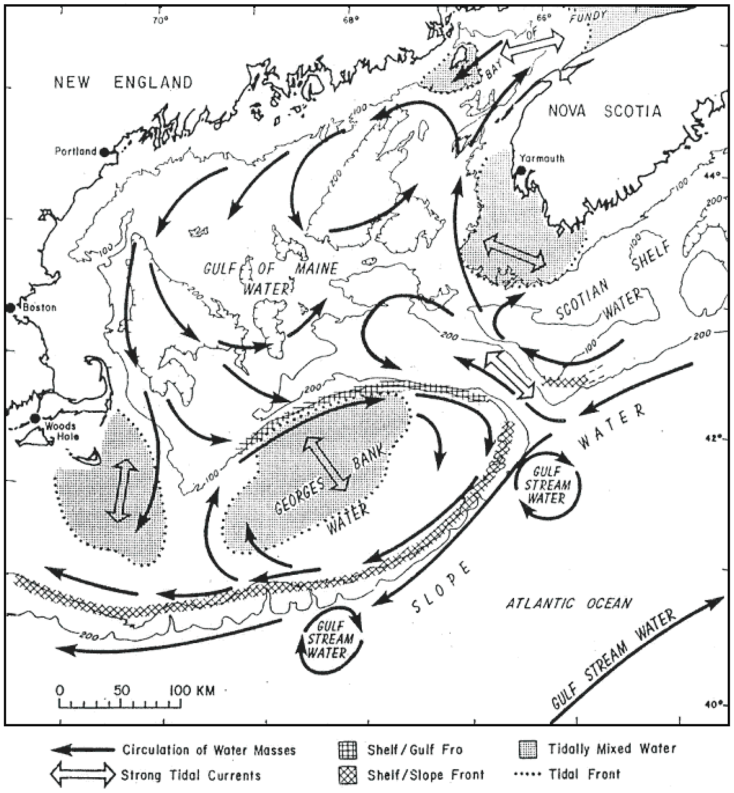


Figure 13 – Water mass circulation patterns in the Georges Bank - Gulf of Maine region.

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 17**)**.

Table 17 – 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 18).

Table 18 – 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 12). 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 19, Figure 14).

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 17). 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 19 – 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

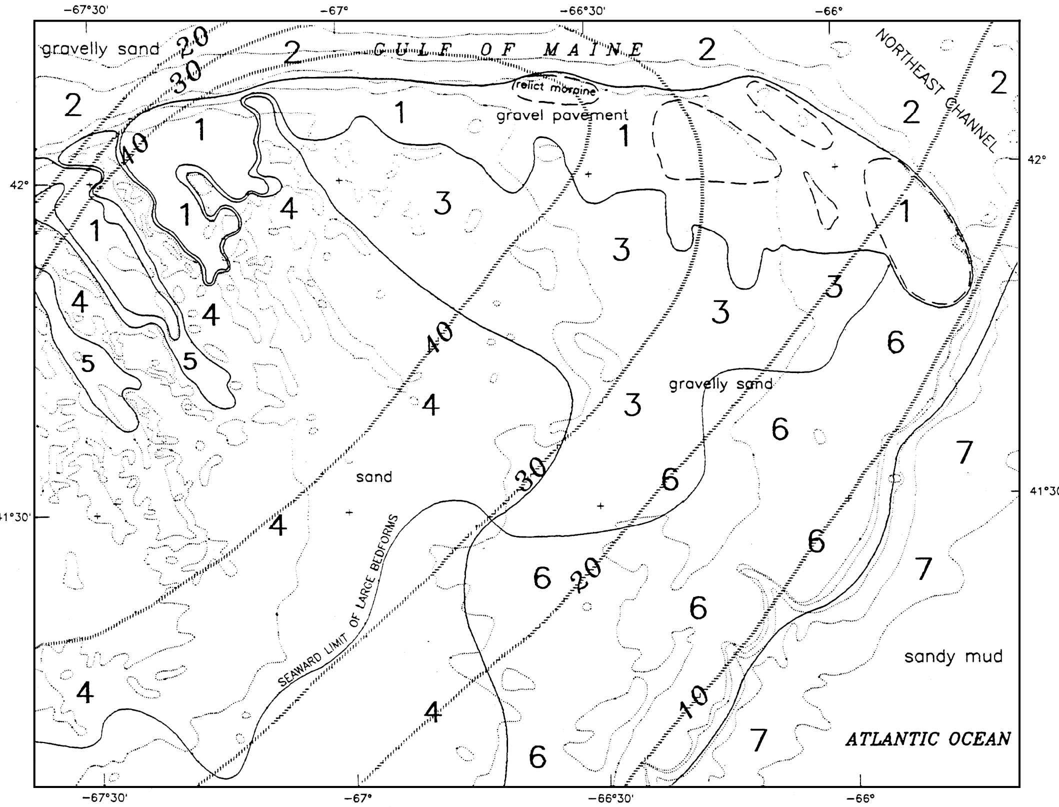


Figure 14 – Sedimentary provinces of eastern Georges Bank. Based on criteria of sea floor morphology, texture, sediment movement and bedforms, and mean tidal bottom current speed (cm/s). Relict moraines (bouldery seafloor) are enclosed by dashed lines. See Table 3 for descriptions of provinces. Source: 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 15 and Figure 16).

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.

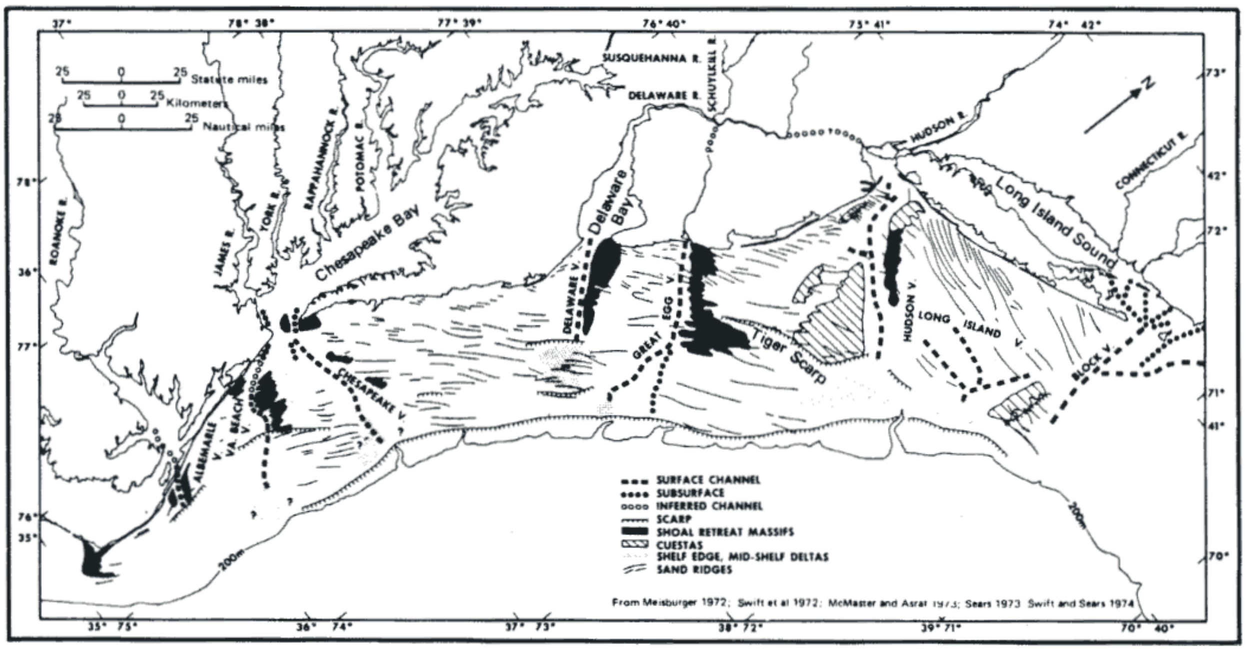


Figure 15 – Mid-Atlantic Bight submarine morphology. Source: Stumpf and Biggs (1988).

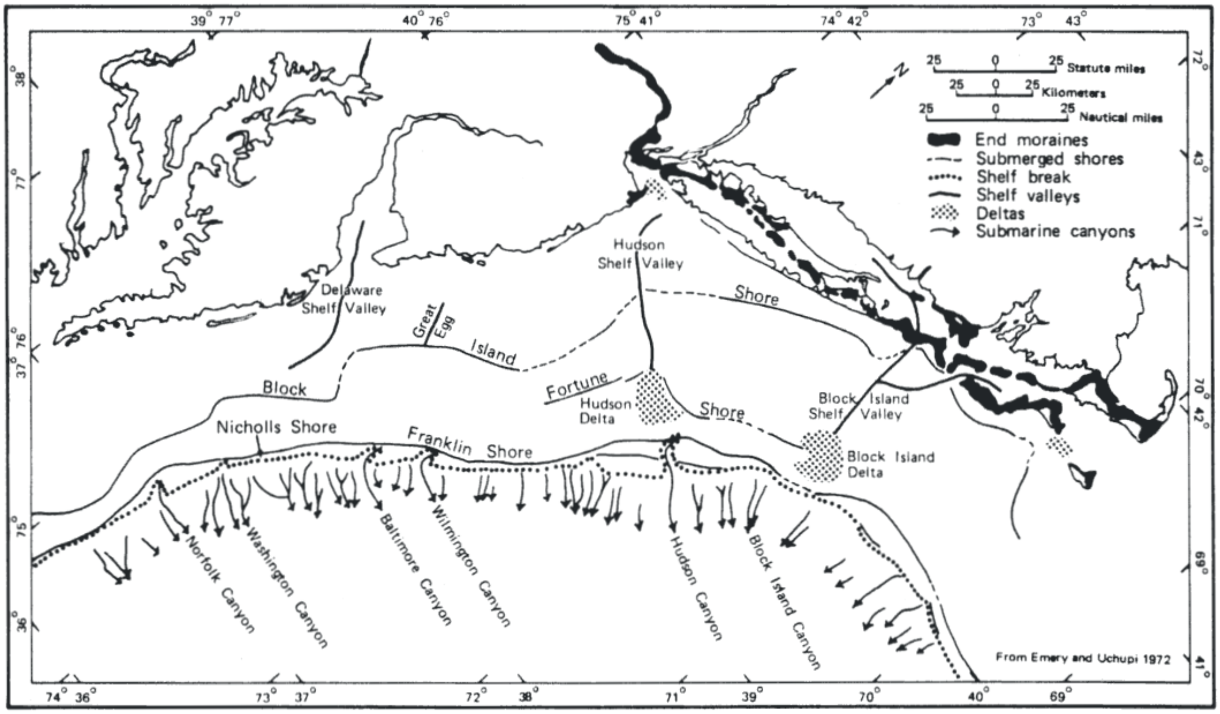


Figure 16 – Major features of the mid-Atlantic and southern New England continental shelf. Source: Stumpf and Biggs (1988).

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 20). 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 21). 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 20 – 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 21 – 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 17). This area, which could potentially be affected by the proposed action, has been identified as EFHfor various species (

Table 22). 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 23. 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 Essential Fish Habitat Omnibus Amendment 2. The sea scallop fishery overlaps spatially with designated EFH for both NEFMC and MAFMC-managed species.

Figure 17 – Geographic extent of the Atlantic sea scallop fishery

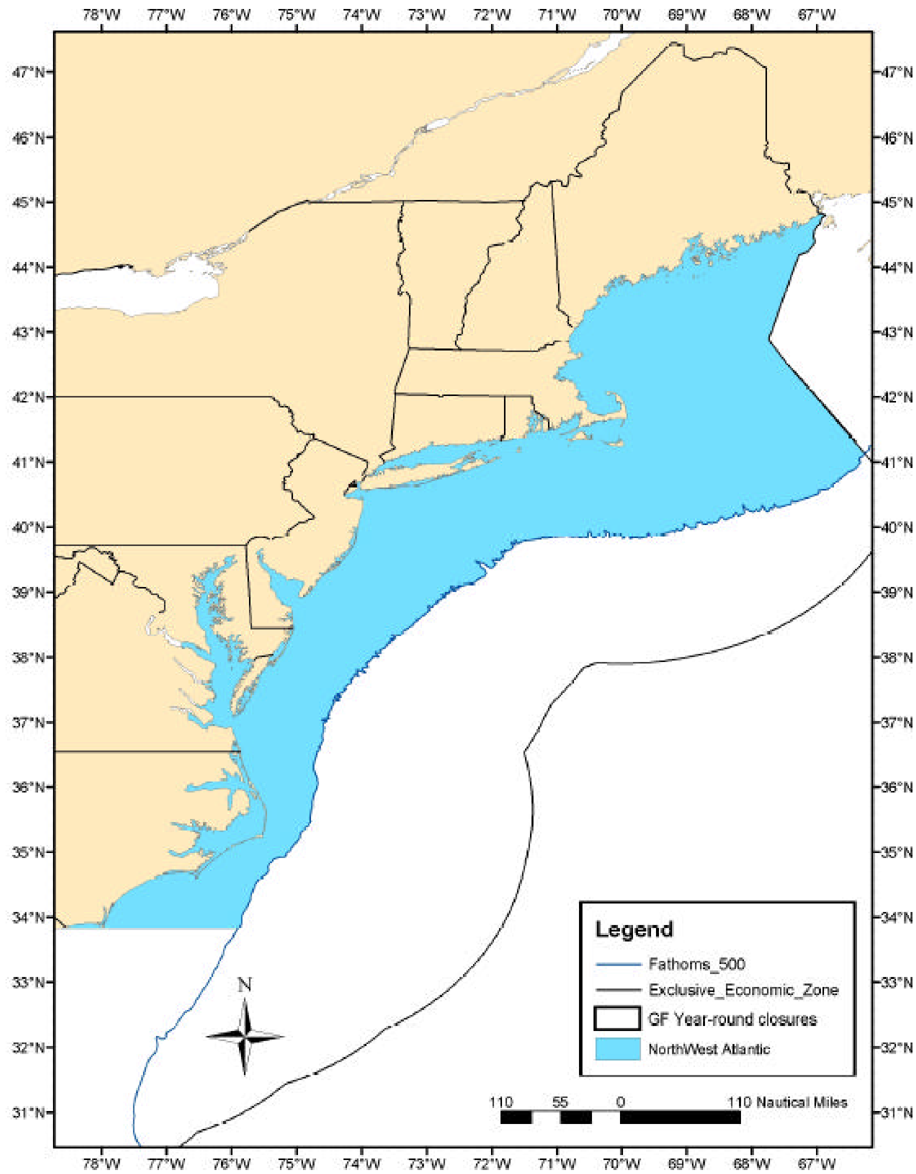


Table 22 –Designated EFH that overlaps with the Atlantic sea scallop fishery, listed by managed species and lifestage.

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 23 – Listing of sources for original EFH designation information

Species	*Manageme nt 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

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 the continued authorization of the sea scallop fishery would not have any adverse impacts on cetacean prey, and that it would not affect the oceanographic conditions that are conducive for calving and nursing of large cetaceans.

- **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. 2009 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 from the most recent stock assessment suggests that the population increased at a rate of 1.8 percent per year from 1990-2003, and the total number of North Atlantic right whales is estimated to be at least 323 animals in 2003 (Waring et al. 2009). The minimum rate of annual human-caused mortality and serious injury to right whales averaged 3.8 per year during 2002 to 2006 (Waring et al. 2009), with 1.4 of these resulting from fishery interactions. Recent mortalities included six female right whales, including three that were pregnant at the time of death (Waring et al. 2009).

Based on the stock assessment data available, the minimum population estimates for other western north Atlantic whale stocks are 2,269 fin whales, 207 sei whales, 4,804 sperm whales, and 3,312 minke whales (Waring et al. 2009). No recent estimates are available for blue whale abundance. Insufficient data exist to determine trends for any other large whale species.

For the North Atlantic population of humpback whales, the most recent stock assessment resulted in a population estimate of 11,570, although this number is considered to be negatively biased (Waring, et. al, 2009). Information from the stock assessment indicates an upward trend in abundance for the Gulf of Maine population, but is inconclusive about the North Atlantic population as a whole. Based on data available for selected areas and time periods, the minimum population estimates for other western north Atlantic whale stocks are 2,269 fin whales, 207 sei whales, 4,804 sperm whales, and 3,312 minke whales (Waring et al. 2009). No recent estimates are available for blue whale abundance. Insufficient data exist to determine trends for any other large whale species.

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 adversely affect the following ESA-listed sea turtle species: loggerhead, leatherback, Kemp's ridley, and green sea turtles.

4.3.2.1 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 long-lived species and reach sexual maturity relatively late (NMFS SEFSC 2001; NMFS and USFWS 2007a; 2007b; 2007c; 2007d, 2008). Sea turtles are injured and killed by numerous human activities (NRC 1990; NMFS and USFWS 2007a; 2007b; 2007c; 2007d; NMFS and USFWS 2008, 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 recovery units (NMFS and USFWS 2008). 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 in US waters occurs on beaches of the southeastern U.S. (especially Florida). Waters as far north as 41-42^{o} N (Figure 1) are used for foraging, with common occurrences of the species from Florida through Cape Cod, MA. While some long term in-water population studies have shown an increase in loggerhead abundance (Pamlico Sound, NC; St. Lucie Nuclear Power Plant, FL), other areas have shown no trend (Indian River Lagoon, FL; Florida Bay, FL) or declining abundance (New York inshore waters; Virginia Chesapeake Bay) (NMFS and USFWS 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, farther inshore than the scallop fishery takes place. 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.

4.3.2.2 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 was not likely to 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 observed 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 and USFWS 1998; USFWS and NMFS 1992; NMFS and NMFS 2005; NMFS and USFWS 2008).

The recently published Atlantic 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 to the species 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, as a main source of mortality of loggerheads, but recovery actions are specified for the commercial scallop dredge fishery.

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 anticipated that up to 929 loggerheads will be captured biennially in the scallop dredge fishery, of which 595 are anticipated to be lethal. The 2008 BiOp also estimated 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 2008 BiOp estimate 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 Loggerhead Recovery Plan (NMFS and USFWS 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). (It should be noted that three off-watch takes were reported in 2005, and the actual number of takes in the fishery for that year is assumed to be greater than zero.) 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 (also referred to as "turtle chains"). 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 time and area 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 gear likely results in a higher level of mortality than evidenced due to submergence 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 a rapid escalation in mortality rate does not occur until after 50 minutes of tow time (Sasso and Epperly 2006). This data is for trawl gear, but NMFS assumes the same is true for dredge gear. Because scallop dredge tows are generally less than or equal to 1 hour, this should help reduce the risk of death from forced submergence. Contact injuries are classified as including scrapes or cuts 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 that come in contact with the gear; rather they decrease the likelihood that turtles will suffer serious injuries from being caught in the dredge bag. 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. This mortality rate was based on NMFS working guidance for serious injury determinations for sea turtles caught in scallop dredge gear and the analysis of observed scallop dredge takes in 2003. 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, leatherback turtle takes are unlikely to be lethal because they are more likely to happen in the water column, and because they are not likely to get caught in a dredge with a chain mat due to their size (both of which are not true for Kemp's and greens)

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. Of the non-decomposed turtles, 14 were loggerheads and one was unidentified. Twelve of the 14 turtles examined on board had no injuries. These takes were only observed from June through September. An estimated 154 loggerheads were captured 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**

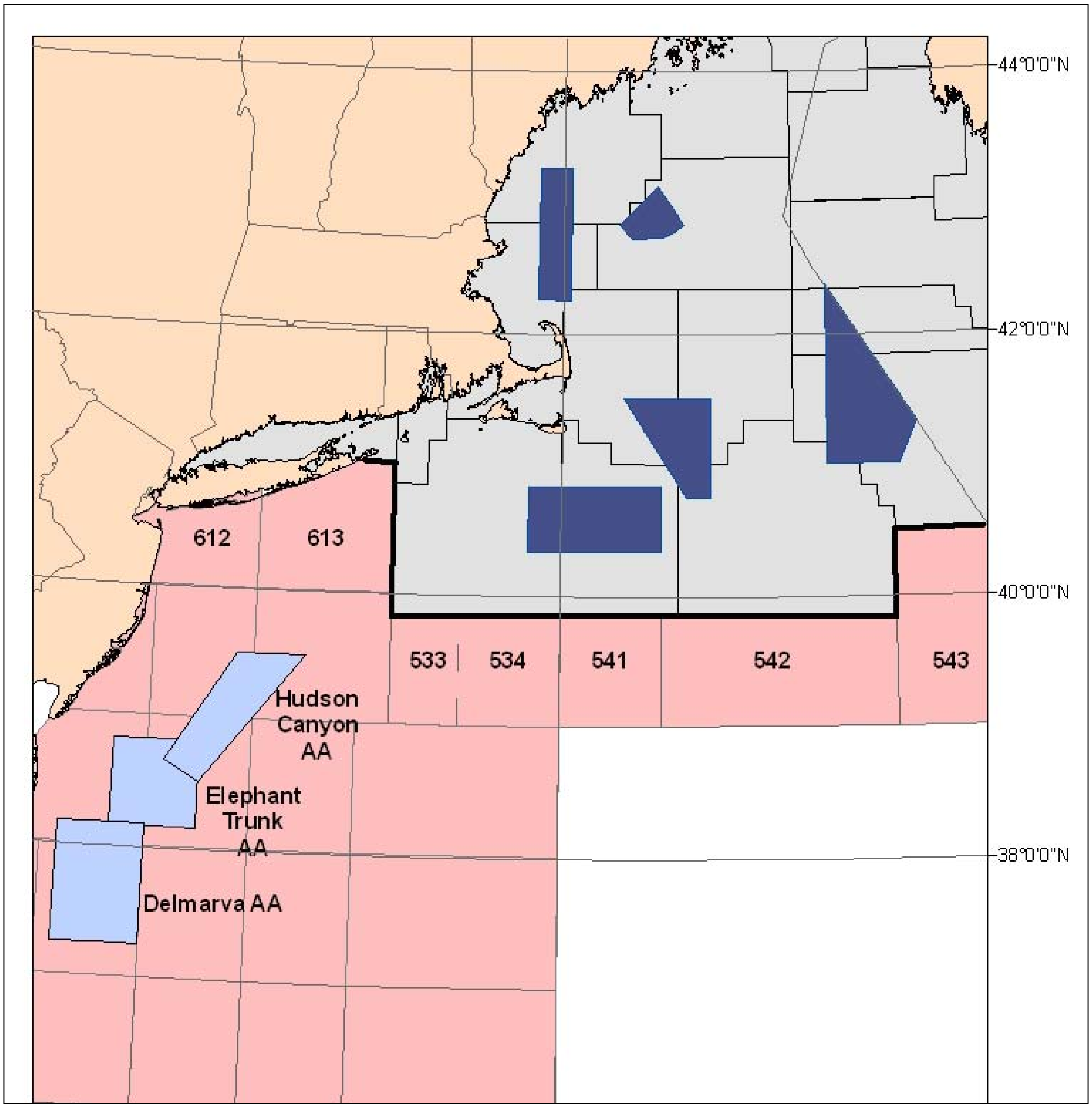
The overall conclusion of the 2008 BiOp for the sea scallop fishery is: "*After reviewing the current status of loggerhead, leatherback, Kemp's ridley, and green sea turtles, the environmental baseline and cumulative effects in the action area, the effects of the continued authorization of the Scallop 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 likely reduce the availability of prey for the four species of sea turtles.

The 2008 BiOp had five non-discretionary reasonable and prudent measures (RPMs) with an associated five terms and conditions (T&C) that implement the RPMs. The first RPM is the only one that directly affects the allocated effort in the fishery. The other RPMs (2-5) are more related to research needs and investigation of turtle interactions with the scallop fishery. RPM #1 states 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 18 – 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 document 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 to 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 2008 BiOp 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.

4.3.2.3 Overall Sea Turtle Conservation

Below is a summary of some of the measures in place for turtle conservation under the Scallop FMP and outside of the Scallop FMP. In addition, this section summarizes the recent and current research being conducted on sea turtles and the scallop fishery that address many of the research objectives of the Reasonable and Prudent Measures identified in Biological Opinions for the scallop fishery.

Measures in place outside the Scallop FMP that still affect the scallop fishery

On February 15, 2007, NMFS 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 turtles where they are vulnerable to incidental capture and mortality in Atlantic trawl fisheries.

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.

Measures in place under the Scallop FMP

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).

There are a number of measures currently in place in the Scallop FMP that help minimize interactions with turtles and the effect of those interactions on turtles now and in the future. These measures include a seasonal closure in the ETA, the mandated use of a chain mat from May 1 through November 30 in all areas south of 41° 9.0’ N, and the research set-aside program that has funded a number of turtle-related projects. In addition, rotational area management has increased catch per unit effort thus the time that gear is in the water and could impact turtles has been reduced dramatically. See Section 5.3.2.5 for more detailed analyses of how effort levels have changed in the scallop fishery, particularly in the Mid-Atlantic during the time of year when turtles are more likely to be present.

The seasonal closure in ETA was implemented in 2007 when the area reopened. For two months (September 1-October 31) each year, the entire access area is closed. So far, analyses support that this seasonal closure is having beneficial impacts on turtles by shifting effort to other times of the year with lower bycatch rates, compared to shifting effort to open areas during the same season. In 2007 and 2008, effort in the ETA increased in March, April, August, November and

December compared to overall fishing time in years before that when fishing was permitted in ETA region during September and October (Figure 42). All month with increased effort, excluding August, have less likelihood of catching turtles given sea turtle distribution is lower during these months (March, April, November, and December).

NMFS finalized a rule (71 FR 50361, August 23, 2006) that requires modification of Atlantic sea scallop dredge gear, regardless of dredge size, by a chain mat when the gear is fished in 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. These regulations were modified through subsequent rulemakings (71 FR 66466, November 15, 2006; 73 FR 18984, April 8, 2008; 74 FR 46930, September 14, 2009). However, these modifications did not change the temporal or spatial extent of the chain mat requirements. 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.

While turtle observations have been reduced since the chain mat regulations went into place, there have still been several takes in the sea scallop dredge fishery in recent years. In 2007, there were 5 takes in scallop dredge gear. Four of the takes, all loggerhead sea turtles, occurred south of the northern boundary of the chain mat regulation, while one take, a Kemp's ridley sea turtle, was documented north of this line. Of the four takes south of the line, one of the turtles was observed on top of the dredge frame, swimming away before the dredge came on deck; two were observed in the dredge bag; and one turtle was reported between the chain mat and the dredge. There were two takes in scallop dredge gear in 2008 in the dredge frame. There were two takes in scallop dredge gear in 2009 (data available through Aug 09).

The research set-aside program, with additional NMFS financial support through contracts, has and continues to address many of the research objectives of the Reasonable and Prudent Measures (RPMs) identified in a series of Biological Opinions (BiOps) issued by NMFS for the sea scallop fishery. The sea scallop industry and its research partners have been working with NMFS to address specific RPMs since 2003. A summary of RPMs and how research has and continues to address sea turtle bycatch is below. Two outputs from some of this research that are currently being used by a growing number of scallop industry participants, but are not required, are a "turtle excluder dredge" and a "placard" that describes how to handle turtles safely and how to reduce the potential for interactions by rigging chain mats on the dredge.

<u>Specific research that has been conducted related to RPMs in 2008 biological opinion</u>
Research has been grouped by topic based on the RPMs in the 2008 biological opinion. The first RPM, related to limiting effort, is addressed in Section 2.8; RPMs #2 - #5, and the term and conditions (T&Cs) used to implement the RPMs, are all related to research and are summarized below. There is no time limit for when the agency must comply with these RPMs, and it is likely that future research funded through the RSA program will continue to support these projects since turtle related research is listed as a research priority for RSA funds. This is not a complete list of the work that has been or is being conducted to help comply with these RPM, this is only a list of the projects the PDT is aware of, many of which were fully funded by, partially funded by the Scallop RSA program, or through contracts with NMFS.

- RPM #2 – Term and Condition #2

RPM #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.
T&C#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 to minimize the number and/or severity of sea turtle interactions with scallop fishing gear.

Turtle Excluder Devices (TEDs) have been proven to be an effective method to minimize adverse effects related to sea turtle bycatch in the shrimp trawl fishery, summer flounder trawl fishery, several state trawl fisheries, and certain other trawl fisheries around the world. TEDs have an escape opening, usually covered by a webbing flap that allows sea turtles to escape from trawl nets. On-going research is being conducted on catch retention of Atlantic sea scallops in trawl nets equipped with a TED.

As described above, the chain mat is designed to prevent sea turtles from being captured in the dredge bag. Another modification being tested is a modified dredge frame designed to guide sea turtles over the dredge. See DuPaul et al, 2004 for more information). The chains were found to be 100% effective in keeping turtles out of the dredge bag during the research trials, but it should be noted that the potential exists for the smallest turtles to pass through the spacing in the chain and result in a take (cite BiOp, chain mat EA).

The two components of the design work independently; the chains prevent sea turtles from entering the dredge bag and the frame modifications prevent entrapment on top or underneath the dredge. While research continues to determine the magnitude of turtle encounters that take place while the dredge is on the sea floor or up in the water column, the new dredge design is proving to be successful in retaining scallop catch and has been shown to guide experimental sea turtle carcasses up and over the frame. This research is documented in the following reports: Smolowitz and Weeks, 2008; Smolowitz and Weeks, 2008b, Milliken et al., 2007, and Smolowitz et al., 2005.

- RPM #3 – Term and Condition #3

RPM#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.
T&C #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.

Ongoing and proposed research using an ROV and oceanographic sampling in conjunction with sea turtle tracking is shedding light on the location of the turtles geographically and on the amount of time they spend at the surface and on the sea floor. These projects have advanced the ability to locate, track and observe loggerhead sea turtles through innovative use of dredge- and ROV-mounted video cameras and side-scan sonar. Recent field work carried out in July 2009 tracked and observed sea turtles throughout the water column with an ROV.

During the same time period, oceanographic data was collected at a series of stations and during aerial over-flights in order to establish the localized oceanographic features associated with turtle distributions. Proposed work will continue to build this unique set of observational records and use them to assess ideas regarding the factors that govern sea turtle distributions and behavior in the Mid-Atlantic Bight (MAB) shelf region. While past studies have focused mainly on sea surface temperature and bathymetry as controlling and/or predictive factors (e.g. Hawkes et al., 2007; Murray, 2007), ongoing research postulates that on time scales of days to weeks, sea turtle "hot spots" are more closely tied to the geography of oceanographic fronts associated with water mass and chlorophyll gradients driven by wind stress and buoyancy (density) contrasts. These linkages will be investigated by conducting regional hydrographic surveys with shipboard CTD (conductivity/ temperature/ depth), fluorometer and ADCP (Acoustic Doppler Current Profiler) measurements in conjunction with aerial sea turtle sighting and ROV video tracking surveys.

- RPM #4 – Term and Condition #4

RPM#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.
T&C #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.

It is important to be able to quantify the effectiveness of chain mats in reducing potential injury to turtles during towing of the standard New Bedford dredge. The key cause of this potential injury is the possibility of a standard dredge running over a turtle on the seafloor. If one assumes that the turtle excluder dredge is highly effective in preventing turtles from getting under the cutting bar, a comparison of the two dredge types, without chain mats, would shed light on this issue. If both dredges have an equal probability of catching turtles in the water column, then a comparison should show no difference in takes between dredge types if there are no bottom interactions. This might indicate turtles are not suffering significant serious injury/deaths in interactions with conventional scallop gear as a result of interactions on the bottom. If the standard dredge catches significantly more turtles, then there is a high probability that it is catching those turtles on the sea floor and the potential for injury exists. Another issue regarding the modified frame is whether the initial encounter with the dredge causes injury, the severity of that injury, and the effectiveness of the modified dredge at reducing those injuries.

Proposed dredge comparison work will be a continuation of a study started by the NEFSC's Protected Species Branch and all protocols set forth by the NEFSC during previous contract work with Coonamessett Farm. To date, a total of more than 1500 paired tows have been observed following these protocols. In order to obtain statistically significant results, an additional 600 to 3000 paired tows may have to be observed due to the rarity of observed turtle-dredge interactions. This portion of the proposed study will take place on commercial fishing vessels working under normal fishing operations, but without the required turtle chain mats, during the months and areas in which loggerhead turtle interactions are known to occur. A total of at least 600 paired tows will be observed on vessels fishing a standard New Bedford scallop dredge and a Coonamessett Farm turtle excluder dredge simultaneously during 2010. A NMFS-certified scallop fisheries observer will be onboard to record all catch and tow data while also observing sea turtle interactions.

- RPM #5 – Term and Condition #5

<u>RPM#5</u>: *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.*

<u>T&C #5</u>: *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.*

As mentioned above, ongoing and proposed use of ROVs and oceanographic sampling along with tracking of tagged sea turtles will likely provide more information on seasonal locations and behavior of these animals which will aid in bycatch avoidance and scallop management. Knowledge of where turtles spend their time in the water column is one of the major outcomes of this research, which will help to assess current gear regulations and proposed modifications.

On August 24, 2009, Coonamessett Farm and NMFS staff successfully attached Fastloc Argos satellite tags to two juvenile loggerhead turtles in the HCAA. The tags are transmitting turtle location, time at depth, and water temperature data. This data will be incorporated with all the other data collection efforts to evaluate juvenile loggerhead behaviors on the scallop grounds.

<u>RPMs from previous biological opinions that have been addressed through projects at least partially funded by the scallop RSA program</u>

NOAA Fisheries must ensure that guidance is provided to fishers in fishery to make them aware of sea turtle presence in fishing areas, advise them to not conduct tows where turtles are observed present at the surface, maintain <60 minute tow times, avoid damage to turtles possibly caught in dredge by lowering bag closer to deck before emptying and not dropping the dredge cutting bar on top of the catch; NOAA Fisheries must provide adequate guidance to all fishers participating in fishery prior to start of each FY so any incidental sea turtle take is handled w/due care, observed for activity, and returned to water; (BiOps 2/24/2003, 2/23/2004)

This was addressed by the production of a wheelhouse card that was distributed to each vessel in the limited access scallop fleet. The card was designed and produced as a joint effort of the FSF, Coonamessett Farm, VIMS and NMFS. In addition, a flyer addressing sea turtle conservation in the fishery was distributed to permit holders.

Handling the turtle to avoid injury can be achieved to a limited extent on a scallop vessel. During the season and area of turtles, after the dredge gets to the block and in the air, the crewmen can be instructed to observe if there is a turtle before dumping the dredge on deck. If there is a turtle, the captain and crew can use the other side's tackle to bring the bale over to the other side of the boat and use that side's tackle on the club stick to gently dump the contents of the bag without ever dropping the dredge or bag on deck. This protocol (or similar protocol) would reduce the likelihood of injury to the turtle when the bag is emptied on deck. The wheelhouse card identified measures the crew could take to reduce injury and mortality to sea turtles on deck.

NOAA Fisheries must conduct video work to investigate how sea turtles interact with scallop fishery gear; (BiOp 12/15/2004)
Dredge-mounted cameras have been and will continue to be used in an attempt to capture underwater interactions between scallop dredges and sea turtles. The first two projects described below were not successful in observing any turtle interactions with dredge gear. This led to a change in strategy identified in the third project; instead of cameras mounted on the dredge turtles were observed and followed a Remotely Operated Vehicle (ROV): (Smolowitz et al., 2005, Smolowitz et al., 2005b, Smolowitz and Weeks, 2009).

4.3.2.4 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

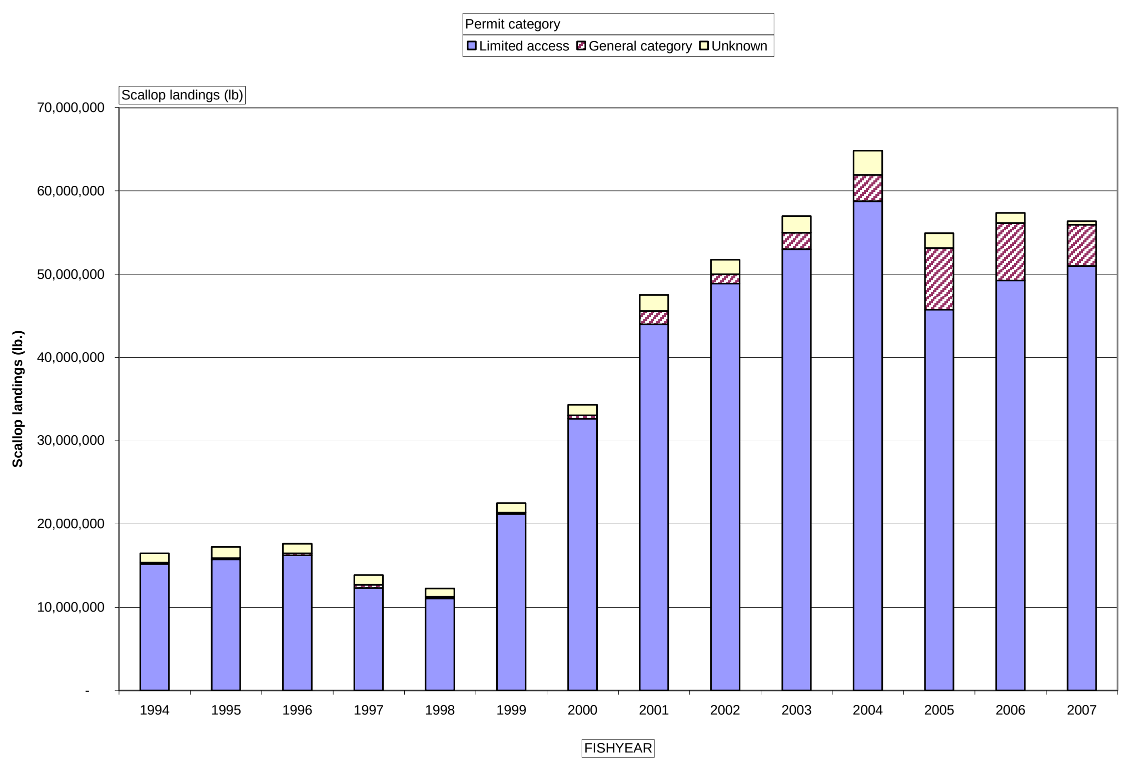
4.4.1 Introduction

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 Framework 21 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 2002-2008, the landings from the northeast sea scallop fishery stayed above 50 million pounds, surpassing the levels observed historically (Figure 19, Table 24). 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 19. Scallop landings by permit category and fishing year (dealer data)



Data source and uncertainties: Figure 19 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).

Table 24. Landings, Revenue, and Ex-vessel price of combined scallop fisheries 1999-2008.

Calendar Year	Scallop landings (lb)	Scallop revenue ($ in 2008 prices)	Ex-vessel price ($ in 2008 prices)
1999	19,683,563	140,463,315	7.14
2000	28,853,542	183,807,637	6.37
2001	40,757,919	187,773,582	4.61
2002	46,910,849	218,768,881	4.66
2003	48,563,601	237,158,584	4.88
2004	59,013,706	339,106,239	5.75
2005	52,500,091	451,577,800	8.60
2006	55,206,866	396,897,813	7.19
2007	58,625,209	407,755,656	6.96
2008	53,315,828	369,615,550	6.93

Figure 20 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 2008 was lower than the price in 1994 (Figure 20). 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 21 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 limited access 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 21). In 2008 and 2009 the number of limited access permits was 356 and 350, respectively.

Figure 20. Trends in total scallop landings, revenue and ex-vessel price by fishing year (limited access fishery only)

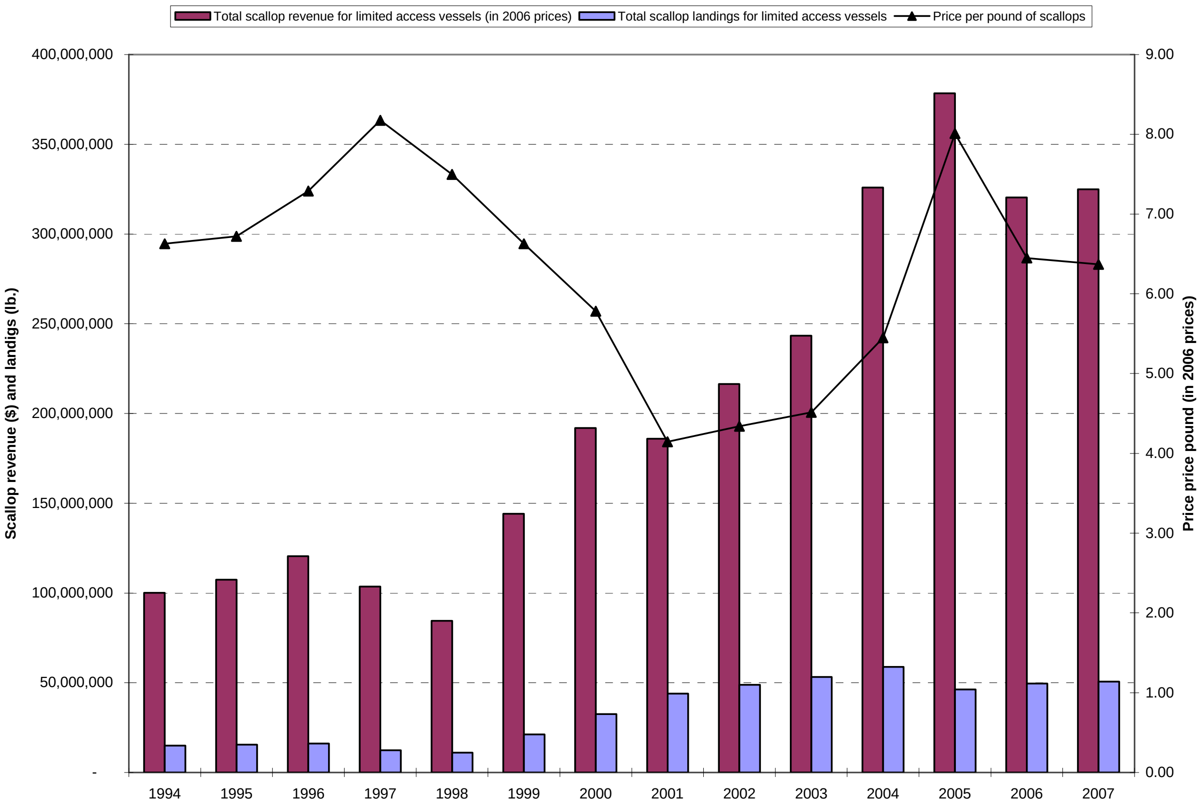
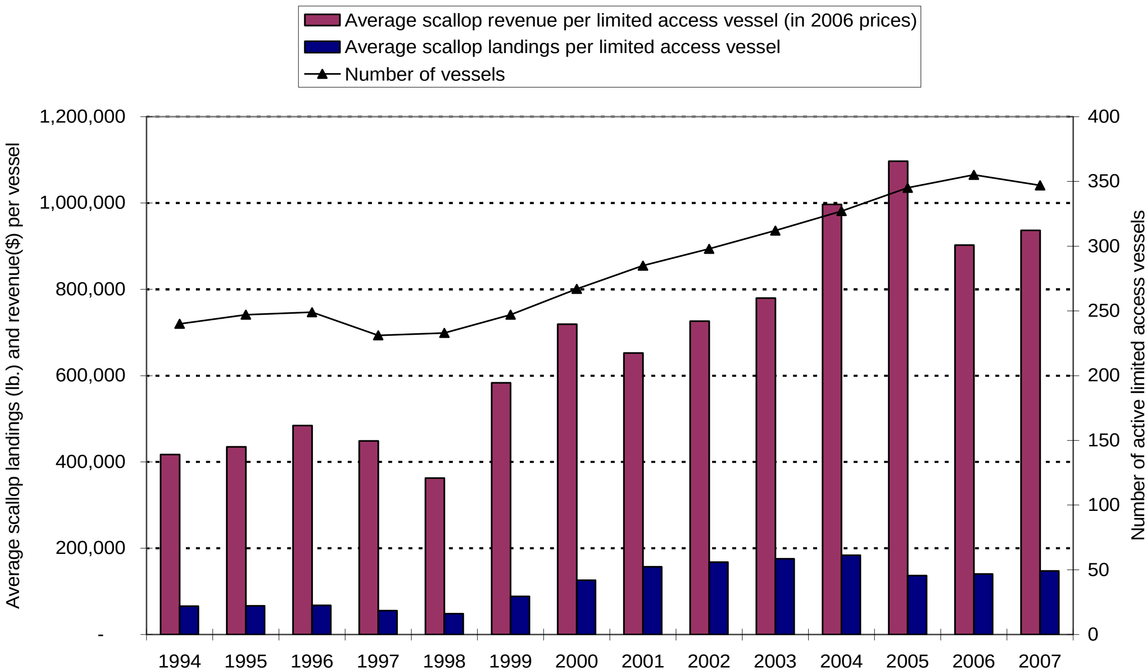


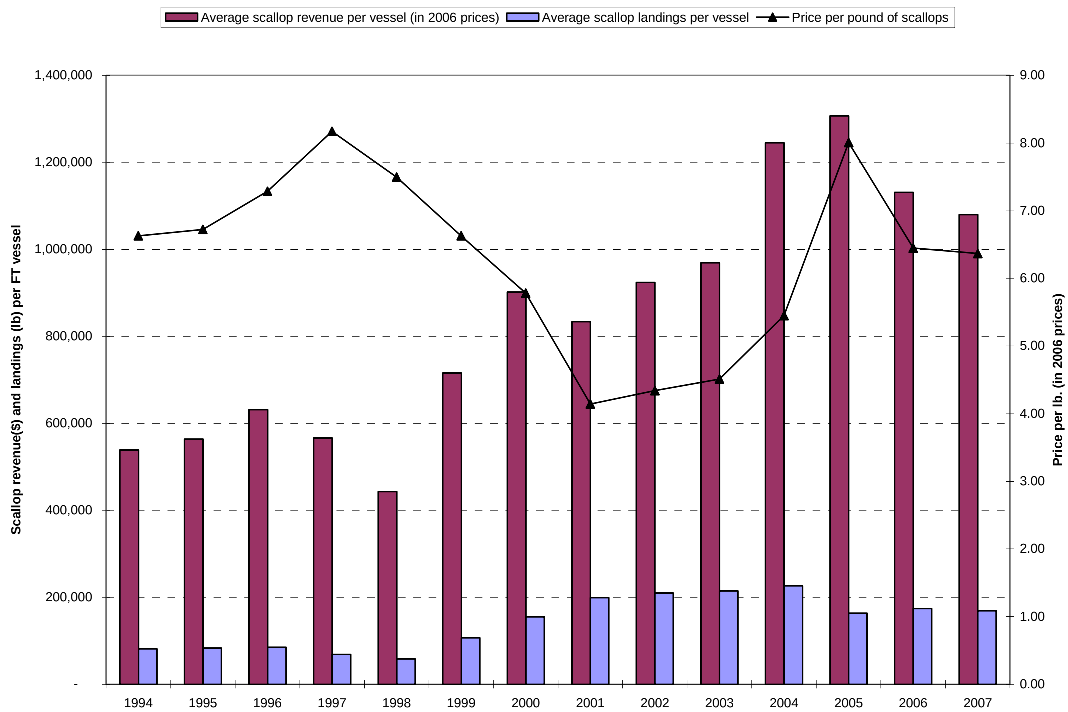
Figure 21. Trends in average scallop landings and revenue per full time vessel and number of active vessels (including full-time, part-time and occasional vessels)



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 22 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 22. 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

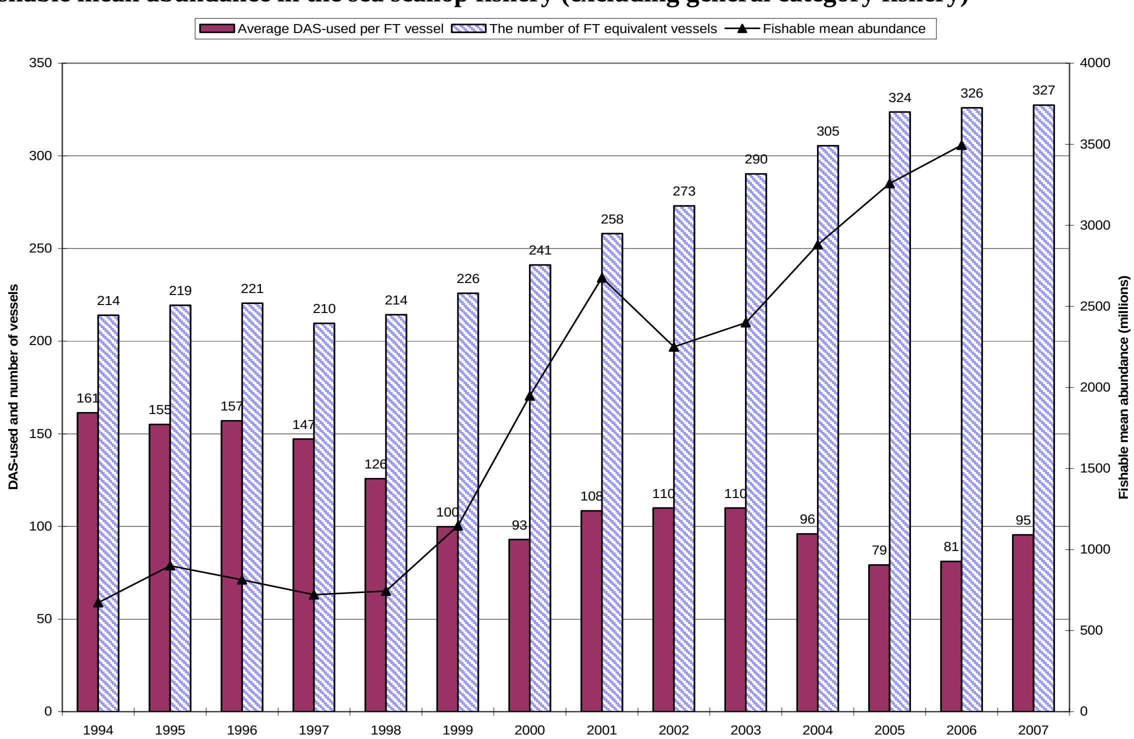
There has been a steady decline in the total DAS used by the limited access scallop vessels from the 1994 to 2001 fishing years as a result of the effort-reduction measures of Amendment 4 (1994) and Amendment 7 (1999)). DAS allocations during this period were reduced almost by half from 204 DAS in 1994 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 25). 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 23). 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 25. 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

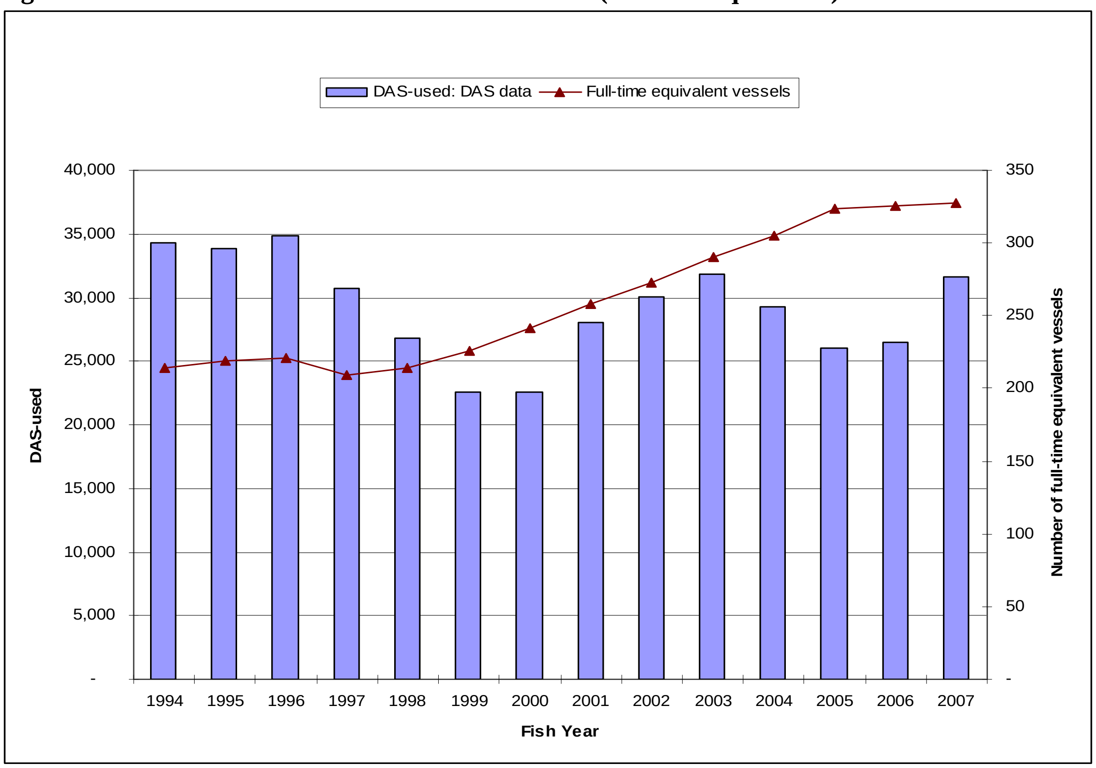
Figure 23. Average DAS-used per full-time vessel, the number of full-time equivalent active vessels and fishable mean abundance in the sea scallop fishery (excluding general category fishery)



DAS Data sources: Reporting changes cause uncertainty in comparing trends in DAS-used.		
1994-2003	SOLE	Enforce.FISHYY
2004-05	CUDA1	DAS.trips
2006-07	CUDA1	Das_use.vms_trip

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 24). 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 24. 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 25, Framework 16). Even though total DAS equivalent allocations remained around the same levels during 2005-2007 (at about 110 equivalent days, Table 25), 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 25 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 26 summarizes the Das used and number of trips taken by full-time vessels in fishing years 2004-2007. In addition, Table 27 describes the fraction of total landings by area for all limited access vessels from 2004-2008. In general, more and more of the total catch for the fishery is coming from access areas, open area catch has declined from 55-60% of total catch in 2004-2006 to just under 40% in 2007 and 2008.

Table 26. 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 28 below.

Table 27 – Percent of total limited access scallop catch by area and calendar year (Dealer and DAS data)

	2004	2005	2006	2007	2008
CA1	0.0%	12.3%	0.0%	9.8%	0.0%
CA2	7.1%	11.8%	26.6%	0.0%	0.0%
ET	0.0%	0.0%	0.0%	31.1%	48.9%
HC	29.3%	14.4%	0.7%	10.0%	0.3%
NL	3.7%	0.0%	16.2%	10.3%	9.7%
OPEN	59.9%	60.9%	55.3%	38.6%	39.5%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%

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 25. Number of limited access vessels by permit category

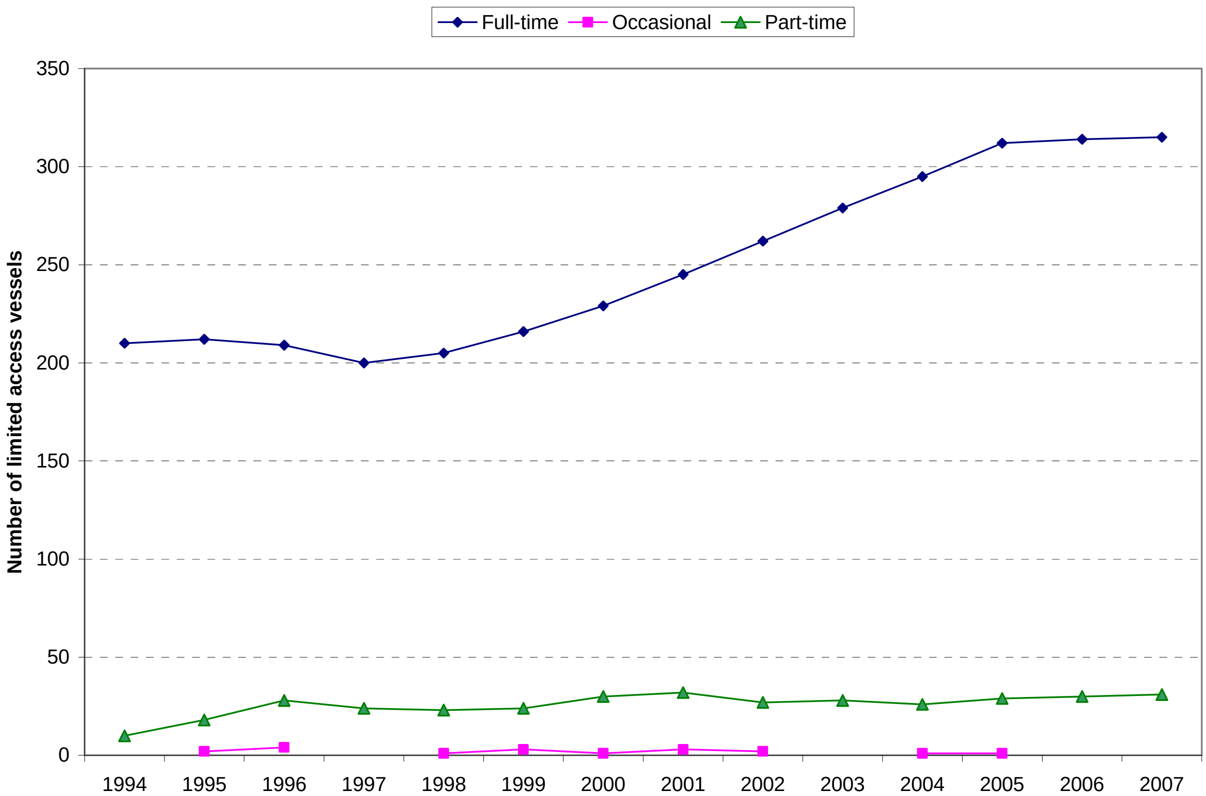
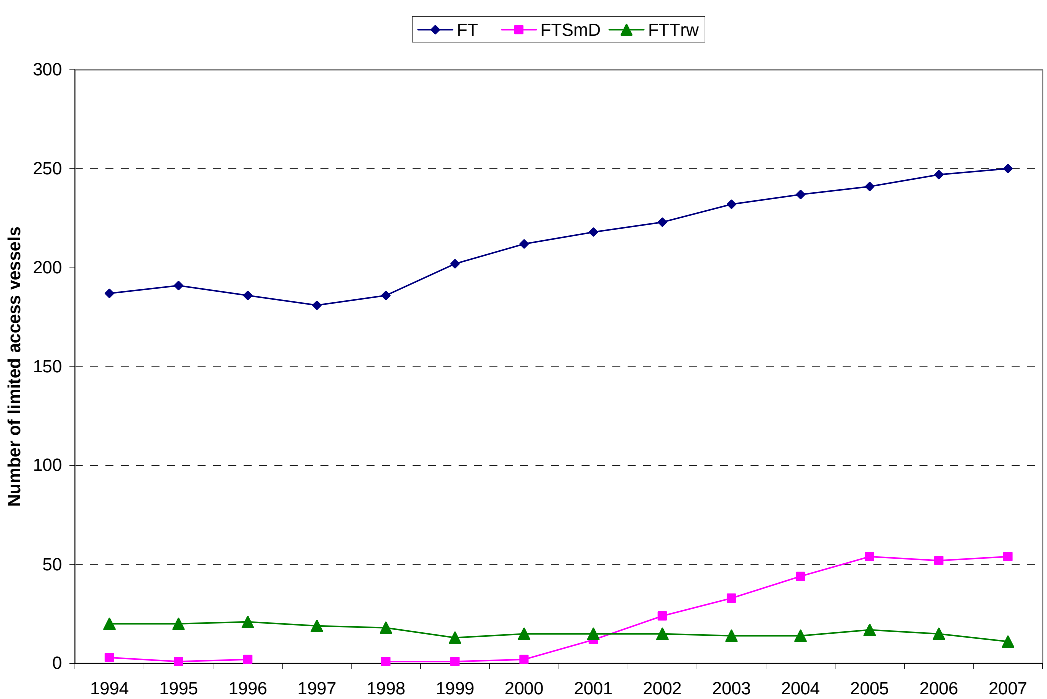


Figure 26. Number of full-time vessels by permit category



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

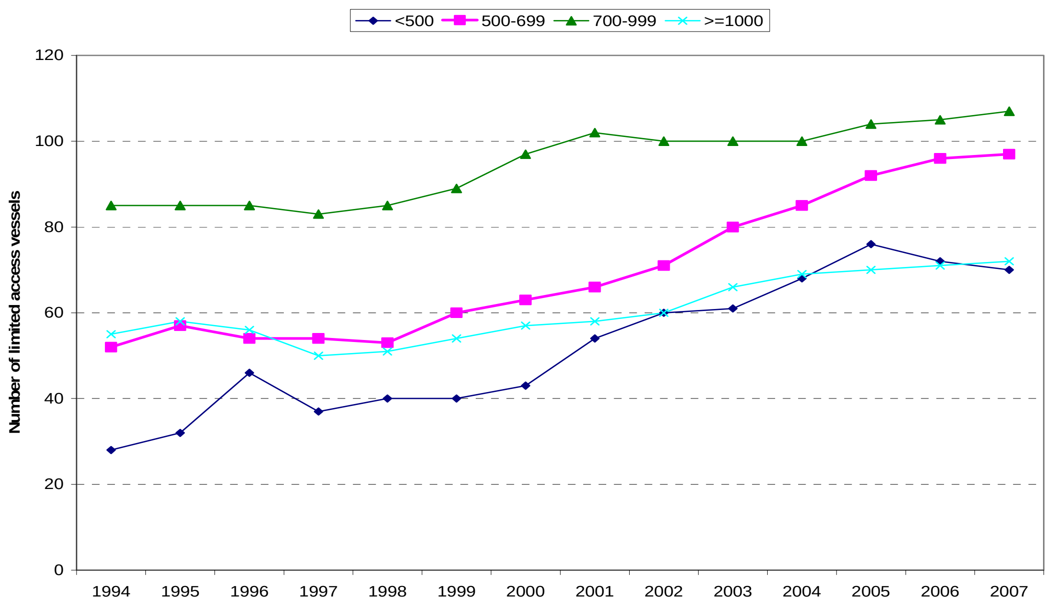


Table 28. Number of limited access vessels by years active

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 28). There is a slight difference in trend for fishing effort weighted by horsepower from the total fleet DAS used as shown in Figure 29.

Figure 28. Average HP, GRT and crew size of limited access vessels

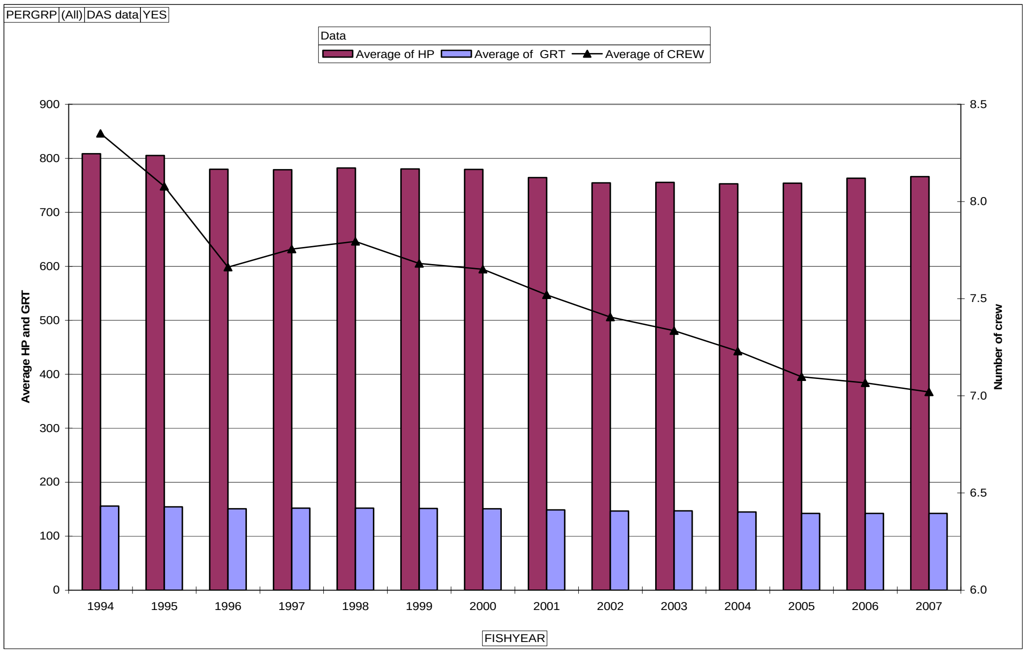
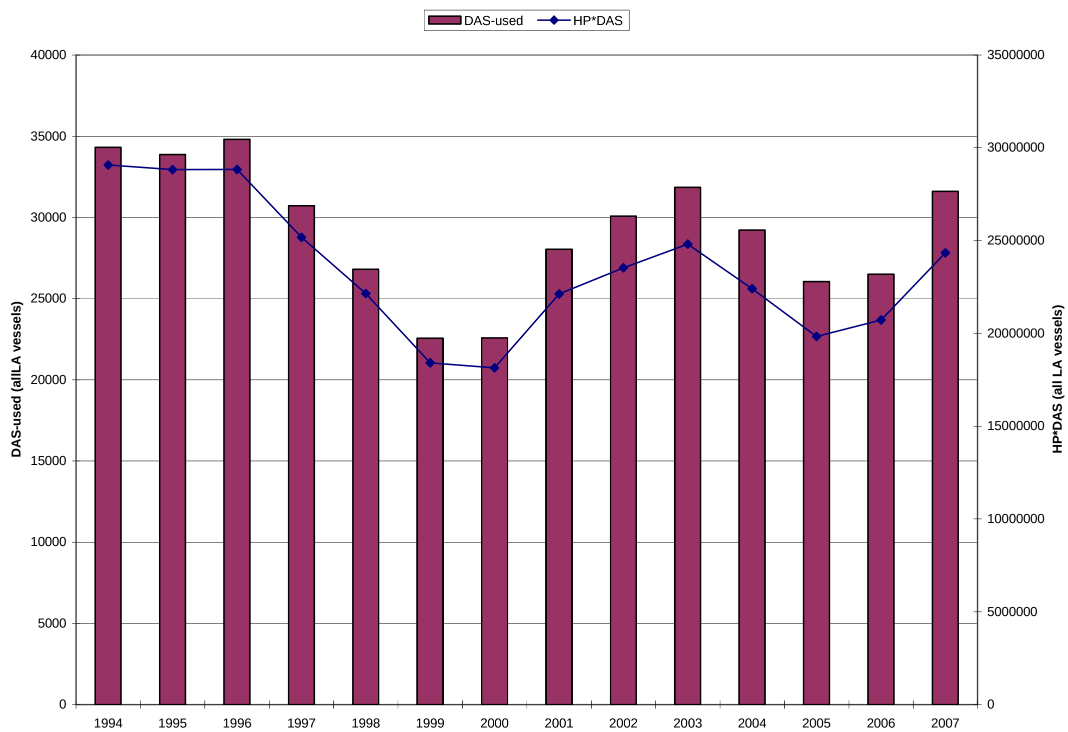


Figure 29. Trends in fishing effort by limited access vessels



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 30). 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 29). 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 30. Fishable biomass, LPUE (annual landings/ DAS) and number of limited access vessels (all vessels)

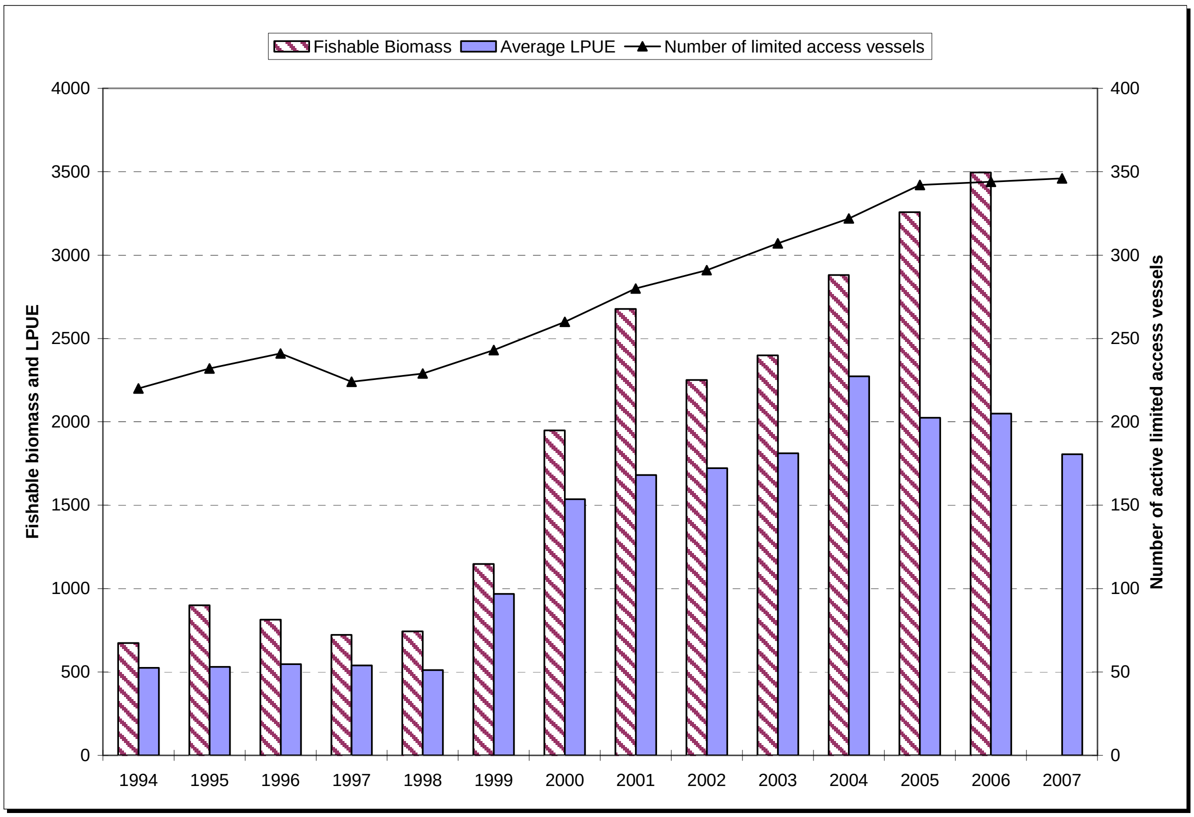


Table 29. Trends in LPUE for full-time vessels (including small dredge and scallop trawls) and fishable mean abundance

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

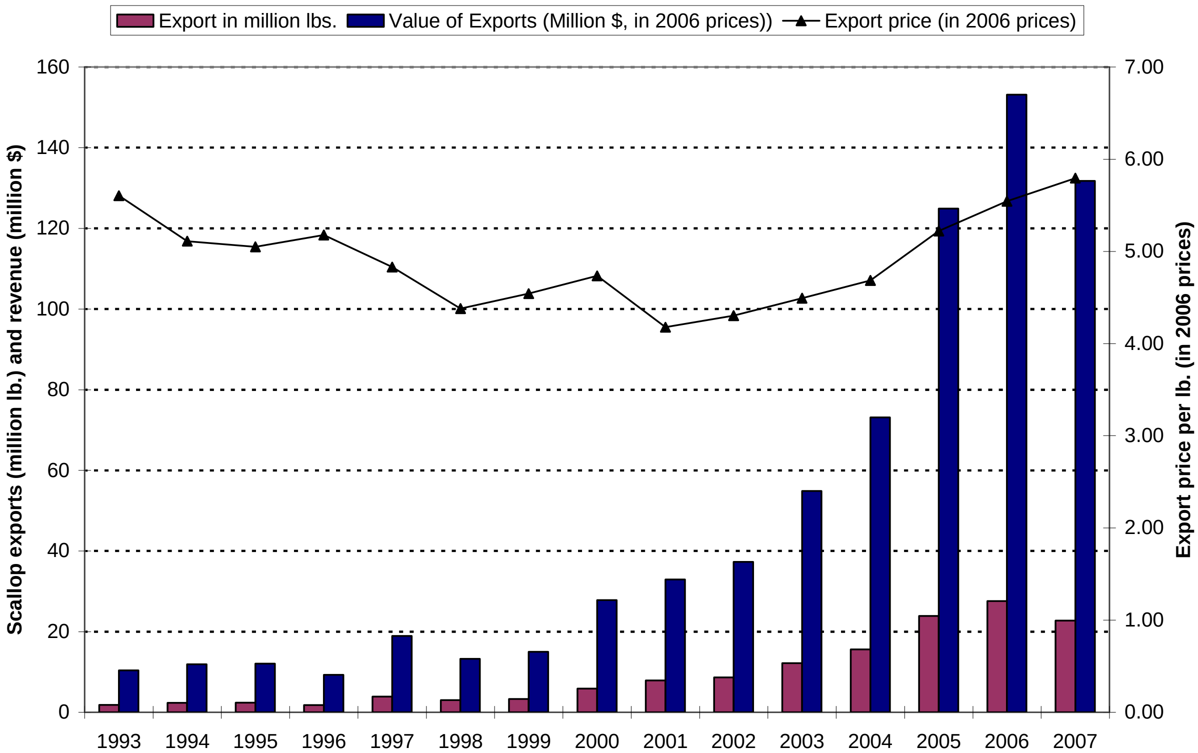
* 45th Stock Assessment Report for Atlantic Sea Scallops (Sept, 2007), Table B5-5, p.183.

4.4.5 Trends in Foreign Trade

4.4.5.1 Exports

Figure 31 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.

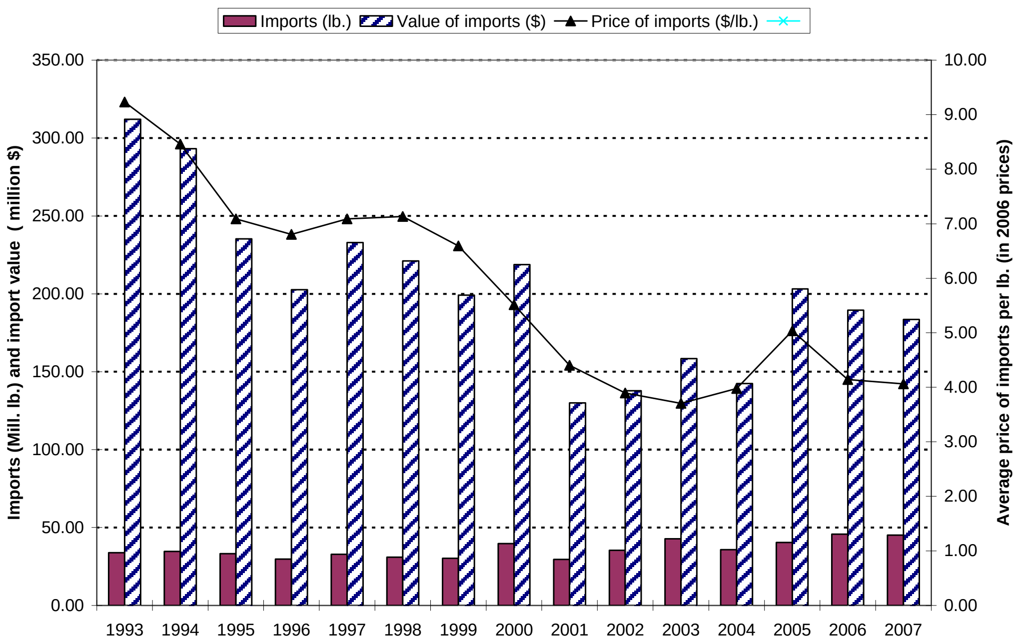
Figure 31. Scallop exports from New England and Mid-Atlantic (by calendar year)



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



4.4.6 The Trends in fishing by gear type

Table 30 through Table 32 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 30). 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 31), with significant amounts also landed by scallop trawls and other trawls. Table 32 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 30. Number of general category vessels by primary gear and fishing year

FISHING YEAR	DREDGE, OTHER	DREDGE, SCALLOP	MISC	TRAWL, OTHER	TRAWL, SCALLOP
1994	*	33	4	42	*
1995	4	91	5	48	4
1996	7	101	13	49	*
1997	6	118	9	55	UNK
1998	10	100	8	52	*
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	*	53	22

* = indicates 3 or less vessels
UNK = value unknown.

Table 31. General category scallop landings by primary 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 32. 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.

4.4.7 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 33). 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 34). 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 33). 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 34). 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 33. 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 34. 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 35. 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 36). 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 37).

Although the largest increases in general category vessels have been from 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 (Table 35). Other ports that saw an increase of 300% in general category vessels, such as Chincoteague, VA and Barnegat Light, NJ (Table 37), had a landed value of $7.3 million and $16.9 million, respectively (Table 35). 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 38 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 36. 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 37. 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 38. Average GRT (gross registered tons), average length, and number of permitted scallop vessels by top 20 homeports, 1994-2008.

			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

Port	Category		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

4.5 NON-TARGET SPECIES

Non-target species (or 'bycatch') include species caught by scallop gear that are not landed, including small scallops. The impacts of the scallop fishery on bycatch have been minimized to the extent practicable. Amendment 10 analyzed the impacts of new management measures (ring size, larger twine top, open area DAS, etc.) on bycatch, relying mainly on recent gear surveys and the general relationship between total area swept and bycatch. In general, the larger twine top mesh allowed greater escapement of many but not all finfish species with minor losses of sea scallop catch (particularly in areas having larger scallops). The effects of the increase to a 4" minimum ring size were assessed for various species observed in field trials, but the major effect came from a greater efficiency in catching scallops over 110-120 mm. Efficiency was forecast to increase by about 10-15%, reducing area swept by the same amount. Since most species were caught incidentally less frequently in dredges with larger rings and efficiency improved in most areas, Amendment 10 estimated that bycatch would decline, particularly in areas having most scallops larger than 110-120 mm. The increase to a minimum 4" ring in all areas occurred in December 2004. Amendment 10 also estimated that the reductions in open area DAS would reduce total area swept and increase scallop LPUE, particularly for larger scallops in the long-term. Appendix IX of Amendment 10 details scallop and finfish bycatch estimates in the scallop fishery (http://www.nefmc.org/scallops/index.html).

Framework 16/39 estimated the total bycatch of many finfish species from observed trips taken in controlled access areas. It also estimated the amount of sampling needed in each area to estimate the total bycatch of a given species with various levels of precision. In general, rotational area management is designed to improve and maintain high scallop yield, while minimizing impacts on groundfish mortality and other finfish catches. Access programs may even reduce fishing mortality for some finfish species, because the total amount of fishing time in access areas is very low compared with fishing time in open areas due to differences in LPUE. See Sections 6.1.1.2 and 6.1.1.3 of Framework 16/39 for more information about the expected impacts on bycatch from that action. Catches of regulated species in the access areas were expected to be less than 10% of the overall TAC in the Multispecies FMP. This amount is less than the level that the Groundfish PDT identified as having possible repercussions for meeting the groundfish mortality targets and affecting the rebuilding of overfished groundfish stocks. Many of the impacts are expected to be similar for Framework 21 since this action proposes to implement similar alternatives to both FW16/39 and FW19. Impacts on non-target species may even be reduced compared to recent years because this action proposes fewer open area DAS and less effort on Georges Bank.

4.5.1 Species caught incidentally in the scallop fishery

To identify potential non-target species caught incidentally in the scallop fishery, the Scallop PDT considered discard info from the 2008 SBRM report, Wigley et al. 2008, and various assessments such as GARM III and the Skates Data-poor Workshop (Table 39). A note of caution in using the 2008 SBRM data was that it was not extrapolated out to the entire fishery. Therefore, fisheries with higher observer coverage, such as the scallop fishery, appeared to have more bycatch than other fisheries.

Based on the 2008 SBRM report in which 2007-2008 data was compiled, the species with more than 5% of total estimated catch from discards in the scallop fishery are: fluke, winter flounder, monkfish, barndoor skate, little skate, unidentified skate, surfclams, and ocean quahog. These species were narrowed down by looking at the report presented by Wigley et al. (2008). While it is based on 2005 data, it is extrapolated out across fisheries such that a consistent conclusion can be made. Based on this report, the PDT identified the following species as having more than 5% of total estimated catch from discards in the scallop fishery: monkfish, skate (overall), and windowpane flounder (Table 40).

In addition to the snapshot of information available from the 2008 SBRM process and Wigley et al. (2008), the PDT also reviewed discard info for the scallop fishery in recent assessments for the species listed above. GARM III for multispecies identified that the scallop fishery caught more than 5% of the bycatch (compared to overall catch) for some species by region (Table 40). Georges Bank (GB) and Southern New England (SNE) yellowtail flounder were caught in amounts greater than 5%, but the Cape Cod yellowtail only has occasional spikes over 5%. GB winter flounder has catch over 5%, but neither SNE nor Gulf of Maine (GOM) winter flounder is caught appreciably. Although there is greater than 5% caught in both the GB/GOM and SNE regions for windowpane flounder, the catch is generally higher in SNE. The Skate Data-poor Working Group identified the greatest bycatch for the scallop fishery as little and winter skates. Lastly, when extrapolated out across the entire fishery, the ocean quahog and surfclam assessments show close to zero bycatch of these species by the scallop fishery.

Table 39 – Summary of discards by species in scallop gear types (Based on 2005 observer data presented in Wigley et al. 2008). All values in live mt.

Species	Fishery Landings + discards	Scallop Fishery Total	Scallop Overall Percent	
Bluefish	3,058	0	0	
Atlantic Herring	100,071	0.05	0.0	
Atlantic Salmon	0	0		
Deep Sea Red Crab	2,117	0.14	0.0	*
Atl. Sea Scallop	219,901	5767.33	2.6	
Atl. Mackerel	43,780	1.42	0.0	
Illex Squid	13,623	1.61	0.0	**
Loligo Squid	17,890	3.48	0.0	**
Butterfish	1,422	0.14	0.0	
Monkfish	23,154	2563.1	11.1	
Atl. Cod	7,182	2.63	0.0	
Haddock	8,121	3.54	0.0	
Yellowtail Flounder	4,803	229.07	4.8	
American Plaice	1,652	8.35	0.5	
Witch Flounder	2,940	48.63	1.7	
Winter Flounder	4,026	118	2.9	
Pollock	6,580	0.03	0.0	
Acadian Redfish	648	0.32	0.0	
White Hake	2,809	5.43	0.2	**
Windowpane Flounder	935	164.81	17.6	
Atl. Halibut	31	0.01	0.0	
Ocean Pout	161	4.44	2.8	

Silver Hake	10,257	17.34	0.2	
Offshore Hake	24	0	0	**
Red Hake	1,959	61.72	3.2	**
Skates	50,168	10697.41	21.3	
Spiny Dogfish	5,489	47.07	0.9	
Summer Flounder	9,005	381.53	4.2	
Scup	4,815	1.47	0.0	
Black Sea Bass	1,395	4.76	0.3	
Atlantic Surfclam	140,886	13.55	0.0	*
Ocean Quahog	113,857	57.48	0.1	*
Tilefish	706	0	0	

* These species have gear-specific, directed fisheries that were not observed in 2005
** Potential "mixed" species: squid unknown, and red, offshore, and white hake mix.

Table 40 – Summary of discards by species in scallop gear types (Based GARM III analyses, except for skates). All values in live mt.

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GB Yellowtail flounder	9.6	14.1	23.6	16.4	0.8	1.1	8.0	1.3	5.2	15.9	7.7
SNE Yellowtail flounder	17.0	11.8	9.9	9.4	1.5	2.3	10.6	3.1	18.5	19.2	23.0
CC/GOM Yellowtail flounder	21.0	14.1	1.9	1.0	3.7	0.6	1.2	1.4	0.4	0.6	5.4
GB Winter flounder	4.8	3.5	3.7	2.6	0.4	0.7	0.1	0.2	4.0	6.9	13.2
GB/GOM Windowpane flounder	19.5	10.5	5.6	6.0	9.9	12.7	3.0	2.2	1.8	11.1	9.4
SNE Windowpane flounder	44.4	28.4	23.6	9.9	3.9	18.2	15.8	10.5	32.8	15.6	17.9
Skate Complex*	41.3	19.0	35.3	20.4	13.7	26.3	23.1	15.2	17.8	20.4	20.5

* Data is from the Skate Data-poor Workshop

4.5.2 Groundfish Mortality Closed Areas and Yellowtail Flounder

The groundfish closed areas were originally established to reduce the effects of fishing on spawning cod and haddock, in particular within Closed Areas I and II. Peak spawning activity occurs from February to April, coinciding with the original seasonal closures. After spawning, these fish often disperse to other areas during their annual migration. Yellowtail flounder is another species that was intended to be protected by the groundfish closed areas. The Georges Bank stock is predominately found on the southeastern and northwestern portions of Georges Bank, overlapping the scallop access areas in Closed Areas I and II. Unlike spawning cod and haddock, however, yellowtail flounder tend to be present in these locations year around. The Southern New England stock of yellowtail flounder was one of the primary intended beneficiaries of the Nantucket Lightship Area. Most of this stock occurs in the portions of the Nantucket Lightship Area that will remain closed to scallop fishing, or in other areas of Southern New England and the Mid-Atlantic region where scallop fishing occurs in open areas. More details about the biological characteristics of groundfish species in the closed areas is provided in the FSEIS for Amendment 13 to the Multispecies FMP.

Amendment 16 to the Multispecies FMP was recently approved by the Council and is currently under review by NMFS; it is expected to be implemented before May 1, 2010. This action identified a process for setting annual catch limits (ACLs) for all Groundfish species. A major sub-component of yellowtail flounder catch is incidental catch in the scallop fishery, most of which is discarded. Amendment 16 calls for this catch to be estimated and identified as an “other sub-component” in 2010 until accountability measures (AMs) can be adopted through the scallop FMP under Amendment 15 in 2011, at which point the sub-component will be considered a sub-ACL. This ACL will apply to all scallop fishery catches of yellowtail flounder.

Framework 44 to the GF plan considered this allocation and the proposed action is to allocate 100% of the projected GB and SNE/MA YT flounder ACL needed for the scallop fishery for FY2010 and 90% of what is needed for 2011 and 2012. These values recognize the importance of yellowtail flounder to the scallop fishery and provide an incentive for scallop fishermen to reduce their YT bycatch in order to maximize scallop yield. The values for 2011 and 2012 can be adjusted if there is new information regarding scallop and yellowtail stocks, or based on access area measures in the scallop fishery for those years. The Council decided not to have a separate allocation for the CC/GOM YT stock for the scallop fishery because estimated levels of catch from that stock are relatively low. This may be changed in the future if it is deemed necessary to include CC/GOM YT as part of the sub-ACL.

The Council approved FW44 at the November 2009 Council meeting, and if approved it will be effective in 2010. This decision to allocate these amounts was based on an analysis of estimated incidental catch of YT in the scallop fishery and the associated impacts of various allocation alternatives on revenue in both the scallop and groundfish fisheries. Multispecies Framework 44 includes all the analyses related to this decision. Framework 44 also proposes that all limited access vessels be required to land all legal-sized yellowtail flounder.

The Scallop and GF PDTs estimated the scallop incidental catch of yellowtail flounder in 2010-2012 for Council action on MS Framework 44. At the September 2009 Council meeting staff presented the amount of YT needed to harvest scallop yield based on the ratio of yellowtail discards to scallop kept catches for the four scallop rotational management scenarios in this action, which will set measures for FY2010 only.

For CC/GOM yellowtail flounder the estimate of required yellowtail flounder allocation is always less than five percent. For GB yellowtail flounder the estimate of required allocation ranges from 11 to 29 percent, while for SNE/MA yellowtail flounder it ranges from 14 to 41 percent (Table 41). There are differences between the scallop scenarios with the ‘no new closure’ scenarios requiring the least yellowtail flounder for GB and SNE/MA yellowtail stocks. The range is relatively large due to the variety of scallop allocation scenarios under consideration (Table 42).

Table 41 – Range of percent YT catch needed for the 4 scallop allocation scenarios under consideration

	2010	2011	2012
CC/GOM	2.0 - 4.5%	1.3 - 2.5%	0.8 - 2.8%
GB	11.4 - 22.4%	20.9 - 24.3%	25.9 - 28.8%
SNE/MA	22.5 - 40.9%	14.0 - 19.5%	15.0 - 15.3%

Table 42 – Summary of expected scallop catch and DAS allocations for 2010

	2010 Scallop Landings (mt)	2010 Estimate of DAS per FT vessel
No Closure F = 0.20	18829	29
No Closure - F = 0.24	21445	38
Closure F = 0.18	22299	42
Closure F = 0.20	24269	51

Proposed action shaded

In terms of YT catch in the scallop fishery in the past, the expected values for 2010 are within the range of catches for each stock area in recent years.

Table 43 summarizes the annual YT catch by scallop dredge gear (landings and discards) for 2004-2008. Annual changes in catch are largely due to varying scallop management tactics that allocated access areas and DAS differently each year.

Table 43 – Summary of YT TACs and YT catch on scallop dredge vessels for 2004-2008 compared to estimates for 2010 (in mt).

	Fishing Year	2004	2005	2006	2007	2008	*2010 Estimates*
CC/GOM	Total TAC	881	1233	650	1078	1406	*863*
	Total TAC for scallop fishery*	86.3	120.8	63.7	105.6	137.8	*N/A***
	Scallop AA open or closed	N/A	N/A	N/A	N/A	N/A	*N/A*
	Total YT catch by dredge gear (landings and discards)	**18**	**6**	**12**	**35**	**5**	***17-30***
SNE	Total TAC	707	1982	146	213	312	*493*
	Total TAC for scallop fishery*	69	194	14	21	31	*111*
	Scallop AA open or closed	open	closed	open	open	open	*open*
	Total YT catch by dredge gear (landings and discards)	**125**	**130**	**168**	**188**	**151**	***111-202***
GB	Total TAC	6000	4260	2070	900	1869	*960*
	Total TAC for scallop fishery*	588	417	203	88	183	*110*
	Scallop AA open or closed	open	open	open	open	closed	*open*
	Total YT catch by dredge gear (landings and discards)	**84**	**194**	**254**	**122**	**134**	**110-215**

*Scallop TAC has been calculated from total TAC = 9.8% of total TAC. These values have not been confirmed with regulations.

** Council decided in Framework 44 that scallop fishery should not receive an allocation of CC/GOM YT since catch relatively minor

The Scallop PDT completed a relatively simple estimate of overall revenue loss if less YT were allocated to the scallop fishery than "needed." For each FW21 scenario an estimate of YT needed by stock area (in both amount and percentage of total) was identified. The PDT then evaluated the overall impact on scallop revenue if some amount less was allocated to the scallop fishery. All the analyses are summarized in FW44, and since the Council selected to allocate

100% of the projected need of YT catch, impacts are expected to be minimal. The Council may consider other ways to address incidental catch of YT in the scallop fishery in the near future.

4.5.3 Observer set-aside program

The scallop fishery is the only fishery in the Northeast that already has an industry-funded observer program in place. Since 1999, the majority of observer coverage in the scallop fishery has been funded through the scallop observer set-aside program. A percentage of the total allowable catch (TAC) in access areas has been deducted before allocations are made to generate funding for vessels required to carry an observer. Amendment 10 extended that requirement to open areas as well, so a percent of potential allocated effort in DAS from open areas is set-aside to help fund the program. Observer coverage is necessary in the scallop fishery to monitor bycatch of finfish and to monitor interactions with endangered and threatened species. Vessels required to carry an observer are authorized to land more than the possession limit from trips in access areas, and in open areas vessels are charged a reduced amount to help compensate for the cost of an observer.

In 2008 and 2009, a total of 629 trips and 404 trips, respectively, were observed on both limited access and general category vessels from the observer set-aside program (Table 44, 2009 numbers are through 11/30/09). This is equivalent to roughly 3600 sea days in 2008 and 2700 sea days in 2009 observed through this program. An additional 96 (in 2008) and 58 (in 2009) sea days were observed and paid for fully with federal funds.

Table 44 – Summary of observed trips in the scallop fishery from observer set-aside program

	2008		2009 (as of 11/30/09)	
	Trips	DAS	Trips	DAS
Elephant Trunk	*4 trips allocated*		*3 trips allocated*	
Limited Access	213	1752	90	799
General Category	150	246	116	213
Delmarva	*Closed*		*1 trip allocated*	
Limited Access	Closed		21	247
General Category	Closed		35	68
Closed Area II	*Closed*		*1 trip*	
Limited Access	Closed		23	191
General Category	Closed		N/A – no trips allocated	
Nantucket Lightship	*1 trip allocated*		*Closed*	
Limited Access	34	244	Closed	
General Category	106	193	Closed	
Open Areas	*35 DAS allocated*		*37 DAS allocated*	
Limited Access	126	1195	119	1200
General Category	N/A – not part of set-aside program		N/A – not part of set-aside program	
TOTAL	***675***	***3726***	***404***	***2718***
Limited Access	**373**	**3191**	**253**	**2437**
General Category	**256**	**436**	**151**	**281**
Additional non-RSA federally funded days (GC Open Area)	46	96	38	58

This framework includes the 1% set-aside for observer coverage from access area TACs as well as 1% of DAS in open areas. Estimated set-aside available for 2010 is 398,756 pounds (Table 13). Based on an estimated value of $7.31 a pound (the updated estimate of average price for 2010 under proposed action scenario), this set-aside is expected to generate approximately $2.9 million dollars. Based on that estimate, approximately 3,737 sea-days could be covered under the current set-aside program, assuming a $780 per day cost to carry an observer. This value far exceeds the number of sea days needed to achieve the SBRM mandate of a 30% CV. The estimated sea days needed in the scallop fishery for 2009 were calculated using the same methods as the SBRM Amendment (NMFS, 2007).

For 2009 (April 2009-March 2010), 1354 sea days would achieve a 30% CV for all fishing modes in the scallop fishery (not counting federally funded general category open area days, 1564 with these days). Therefore, if the needed observer coverage levels for 2010 are similar to the values generated for 2009 with the 2007-2008 data, the 1% set-aside is expected to provide adequate funding to attain a 30% CV for each fishing mode. If additional days are needed to adequately observe the fishery beyond the 1% set-aside, they would be funded either directly by the industry from vessels that are required to carry an observer after the set-aside has been exhausted or funded by the federal government under the regular observer program budget. The SBRM prioritization information for 2010 is expected to be available early in the 2010 calendar year, before April 2010 when the next year begins.

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 <u>and</u> 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.

5.1.1.1 Summary of biological projections for the No Action alternative

Under the no action alternative overall fishing mortality is about F=0.25. DAS are 42 for full-time vessels under this scenario, 3 trips in ETA and one trip in Delmarva. The total biomass from 2010 through 2016 is about 1.67 million MT (Table 45), less than the proposed action slightly more than NCLF24 scenario (Table 47). Total landings for 2010 under this alternative is 22,510 mt or 49.6 million pounds. While landings are higher for 2010 under no action than the proposed action, it should be noted that there are very low U10 landings under No Action, due to no fishing in GB closed areas. The cumulative landings for 2010-2016 for the No Action alternative are 427.5 million pounds, just less than the proposed action and slightly more than NCLF24. Finally, total bottom area swept in 2010 is higher than the proposed action as well as NCLF24, since DAS allocations are higher (Table 54).

Table 45 – Summary of biological projections for No Action alternative

Year	Total Biomass (mt)	Landings (lbs)	Bottom Area
2010	154,012	49,626,064	4,390
2011	171,583	59,317,586	3,349
2012	181,958	66,652,367	4,547
2013	185,518	62,622,316	4,429
2014	190,050	65,909,409	4,572
2015	191,604	64,729,936	4,864
2016	192,603	58,631,949	5,625
Cum 2010-2016	1,267,328	427,489,627	31,776

Overall, impacts of No Action on the scallop resource would higher than other scenarios since overall estimate of F is higher (0.25). DAS are higher than most scenarios and no additional area is closed, thus overall F is higher. Fishing effort in ETA would definitely be higher than all scenarios since this alternative allows for three trips in ETA, same as 2009. 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. Not closing the Channel under No Action would reduce the potential yield from that area in the near and long term.

There are several measures included in this action that will be in effect if FW21 is delayed. Since these measures are designed to prevent excessive fishing before FW21 is implemented they are expected to have positive impacts on the resource. Any effort used prior to implementation that ends up being more than what is ultimately allocated will be reduced on an individual basis in 2011. For example, if a vessel uses more than 29 DAS in FY2010, any additional DAS will be reduced from their 2011 allocation.

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 33). 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 46 – 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

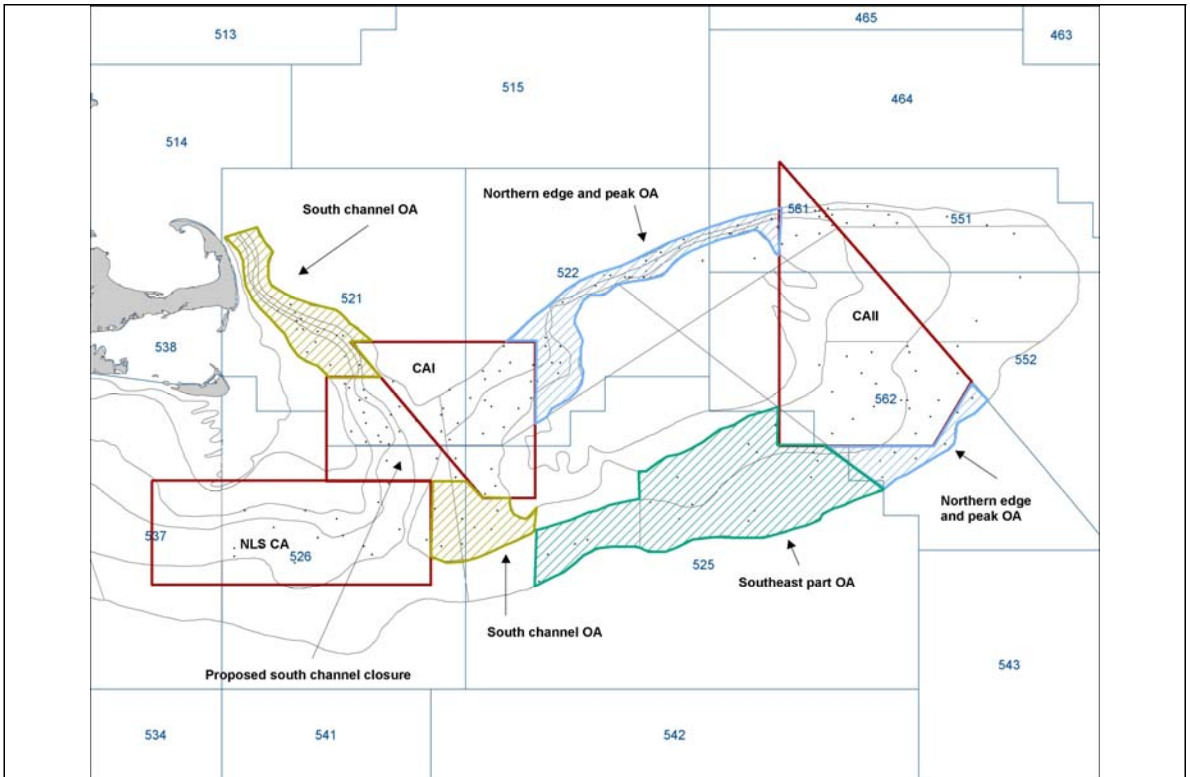
** The full-time individual DAS value is based on an estimate of 340 active full-time equivalent limited access vessels. These values have removed TAC for general category allocations and set-asides.*

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 34 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 33- SAMS model areas, with statistical areas and stratum boundaries on Georges Bank and the Mid-Atlantic



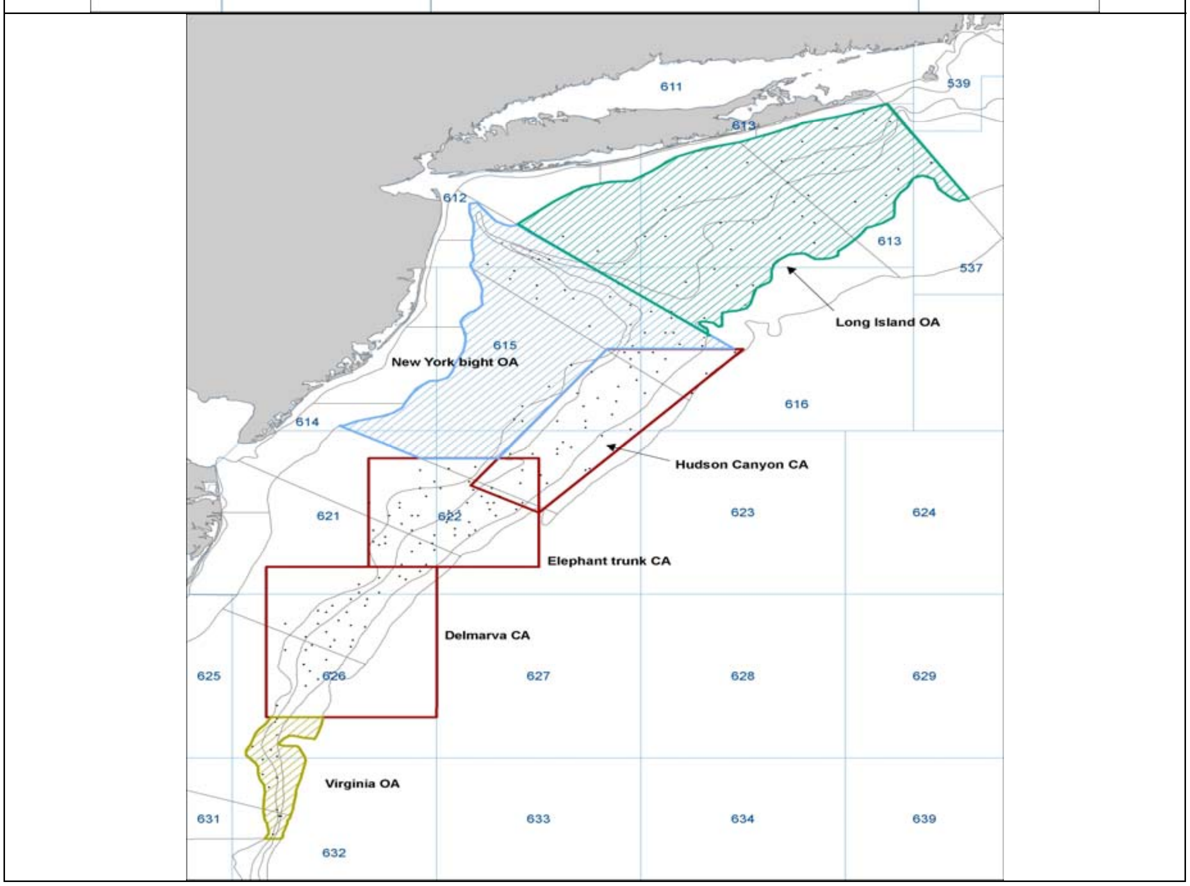
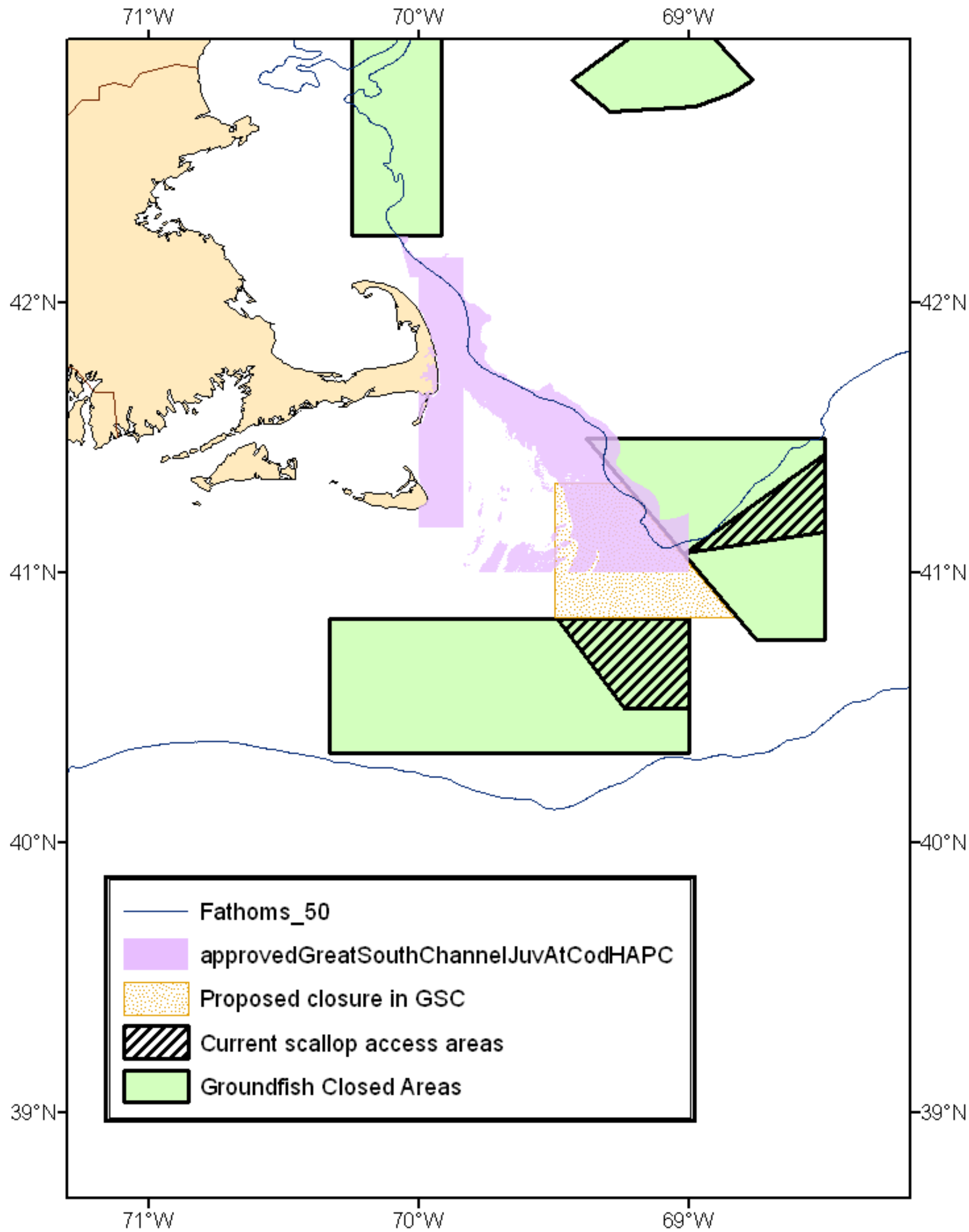


Figure 34 – Approved GSC Juvenile Cod HAPC in Draft EFH Omnibus Amendment (shaded area in Channel) with proposed scallop rotational area in the Channel (gray outline between CA1 and NL)



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 47). In the short term (2010-2012) NCLF20 scenario has slightly higher biomass, but in the long-term CLF18 has the highest biomass compared to all the other scenarios (Table 48). From 2013 and the next several years the Channel area reopens as an access area CLF18 has biomass values close to 200,000 mt (440 million pounds) (Figure 35).

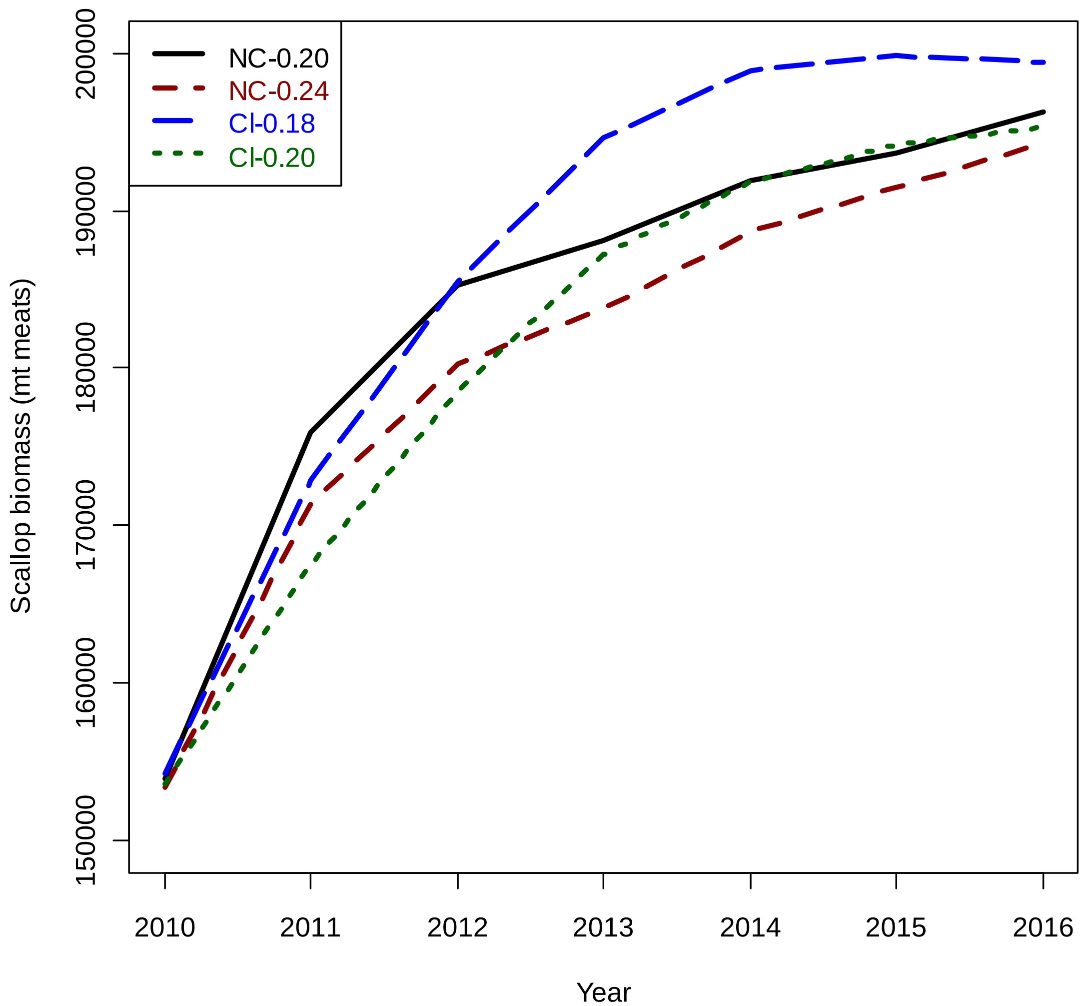
Table 47 – Total projected 2010 scallop exploitable biomass by scenario and SAMS area (million pounds)

	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 48 – Total biomass in mt by year and scenario (2010-2016)

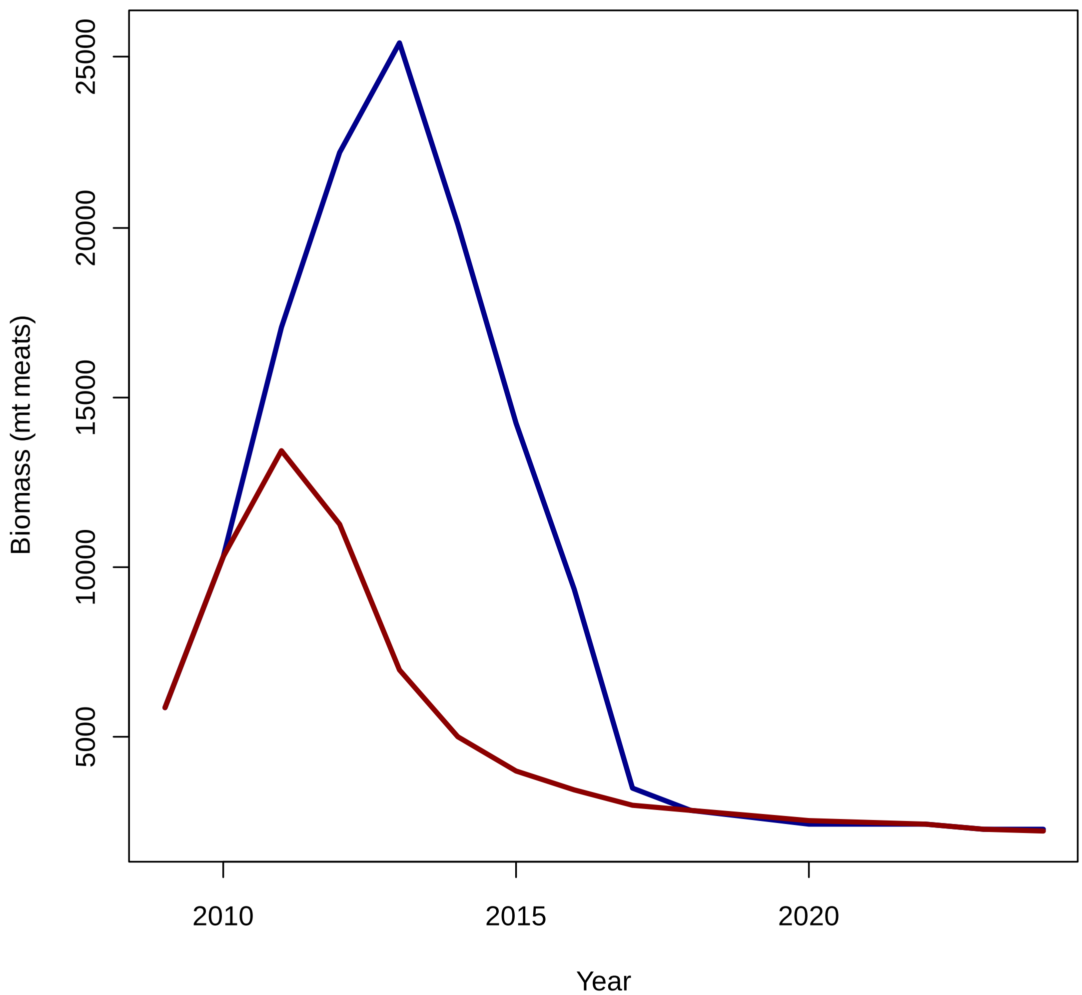
	Biomass			
year	**nc20**	**nc24**	**cl18**	**cl20**
2010	153,912	153,396	154,212	153,566
2011	175,935	171,345	172,854	167,573
2012	185,267	180,230	185,439	178,499
2013	188,053	183,770	194,641	187,274
2014	191,951	188,596	198,823	191,774
2015	193,688	191,471	199,817	194,184
2016	196,258	194,343	199,384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

Figure 35 - Comparison of projected scallop 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 36).

Figure 36 - 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 49). 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 50).

Table 49 – 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

** Note that all catch associated with CA1 access area has been converted to catch from NL access area. Original projection included partial access in both areas – but ultimate allocation scenarios have full access from NL only. Total catch from NL will be sum of CL1-Acc and NLS-Acc.*

Table 50 – 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 37 - Comparison of projected scallop landings for the scenarios under consideration (2010-2016) in mt

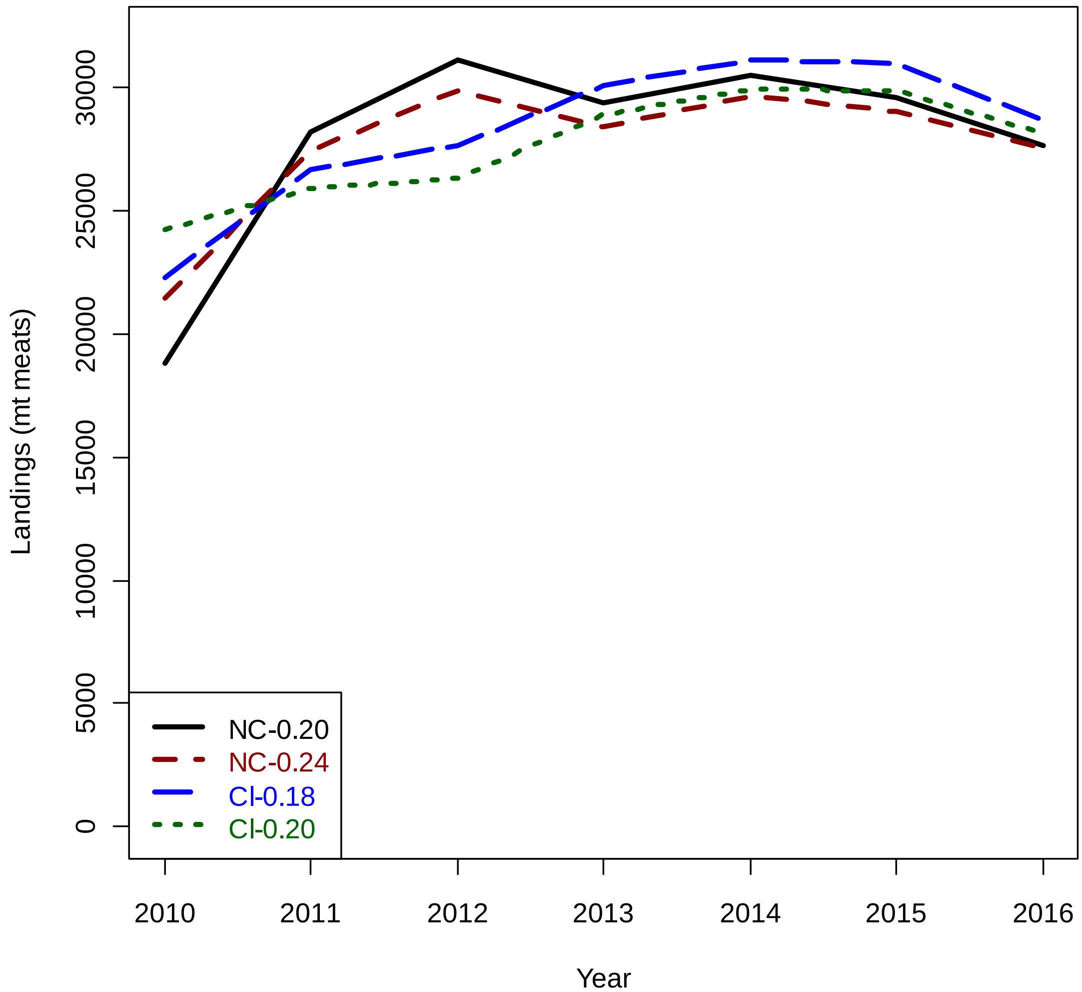


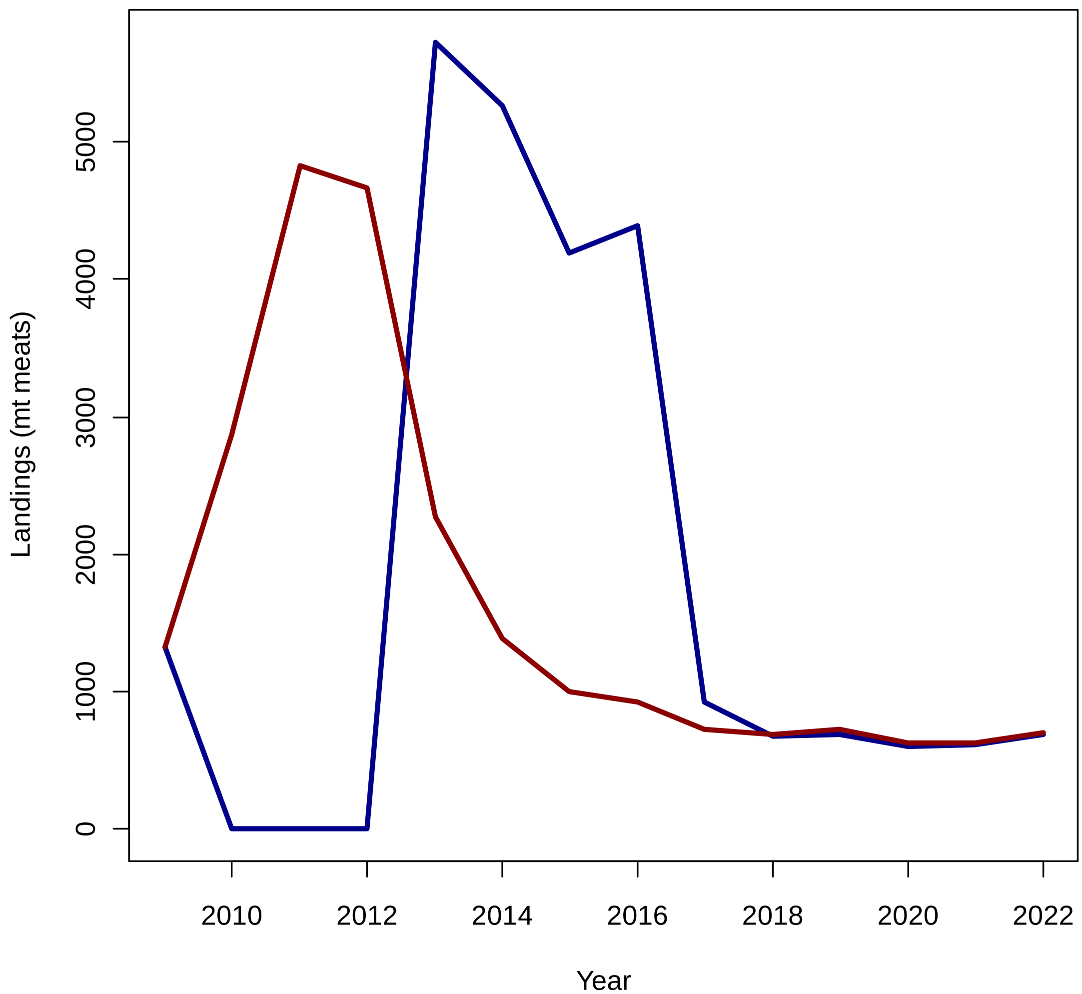
Figure 38 compares the projected catch from the Channel area if it is closed in this action, compared to if it is left open. Again, for 2010-2012 catch is higher from that area if left open, and declines quickly after 2012. If closed catch will be higher in 2013 (over 5000 MT or 12 million pounds). Table 51 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 51 – Projected landings from the channel closure area for 2010-2016 (pounds)

Scenario	CLF18	CLF20	NCLF20	NCLF24
Sreg	Sch-CI	Sch-CI	Sch-CI	Sch-CI
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 38 - 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

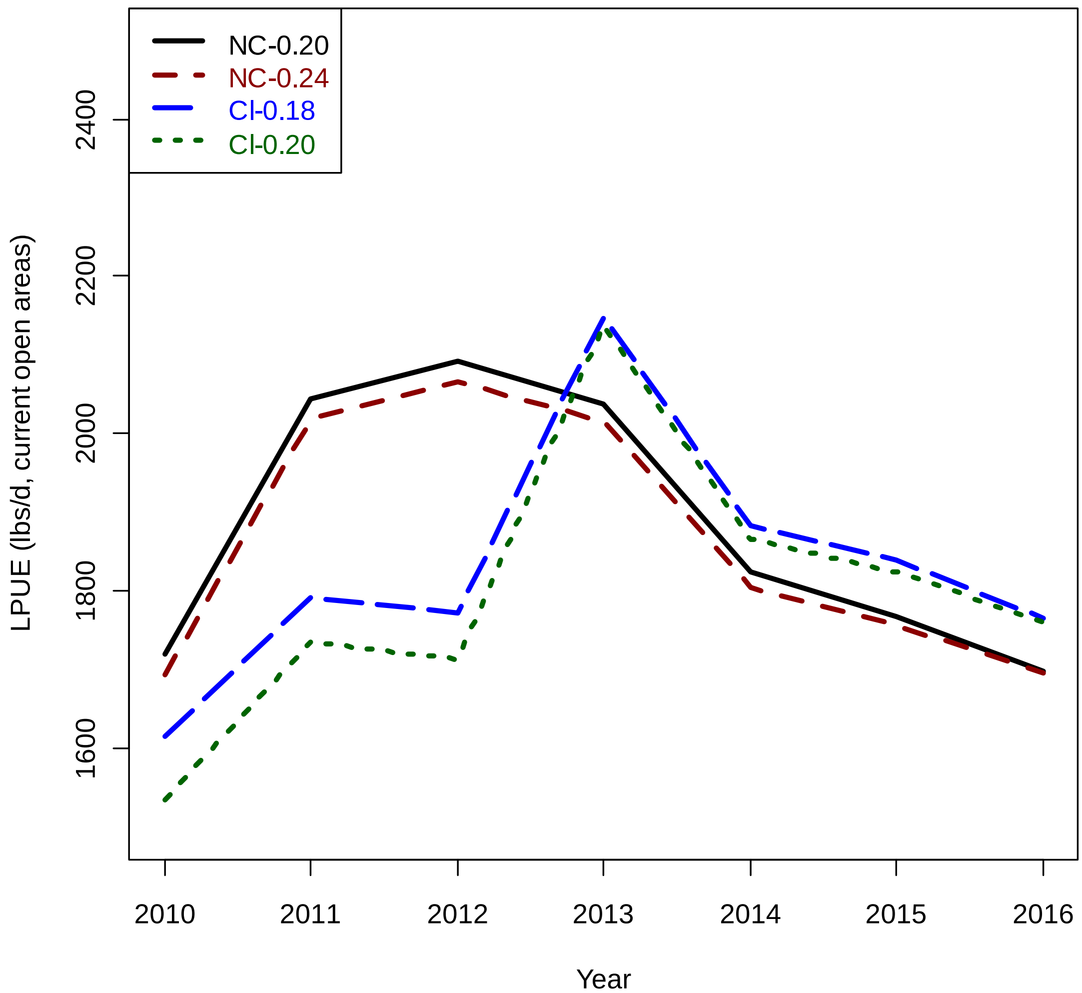
In 2010 overall LPUE is estimated to be between 1,671 and 1,885 depending on the scenario. It is much higher in access areas compared to open areas. LPUE values are similar for the scenarios in access areas, so LPUE are compared in this section for open areas only. In FY2010-2012 LPUE is higher for the 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 39 – 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 52. 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

** Note that all DAS associated with CA1 access area has been converted to catch from NL access area. Original projection included partial access in both areas – but ultimate allocation scenarios have full access from NL only. Total DAS used in NL will be sum of CL1-Acc and NLS-Acc.*

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 53). 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 54). 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 53. 2010 Projected bottom area swept (sq. nautical miles)

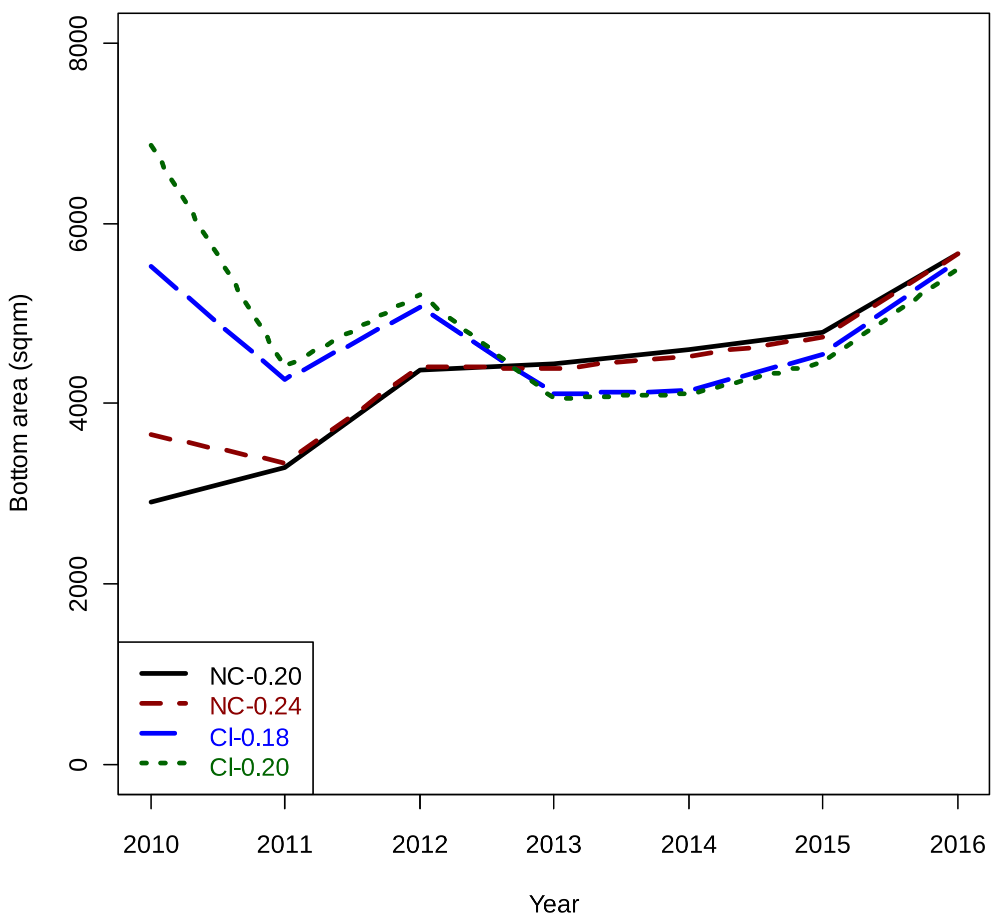
Reg	Sreg	CLF18	CLF20	NCLF20	NCLF24
GB	SEP	748	964	275	388
	CL1-Acc	142	143	141	143
	CL1-NA	0	0	0	0
	CL2-Acc	0	0	0	0
	CL2-NA	0	0	0	0
	NEP	299	393	105	150
	NLS-Acc	162	163	163	163
	NLS-NA	0	0	0	0
	Sch-Cl	0	0	203	290
	Sch-Op	459	585	169	239
MA	DMV	173	173	173	173
	ET	690	699	694	696
	HCS	0	0	0	0
	LI	1,738	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

** Note that all area swept associated with CA1 access area has been converted to catch from NL access area. Original projection included partial access in both areas – but ultimate allocation scenarios have full access from NL only. Total area swept in NL will be sum of CL1-Acc and NLS-Acc.*

Table 54 – 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 40 – 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 48). 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 36). 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 50). **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 do *not* close the channel, particularly in 2010-2012 while the channel is closed because DAS allocations are substantially higher 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.

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 5.4 DAS under the proposed action. 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 5.4 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 15. 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 4). 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.

<u>Physical area of proposed closure</u>
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 55 – Physical area comparison of open versus closed with proposed GSC area

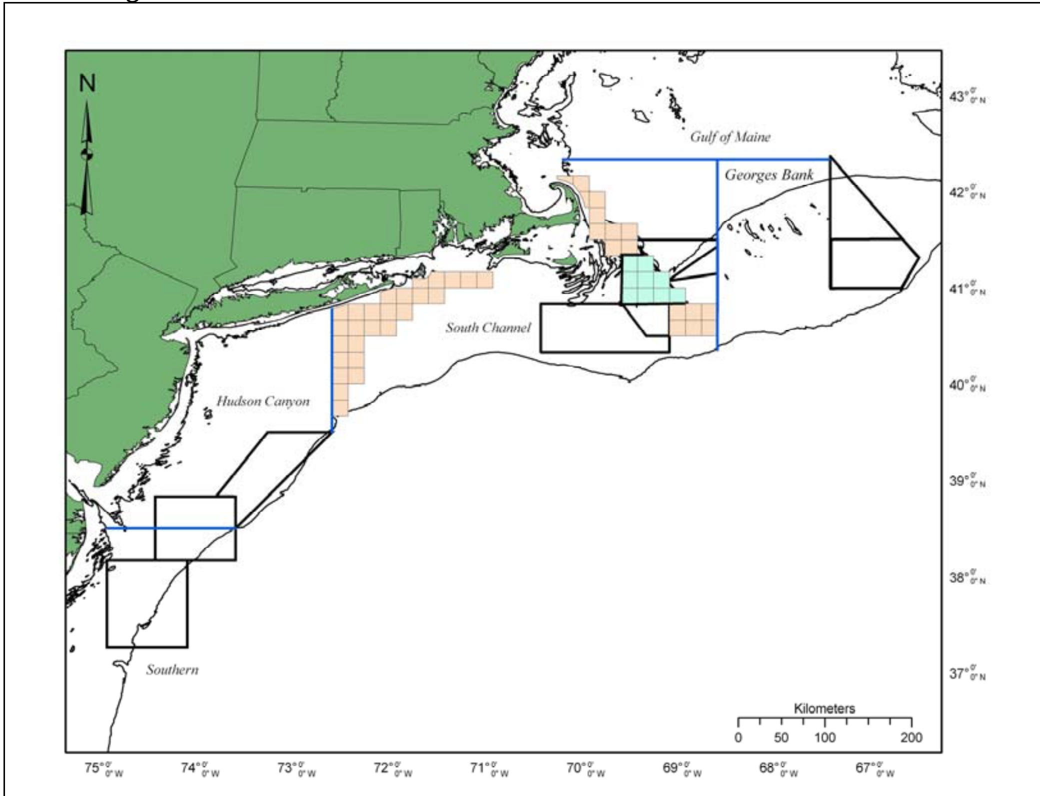
Region	Area km^2	% of Area Contained in Proposed GSC Closure
Proposed GSC Closure	2332	
A10 South Channel Region	13129	18
A10 South Channel Region - excluding Proposed GSC Closure	10797	22
Georges Bank Open Area	20310	11
Georges Bank Open Area - Excluding Proposed GSC Closure	17978	13

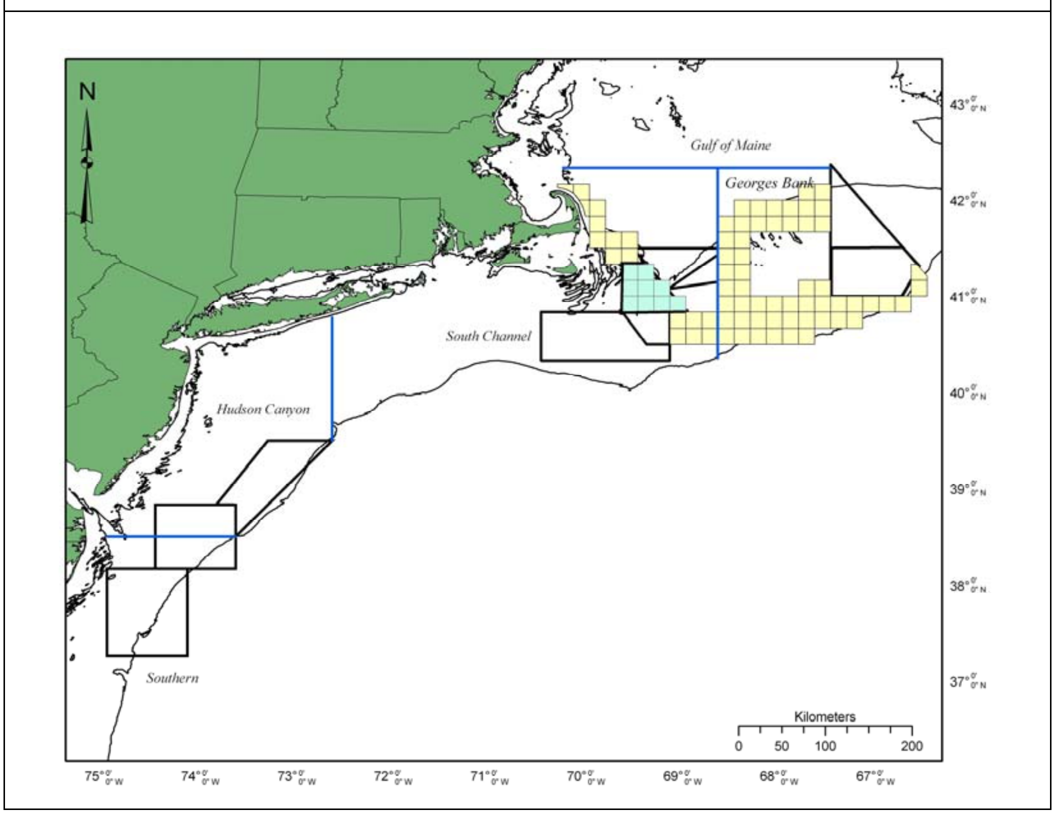
Biomass
If time permits the PDT may analyze the total amount of exploitable biomass in the proposed closure compared to both the South Channel area and what percent of the total open area on GB is within this area using data from the combined biomass estimates from 2009. For the time being, based on 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 41 – 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.

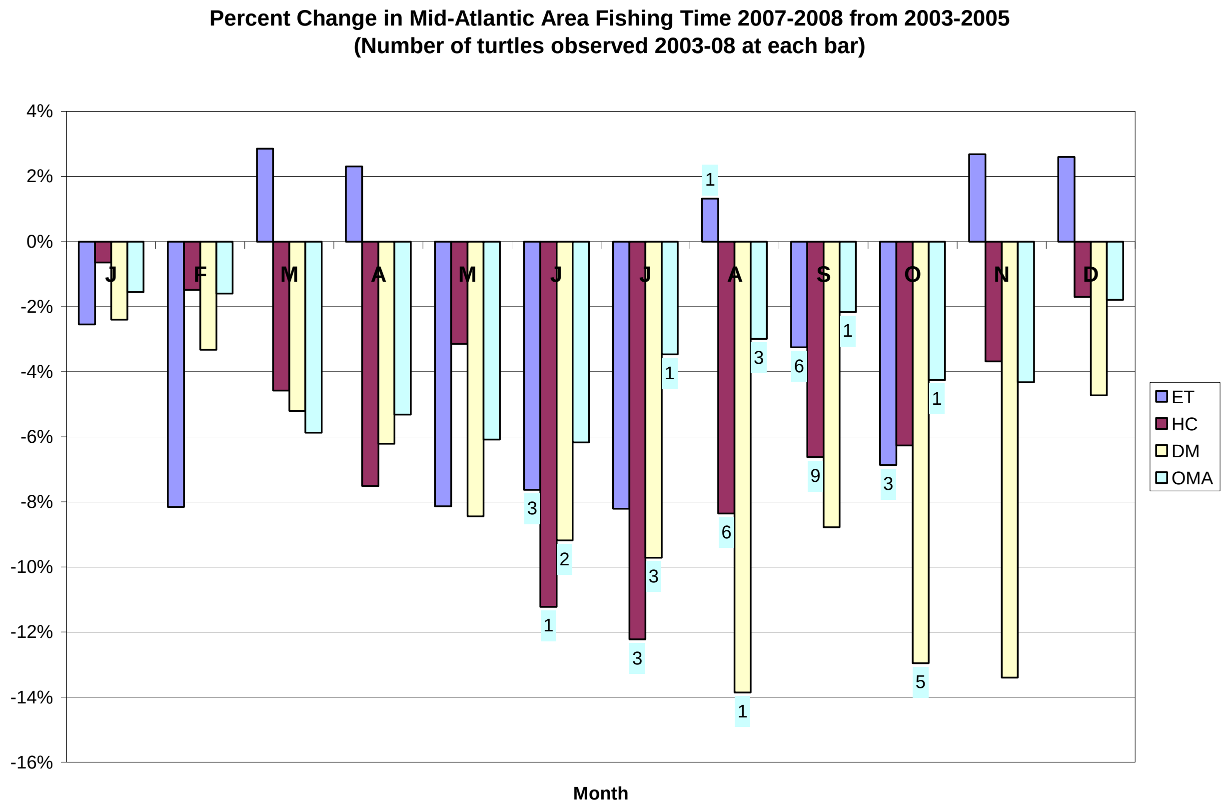
In terms of the season alternatives, if the restriction is extended into late October that is actually good for the scallop resource, provided effort from those two weeks are used during more productive months. This alternative will have more impacts the more trips that are impacted by the RPM. Overall, 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 42). 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 42 – 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.

Comparing area swept estimates for two F levels with GSC closure and without, the GSC closure scenarios have increased area swept in both the short-term (i.e. FY2010) and the long term (cumulative from 2010-2016). In addition to area swept concerns, a Habitat Area of Particular Concern (HAPC) was proposed in this area and approved by the Council in September 2007 as part of Omnibus EFH Amendment 2. Part of the rationale for establishing this area was protection of juvenile cod habitat, as evidenced by an abundance of juvenile cod in the region according to survey data. While there are currently no management measures associated with this HAPC, measures could be proposed during Phase 2 of Omnibus EFH Amendment 2, which is ongoing. Establishment of a scallop rotational closure in this action could affect the types of measures that might be developed.

Given these two factors, area swept and status as a proposed HAPC, this closure is expected to have potentially negative impacts on EFH.

Allocation scenarios

Four allocation scenarios are under consideration in this framework: (1) No closure in Channel, Overall F = 0.20 (status quo F); (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 56 – 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

If the NL access area closes due to yellowtail bycatch, this alternative specifies the number of open area days at sea allocated for each trip not taken before the closure. The allocation rate of open DAS per access trip is intended to have neutral impacts in terms of sea scallop mortality, and accounts for the size of scallops in each of the areas (open vs. NL access). NL landings are restricted based on trip limits, but open area landings are not. On one hand, it is possible that vessels could sweep more of the seabed fishing under 5.4 open area DAS (under NCLF20) as compared to catching their trip limit in the NL. However, impacts to EFH resulting from the same amount of area swept may vary depending on where those areas are and what types of seabed habitats are present. Recently catch rates in open areas have been higher than during past NL openings, such that fishing might be limited by shucking capacity rather than by DAS constraints. Given these factors, it is difficult to predict whether impacts to EFH would be negative, positive, or neutral if the NL closes and open area fishing occurs.

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 Background

The Framework Adjustment 21 alternatives are evaluated below for their impacts on protected resources with a focus on threatened and endangered sea turtles, as noted in the Affected Environment Section. As with the analyses provided in the last scallop management action, the species considered here are loggerhead, leatherback, Kemp's ridley and green sea turtles.

Both scallop dredge and scallop trawl gear will be addressed in this section, generally collectively, given they are the most commonly used gears by general category and limited access vessels in this fishery. To evaluate impacts it may be helpful to note that the majority of fishing effort is attributed to the dredge fishery. Most of the approximately 340 active limited access vessels use dredge gear. There are about 400 general category vessels that are expected to be allowed to land 10 percent of the total projected scallop landings during the transition period to IFQs and 5 percent of the total once the transition measures are phased out, likely before March 1, 2010.

To briefly summarize the sea scallop fishery management program, it employs a limited access permit system and controls DAS use in scallop open areas. Limited numbers of trips with trip limits also are allowed in designated rotational access areas. Major harvest areas include Georges Bank with less activity in the Gulf of Maine. Both are regions in which turtles are far less likely to be found relative to Mid-Atlantic waters, where effort and scallop catch levels have increased in recent years. In addition, directed general category scallop fishing effort has increased overall since 1994, including new effort in the Mid-Atlantic, but this trend is being addressed by measures implemented in Amendment 11 to the Atlantic Sea Scallop Fishery Management Plan.

Although scallop fishing is a year-round activity, takes of sea turtles potentially may occur from May through November given the overlap of the sea turtle distribution (Shoop and Kenney 1992; Braun-McNeill and Epperly 2002) and fishery effort (NEFMC 2003, 2005).

With respect to sea turtle interactions with the fishery overall, it is noteworthy that there were very low levels of observer coverage throughout the fishery up to 2001 (though observer coverage during 2001 and 2002 was concentrated mainly in the Hudson Canyon Access Area). Since that time, bycatch rates, with a focus on the Mid-Atlantic, have been analyzed in a number of publications that are discussed in the Affected Environment section.

Beginning in September 2006, federally permitted scallop dredge gear must be modified by adding an arrangement of horizontal and vertical chains, referred to as "chain mats", between the sweep and the cutting bar when fishing in an area that extends 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 (71 FR 50361). The requirement is expected to reduce the severity of some turtle interactions with scallop dredge gear. There has also been a seasonal closure in ETA from September 1-October 31 since the area re-opened as an access area.

With respect to Framework Adjustment 21, several rotational fishing areas are considered: Nantucket Lightship Closed Area (NLCA), the Elephant Trunk Area (ETA), the Delmarva Area (DMV), and a potentially new access area in the Great South Channel off Cape Cod. Measures primarily serve to set 2010 access levels to these areas and change levels of fishing effort in the areas outside of these rotational areas. Additional measures address adjustments to the observer program and specific measures to comply with the recent biological opinion of this fishery related to impacts on sea turtles.

Discussions regarding sea turtle interactions with the fishery are largely qualitative and based on factors such as projected DAS use-by-area and projected bottom area swept (Section 5.3.3). It is important to recognize that neither factor directly relates to the frequency of turtle bycatch in the fishery, but provide some measure of how much effort is projected to occur and which areas might be subject to more or less activity based on catch rates. Although it is not repeated in each alternative, the general assumption is made that turtles interactions occur when and where scallop fishing effort overlaps with the presence of sea turtles. Risks may be greater during turtle high use periods, but interactions could still occur in the margins of that period given that both turtle distribution and fishing activities are highly variable.

The analyses for the alternatives to comply with the RPM are also largely qualitatively in terms of direct impacts on sea turtles. However, the approach used to determine if impacts of the measures are expected to have more than a minor impact on the fishery are quantitative. The Scallop PDT used a similar approach for assessing what constitutes a more than minor impact on the fishery as it did last year when the Council was asked to evaluate original RPM measures in a previous biological opinion. The methods and results of the more than minor impact analyses are presented first below in Section 5.3.2, and are followed by an evaluation of the impacts of all FW21 alternatives on protected resources, namely sea turtles (Section 5.3.3).

5.3.2 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.

5.3.2.1 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.

5.3.2.1.1 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 57). The model assumes that effort will be distributed by these percentages in 2010 as well.

2) **Effort displacement for open areas and access areas: 100%**

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) **Open area effort distribution between Georges Bank and Mid-Atlantic**

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 58).

4) **The seasonal composition of access area effort**

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 59).

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 57 – 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 58 – 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 59 – 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 60).

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 61). 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 60 – 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 61 - 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 5.3.2.1.2 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 62 – 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

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

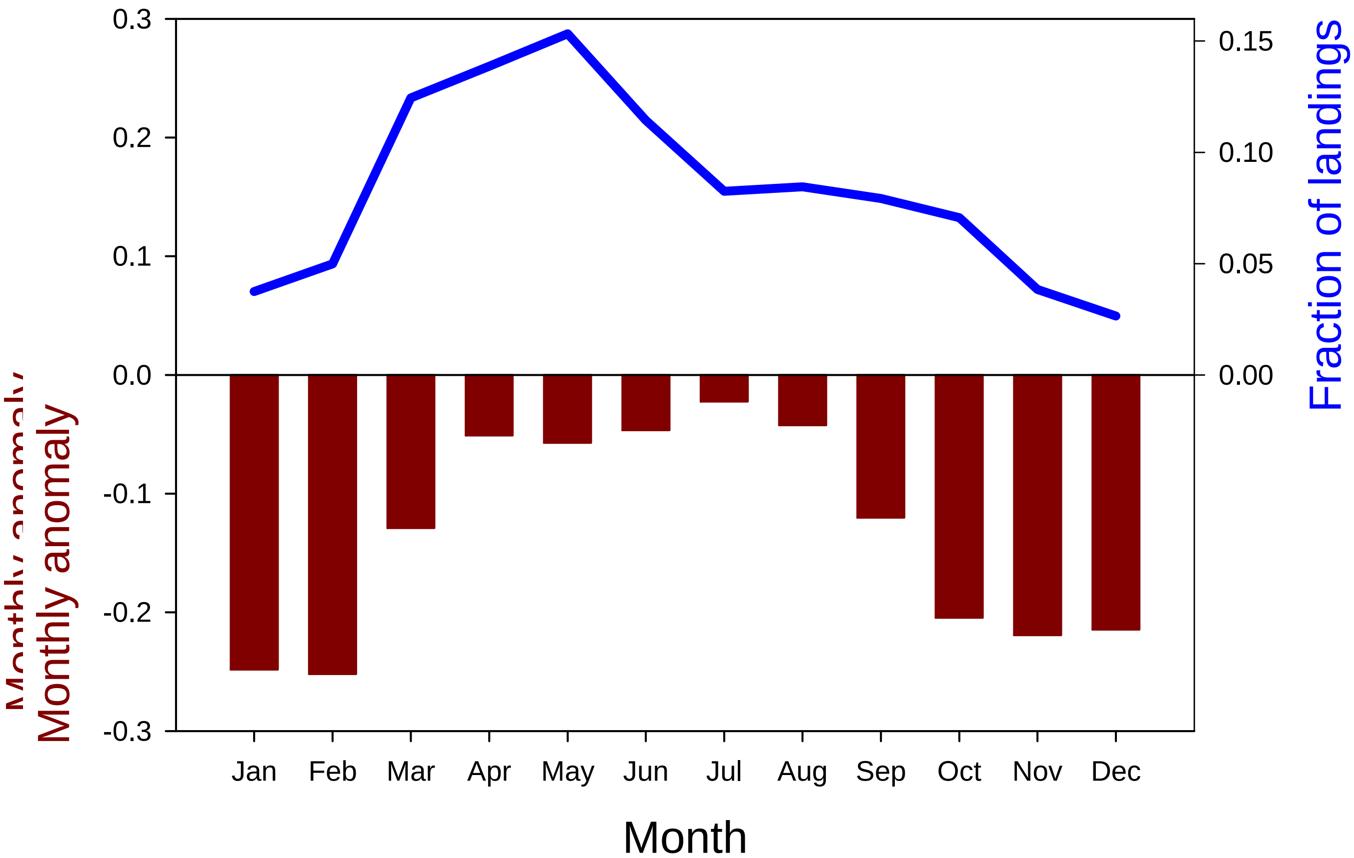
The PDT analyzed seasonal changes in scallop meat-weight yields to assess the potential impacts of restricting effort in the Mid-Atlantic during the time windows identified in the turtle biological opinion (June-October and May-November). Meat weights in the Mid-Atlantic are highest in July and decrease 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 43 – Fraction of scallop landings in the Mid-Atlantic by month (2001-2006) and monthly meat weight anomaly



5.3.2.2 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.

5.3.2.3 Assessment of original 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 44 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 44 – 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%**				

				% of Effort	
				28.30%	72%
ACCESS AREAS	**Total access areas**	**GB access areas**	**MA access areas**	**Mid.At. June15 -Oct 31**	**Mid.At. Nov 1 to June 14**
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 <u>without</u> 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 63 – Summary of results for each FW21 scenario <u>without</u> 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 44). 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 64. 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 64 – 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 65).

Figure 45 – Number of LA vessels and DAS used in Mid-Atlantic from June-October (2008 VTR data)

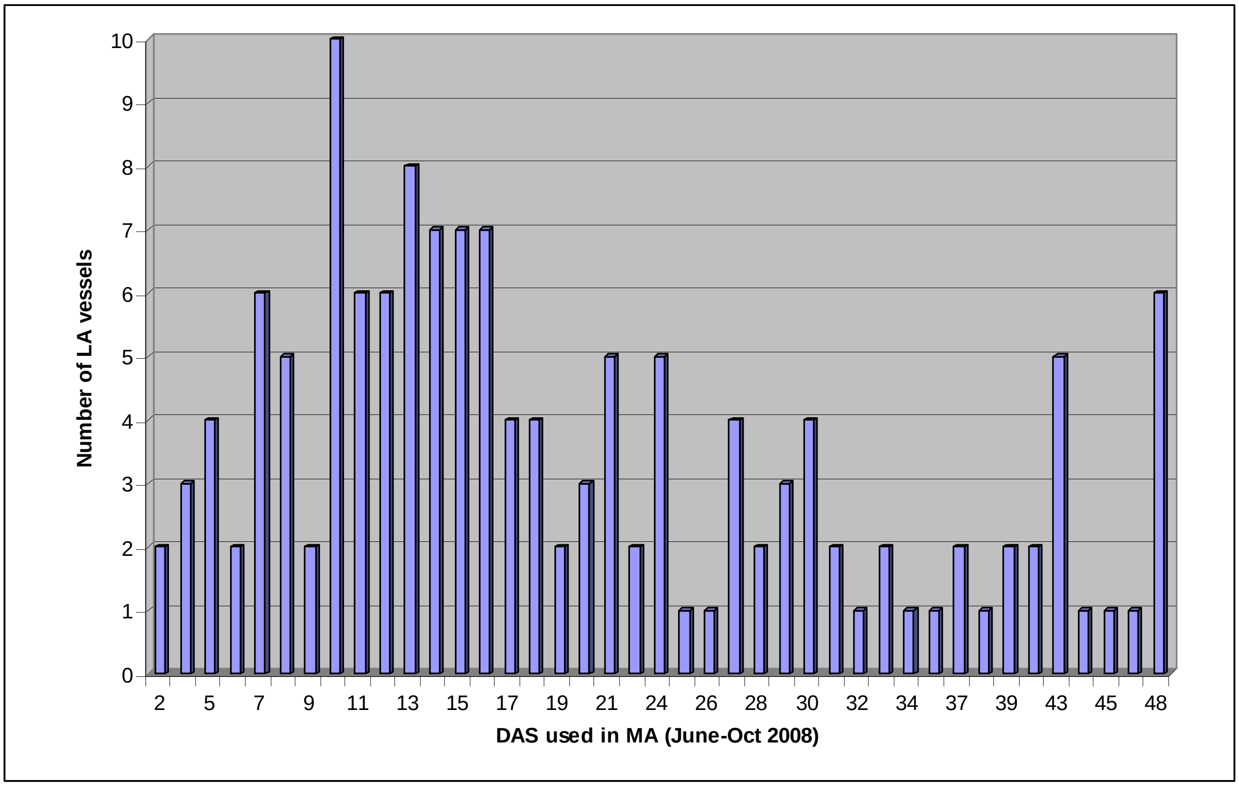


Table 65 – Number of vessels and DAS absent in the MA from June-Oct 2008 with percent of DAS reduction compared to 2008 for each DAS value

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%

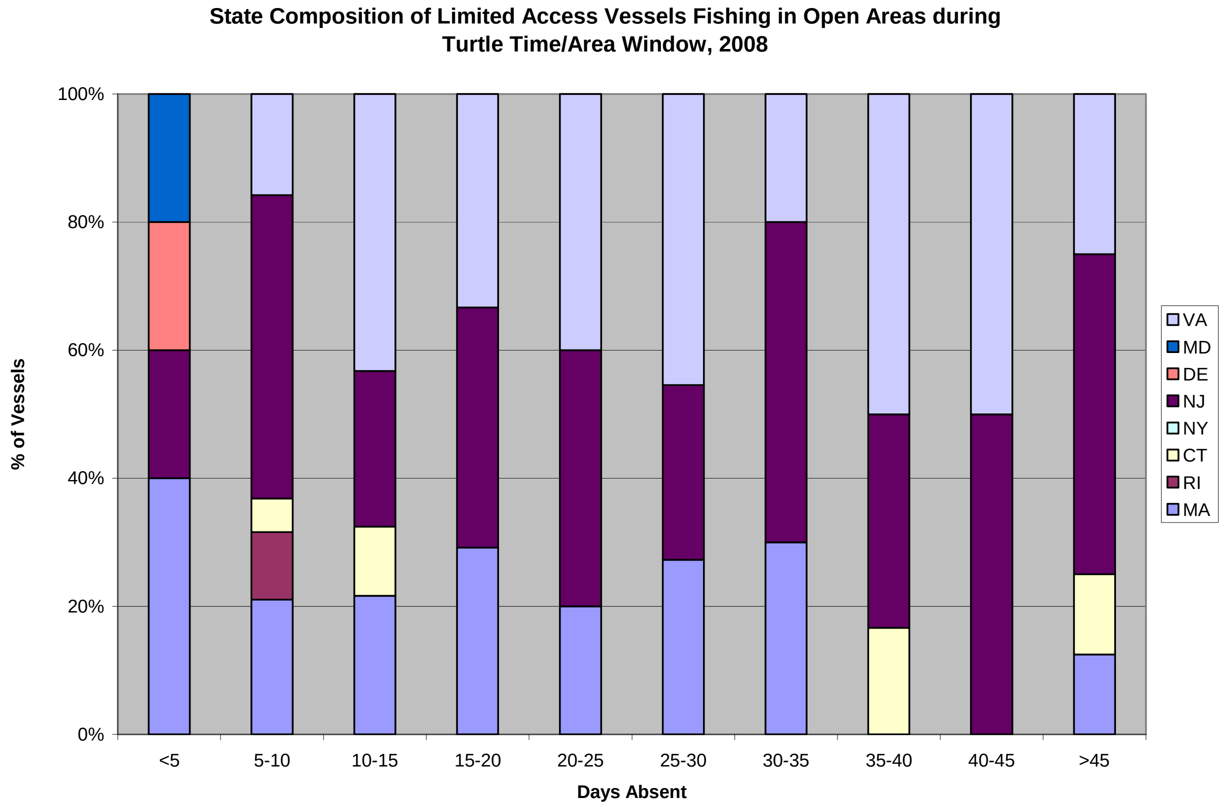
The PDT recognized that this RPM will have very different distributional impacts on the fleet; high for vessels that historically fish in that area and season and zero impacts on vessels from the north that never use DAS in that area and season. The number of DAS absent per LA vessel were evaluated using 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 46).

Table 66 – 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 46 – 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 67. 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 67 - 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 68). 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 68 – 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 67).

- ***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 69.

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 69 - 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

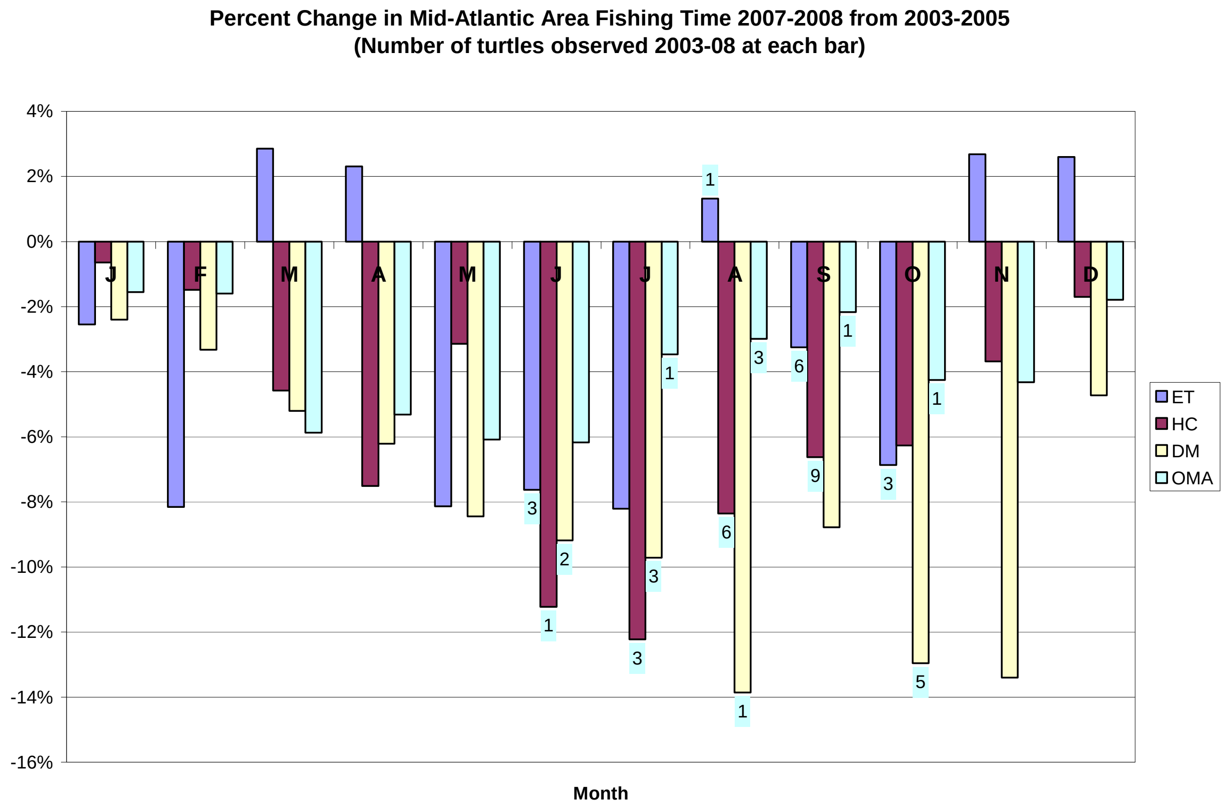
The assumptions used for changes in meat weight from trips shifted from either September-October or October only are a gain of 5% for the longer time period and 11% for the one month period. These values are weighted with historical catch in each period compared to the remainder of the year. The reason 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 42). 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 70). 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 70 – 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 47 – 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 71 - 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

5.3.2.4 Analyses of combined RMP measures

Following the Scallop Committee where the above analyses were reviewed, staff prepared similar analyses for "combined RPM measures" based on the Committee discussion. The Committee originally identified the two-month seasonal closure in Delmarva as a preferred alternative. However, general concern was raised at that meeting that the Delmarva seasonal closure would provide some benefit for sea turtles, but the RPM requires that the action minimize takes (in this case by limiting effort) up to point that would not have more than minor impact on the fishery. From the analyses to date some felt it was unclear how the Delmarva seasonal closure would minimize takes up to a more than minor impact threshold. As the impact on the fishery would be neutral (or positive if possession limits were adjusted to maintain fishing mortality rates), it would seem that the action could do more to minimize takes before approaching the more than minor threshold.

Therefore, following the Committee meeting staff developed several combination options and the expected impacts on effort shifts, fishing mortality, revenues and costs were completed and presented to the Council in November. This section summarizes the results of those combined options.

5.3.2.4.1 Status Quo Assumptions

Reducing possession limits or limiting the number of trips during the period from June 15 through August 31 will reduce effort in this time window from the Mid-Atlantic access areas while the Delmarva closure will reduce effort in September and October. The following analyses estimate the impacts of the combined alternatives on effort shift, fishing mortality, revenues, and fishing costs for the 'turtle window' from June 15 to October 31.

Moving effort out of the period from June15 to October 31 is estimated to reduce meat weight by 2.7%. We calculated that 28.3% of the Mid-Atlantic access area effort took place during this time period and the rest (71.7%) took place outside of the turtle window. Applying the same percent distribution of effort to 1020 trips (3 access area trips for each of 340 FT equivalent vessels) that will be allocated for the 2010 fishing year, we estimated that about 289 trips will take place during this window, totaling 5.19 million pounds of scallop landings. It is estimated that 64 of these trips would take place in the Delmarva access area during September and October, totaling 1.15 million pounds of scallop landings. Thus, the rest of the 225 trips would take place during the window from June 15 to August 31, totaling 4.04 million pounds of scallop landings. Furthermore, we assumed that 22.03% of the Delmarva trips take place during this time period, totaling 75 trips and 1.35 million pounds landed at a possession limit of 18,000 pounds. There will be about 150 trips to ETA totaling 2.69 million pounds.

Table 74 through Table 76 estimate the number of trips, DAS used, and landings for each measure in the absence of the RPM measures (status quo) and the impacts on the number of trips, effort, fishing mortality, landings, fishing costs and revenues as a result of the RPM measures. Table 74 shows the results of the effort shifts for the turtle window from June 15 to October 31 without any closure of Delmarva in September and October, but without any effort shift from June 15 to August 31 window moving in to the months of September and October. Table

75assesses the impacts on effort and landings of a closure of Delmarva in September to October with no change in effort during the June 15 to August 31 window. In other words, it is assumed that the Delmarva trips removed from the months of September and October will not shift into June 15 to August 31, but will take place outside of the longer window of November 1 to June 14. Finally, Table 76 shows the combined impacts of these measures on the number of trips, effort, fishing mortality, landings, fishing costs and revenues.

5.3.2.4.2 Combination of Delmarva closure in Sept. and Oct. and reduced possession limit in ETA (Option A) and/or DMV (Option B) from June 15 through August 31

5.3.2.4.2.1 Option A (ETA reduced possession limit only)

There will be no reduction in possession limit for DMV trips, therefore the projections expect there will still be 75 trips to this area during the window June 15 to August 31. The possession limit for ETA trips will be reduced however, so assuming that the same number of ETA trips (150) will be taken at 12,000 pounds each, total landings from this area will decline to 1.8 million pounds and total landings from Mid-Atlantic access areas including DMV will decline from 4.04 million to 3.15 million pounds during this window. Adding the estimated landings in DMV in September and October, total landings for the entire turtle window from June 15 to October 31 will go from about 5.19 million pounds to 4.30 million pounds (Table 74). This is equivalent to a 17% reduction in landings and effort as measured by DAS used during the turtle window. Total DAS used is estimated by dividing total landings by LPUE. Status quo DAS used is estimated to be 2541 DAS, which is expected to decline by 437 to 2104 DAS during the window.

Moving this effort and landings from the turtle window (from June 15 to October 31) to the rest of the year is about a 4.9% effort shift. If the possession limit stays at 12,000 pounds and there is no reduction in total landings from the DMV and ETA areas for the year, the fishing mortality is estimated to increase by 0.001. There would be no loss in scallop revenue because the vessels will be allowed to land the same amount of pounds. Because the number of trips would increase for people that take their trips in the summer period, however, there will be an increase in fishing costs. As indicated above, 150 trips are expected to be taken in ETA during the turtle window. The possession limit for these vessels will decline to 12,000 pounds, but they will be allowed to take three trips instead of two. If the steam time for each trip is one day both ways, this will increase total fleet trip costs by $480,000 assuming that trip costs average $1600 per DAS. This is in addition to the increase in fleet trip costs of $19,030 due to fishing more in the less productive season, totaling an increase in fishing costs of $499,030.

The results are based on the assumption that the reduction in the possession limit will have no affect on the number of trips taken to ETA during the turtle season. If the lower possession limit provides an incentive for some vessels to avoid taking any trips to ETA during this season, the increase in costs will be less, impacts on *F* will be higher, and there will potentially be beneficial impacts on turtles if more effort shifted out of this season than predicted.

In addition, this measure will involve closure of DMV (Alternative 3) from September 1 through October 31. If this effort could be shifted to the rest of the year from November 1 through August 31, the impacts of this closure would be positive because meat weight is expected to be

5% higher in the window November 1 to August 31 compared to the September 1 to October 31 window. But the combined measure will restrict the number of trips from June 15 to August 31, therefore DMV trips removed from the September to October window are estimated to move to the window from November 1 to June 14. During this period (November 1-June14) meat weight is expected to be 2.7% lower than the turtle window of June 15-October 31.

It is estimated that 64 DMV trips (6.7%) would normally take place during the months of September and October. The DAS used for these trips is estimated to be 563, and this effort will be removed from turtle window. This constitutes a 6.3% effort shift and an increase in *F* by 0.002 for the entire turtle window from June 15 to August 31. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same amount of pounds. Therefore the fleet fishing costs will increase by $24,530 because of the DMV closure.

Therefore, the net change in *F* of closing DMV (increase of 0.002) and reducing the possession limit on ETA trips during the turtle window (increase of 0.001) will be 0.003. The combined measure will also result in an 11.1% shift of effort from the turtle window to the rest of the year. Adding the increase in fishing costs due to the DMV closure to the increase in costs due to the ETA measure discussed above during the turtle window, the total trip costs with the combined measure will increase by $523,560 for the scallop fleet. The increase in costs will be less if the number of ETA trips declines during the turtle season.

The results discussed above assume that there will be no adjustment to the possession limits to keep fishing mortality constant when effort is moved to a less productive season. Likewise, the proposed measure does not include an adjustment to the possession limit given that changes in F are relatively small. The following analysis shows the theoretical results with an adjustment in possession limit to keep *F* constant. If the possession limit was adjusted to 11,999 pounds for ETA (from 12,000 pounds) for those taking two trips outside of the turtle window, then shifting effort from June 15 to August 31 will have no impact on *F*. But this reduction will lower landings by 42,246 pounds and revenues by $308,821. For the Delmarva closure, keeping effort (DAS used) and fishing mortality at the same level would mean a reduction in possession limit of 17,962 pounds. As a result landings would decline by 31,104 pounds and revenues for the fleet would decline by $227,370. The net result of adjusting possession limits for both ETA and DMV would be a decrease in fleet revenue by $536,191.

Without a reduction in the possession limit there would be no change in revenues if the average prices stayed constant as a result of the RPM measures. These measures will change the composition of landings by shifting a part of the effort outside the turtle season, and as a result could have some impacts on the average annual price as discussed in Section 5.3.2.4.5 below.

5.3.2.4.2.2 Option B (ETA and Delmarva reduced possession limit)

Assuming a reduced possession limit of 9,000 pounds and reduced effort level of 75 trips in Delmarva taken during the window June 15 to August 31st, landings from DMV will decline to 0.675 million pounds. Assuming that the same number of ETA trips (150) will be taken at 12,000 pounds each, total landings from this area will decline to 1.80 million pounds and total landings from Mid-Atlantic access areas including DMV will decline to 2.46 million pounds during this window. Adding the estimated landings in DMV (about 1.15 million pounds) in September and October, total landings for the entire turtle window from June 15 to October 31 will go down from about 5.19 million pounds to 3.62 million pounds (Table 74). This is equivalent to a 21% reduction in landings and effort as measured by DAS used during the turtle window. DAS used is estimated by dividing total landings by LPUE. Status quo DAS used is estimated to be 2541 DAS, which is expected to decline by 768 DAS to 1773 during the window. This assumes that DMV area is not closed in September and October.

Moving this effort and landings from the turtle window to the rest of the year corresponds to an 8.5% effort shift. If the possession limits are not adjusted down for the lower meat-weight outside the window and there is no reduction in total landings from the DMV and ETA areas for the year, fishing mortality is estimated to increase by 0.002. There would be no loss in scallop revenue because the vessels will be allowed to land the same amount of pounds.

Because the number of trips would increase for people that take their trips in the summer period there will be an increase in fishing costs. As indicated above, 150 trips are expected to be taken in ETA with 75 of those during the turtle window. The possession limit for these vessels will decline to 12,000 pounds for ETA, but they will be allowed to take three trips instead of two. The possession limit for DMV will decline to 9,000 pounds, but they will be allowed to take two trips instead of one. In other words, in total an extra 225 (150 + 75) trips would have to be taken at the reduced possession limit in both areas. If the steam time for each trip is one day each way, this will increase total fleet trip costs by $720,000 assuming that trip costs average $1600 per DAS. In addition, the fleet trip costs will increase by $33,407 because effort is shifted to the less productive season. Thus, total trip costs for the fleet will go up by $753,407. This is assuming that the reduction in the possession limit will have no effect on the number of trips taken to ETA and DMV during the turtle season. If the lower possession limit provides an incentive for some vessels to avoid taking any trips to ETA during this season, the increase in costs will be less.

In addition, this measure will involve closure of DMV (Alternative 3) from September 1 through October 31. If this effort could be shifted to the rest of the year from November 1 through August 31, the impacts of this closure would be positive because meat weight is expected to be 5% higher in the November 1 to August 31 window compared to the September 1 to October 31 window. But the combined measure will restrict the number of trips from June 15 to August 31, therefore DMV trips removed from the September to October window are estimated to move to the November 1 to June 14 window. During this period (November 1-June14) meat weight is expected to be 2.7% lower than the turtle window of June 15-October 31.

It is estimated that 64 trips (6.7%) in DMV would normally take place during the months of September and October. The DAS used for these trips is estimated to be 563 DAS, and this effort will be removed from turtle window. This constitutes a 6.3% effort shift and an increase in *F* by 0.002 for the entire turtle window from June 15 to August 31. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore the fleet fishing costs will increase by $24,530 because of the DMV closure.

Therefore, the change in *F* of closing DMV (increase by 0.002) and moving effort from the June 15 to August 31 window to the rest of the year (increase by 0.002) adds up to a net increase in *F* of 0.004 for the entire turtle window from June 15 to October 31. The combined measure will also result in a 14.8% shift of effort from the turtle window (June 15 – October 31) to the rest of the year. Adding the increase in fishing costs due to the DMV closure to the increase in costs due to the ETA measure discussed above during the turtle window gives a total trip cost increase of $777,938 for the scallop fleet. The increase in costs will be less if the number of ETA trips declines during the turtle season.

The results discussed above assume that there will be no adjustment to the possession limits to keep fishing mortality constant when effort is moved to a less productive season. Likewise, the proposed measure does not include an adjustment to the possession limit given that changes in *F* are relatively small. The following analysis is conducted to show the theoretical results with an adjustment in possession limit to keep *F* constant. If the possession limit was decreased to 11,630 pounds (from 12000 pounds for those taking 2 trips) and the DMV possession limit to 8,723 pounds outside of the turtle window, then shifting effort from June 15 to August 31st will have no impact on fishing mortality. However this reduction will lower landings by 60,092 pounds and revenues by $439,275. For the Delmarva closure, keeping effort (DAS used) and fishing mortality at the same level would mean reducing the possession limit to 17,962 pounds. As a result landings would decline by 31,104 pounds and revenues for the fleet would decline by $227,370. The net result of adjusting possession limits for both ETA and DMV would be a decrease in fleet revenue by $666,645.

Without a reduction in the possession limit there would be no change in revenues if the average prices stayed constant as a result of the RPM measures. These measures will change the composition of landings by shifting a part of the effort outside the turtle season, and as a result could have some impacts on the average annual price as discussed in Section 5.3.2.4.5 below.

5.3.2.4.3 Combination of Delmarva seasonal closure in September and October as well as a limiting the number of trips that can be taken in ETA with a reduced possession limit between June 15 through August 31

For this alternative there will be no reduction in possession limit for DMV trips, but the possession limit for ETA trips will be reduced to 14,000 pounds and vessels will be allowed to take only one ETA trip during this period. There are several ways the results of this scenario could be analyzed. One way is to assume that the number of DMV trips will stay constant at 75 and the number of ETA trips will decline because the number of trips to this area will be limited to one and also because of the reduction in the possession limit to 14,000 pounds. This may not be a realistic assumption, however, because the vessels could increase the number of their DMV trips during this period instead to take their ETA trips outside the window. According to the analysis of the effort distribution during these months, it was estimated that 225 trips would be taken during this window if there were no limits on the number of trips per vessel. If this happened, there would be no change in effort, *F* or landings during this period.

The above assumption could be unrealistic since it assumes that the restriction on the number of trips and reduction in the possession limit will have no impact on total effort during this period. The analysis provided in Section 5.3.2.4.4.2, below shows that when the number of trips was restricted to two per vessel during the June 15 to August 31 window, the total number of trips taken to the MA access areas would decline by 18% from 225 trips to184 trips. Since this measure effectively limits the number of trips to two per vessel, one for DMV and one for ETA, it could be assumed that this measure will reduce the effort during this window to 184 trips.

The second assumption is about the composition of these trips between DMV and ETA areas. If the reduction in the possession limit for ETA discourages vessels from taking their ETA trips during this period, then more vessels could instead take their DMV trips between June 15 and August 31. Again, how many vessels would choose to do so is unknown, but the analysis provided in Section 5.3.2.4.4.1 below and in Table 72 shows that if the number of trips were limited to one per vessel, total number of trips would go down by 48%. If we apply this same reduction to the number of ETA trips (150) expected to be taken during this period under status quo conditions, the total number ETA trips would decline to 78 trips (150*(1-0.48)). This would increase the number of trips to the DMV area from 75 to 106 trips assuming that vessels will still take 184 trips to the Mid-Atlantic areas between June 15 and August 31. If instead it was assumed that the number of trips to DMV area would stay the same at 75 trips, the total number of trips would decline to 153 trips, which could be an extreme assumption. Therefore, for the purposes of this analysis, it is assumed that the total number of trips would decline from 225 trips to 184 trips as a result of this measure, with a decline in ETA trips to 78 and an increase in DMV trips to 106 between June 15 and August 31. Obviously, the assumption of constant effort in DMV (75 trips) and a decline in total number of trips to 153 in Mid-Atlantic access areas would magnify the negative impacts on effort, landings and fishing mortality compared to the scenario where trips are reduced from 225 to184 in the window between June 15 through August 31.

We assumed that 22.03% of Delmarva trips take place during this time period, totaling 75 (340*0.2203) which equals 1.35 million pounds landed at a possession limit of 18,000. There will be about 150 trips to ETA totaling 2.69 million pounds.

Assuming 106 trips will be taken to the DMV at 18,000 pounds each, the landings from this area would increase to 1.9 million pounds from 1.35 million pounds. Assuming 78 trips will be taken at 14,000 pounds each to the ETA, total landings from this area will decline to 1.09 million pounds from 2.69 million pounds. Adding the estimated landings in DMV in September and October, total landings for the entire turtle window from June 15 to October 31 will decline from about 5.19 million pounds to 4.15 million pounds (Table 74). This is equivalent to a 20% reduction in landings and effort as measured by DAS used during the turtle window. Total DAS used is estimated by dividing landings by LPUE. Status quo DAS used is estimated to be 2541 DAS, which is expected to decline by 511 to 2030 DAS during the window for this measure alone.

Moving this effort and landings from the turtle window to the rest of the year is about a 5.7% effort shift and would increase the fishing mortality by 0.002. There would be no loss in scallop revenue because the vessels will be allowed to land the same amount of pounds. Because there will be more fishing during the less productive season, fleet trip costs would increase by $22,228 due to needing to fish more to catch the same amount in the less productive season.

In addition, this measure will involve closure of DMV (Alternative 3) from September 1 through October 31. If this effort could be shifted to the rest of the year from November 1 through August 31, the impacts of this closure would be positive because meat weight is expected to be 5% higher in the window November 1 to August 31 compared to the September 1 to October 31 window. But the combined measure will restrict the number of trips from June 15^{th} to August 31, so DMV trips removed from September and October are expected to move to November 1 to June 14. During this period (November 1-June14) meat weight is expected to be 2.7% lower than the turtle window of June 15-October 31.

It is estimated that 64 DMV trips (6.7%) would normally take place during the months of September and October. The DAS used for these trips is estimated to be 563 DAS, and this effort will be removed from the turtle window. This constitutes a 6.3% effort shift and an increase in *F* of 0.002 for the entire turtle window. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same poundage. Therefore the fleet fishing costs will increase by $24,530 because of the DMV closure.

Therefore, the net effect on *F* of closing DMV (increase by 0.002) and moving effort from between June 15 and August 31 to the rest of the year (increase by 0.002) will be net increase in F by 0.004 for the entire Turtle window from June 15 to October 31. The combined measure will also result in a 12% shift of effort from the turtle window to the rest of the year. Adding the increase in fishing costs due to the DMV closure to the increase in costs due to the ETA measure discussed above during the turtle window, trip costs for the combined measure will increase by $46,758 for the fleet. The increase in costs will be less if the number of ETA trips declines during the turtle season.

The results discussed above assume that there will be no adjustment to the possession limits to keep fishing mortality constant when effort is moved to a less productive season. Likewise, the proposed measure does not include an adjustment to the possession limit given that changes in *F* are relatively small. The following analysis is conducted, however, to show the theoretical results with an adjustment in possession limit to keep F constant. If the possession limit was adjusted down, however, to 21,900 pounds (instead of 22,000 pounds for the trips taken to ETA during June 15 and August 31) outside of the turtle window, then shifting effort from June 15 to August 31 will have no impact on *F*. But this reduction will lower landings by 20,784 pounds and revenues by $151,928. For the Delmarva closure, keeping effort (DAS used) and fishing mortality at the same level would mean a reduction in possession limit to 17,962 pounds. As a result landings would decline by 31,104 pounds and revenues for the fleet would decline by $227,370. The net result of adjusting possession limits for both ETA and DMV would be a decrease in fleet revenue by $379,298.

Without a reduction in the possession limit there would be no change in revenues if the average prices stayed constant as a result of the RPM measures. This alternative will change the composition of landings by shifting 12% effort to outside the turtle season, and as a result could have some impacts on the average annual price as discussed in Section 5.3.2.4.5 below.

5.3.2.4.4 Combination of Delmarva seasonal closure in September and October as well as a restriction on the number of access area trips in the Mid-Atlantic that can be used between June 15 and August 31

5.3.2.4.4.1 Option A (one trip maximum)

Status quo is same as described in Section 5.3.2.4.1 above. This alternative will not impact the possession limit for access areas but will limit the maximum number of trips that can be taken from June 15 to August 31. Table 72 provides a method of estimating the total number of trips when number of trips per vessel is restricted to one.

The landings data from Mid-Atlantic from past years indicated that 22% of trips took place during the window from June 15 to August 31, which amounts to 225 trips from both areas assuming an allocation of three trips per vessel. Including the 64 trips estimated in the Delmarva access area for September and October, the total number of trips for the turtle window is 289. However, this data does not provide information about the number of trips taken by each vessel. The DAS data for the access area trips in ETA in 2007 and 2008 shows that the average number of trips taking place there during the turtle window is 316 (Table 72). This number is greater than 289 because the vessels were allocated four trips in the Mid-Atlantic those years, but the projected number of trips corresponds to allocation of three trips to ETA and DMV combined. In order to estimate number of trips consistent with 2010 access area trip allocations (three per vessel), the total number of trips is derived in Table 72 by setting the maximum trips per vessel to three in 2007-2008.

These adjusted results indicate that as an average of these two years, there were about 292 trips during the turtle window. The projected 289 trips in the window are three trips less than the 292 trips shown in Table 72, because the former is based on the landings data estimates while the latter is based on the DAS data shown in (Table 73). This small difference does not have a significant impact on the results. Out of the 292 trips, 151 trips correspond to single trips taken by 151 vessels during this period. The rest of the 141 trips were taken as a second or a third trip by a subset of vessels that took at least one trip during the same window. Therefore, if the maximum number of trips per vessel was limited to one during this window, the total number of trips would decline by 141 trips, or by 48% as an average of 2007-2008. When the projected 225 trips for the June 15 to August 31 window are lowered by 48%, the total number of trips is estimated to decline to 117 trips. When the entire window and the 64 trips that are estimated to be taken from the DMV area is added to this number, total number of trips without a closure in DMV would add up to 181 trips as shown in (Table 74).

Table 72- Estimation of number of trips with constraints on maximum trip per vessel during the turtle window (June 15 to October 31st) and assuming 3 access area trip allocations per vessel (Based on info in Table 68, DAS data)

Data	Number of trips per vessel	2007		2008		2007-2008 average
		Number of vessels	Number of trips	Number of vessels	Number of trips	
	0	285	0	87	0	
	1	25	25	99	99	
	2	13	26	62	124	
	3	8	24	95	285	
Total number of vessels		331	75	343	508	337
Total number of trips			75		508	292
Number of trips if maximum trip=1			46		256	151
Decline in trips if maximum trip=1			29		252	141
Decline in trips if maximum trip =1			**39%**		**50%**	**48%**

Limiting the maximum number of trips to one per vessel will move 948 DAS from the turtle window to the rest of the year, which constitutes about 10.6% effort shift. If the possession limit is not adjusted down outside of the window for the decline in meat-weight there is no reduction in total landings from the DMV and ETA areas for the year, and the fishing mortality is estimated to increase by 0.003 for the entire turtle window from June 15 to October 31. There would be no loss in scallop revenue because the vessels will be allowed to land the same amount of pounds. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore the fleet fishing costs will increase by $41,265.

In addition, this measure will involve closure of DMV (Alternative 3) from September 1 through October 31. If this effort shifted to the rest of the year from November 1 through August 31, the impacts of this closure would be positive because meat weight is expected to be 5% higher in the window of November 1 to August 31 compared to the September 1 to October 31 window. However the combined measure will restrict the number of trips from June 15 to August 31, therefore DMV trips removed from September and October are estimated to move to the window from November 1 to June 14. During this period (November 1-June14) meat weight is expected to be 2.7% lower than the turtle window of June 15-October 31.

It is estimated that 6.7% of DMV trips (67 total) would normally take place during the months of September and October. The DAS used for these trips is estimated to be 563, and this effort will be removed from the turtle window. This constitutes a 6.3% effort shift and an increase in *F* of 0.002 for the entire turtle window from June 15 to August 31. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore the fleet fishing costs will increase by $24,530 because of the DMV closure.

The net change in *F* of closing DMV (increase *F* by 0.002) and limiting the number of trips to one per vessel during the June 15 – August 31 window (increase *F* by 0.003) will be a net increase in *F* of 0.005. This combined measure will also result in a 16.8% shift of effort from the turtle window (June 15 – October 31) to the rest of the year. Adding the increase in fishing costs due to the DMV closure to the increase in costs due to effort shifts from ETA during the turtle window, the total increase in trip costs for the combined measure would be $65,795 for the scallop fleet.

The results discussed above assume that there will be no adjustment to the possession limits to keep fishing mortality constant when effort is moved to a less productive season. Likewise, the proposed measure does not include an adjustment to the possession limit given that changes in F are quite small. The following analysis is conducted to show the theoretical results with an adjustment in possession limit to keep *F* constant. If the possession limit was adjusted down to 17,935 pounds (from 18,000 pounds) for those taking trips outside of the turtle window, then shifting effort from June 15 to August 31 will have no impact on *F*. But this reduction will lower landings by 52,323 lb and revenues by $382,479. For the Delmarva closure, keeping effort (DAS used) and fishing mortality at the same level would mean reducing the possession limit to 17,962 pounds. As a result landings would decline by 31,104 pounds and revenues for the fleet would decline by $227,370. The net result of adjusting possession limits for both ETA and DMV would be a decrease in fleet revenue by $609,850.

Without a reduction in the possession limit there would be no change in revenues if the average prices stayed constant as a result of the RPM measures. This alternative will change the composition of landings by shifting 16.8% effort outside the turtle season, and as a result could have some impacts on the average annual price as discussed in Section 5.3.2.4.5 below.

5.3.2.4.4.2 Option B (two trip maximum)

Status quo is same as described above in Section 5.3.2.4.1 above. This alternative will not impact the possession limit for access areas but will limit the maximum number of trips that can be taken from June 15 to August 31. Table 73 provides a method of estimating the total number of trips when number of trips per vessel is restricted to two.

The landings data from Mid-Atlantic access areas for the earlier years indicated that 22% trip took place during the window from June 15 to Aug.31st, which amounts to 225 trips from both areas assuming an allocation of 3 trips per vessel. Including the 64 trips estimated for the Delmarva access area for September and October, total number of trips for the Turtle window amounts to 289 trips. However, this data does not provide information about the number of trips taken by each vessel. The DAS data for the access area trips in ETA showed that as an average of the years 2007 and 2008, about 316 trips took place during the turtle season from June 15 to October 31st (Table 68). This number is greater than 289 because the vessels were allocated 4 trips in ETA, while the projected number of trips, that is 289, corresponds to allocation of 3 trips to ETA and DMV combined. In order to estimate number of trips consistent with 2010 access area trip allocations (3 per vessel), total number of trips are derived in Table 73 by setting the maximum trip per vessel to 3 in 2007-2008. These adjusted results indicate that as an average of these two years, there were about 292 trips during the turtle window from June 15 to October 31st.

The projected trips, 289 trips, for the window are 3 trips less than the 292 trips shown in Table 73, because the former is based on the landings data estimates while the later is based on the

DAS data. This difference is very small and do not have any significant impact on the results because of the number of trips for vessels taking one trip only was calculated as a percentage of the total number estimated, i.e., 289 trips as follows: Using the same method as in Table 72 above, it is estimated that 240 out of 292 trips during the turtle window from June 15 to October 31st and 151 included trips by vessels that took one or two trips. The rest of the 52 trips were taken as a third trip by a subset of vessels that took at least one trip during the same window. Therefore, if the maximum trip per vessel was limited to two trips during this window, the total number of trips would decline by 52 trips, or by 18% as an average of 2007-2008 (Table 73). When the projected 225 trips for the June 15 to Aug.31st window are lowered by 18%, the total number of trips is estimated to decline by 41 trips to 184 trips. When the 64 trips that are estimated to be taken from the DMV area for the entire window from June 15th to October 31st are added to this number, total number of trips without a closure in DMV would add up to 248 trips as shown in last column of Table 74.

Table 73 - Estimation of number of trips when maximum trip per vessel are set to two trips per vessel during the turtle window (June 15 to October 31st) and assuming 3 access area trip allocations per vessel (Table 68DAS data)

Data		2007		2008		2007-2008 average
		Number of vessels	Number of trips	Number of vessels	Number of trips	
Number of trips per vessel						
	0	285	0	87	0	
	1	25	25	99	99	
	2	13	26	62	124	
	3	8	24	95	285	
Total number of vessels		331	75	343	508	337
Total number of trips			75		508	292
Number of trips if maximum trip=2			67		413	240
Decline in trips if maximum trip=2			8		95	52
Decline in trips if maximum trip =2			**12%**		**23%**	**18%**

Limiting maximum number of trips to two per vessel will move 358 DAS from the turtle window to the rest of the year, which constitutes about a 4.0% effort shift. If the possession limit is not adjusted down outside of the window for the decline in meat weight, there is no reduction in total landings from the DMV and ETA areas for the year, and the fishing mortality is estimated to increase by 0.001 for the entire turtle window from June 15 to October 31. There would be no loss in scallop revenue because the vessels will be allowed to land the same amount of pounds. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore fleet fishing costs will increase by $15,584.

In addition, this measure will involve closure of DMV (Alternative 3) from September 1 through October 31. If this effort could be shifted to the rest of the year from November 1 through August 31, the impacts of this closure would be positive because meat weight is expected to be 5% higher in the window of November 1 to August 31 compared to September 1 to October 31. The combined measure will restrict the number of trips from June 15 to August 31, therefore

DMV trips removed from September and October are expected to move into the window from November 1 to June 14. During this period (November 1-June14) meat weight is expected to be 2.7% lower than the turtle window of June 15-October 31.

It is estimated that 64 DMV trips (6.7%) would normally take place during the months of September to October. The DAS used for these trips is estimated to be 563, and this effort will be removed from turtle window. This constitutes a 6.3% effort shift and an increase in *F* of 0.002 for the entire turtle window from June 15 to August 31. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore the fleet fishing costs will increase by $24,530 because of the DMV closure.

The net change in *F* of closing DMV (increase in *F* of 0.002) and limiting the number of trips to two trips per vessel during the June 15 – August 31 window (increase in *F* of 0.001) will be a net increase in *F* of 0.003. The combined measure will also result in a 10.3% shift of effort from the turtle window (June 15 – October 31) into the rest of the year, which is just above the recommended threshold level for a minor change based on the analyses prepared by the PDT for the original RPMs in FW21. Adding the increase in fishing costs due to the DMV closure to the increase in costs due to effort shifts from ETA during the turtle window, the total trip costs with this combined measure will increase by $40,115 for the scallop fleet.

The results discussed above assume that there will be no adjustment to the possession limits to keep fishing mortality constant when effort is moved to a less productive season. Likewise, the proposed measure does not include an adjustment to the possession limit given that the changes in *F* are quite small. If the possession limit was reduced to 17,975 pounds (from 18,000 pounds) for those taking trips outside of the turtle window, then shifting effort from June 15 to August 31 will have no impact on *F*, but this reduction will lower landings by 19,761 pounds and revenues by $144,451. For the Delmarva closure, keeping effort (DAS used) and fishing mortality at the same level would mean a reduction of the possession limit to 17,962 pounds. As a result landings would decline by 31,104 pounds and revenues for the fleet would decline by $227,370. The net result of adjusting possession limits for both ETA and DMV would be a decrease in fleet revenue of $371,821.

Without a reduction in the possession limit there would be no change in revenues if the average prices stayed constant as a result of the RPM measures. These measures will change the composition of landings by shifting a part of the effort outside the turtle season, and as a result could have impacts on the average annual price as discussed in Section 5.3.2.4.5 below and compared with the impacts of other alternatives.

5.3.2.4.5 Discussion of impacts of effort shifts on prices

Without a reduction in the possession limit there would be no change in revenues if the average prices stayed constant as a result of the proposed RPM measures or the alternatives. The proposed measures will lead to a change in the seasonal composition of landings and therefore could lead to a change in prices. In general, the reduction in landings during the turtle window is expected to increase prices during the period from July 15 to October 31, but expected to reduce prices for months outside of the turtle window. Whether the increase in scallop prices in the first period will offset the decrease in prices in the second period will depend on the magnitude of the shift, the timing of the displaced effort, and the change in meat weight of scallops outside of the turtle window. If the shift in effort and landings comprises a small proportion of total effort and landings in the turtle window the impacts on prices will be low. Similarly if the displaced effort is distributed more or less evenly throughout the window it is shifted to, the impacts on prices will be small.

The proposed action is expected to minimize the effort shift from the turtle window compared to the other alternatives considered by the Council (Table 76) Proposed measures would shift 10.3% of effort outside the turtle season, while the other alternatives would shift 11.2% (combined measure 1.1, Option A) to 16.8% (combined measure 1.3, Option A) and as a result the proposed action will have the least impacts on prices. However, this impact cannot be quantified with 100% accuracy due to the factors explained below.

- With the proposed measure, the landings in the Mid-Atlantic access areas will decline by 1.8 million pounds during the turtle window, which amounts to about 10.3% of the total landings from all areas (18.5 million) during the same window. Therefore, it is unlikely for this shift to have a significant impact on the scallop prices for this period. It is also not possible to quantify with certainty the extent of the increase in prices at this time since many factors that impact prices such as the quantity of exports, import prices, size composition of scallops during and outside of the turtle window, and seasonal distribution of future landings are unknown at this time.
- Since there will be no change in the possession limit, the access area effort shifted from the turtle window will take place between November 1 and June 14. Therefore 1.8 million more pounds will be landed in this window. Since total landings from all areas without the RPM measures are expected to be about 23.2 million pounds during this period, shifting 1.8 million pounds would increase landings by 8.1% outside the turtle window and would probably lower the price of scallops. Again, it is unlikely that this shift will reduce prices significantly during this period, especially if the displaced effort is distributed more or less evenly and if some vessels try to maximize their revenue by taking their trips during months when prices are relatively higher because of lower landings.
- Since the reduction in landings during the turtle window (10.3%) is greater than the increase in landings (8.3%) outside of the turtle window, the percentage increase in prices could exceed the percentage decline in prices outside the turtle window, outweighing the decline in the later period. On the other hand, the meat weights will be slightly lower (by 2.7%) for the landings that are shifted out of the turtle window and this could have a negative impact on prices. If the effort during the turtle window is directed more to the areas with higher scallop abundance, the meat-weight composition of the landings could increase during this window, resulting in even higher prices.

Table 74 – Summary of potential impacts on fishing mortality, effort shifts, yield, revenue, and fishing costs associated with combined RPM alternatives based on effort shifts for the turtle window from June 15 to October 31 without any closure of Delmarva in September and October, and without any effort shift from June 15 to August 31 window moving in to the months of September and October. All analyses are based on the NCLF20 scenario.

Limit on MA AA effort by # of trips or possession limit

	Combined Measure 1.1 Seasonal closure in DMV + Reduced Possession limit and additional trip		**Combined Measure 1.2** Seasonal closure in DMV + Reduced poss limit in ETA of 14,000 in window and 22,000 on subsequent trip	**Combined Measure 1.3** Seasonal closure in DMV + Max # of MA AA trip from June15-Aug31	
	Option A - ETA only	Option B - ETA and DMV		Option A - max of 1 trip	Option B - max of 2 trips
Possession limit ETA during window	12,000	12,000	14,000	18,000	18,000
Possession limit DMV during window	18,000	9,000	18,000	18,000	18,000
Projected # of trips in window PRE RPM	289	289	289	289	289
Projected # of trips in window POST RPM	289	289	248	181	248
Difference in # of trips in MA AA during window	0	0	-41	-108	-41
Total landings in MA AA in window PRE RPM	5,195,880	5,195,880	5,195,880	5,195,880	5,195,880
Total landings in MA AA in window POST RPM	4,302,000	3,627,000	4,152,000	3,258,000	4,464,000
Difference in landings in MA AA during window	(893,880)	(1,568,880)	(1,043,880)	(1,937,880)	(731,880)
Projected DAS used in MA AA during win. PRE RPM	2541	2541	2541	2541	2541
Projected DAS used in MA AA during win. POST RPM	2104	1773	2030	1593	2183
Difference in projected DAS used in MA AA during win.	-437	-768	-511	-948	-358
% reduction in MA AA effort during window	-17%	-30%	-20%	-37%	-14%
Total effort shift in MA (AA +OA) during window	4.9%	8.5%	5.7%	10.6%	4.0%
Change in F (increase)	0.001	0.002	0.002	0.003	0.001
Change in fishing costs (increase)	499,030	753,407	22,228	41,265	15,584
Change in Revenue - no change in poss limit	0	0	0	0	0
Possession limit change	11,999	ETA=11630 DMV=8723	21900	17935	17975
Reduction in Landings with change in poss limit	(42,246)	(60,092)	(20,784)	(52,323)	(19,761)
Reduction in Revenue with change in poss limit	(308,821)	(439,275)	(151,928)	(382,479)	(144,451)

Table 75 – Summary of potential impacts on fishing mortality, effort shifts, yield, revenue, and fishing costs associated with combined RPM alternatives based on closure of Delmarva in September to October with no change in effort during the June 15 to August 31 window. All analyses are based on the NCLF20 scenario.

	Combined Measure 1.1 Seasonal closure in DMV + Reduced Possession limit and additional trip		**Combined Measure 1.2** Seasonal closure in DMV + Reduced poss limit in ETA of 14,000 in window and 22,000 on subsequent trip	**Combined Measure 1.3** Seasonal closure in DMV + Max # of MA AA trip from June15-Aug31	
	Option A - ETA only	Option B - ETA and DMV		Option A - max of 1 trip	Option B - max of 2 trips
Projected # of trips in window PRE RPM	289	289	289	289	289
Projected # of trips in window POST RPM	225	225	225	225	225
Difference in # of trips in MA AA during window	-64	-64	-64	-64	-64
Total landings in MA AA in window PRE RPM	5195880	5195880	5195880	5195880	5195880
Total landings in MA AA in window POST RPM	4043880	4043880	4043880	4043880	4043880
Difference in landings in MA AA during window	-1152000	-1152000	-1152000	-1152000	-1152000
Projected DAS used in MA AA during win. PRE RPM	2541	2541	2541	2541	2541
Projected DAS used in MA AA during win. POST RPM	1977	1977	1977	1977	1977
Difference in projected DAS used in MA AA during win.	-563	-563	-563	-563	-563
% reduction in MA AA effort during window	-22%	-22%	-22%	-22%	-22%
Total effort shift in MA (AA +OA) during window	6.3%	6.3%	6.3%	6.3%	6.3%
Change in F (increase)	0.002	0.002	0.002	0.002	0.002
Change in fishing costs (decrease)	24,530	24,530	24,530	24,530	24,530
Change in Revenue - no change in poss limit	0	0	0	0	0
Change in poss limit	17962	17962	17962	17962	17962
Reduction in Landings with change in poss limit	(31,104)	(31,104)	(31,104)	(31,104)	(31,104)
Reduction in Revenue with change in poss limit	(227,370)	(227,370)	(227,370)	(227,370)	(227,370)

Table 76 – Summary of potential net impacts on fishing mortality, effort shifts, yield, revenue, and fishing costs associated with combined RPM alternatives

NET of combined alternatives

	Combined Measure 1.1 Seasonal closure in DMV + Reduced Possession limit and additional trip		**Combined Measure 1.2** Seasonal closure in DMV + Reduced poss limit in ETA of 14,000 in window and 22,000 on subsequent trip	**Combined Measure 1.3** Seasonal closure in DMV + Max # of MA AA trip from June15-Aug31	
	Option A - ETA only	Option B - ETA and DMV		Option A - max of 1 trip	Option B - max of 2 trips
Projected # of trips in window PRE RPM	289	289	289	289	289
Projected # of trips in window POST RPM	225	225	184	117	184
Difference in # of trips in MA AA during window	-64	-64	-105	-172	-105
Total landings in MA AA in window PRE RPM	5,195,880	5,195,880	5,195,880	5,195,880	5,195,880
Total landings in MA AA in window POST RPM	3,150,000	2,475,000	3,000,000	2,106,000	3,312,000
Difference in landings in MA AA during window	(2,045,880)	(2,720,880)	(2,195,880)	(3,089,880)	(1,883,880)
Projected DAS used in MA AA during win. PRE RPM	2541	2541	2541	2541	2541
Projected DAS used in MA AA during win. POST RPM	1540	1210	1467	1030	1619
Difference in projected DAS used in MA AA during win.	-1001	-1331	-1074	-1511	-921
% reduction in MA AA effort during window	-39%	-52%	-42%	-59%	-36%
Total effort shift in MA (AA +OA) during window	11.1%	14.8%	12.0%	16.8%	10.3%
Change in F	0.003	0.004	0.004	0.005	0.003
Change in fishing costs	523,560	777,938	46,758	65,795	40,115
Change in Revenue - no change in poss limit	0	0	0	0	0
Reduction in Landings with change in poss limit	(73,350)	(91,196)	(51,888)	(83,427)	(50,865)
Change in Revenue with change in poss limit	(536,191)	(666,645)	(379,298)	(609,850)	(371,821)

5.3.2.5 Additional analyses of scallop fishery trends related to RPM

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 77 – 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 78). 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 78 – 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

5.3.2.5.1 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 48). 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 49 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 50 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 48 – Scallop landings in the Mid-Atlantic by month and year

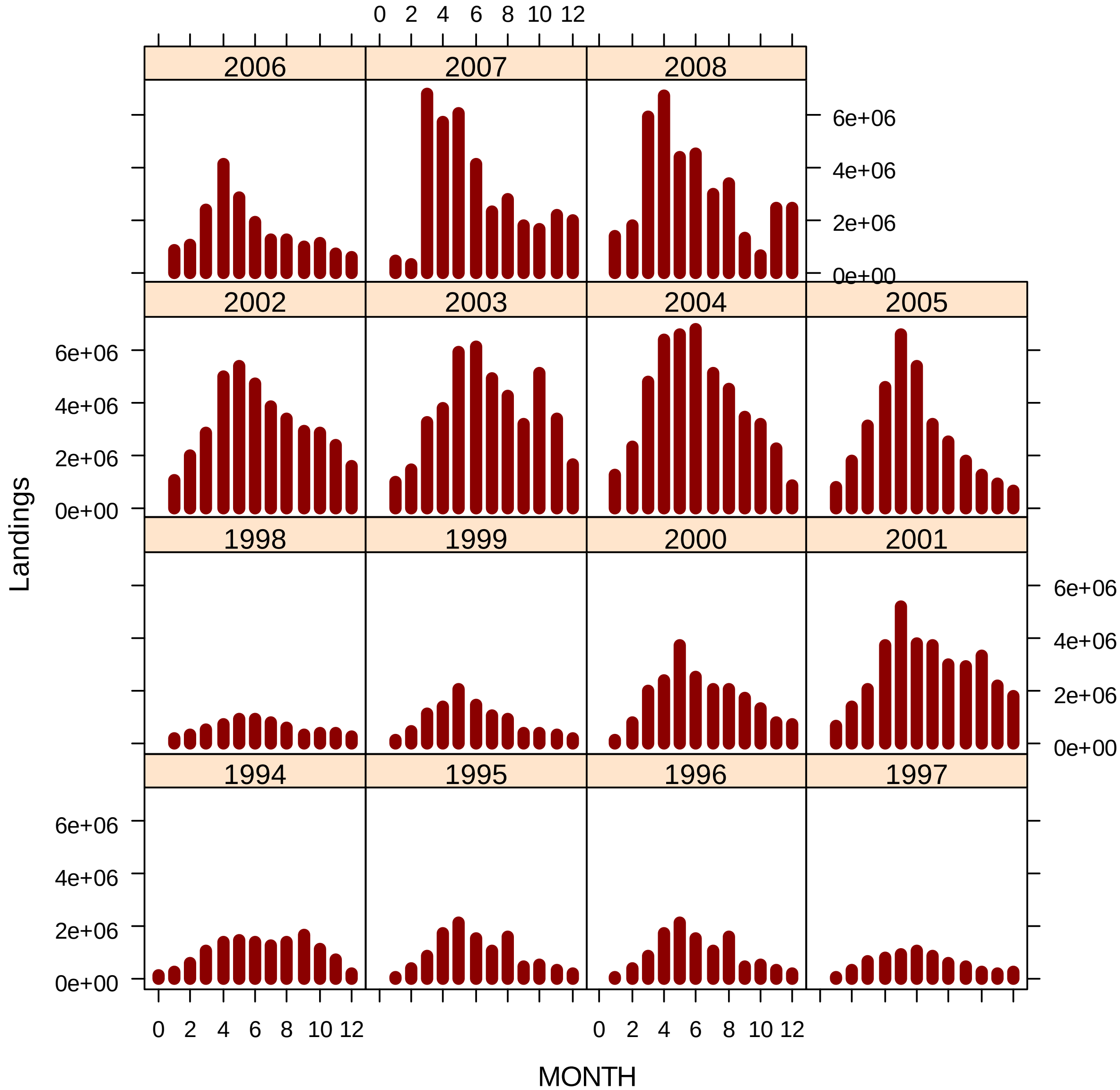


Figure 49 – Percent of Mid-Atlantic landings (open and access areas combined) for the two turtle seasons under consideration – June 16-Oct14 (dashed) and June15-Oct31 (solid)

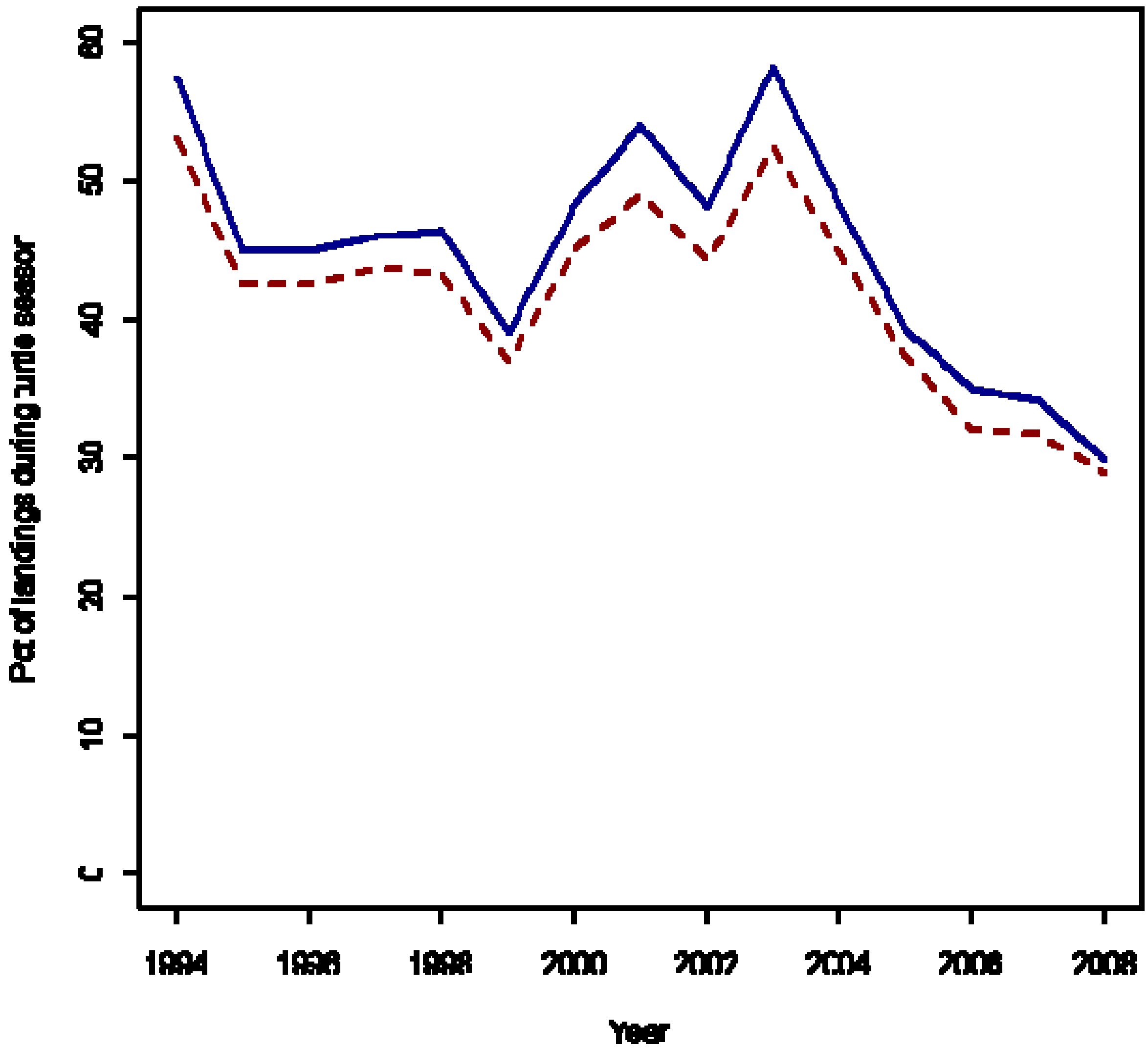
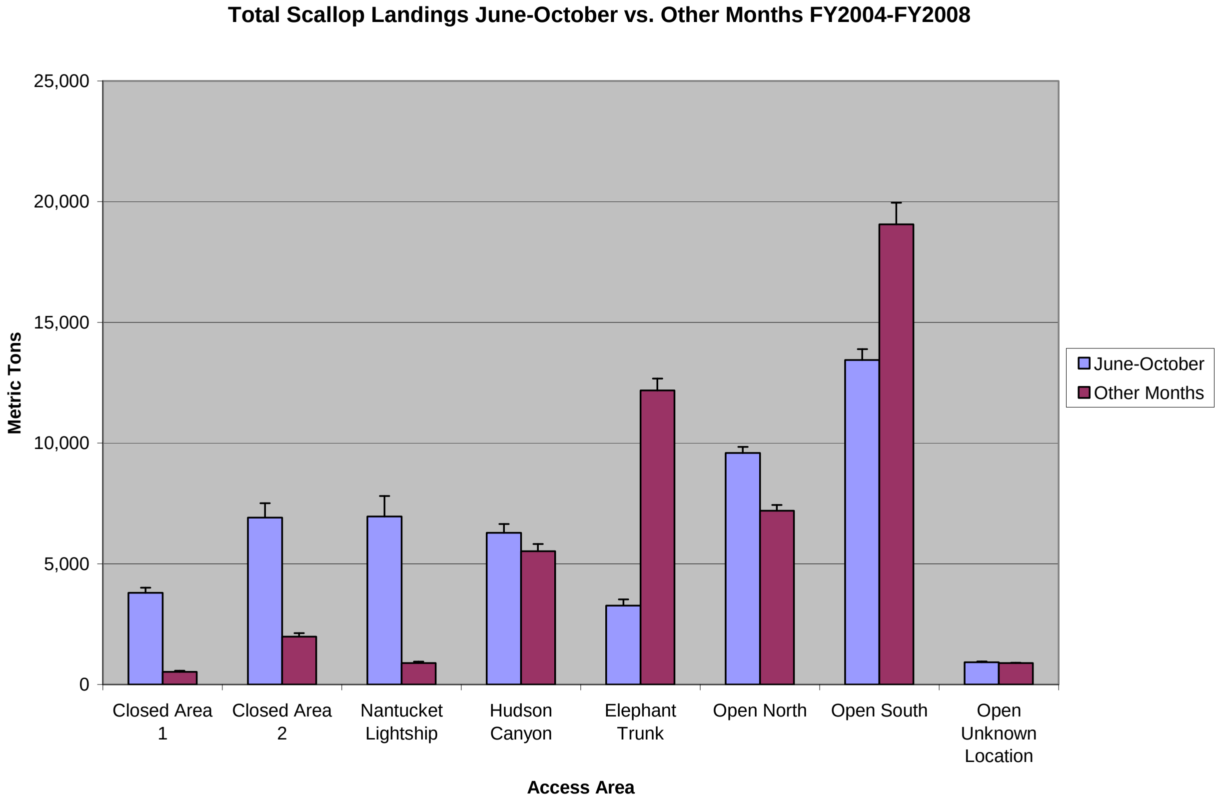


Figure 50 – Scallop landings during turtle season of June-October compared to the rest of the year



Fishing mortality peaked in the early 1990s, but has decreased substantially since then and, in general, has remained stable since 1999 (Table 51). 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 52).

Figure 51 – Fishing mortality in the scallop fishery overall (and in Georges Bank and Mid-Atlantic) from 1983 -2006

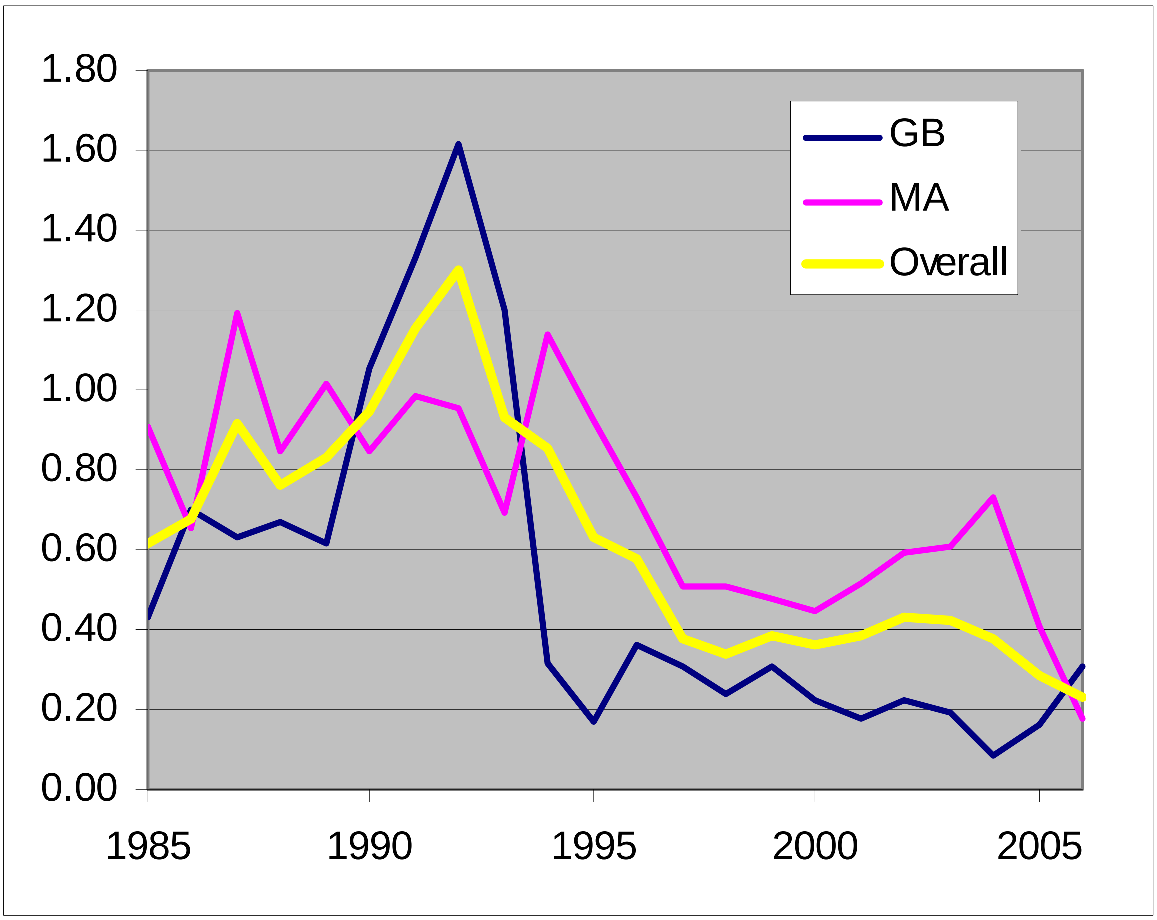
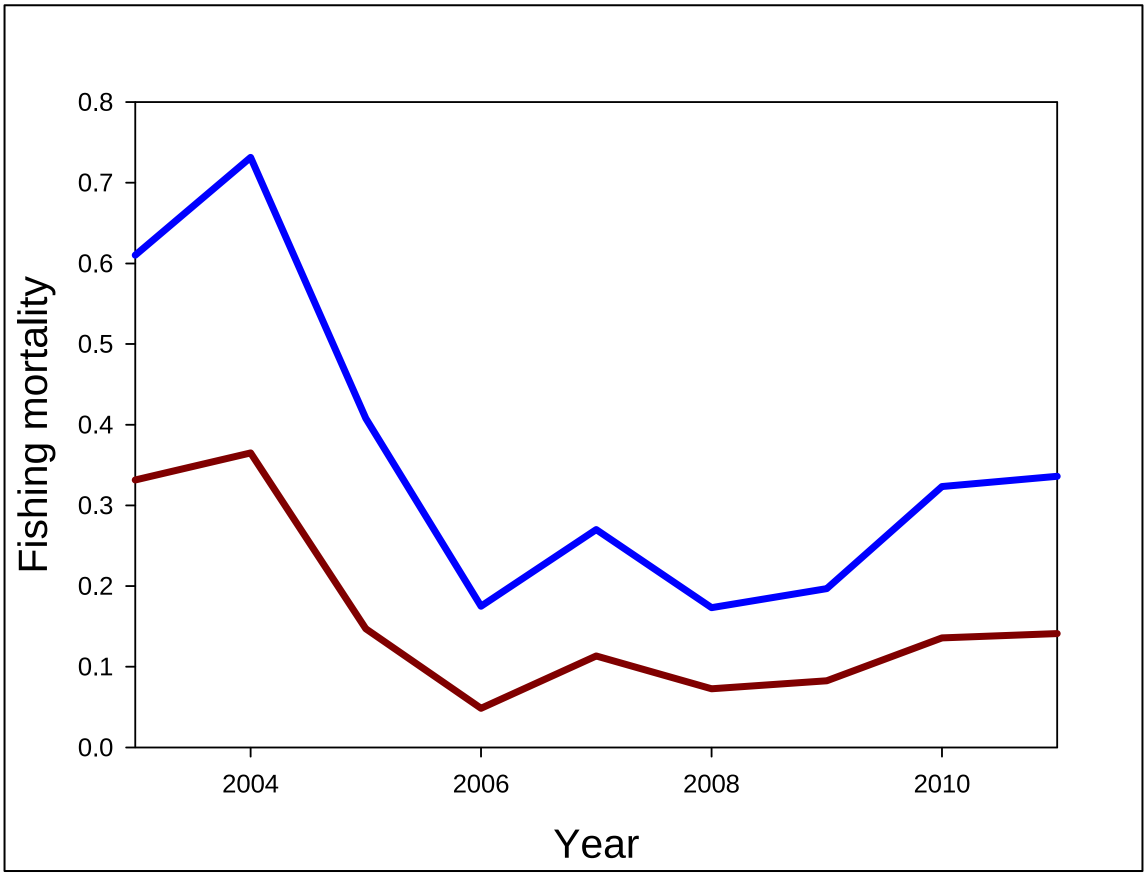


Figure 52 – Estimate of fishing mortality in the Mid-Atlantic (blue) and during the months of June-October (red). Fractions in projections assume June-October fishing mortality is 42% of annual F.
F estimates for 2003-2006 from SAW Report and projections for 2007-2011 from FW19 projections



5.3.2.6 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.

5.3.2.7 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.

5.3.3 Analysis of measures in FW21

5.3.3.1 No Action

Impacts of No Action on protected resources could be higher than scenarios under consideration because fishing levels would be higher in ETA, 3 trips compared to 2 trips. If these additional trips occur in the season that turtles are present there is a higher chance of interaction with scallop gear compared to all 4 scenarios under consideration. All four scenarios include only two trips in ETA. However, No Action does not include a trip into Delmarva, so the cumulative impacts may not be that different. Open area DAS allocations under No Action are within the range being considered for this action, higher than some scenarios and lower than others.

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. Because NCLF20 does not close the channel it has potentially greater impacts on protected resources if some of the additional open area effort moves from the Channel area to the Mid-Atlantic during the time of year turtles are present. Overall DAS allocations are similar to recent years so the potential increase is limited. In addition, this scenario has the lowest projected DAS used than all other FW21 scenarios (about 22,000 compared to 25-32,000 for the other scenarios) (Table 40 in FW21).

5.3.3.2 Overall comparison of the scenarios

Four different scenarios for open area and DAS allocations 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. 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. For these few years, (2010-2012) fishing effort could be higher in open areas in the Mid-Atlantic if effort from the channel shifts to that area. And if the effort is higher in June-October when turtles are present, impacts on protected resources may be greater compared to alternatives with lower open area DAS allocations. The two options that propose closing the Channel have higher DAS used values for open areas in the Mid-Atlantic including waters around Long Island, the New York bight and off Virginia Beach (Table 40 and Figure 41 in FW21).

However, after the Channel opens in 2013 LPUE is higher and area swept is lower for the two scenarios that close the Channel, so impacts on protected resources would be reduced during the years the Channel area reopens (Figure 37 in FW21).

5.3.3.3 Measures for Limited access vessels

This framework includes the specific access area schedule and DAS allocation s for all limited access scallop vessels. The expected impacts on protected resources from the various scenarios are described above. In terms of the set-asides for observers and research there are indirect beneficial impacts on protected resources if that set-aside is used to learn more about the interactions of the scallop fishery and protected resources. Numerous turtle related research projects have been funded through the Scallop RSA program to date, and that topic is a high priority for future research proposals. In addition, much of the information known about when and where interactions have happened are from data collected through the observer set-aside program. So both these programs are expected to have continued indirect benefits on protected resources.

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 5.4 DAS. If the area closes early those DAS could be used in open areas in the Mid-Atlantic, especially if southern vessels do not get a chance to use their trip in NL. Those additional DAS could have impacts on protected resources if fished during the time of year when turtles are present, but the amount of additional effort is limited.

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 protected resources. Preliminary analyses suggest

that effort in ETA from the September and October closure has shifted into adjacent months. Specifically, access area trips not taken in September and October were taken mostly in August, November and December. Vessels have not increased open area effort during Sept and Oct as a result of the seasonal closure. It is difficult to say whether increased fishing in August has different impacts on turtles compared to Sept and Oct since turtles can be present during all three months. But any effort shifted after October is expected to have beneficial impacts because turtles have not been present in that area after October.

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%. Overall, there are no expected differences of impacts on the protected resources if the limited access fishery lands these scallops or the general category fishery. General category vessels are found in the north and the south, and some vessels move depending on resource availability.

5.3.3.4 Measures for General category vessels

5.3.3.4.1 Measures if IFQ program is delayed

5.3.3.4.1.1 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. Similar to 2008 and 2009, it is expected that most general category fishing would take place several weeks after each opening. The quarterly TACs are not equally divided across the fishing year but represent percentages that generally reflect seasonal effort as it has historically been fished by the general category fleet: 35 percent during the March –May period, 40 percent from June-August, 15 percent from September-November and 10 percent for December-February. Because this alternative does not represent a redirection of effort during the four periods, the quarterly hard-TAC is not likely to have measurable impacts on protected resources except that it could potentially mitigate the possibility of concentrated effort over protracted periods of time.

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. These measures are not expected to change overall fishing effort, nor are they likely to influence the distribution of that fishing effort. As such, they are expected to have a neutral impact on sea turtles inhabiting the sea scallop management unit.

The measures for NGOM and incidental catch TACs are not expected to have impacts on protected resources.

5.3.3.5 Consideration of new rotational area in the great south channel

Additional rotational areas could reduce the potential negative impacts of scallop gear interactions with threatened and endangered sea turtles if they allow for decreased effort and bottom contact time relative to No Action in areas and at times when fishery encounters are most likely to occur. In this case, however, DAS used and bottom area swept is greater under both closure options compared to non-closure options (Table 40 and 41 in FW21). Because of these increases, correspondingly greater risks to turtles may result if effort overlaps with the presence of sea turtles. Further, closing the Great South Channel area is not likely to confer benefits to turtles because of their general scarcity in the area and because effort could potentially shift to the Mid-Atlantic where sea turtles have a higher risk of entanglement. Leaving the Channel area open under any of the scenarios is less risky relative to sea turtles.

It should be noted that this action is also considering specific measures to limit effort in the Mid-Atlantic to comply with a recent biological opinion of this fishery and its impacts on sea turtles. Therefore, if certain measures are selected under that section the combined potential impact on turtles of closing the Channel may be reduced if other actions are taken to limit scallop effort in the Mid-Atlantic during the time of year turtles are present.

5.3.3.6 Compliance with reasonable and prudent measure in recent biological opinion

5.3.3.6.1 Alternatives to comply with RPM

Sea turtles are present seasonally in the Mid-Atlantic, moving up the coast from southern wintering areas as water temperatures warm in the spring and returning in the fall (NMFS 2008). Fisheries observers have recorded sea turtle interactions with scallop gear during June – October (Figure 1). While turtle interactions could occur in any month throughout the Mid-Atlantic during this time period, higher probabilities have generally been associated with warm sea water temperatures (>19C) and depths between 50 and 70m (see Murray 2004a, 2004b, 2005, 2007 for more information on estimated bycatch rates and observer coverage levels).

In mid-2006, NMFS finalized a rule (71 FR 50361, August 23, 2006) that required scallop fishermen operating south of 41 9.0' N from May 1 through November 30 each year to equip dredges with chain mats. 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. 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. Because chain mats are designed to keep turtles out of the dredge bag, enumerating observed interactions in and around scallop dredge gear became difficult after 2006.

The impacts on sea turtles of FW21 alternatives designed to meet the requirements of the Biological Opinion can be assessed qualitatively, by comparing shifts in fishing effort to historic patterns in sea turtle bycatch rates, particularly those before 2006 when chain mats were not required. (Note that if sea turtle abundance in the Mid-Atlantic increases in 2010 and beyond, the effect of effort shifts become less predictable).

RPM Alternatives #1 and #2 will likely result in a reduction in turtle bycatch in the Mid-Atlantic, because effort will either be reduced in the region, or move into other seasons and areas where there have been very few turtle interactions. (Only 1 turtle bycatch was observed north of the RPM line b/w 2001-2008, and none were observed during Nov-May) (Figure 53). FW21 has analyzed the potential impacts of shifting 10% of expected catch in the Mid-Atlantic during the turtle season to other areas or seasons. If 10% of total effort in that area and time are shifted to other seasons or areas as a result of either RPM Alternative #1 or #2, overall impacts on turtles are expected to be positive since less effort will be permitted in the area and time of year turtle interactions are most likely.

In terms of the season options for these alternatives, if the restriction is extended into late October that may be more beneficial for turtles since turtles may still be in the general area. Limiting effort during the last two weeks of October may provide a buffer of protection around the time that turtles have been observed in case their migration pattern happens to be later in 2010. In terms of the area alternatives, there is sea surface temperature data that supports that limiting effort in the areas south of Long Island and east of New Jersey (statistical areas 612 – 616, and 533, 534, and 541-543) may not be necessary during the month of June because the mean sea surface temperature in that area is below the minimum temperature at which loggerhead sea turtle interactions have been observed in scallop gear (Figure 54 and Figure 55). However, limiting effort in this area in June as well is more precautionary in case temperature trends change or turtle migration patterns are different than data suggest.

Figure 53 - Observed turtle bycatch in scallop dredge and trawl gear 2001-2008 shown in relation to RPM line

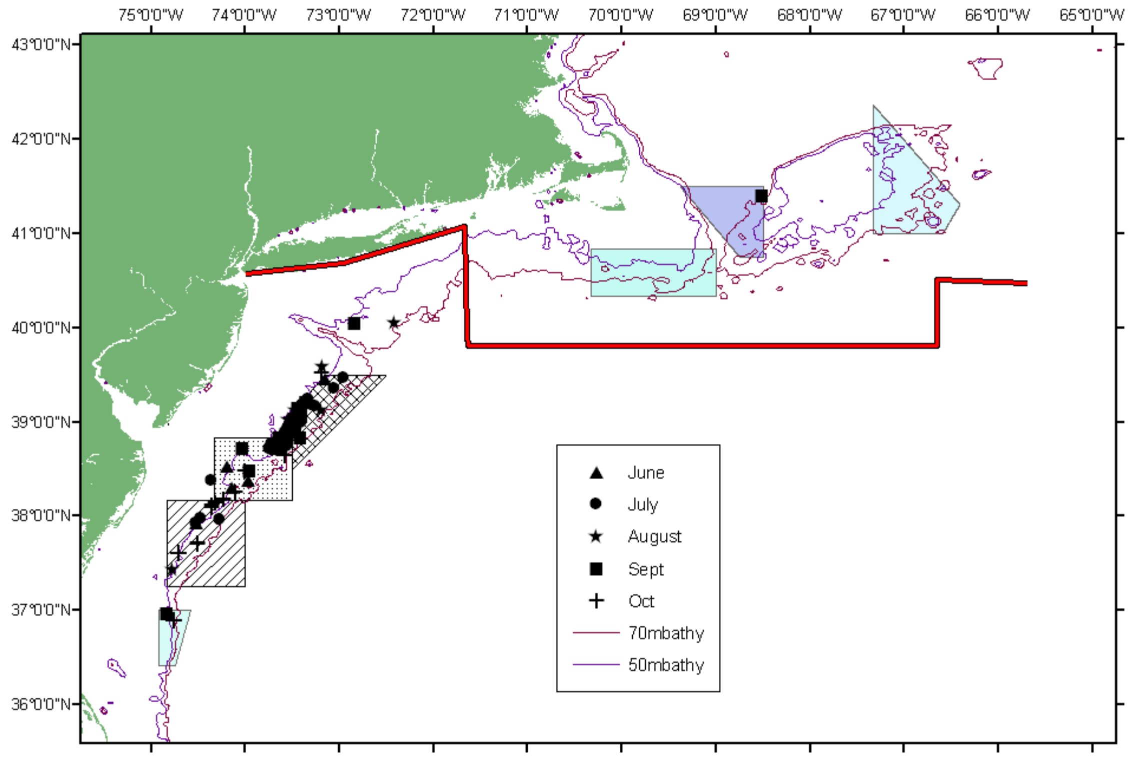


Figure 54 – Alternative RPM boundary for the month of June for RPM alternatives 1 and 2 based on sea surface temperature data

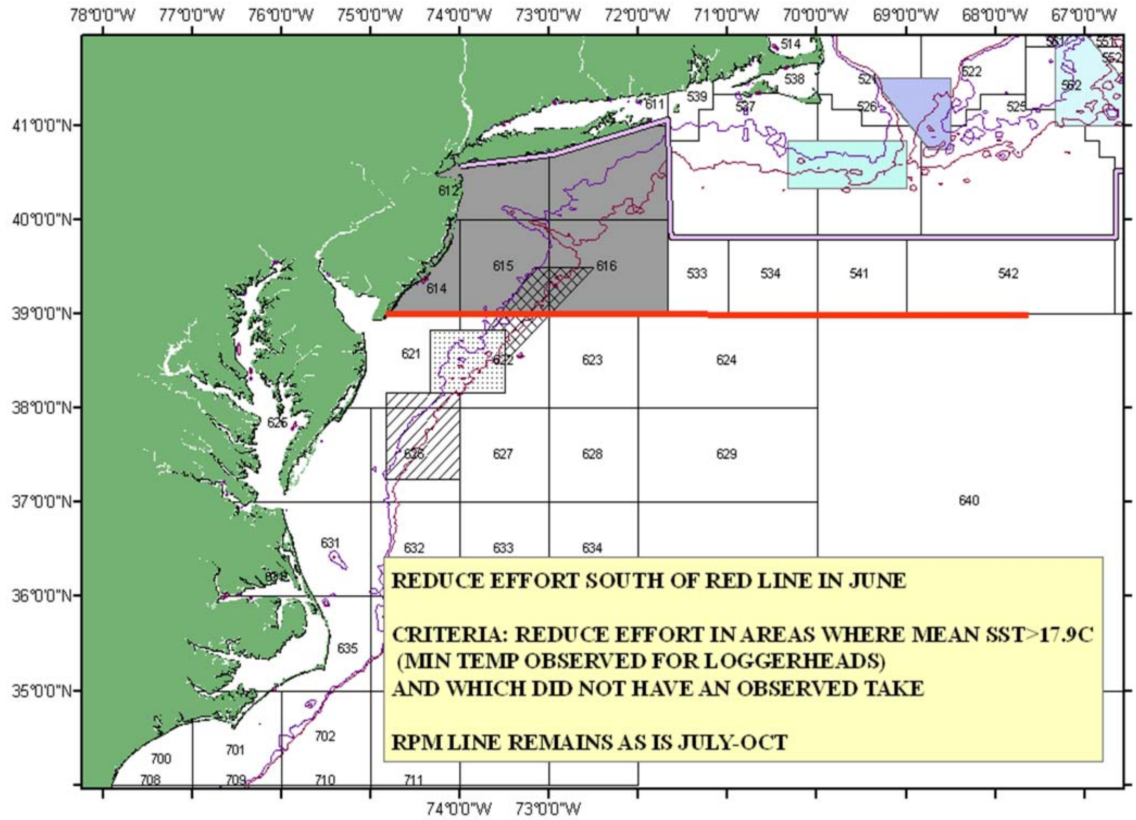
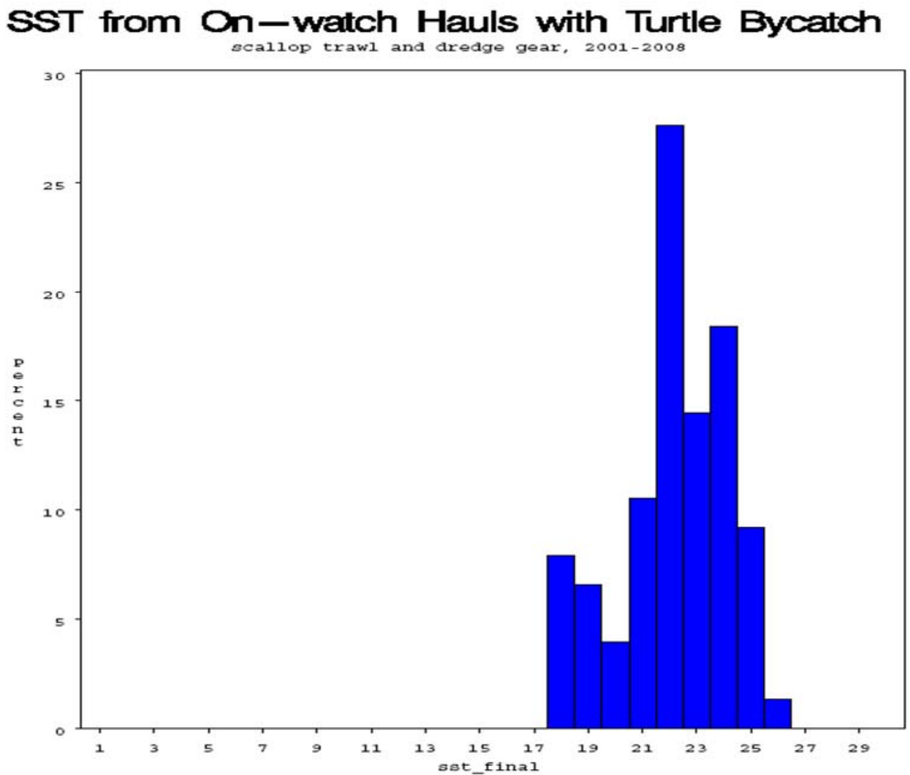
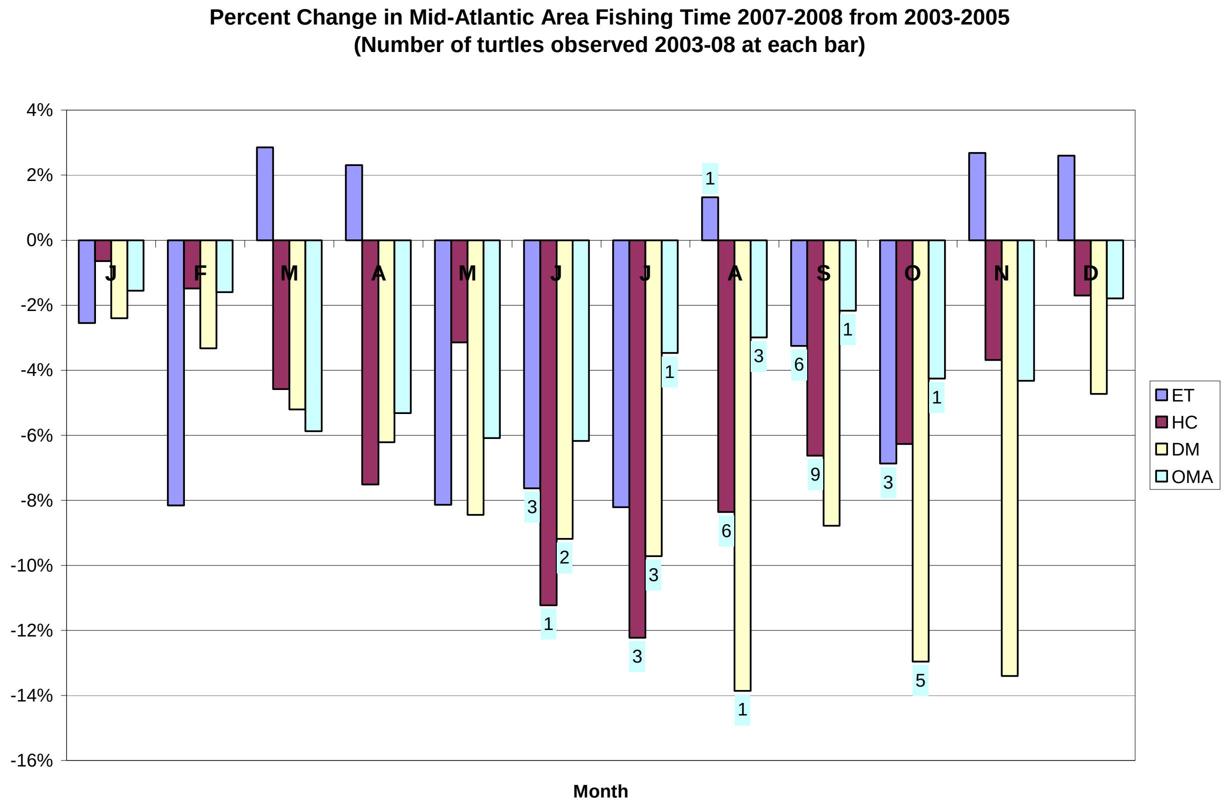


Figure 55 – Sea surface temperature from on-watch hauls from observed scallop trawl and dredge trips from 2001-2008



The affect of RPM Alternative #3, to close the Delmarva area during September and October, will depend on where and when fishing effort is displaced. If effort redistributes to surrounding time periods, as it did when the Elephant Trunk area was closed to fishing in 2007 and 2008 during September and October to minimize impacts on sea turtles, then the number of turtle interactions would likely decrease because effort is shifting into cooler-water months when sea turtles are not likely to be in the area (Figure 42). The increase in effort in ETA in March and April seen in 2007 and 2008 compared to 2003-2005 is not due to the seasonal closure. That increase in effort during those two months is likely from high levels of general category effort, increased interest to get in that area at the start of the fishing year after it was closed for several years, and more trips were allocated in 2007 and 2008 so vessels had to spread effort out more than they will in 2010 with only two allocated trips.

Figure 56 – Percent change in Mid-Atlantic area fishing time by month in recent years compared to 2003-2005



The affect of RPM Alternative #4 is likely to be positive because this alternative does not allow effort to be shifted to other seasons or areas, it simply reduces it for the entire area and year. Specifically, it reduces the possession limit if a vessel takes an access area trip in the Mid-Atlantic during the turtle season, and those pounds cannot be recaptured on a future trip outside the turtle season. For example, under NCLF20 for the June15-Oct31 alternative, 289 of the total 1020 MA AA trips are expected to be taken during that time period (Table 59 in FW21). Those trips are expected to fish 2,541 DAS with an 18,000 pounds possession limit. This measure would restrict the possession limit to something lower so that 1,652 DAS would be used instead to equate to a 10% shift of total effort from that area and time. That restriction would have the equivalent reduction of 890 DAS (35% reduction), therefore, beneficial impacts on protected resources are expected.

The expected impacts of the Combined RPM measures are described in detail in Section 5.3.2.4. Overall, the first combined measure would have higher impacts on costs because it includes an additional trip that would need to be taken (3 ETA trips compared to 2). The major issue with this alternative and the second combined alternative is timing. Because FW21 will be implemented late vessels would not be able to take advantage of higher possession limits until the FW was implemented, likely not until June. Since that is very close to the beginning of the restricted window of June15-Oct31, vessels would be limited to taking larger trips, or additional trips after the seasonal restriction later in the year when weather is worse and meat weights are less. The combined measure that preformed the best in the analyses and seems to strike a balance in terms of limiting effort to benefit turtles but not beyond more than a minor impact on the fishery or the resource is the measure that combines the 2-month seasonal closure in Delmarva and restricting each vessel to only 2 of the three allocated MA access area trips from June15-October 31.

Limiting the maximum number of trips to two per vessel will move 358 DAS from the turtle window to the rest of the year, which constitutes about a 4.0% effort shift. There would be no loss in scallop revenue because the vessels will be allowed to land the same amount of pounds. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore fleet fishing costs will increase by $15,584. In addition, this measure will involve closure of DMV (Alternative 3) from September 1 through October 31. It is estimated that 64 DMV trips (6.7%) would normally take place during the months of September to October. The DAS used for these trips is estimated to be 563, and this effort will be removed from turtle window. This constitutes a 6.3% effort shift and an increase in *F* of 0.002 for the entire turtle window from June 15 to August 31. Because more trips will take place in the window when meat weights are lower compared to the status quo, it will take more DAS to land the same pounds. Therefore the fleet fishing costs will increase by $24,530 because of the DMV closure.

The net change in *F* of closing DMV (increase in *F* of 0.002) and limiting the number of trips to two trips per vessel during the June 15 – August 31 window (increase in *F* of 0.001) will be a net increase in *F* of 0.003. The combined measure will also result in a 10.3% shift of effort from the turtle window (June 15 – October 31) into the rest of the year, which is just above the recommended threshold level for a minor change based on the analyses prepared by the PDT for the original RPMs in FW21. Adding the increase in fishing costs due to the DMV closure to the increase in costs due to effort shifts from ETA during the turtle window, the total trip costs with this combined measure will increase by $40,115 for the scallop fleet. In summary, this final combined measure would limit scallop effort and not have more than a minor impact on the fishery.

5.3.3.7 Improvements to the observer set-aside program

5.3.3.7.1 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 protected resources. If this ultimately improves the overall coverage of the scallop fishery there may be indirect benefits on protected resources from improved information about how the fishery interacts with turtles.

5.3.3.7.2 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 protected resources. If this ultimately improves the overall coverage of the scallop fishery there may be indirect benefits on protected resources from improved information about how the fishery interacts with turtles.

5.4 ECONOMIC AND SOCIAL IMPACTS

5.4.1 No Action and Status Quo

The objective of the cost-benefit analysis is to evaluate the net economic benefits arising from changes in consumer and producer benefits that are expected to occur with implementation of a regulatory action. As the Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007) [4] state "the proper comparison is '*with the action' to 'without the action'* rather than to *'before and after the action,'* since certain changes may occur even without action and should not be attributed to the regulation." Even without action, the scallop stock abundance in open and access areas will be different, requiring changes in open area DAS and trip allocations in order to maximize yield from the fishery over the long-term. As a result, landings, scallop prices, fishing costs, revenues and benefits from the fishery would change. For these reasons and in accordance with the NMFS Guidelines (NMFS, 2007), the cost-benefit analyses presented in Section 5.4.2 compare the economic benefits of the proposed measures with the "No Action" scenario rather than with previous benefits or with economic impacts compared to 2009 fishing year.

No action for the cost-benefit analysis of the Framework 21 alternatives could be defined as "the continuation of all the measures including the open area DAS and access area trip allocations as specified in the present regulations, i.e., in Framework 19." Thus, under no action the measures from the most recent year would continue. The full-time limited access vessels would get 42 DAS and 4 access area trips assuming that the general category IFQ program is implemented. Access area allocations drop to four trips because of the way the regulations are written; an access area scheduled to open cannot under No Action unless it was open the previous year. In 2010 both NL and CA1 are scheduled to open, but since neither was open in 2009, neither would be open in 2010. A full description of the no action alternative is provided in Section 2.2.1. The following section (Section 5.4.2) discusses the impacts of no action on economic benefits compared with the proposed action (status quo F-target) and with other alternatives considered by this framework.

This action also includes a status quo option F_{target} (NCLF20), *which for practical purposes is No Action* in terms of how the Council would set F_{target} and associated 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). Specifically, under "status quo" in open areas, full-time limited access scallop vessels would receive an allocation of 29 days-at-sea. There will be four access area trips allocated including one trip in Nantucket Lightship, one trip in Delmarva, and two trips in the Elephant Trunk Area. Therefore, this scenario is considered as a more realistic baseline against which all other alternative actions

[4] Guidelines for Economic Reviews of National Marine Fisheries Service Regulatory Actions, March 2007, http://www.nmfs.noaa.gov/sfa/domes_fish/EconomicGuidelines.pdf

could be compared in terms of the economic impacts. For this reason, the economic analyses provided in Section 5.4.2 evaluate economic benefits of the alternative actions compared with both 'No Action' and the 'Status Quo F-target (NCLF20)' benefits. As the Guidelines for Economic Analysis of Fishery Management Actions specify, "benefits and costs are measured from the perspective of the Nation, rather than from that of private firms or individuals. Benefits enjoyed by other nations are not included, although tax payments by foreign owners, and export revenues, are benefits to the Nation."

The overall benefit and costs of the fishery management actions generally vary over time depending on the rate of growth of the stock and according to the nature of management measures implemented to maximize the yield from fishery. Although a general guideline for the period of analysis cannot be established for all fishery management actions due to the diversity of possible situations and measures to be dealt with, the Guidelines state that "the period of analysis could reflect the time it takes for the fishery to move from its initial equilibrium along the expansion path to the final equilibrium point (including the time needed for the present value of costs and benefits to approximate zero) due to the adoption of the proposed regulation, holding all other influence constant." In addition, the Guidelines indicate that "a reasonable attempt should be made to conduct the analysis over a sufficient period of time to allow a consideration of all expected effects".

Because fishery management actions in general result in short-term costs for the industry in terms of foregone revenue, "choosing a period of analysis that is too short may bias the analysis toward costs, where costs are incurred in the short-term and benefits are realized later." Similarly, the Office of Management and Budget (OMB, 2003) indicated that the analyses should "present the annual time stream of benefits and costs expected to result from the rule," and state that "the beginning point for your stream of estimates should be the year in which the final rule will begin to have effects" and "the ending point should be far enough in the future to encompass all the significant benefits and costs likely to result from the rule."[5]

Furthermore, the economic impacts of the proposed regulations over the long-term should be evaluated by the discounted cumulative present value of the stream of benefits since benefits or costs that occur sooner are generally more valuable (or have a positive time preference). OMB Circular points out that the analytically preferred method of handling temporal differences between benefits and costs is to adjust all the benefits and costs to reflect their value in equivalent units of consumption and to discount them at the rate consumers and savers would normally use in discounting future consumption benefits (OMB, 2003). Discount rate is the interest rate used in calculating the present value of expected yearly benefits and costs. This Circular suggests that for regulatory analysis, the cost-benefit analyses should provide estimates of net benefits using both three percent and seven percent.

Since the benefits from the Framework 21 management action are expected to be realized over the long-term but will have some negative impacts during the first year, Section 5.4.2 examines both the short-term (fishing year 2010 only) and the long-term (2010-2023) economic impacts of the proposed regulations over the next 14 years. The long-term is divided into two sub-periods:

[5] OMB Circular A-4 (September 17, 2003), http://www.whitehouse.gov/omb/circulars_a004_a-4/

near-term from 2010 to 2016 and longer-term from 2017 to 2023. The first period is considered to have less uncertainty in terms of biological and economic factors that impact landings and economic benefits compared with the last seven years from 2017 to 2023 and equals the amount of time the closure alternatives would impact the results. Specifically, if CLF18 or CLF20 were selected the closure would likely be in place 2010-2012 and reopen as an access area in 2013-2016. The present value of long-term benefit and costs are estimated using both a 3% and a 7% discount rate. The higher discount rate provides a more conservative estimate and a lower bound for the economic benefits of the proposed action compared with the No Action scenario and compared with the benefits predicted using a lower discount rate.

Results

The biological estimates for the "No Action" alternative show that this scenario will result in less than optimal long-term landings and economic benefits compared to the proposed action and other alternatives. Table 80 indicates that over the long-term (2010-2023) the cumulative landings with No Action will be 27 million pounds less than the landings expected with the proposed action. Similarly, the present value of the cumulative scallop revenues will be about $80 million (at a 7% discount rate) to $118 million (at a 3% discount rate) lower (Table 81), and the present value of the cumulative total economic benefits will be about $86 million (at 7% discount rate) to $125 million (at 3% discount rate) lower (Table 84) compared to the levels with the proposed action.

The reasons for lower long-term benefits for the "No Action" compared to the proposed action and other alternatives could be summarized as follows:

- "No Action" alternative would allocate 3 trips to ETA, which is higher than the projected biomass in that area can support.
- Under "No Action", there is no access into areas on Georges Bank while the biomass in those areas can support one trip.
- Under "No Action," open area DAS allocations would also be higher than sustainable levels because the present conditions of biomass in those areas were not taken into account.
- For these reasons, the levels of exploitable biomass for the no action alternative will be less than the levels for the proposed action and all the other alternatives (Section **5.1.2.1**). The proposed action (status quo target-F) will result in higher exploitable biomass for each year from 2011 to 2023 compared to "No Action" alternative and high-F options with closure or no closure (Table 79).
- Because of higher DAS allocations (42 days versus 29 days), however, short-term (FY 2010) landings, revenues and economic benefits under "No Action" would exceed the landings and economic benefits for the status quo (NCLF20) and no-closure high F (NCLF24) and closure low F (CLF18) alternatives." On the other hand, more open area DAS are allocated with the new closure high-F option (CLF20), thus "No Action" landings, revenues and economic benefits will be less compared to this alternative.
- Over the long-term landings, revenues, producer and consumer surpluses and total economic benefits under "No Action" would fall short of the levels corresponding to all of the other alternatives considered in this Framework because of the suboptimal

allocation of open area DAS and access area trips that result in lower exploitable biomass (Table 79 to Table 85).

Table 79. Percentage change in exploitable biomass (in metric tons) compared to Status Quo (Proposed Action) Levels

Fishing Year	No Action	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	0%	0%	0%	0%
2011	-3%	-2%	-5%	-3%
2012	-2%	-3%	-4%	-1%
2013	-1%	-2%	0%	4%
2014	-1%	-2%	0%	4%
2015	-1%	-1%	0%	4%
2016	-1%	-1%	0%	3%
2017	-2%	-1%	-2%	0%
2018	-2%	-1%	-2%	0%
2019	-3%	0%	-2%	0%
2020	-3%	0%	-1%	0%
2021	-3%	-1%	-1%	0%
2022	-3%	-1%	0%	0%
2023	-3%	-1%	0%	0%

The economic impacts of the status quo scenario were analyzed in Section 5.4.2 relative to the impacts of the alternatives described in Section 2.0.

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

The specific measures that are included if this action is not implemented by March 1, 2010 will help to reduce the adverse impacts of exceeding the proposed allocations in Framework 21 in 2010 on the scallop resource. These measures are described in Section 2.2.3 of the Framework 21 document. Any excesses over the open area DAS-used or trip allocations for the access areas above the ultimate value allocated for 2010 will be reduced the following fishing year (2011). 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. The short-term impact of exceeding proposed allocations in 2010 will be positive in 2010, but negative in 2011 since vessels fished above the ultimate value allocated for 2010 will get smaller allocations in 2011. This will help reduce the negative impacts of overfishing in 2010 on the scallop resource over the long-term. Therefore, these measures will have positive long-term impacts on landings, revenues, producer and consumer benefit and net national economic benefits.

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

The economic impacts of no action if the IFQ program is not in place prior to March 1 on the limited access and general category vessels are discussed in Section 5.4.3.5, 5.4.4.1, and 5.4.4.2 below.

5.4.2 Aggregate economic impacts of the Framework 21 alternatives

This section provides a cost/benefit analysis of the allocation alternatives proposed by the Council through Framework Action 21 to the Sea Scallop FMP including the status quo option as defined in Section 2.4 of the Framework document and summarized above in Section 5.4.1. The economic impacts of the proposed action and alternatives are compared with the impacts of both "No Action" and the "Status Quo" (proposed action, NCLF20) for the reasons explained above in Section5.4.1. The proposed action is equivalent to status quo F_{target} (NCLF20), thus these terms are used interchangeably in the analyses. In addition to the proposed status quo action, three other scenarios were considered, 2 that propose closing a new area in the South Channel for area rotation (CLF18 and CLF20) and another without (NCLF24) at different overall *F* values. The following sections analyze the aggregate impacts of these options on landings, effort, revenues, fishing costs, consumer and producer surpluses and net economic benefits. These analyses include the economic impacts both on the limited access and general category fisheries given that respectively 95% and 5% of the TAC is allocated to these fisheries. The impacts of the proposed action and alternatives on individual vessels are expected to be proportional to the aggregate impacts on revenues, fishing costs and net revenues (producer surplus).

5.4.2.1 Acceptable Biological Catch

Reauthorization of the MSA requires the SSC to set an acceptable biological catch (ABC), or maximum catch level that can be removed from the resource taking into account all sources of biological uncertainty. The Council is prohibited from setting catch limits above that level. This new requirement is expected to have long-term economic benefits on the fishery by helping to ensure that catch limits and fishing mortality targets are set at or below ABC. This should help prevent overfishing and optimize yield on a continuous basis. Therefore, this measure is expected to have positive impacts on the landings and revenues, producer and consumer surpluses and net economic benefits to the nation.

5.4.2.2 Summary of overall economic impacts of the allocation alternatives

The short-term and long-term economic impacts of the alternatives considered in this Framework could be summarized as follows:

- Economic benefits include the benefits both to the consumers and to the fishing industry and equal the sum of benefits to the consumers and producers. There are trade-offs between the short-term and long-term benefits, and alternatives with higher benefits in the short-term will, in general, result in lower benefits over the long-term.
- In the short-term (i.e. fishing year 2010), landings, revenues and economic benefits for the status quo (NCLF20), for no-closure high F (NCLF24) and closure low F (CLF18) could fall short of landings and economic benefits for the 'No Action" alternative. The scallop revenues are expected to be $47 million lower (Table 81), the producer surplus $37 million lower (Table 82), consumer benefits $4 million lower (Table 83), and total economic benefits $41 million lower (Table 84) with the proposed action (NCLF20) compared with No Action. Table 85 shows percentage change from the No Action levels in 2010 and indicates that scallop revenues will decline by 13%, producer surplus by 12%, consumer surplus by 27% and total economic benefits (i.e., the sum of producer and

consumer benefits) by 13%. This is because "No Action" open area DAS allocations would be higher than the allocations proposed for NCLF20 and NCLF24 and CLF20 alternatives, resulting in higher landings from open areas in 2010. On the other hand, open area DAS allocations (42 days) with the new closure option (CLF18) would be equivalent to the No Action scenario. Because this option results in higher overall LPUE compared to No Action, the revenues and economic benefits for CLF18 would be higher than the No Action levels in 2010. The Council did not select this alternative because new rotational area closure alternatives resulted in a higher area swept estimates in Mid-Atlantic which could have impacts on non-target species in those areas.

- Over the near-term from 2011 to 2016, landings, revenues, producer and consumer surpluses and total economic benefits for the proposed action (status quo) and other alternatives, with the exception of no closure, high-F (NCLF24) alternative are expected to exceed the "No Action" levels. The cumulative present value of the revenues for the proposed action will exceed the no action revenues by $55 million (at 7% discount rate) to $62 million (at 3% discount rate) for the period 2011-2016 (Table 81). The revenues for the no-closure, high-F option will be $2 million (at 3% discount rate) to $3 million (at 7% discount rate) lower than the no action levels, however. Because increase in revenues over the long-term outweighs the decline in revenues in 2010, the proposed action and all the other alternatives will result in higher revenues than the No Action scenario. Over the long-term from 2010 to 2023, the proposed action will generate $80 million (at 7% discount rate) to $118 million (at 3% discount rate) more revenues than the no action alternative. The scallop revenues for High-F (NCLF24) options will exceed the no action revenues by $53 million (at 7% discount rate) to 81 million (at 3% discount rate).
- Under the status quo alternative (NCLF20), the landings (42 million pounds) will be less than the levels estimated for the other alternatives in the short-term, i.e., during fishing year 2010 (Table 80). This is because open area DAS allocations will be smaller under the status quo compared to the other options. In 2011 and 2012, however, status quo landings are expected to increase to 62 million pounds and 69 million pounds, respectively, exceeding the levels for all the other alternatives. Similarly, over the long-term, the status quo landings are expected to be higher than landings compared to the other alternatives if 2010 is not included. Because the alternative with new closure and low fishing mortality ($F = 0.18$) results in higher landings in 2010 and similar levels of landings during the rest of the period, the sum of landings over the 2010-2016 and longer period including 2023 are slightly higher for this alternative compared to the sum of status quo landings.

Table 80. Estimated Landings (million lbs)

Fishing Year	No Action	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	50	42	47	54	49
2011	59	62	60	57	59
2012	67	69	66	58	61
2013	63	65	63	64	66
2014	66	67	65	66	69
2015	65	65	64	66	68
2016	59	61	61	62	63
2010-2016 Subtotal for the period	427	431	426	427	436
2017	64	66	65	64	65
2018	62	65	65	62	65
2019	54	58	58	55	57
2020	61	65	64	63	64
2021	61	65	64	65	65
2022	53	57	56	57	57
2023	63	64	64	64	64
2017-2023 Subtotal for the period	418	439	436	430	437
2010-2023 Grand Total	846	870	863	857	873

- As a result, revenues, producer and consumer surpluses, and total economic benefits for the status quo (NCLF20) will be lower than the levels for other alternatives in the short-term (2010, Table 81 to Table 85), but will exceed the levels for other alternatives in the long-term with the exception of the new closure alternative with low *F* (CLF18). The alternative with new closure and low *F* (CLF18) results in slightly higher overall long-term benefits.
- The proposed action will have positive long-term economic impacts and will increase the present value of total economic benefits to the nation by $86 million (at 7% discount rate) to $125 million (at 3% discount rate). The economic benefits for the high-*F* no closure (NFL24) alternative exceed no action benefits by $54 million to $81 million, but will be fall short of proposed action benefits by $32 million (at 7% discount rate) and $44 million (at 3% discount rate) over the period 2010-2023. This is because this option will generate $58 million less revenues (Table 81), $52 million less producer surplus (Table 82), $4 million less consumer surplus (Table 83) and $56 million less benefits (Table 84) than the proposed option during the near-term period from 2011 to 2016. These levels correspond to a conservative estimate using a 7% discount rate, and with 3% discount rate the benefits with the NCLF24 option will be even less compared to the proposed option.
- Table 85 shows the changes as a percent of the no action levels at 7% and 3% discount rates. No discounting was applied to the first year benefits. T
- It should be reminded that although percentage increase in benefits with the proposed action and alternatives compared with the no action benefits for the long-term are small

(about 2% to 3% for 2010-2023) compared to decline in benefits in 2010 alone (about 13%), this is because the long-term includes 14 years including the first year (2010) and changes are calculated from the discounted cumulative benefits for these 14 years net of no action benefits.

- The proportional impacts of the proposed action and the alternatives on the individual vessels in the limited access and general category fisheries compared to the “No Action” alternative will be similar to the impacts provided in Table 85. The revenues, costs and the net revenues of the individual vessels (producer surplus) will change proportionally according to the open area days and access area trips allocated per limited access vessels. Since the total TAC for the general category fishery will be 5% (10%) of the total TAC if IFQ program is (not) implemented in 2010, the impacts on the individual vessels will be proportional to the aggregate impacts of proposed action and alternatives on revenues, costs and net revenues. The IRFA Section (**6.12**) provide more analyses on the individual vessels of the proposed action and alternatives.

Table 81. Short and long-term cumulative present value of scallop revenue (Million $, in 2008 inflation-adjusted prices, discount rate of 7% (except otherwise noted as 3%)

Period	Data	No action	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	PV of scallop revenue	351	303	344	384	354
	Difference from Status quo	47		40	80	50
	Difference from No Action		-47	-7	33	3
2011-2016	PV of scallop revenue	2,119	2,174	2,116	2,076	2,147
	Difference from Status quo	-55		-58	-98	-27
	Difference from No Action		55	-3	-43	28
	Difference from No Action (3%)		62	-2	-43	38
2010-2016	PV of scallop revenue	2,469	2,477	2,460	2,460	2,501
	Difference from Status quo	-8		-17	-18	23
	Difference from No Action		8	-9	-10	31
	Difference from No Action (3%)		15	-9	-10	41
2017-2023	PV of scallop revenue	1,563	1,635	1,625	1,602	1,631
	Difference from Status quo	-72		-10	-33	-4
	Difference from No Action		72	62	39	68
	Difference from No Action (3%)		104	91	59	98
2010-2023	PV of scallop revenue	4,032	4,112	4,085	4,062	4,131
	Difference from Status quo	-80		-27	-50	19
	Difference from No Action		80	53	29	99
	Difference from No Action (3%)		118	81	50	139

Table 82. Short and long-term cumulative present value of the producer surplus (million $, in 2008 inflation-adjusted prices, discount rate of 7% (except otherwise noted as 3%)

Period	Data	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	PV of producer surplus	305	268	303	333	309
	Difference from Status quo	37		35	64	41
	Difference from No Action		-37	-2	28	4
2011-2016	PV of producer surplus	1,864	1,913	1,860	1,822	1,886
	Difference from Status quo	-49		-52	-90	-27
	Difference from No Action		49	-3	-42	22
	Difference from No Action (3%)		55	-3	-41	31
2010-2016	PV of producer surplus	2,169	2,181	2,163	2,155	2,194
	Difference from Status quo	-12		-18	-26	14
	Difference from No Action		12	-6	-14	26
	Difference from No Action (3%)		18	-5	-13	35
2017-2023	PV of producer surplus	1,363	1,427	1,418	1,398	1,424
	Difference from Status quo	-64		-9	-29	-4
	Difference from No Action		64	55	35	61
	Difference from No Action (3%)		93	80	53	88
2010-2023	PV of producer surplus	3,532	3,608	3,581	3,553	3,618
	Difference from Status quo	-76		-27	-55	10
	Difference from No Action		76	49	21	86
	Difference from No Action (3%)		111	75	39	123

Table 83. Short and long-term cumulative present value of the consumer surplus (million $, in 2008 inflation-adjusted prices, discount rate of 7% (except otherwise noted as 3%)

Period	Data	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	PV of consumer surplus	16	11	13	16	15
	Difference from Status quo	4		2	5	4
	Difference from No Action		-4	-3	1	-1
2011-2016	PV of consumer surplus	101	108	104	100	106
	Difference from Status quo	-7		-4	-7	-2
	Difference from No Action		7	3	0	5
	Difference from No Action (3%)		4	1	1	6
2010-2016	PV of consumer surplus	116	119	117	117	121
	Difference from Status quo	-3		-2	-2	2
	Difference from No Action		3	0	0	4
	Difference from No Action (3%)		4	1	1	6
2017-2023	PV of consumer surplus	59	66	63	61	63
	Difference from Status quo	-7		-3	-5	-3
	Difference from No Action		7	4	2	4
	Difference from No Action (3%)		10	5	4	5
2010-2023	PV of consumer surplus	176	185	180	178	184
	Difference from Status quo	-10		-6	-7	-2
	Difference from No Action		10	4	3	8
	Difference from No Action (3%)		14	6	4	11

Table 84. Short and long-term cumulative present value of the total benefits (million $, in 2008 inflation-adjusted prices, discount rate of 7% except otherwise noted as 3%)

Period	Data	No action	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	PV of Total Benefits	320	280	316	349	324
	Difference from Status quo	41		36	69	44
	Difference from No Action		-41	-5	29	3
2011-2016	PV of Total Benefits	1,965	2,020	1,964	1,923	1,992
	Difference from Status quo	-56		-56	-98	-29
	Difference from No Action		56	0	-42	27
	Difference from No Action (3%)		63	0	-41	37
2010-2016	PV of Total Benefits	2,285	2,300	2,280	2,272	2,315
	Difference from Status quo	-15		-20	-28	15
	Difference from No Action		15	-5	-13	30
	Difference from No Action (3%)		22	-5	-12	40
2017-2023	PV of Total Benefits	1,422	1,493	1,481	1,460	1,487
	Difference from Status quo	-71		-12	-34	-7
	Difference from No Action		71	59	37	64
	Difference from No Action (3%)		103	85	56	94
2010-2023	PV of Total Benefits	3,707	3,793	3,761	3,731	3,802
	Difference from Status quo	-86		-32	-62	9
	Difference from No Action		86	54	24	95
	Difference from No Action (3%)		125	81	44	134

Table 85. Percentage change in short and long-term cumulative present value of benefits net of no action benefits (million $, in 2008 inflation-adjusted prices, discount rates of 3% and 7%)

Period	Data	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010 (not discounted)	PV of Revenues	-13%	-2%	9%	1%
	PV of Producer Surplus	-12%	-1%	9%	1%
	PV of Consumer Surplus	-27%	-18%	5%	-5%
	PV of Total Economic Benefits	-13%	-1%	9%	1%
2010-2016 (Discount rate 7%)	PV of Revenues	0%	0%	0%	1%
	PV of Producer Surplus	1%	0%	-1%	1%
	PV of Consumer Surplus	2%	0%	0%	4%
	PV of Total Economic Benefits	1%	0%	-1%	1%
2010-2016 (Discount rate 3%)	PV of Revenues	1%	0%	0%	1%
	PV of Producer Surplus	1%	0%	-1%	1%
	PV of Consumer Surplus	3%	1%	1%	4%
	PV of Total Economic Benefits	1%	0%	0%	2%
2010-2023 (Discount rate 7%)	PV of Revenues	2%	1%	1%	2%
	PV of Producer Surplus	2%	1%	1%	2%
	PV of Consumer Surplus	5%	2%	2%	5%
	PV of Total Economic Benefits	2%	1%	1%	3%
2010-2023 (Discount rate 3%)	PV of Revenues	2%	2%	1%	3%
	PV of Producer Surplus	3%	2%	1%	3%
	PV of Consumer Surplus	6%	3%	2%	5%
	PV of Total Economic Benefits	3%	2%	1%	3%

A detailed analysis of the short-term and long-term economic impacts is provided in Section 5.4.2.3 to Section 5.4.2.7 below.

5.4.2.3 Impacts of Framework 21 alternatives on prices, revenues and revenues

Prices are estimated using an updated version of the ex-vessel price model described in Amendment 11 and shown in Appendix I of this document. This model takes into account the impacts of changes in meat count, domestic landings, exports, import prices, income of consumers, and composition of landings by market category (i.e., size of scallops) including a price premium on under count 10 scallops. The higher price estimates correspond to the price model outputs assuming that the import prices will be constant at their 2008 levels (given that 2009 trade data is not complete yet), scallop exports will constitute 45% of the domestic landings, and the disposable income in 2010 will be slightly higher (about 1.19% according to the latest statistics) than the levels in 2008. The price estimates shown in Table 87 (for No action) closely trace the average price of scallops in 2008 (about $6.93 per pound) as well as the inflation-adjusted real price of scallops in 2006 and 2007 (in 2008 prices, Table 86).

The price estimate for the proposed action in 2010, $7.31 per pound of scallops, is somewhat higher that its level in 2008, because the scallop landings are projected to be lower (42 million lb.) compared to the levels in 2008 (53 million lb.). It must be cautioned, however, that actual prices could be higher (lower) than these price estimates depending on the future values of the exogenous factors that determine domestic ex-vessel prices. An increase (or decrease) in future disposable income, inflation rate, in the premium for large scallops, in exports or in import prices could result in higher (or lower) prices estimated in Table 87. In addition, the updated model is based on the years 1999 to 2008 and may not capture the increase in the price premium for U-10s and U12s during the recent year. Although the absolute values for revenues, producer and consumer surpluses, and total economic benefits would change with the value of estimated prices, and the percentage differences of these values for the proposed action and other alternatives relative to the no action alternative would not change. Higher prices than estimated in Table 87 will increase the short-term impact of the proposed action on revenues compared to no action, while lower prices reduce this impact. The long-term benefits will be greater with higher prices and smaller with lower prices, however. Section 5.4.8 provides a discussion of uncertainties and a sensitivity analysis using lower import and domestic ex-vessel prices and shows that the ranking of alternatives in terms of revenues, benefits to the consumers and producer and to the nation will not change if the actual ex-vessel prices in 2010 turn out to be lower than the predicted prices.

Table 86. Estimated Prices (estimate in inflation adjusted 2008 prices)

Year	Scallop landings (lb)	Scallop revenue (in 2008 prices)	Ex-vessel price (in 2008 prices)
1999	19,683,563	140,463,315	7.14
2000	28,853,542	183,807,637	6.37
2001	40,757,919	187,773,582	4.61
2002	46,910,849	218,768,881	4.66
2003	48,563,601	237,158,584	4.88
2004	59,013,706	339,106,239	5.75
2005	52,500,091	451,577,800	8.60
2006	55,206,866	396,897,813	7.19
2007	58,625,209	407,755,656	6.96
2008	53,315,828	369,615,550	6.93

The price estimates indicate that in the short-term (FY 2010), prices will be slightly higher ($7.31) for the status quo (NCLF20) option compared to No Action ($7.07) and other options because landings (42 million pounds) with status quo measures will be lower than the level for no action (50 million pounds) and other options (Table 87).

Table 87. Estimated Prices (estimate in inflation adjusted 2008 prices)

Fishing Year	No Action	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	7.07	7.31	7.27	7.17	7.20
2011	7.04	6.98	6.99	7.02	7.00
2012	6.92	6.89	6.89	7.04	7.00
2013	7.05	7.00	6.99	6.96	6.92
2014	7.07	7.04	7.05	7.01	6.98
2015	7.11	7.10	7.12	7.07	7.07
2016	7.19	7.17	7.17	7.15	7.17
2017	7.20	7.17	7.18	7.20	7.18
2018	7.24	7.22	7.22	7.24	7.23
2019	7.28	7.25	7.25	7.26	7.26
2020	7.29	7.26	7.27	7.26	7.28
2021	7.31	7.28	7.30	7.27	7.30
2022	7.30	7.27	7.28	7.27	7.27
2023	7.31	7.31	7.29	7.29	7.30

Note: Projections assume that import prices will stay constant at their average value for 2005-2008 at about $4.50 per pound of scallops and that scallop exports constitute 45% of the domestic landings.

The results of the economic analyses indicate that there will be trade-offs in the short-term versus long-term revenues. The revenues are estimated to be $47 million lower in 2010 with the proposed action, but $80 million (at a 7% discount rate) to $118 million (at a 3% discount rate) higher in the long-term compared to no action revenues. If no discount was applied to the future benefits, the scallop revenues would be $159 million higher than the no action revenues (Table 90, Table 91, Table 92).

In the short-term (i.e. fishing year 2010), revenues for the status quo ($303 million, NCLF20) and for no-closure high *F* ($344 million, NCLF24) will fall short of revenues ($351 million) for the "No Action" alternative. The new closure options will result in higher revenues in the short-term because those options will result in higher landings in 2010 compared with no Action.

During the fishing years 2011 and 2012 the proposed action will result in the highest revenues compared with all other alternatives including the revenues for no action. Although guidelines for the economic analysis indicate that changes in net benefits are measured by the difference in the present value of the discounted stream of net benefits of regulatory action as compared to the status quo or no action, OMB also suggests showing them in undiscounted constant dollars. The undiscounted values of the scallop revenues are shown in Table 88 and present value of the discounted revenues at a 7% discount rate are shown in Table 89 below. Estimated scallop fleet revenue for the proposed action would increase from $303 million in 2010 to $434 million in 2011 and to $473 million in 2012 without applying any discount rate. No action undiscounted revenues will increase to $418 million pounds in 2011 and to $461 million in 2012 (Table 88). These would be the levels of the actual revenues earned if the actual landings and prices are equal to the predicted landings.

Discounting lowers the future level of revenues and benefits and as result, the sum of present value of revenues over the long-term periods is lower than the sum of undiscounted yearly revenues. For example, Table 88 shows that the present value of fleet revenue would be $406 million in 2011 and $413 million as a result of converting future revenues to present values by applying a discount rate of 7%. The present value of the revenues would be higher than these values (but lower than the undiscounted values) if a lower rate of discount (3%) was applied as Table 91 and Table 92 show.

In the same way, over the near-term from 2011 to 2016, landings and revenues for the proposed action (status quo) and other alternatives, with the exception of the no closure, high-F (NCLF24) alternative, are expected to exceed the "No Action" levels. The cumulative discounted value of the revenues with the proposed action will be $8 million more compared to no action if a 7% discount rate was applied (Table 92) and $15 million more is a 3% discount rate was applied (Table 91). The cumulative discounted value of the revenues with the proposed action will be $8 million more compared to no action if a 7% discount rate was applied (Table 92) and $15 million more if a 3% discount rate was applied (Table 91). This is mostly because of the higher landings and revenues for the CLF18 option in 2010 compared to status quo. The cumulative present value of revenues for the new closure low *F* (CLF18) option is estimated to be $31 to $38 million larger, and the revenues with high *F* options will be about $17 to $24 million less than the proposed option depending on the discount rate applied (Table 91 and Table 92). Over the longer-term 2010 to 2023, the scallop revenues with the proposed action (NCLF20) are expected to be $80 to $118 million higher than the revenues compared to the no action alternative and will result in $27 million to $37 million more revenues than the high-*F* no closure alternative (Table 91 and Table 92).

Table 88. Estimated Scallop Revenue (in Million $, undiscounted and in 2008 prices)

Fishing Year	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	351	303	344	384	354
2011	418	434	422	402	412
2012	461	473	454	408	427
2013	441	454	438	444	459
2014	466	474	462	463	479
2015	460	463	456	466	484
2016	422	437	435	444	454
2017	458	473	464	461	469
2018	449	469	467	451	470
2019	392	418	420	402	414
2020	444	468	467	460	467
2021	447	472	469	470	474
2022	390	414	408	413	412
2023	460	465	468	467	467

Table 89. Estimated Discounted (7%) Present Value of Scallop Revenue (in Million $, in 2008 prices)

Fishing Year	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	351	303	344	384	354
2011	390	406	395	375	385
2012	403	413	397	357	373
2013	360	371	357	362	375
2014	356	362	352	354	366
2015	328	330	325	332	345
2016	281	291	290	296	303
2017	285	294	289	287	292
2018	262	273	272	262	273
2019	213	227	229	218	225
2020	226	238	237	234	237
2021	213	224	223	223	225
2022	173	184	181	183	183
2023	191	193	194	194	194

Table 90. Change in Scallop Revenue Compared to No Action (Undiscounted, in Million $ and 2008 prices)

Fishing Year	Status quo	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	-47	-7	33	3
2011	17	5	-16	-5
2012	12	-7	-53	-34
2013	13	-4	2	18
2014	8	-4	-3	13
2015	3	-4	5	23
2016	16	13	22	32
2010-2016	21	-9	-9	50
2017	15	6	3	11
2018	20	18	1	21
2019	26	28	9	21
2020	25	23	16	23
2021	25	21	23	27
2022	24	18	23	22
2023	5	8	7	7
2010-2023	159	113	73	182

Table 91. Short and long-term cumulative present value of scallop revenue (million $, in 2008 inflation-adjusted prices, discount rate of 3%)

Period	Data	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010 (not discounted)	PV of scallop revenue	351	303	344	384	354
	Difference from Status quo	47		40	80	50
	Difference from No Action		-47	-7	33	3
2011-2016	PV of scallop revenue	2,409	2,471	2,407	2,366	2,447
	Difference from Status quo	-62		-64	-104	-24
	Difference from No Action		62	-2	-43	38
2010-2016	PV of scallop revenue	2,760	2,774	2,751	2,750	2,801
	Difference from Status quo	-15		-24	-24	27
	Difference from No Action		15	-9	-10	41
2017-2023	PV of scallop revenue	2,269	2,373	2,359	2,328	2,367
	Difference from Status quo	-104		-13	-45	-6
	Difference from No Action		104	91	59	98
2010-2023	Present value of total economic benefits	5,029	5,147	5,110	5,078	5,168
	Difference from Status quo	-118		-37	-69	21
	Difference from No Action		118	81	50	139

Table 92. Short and long-term cumulative present value of scallop revenue (million $, in 2008 inflation-adjusted prices, discount rate of 7%)

Period	Data	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	PV of scallop revenue	351	303	344	384	354
	Difference from Status quo	47		40	80	50
	Difference from No Action		-47	-7	33	3
2011-2016	PV of scallop revenue	2,119	2,174	2,116	2,076	2,147
	Difference from Status quo	-55		-58	-98	-27
	Difference from No Action		55	-3	-43	28
2010-2016	PV of scallop revenue	2,469	2,477	2,460	2,460	2,501
	Difference from Status quo	-8		-17	-18	23
	Difference from No Action		8	-9	-10	31
2017-2023	PV of scallop revenue	1,563	1,635	1,625	1,602	1,631
	Difference from Status quo	-72		-10	-33	-4
	Difference from No Action		72	62	39	68
2010-2023	Present value of total economic benefits	4,032	4,112	4,085	4,062	4,131
	Difference from Status quo	-80		-27	-50	19
	Difference from No Action		80	53	29	99

5.4.2.4 Impacts of Framework 21 alternatives on DAS, fishing costs, open area and crew days

Total effort measured in terms of DAS used as a sum total of all areas is expected to be smaller in 2010 for the proposed action (22,053 DAS) compared to the other options including no action (28,715 DAS) and no closure high-*F* (25,740) alternatives (Table 93). Table 94 shows open area DAS, Table 95 shows the DAS used for all areas for each scenario and fishing year and Table 96 shows the percentage difference in total fleet DAS used compared to no action. The difference from the no action DAS used amounts to a 23% reduction for the proposed action and 10% reduction for the no closure high-*F* option (Table 96). Only the new closure high-*F* option (CLF24) would increase DAS used by 12% in 2010, while the new closure low-*F* (CLF18) option would reduce DAS used by 2% in 2010. As a result, crew-days will change in the same percentage change to the DAS used, declining for all options except for CLF20. Although it is uncertain to what extent the reduction in crew-days will result in a reduction in the number of crew, thus employment in the fishery, given that this reduction is mostly limited to 2010 and that DAS-used are expected to increase considerably in the following years, the vessel owners may prefer to employ same crew for less fishing days. (For additional discussion of potential impacts on employment please see Social Impacts, Section 5.4.9).

Table 93 shows that one-year negative short-term impacts on DAS-used (thus on crew-days) will be reversed in the future years. Starting in 2011, the DAS used will likely be higher for the proposed action compared to no action. Total DAS used are expected to increase by 43% in 2011 for the proposed action from 22,053 days to 31,521, exceeding the no action levels by 4%. For the overall period from 2011-2016, total DAS-used (thus crew-days) will be 2% higher than the no action levels. The DAS-used for high-*F* alternatives (NCLF24 and CLF20) will be similar to the no action levels, but DAS-used for CLF18 will exceed the "No Action" levels by 2% .

Because of the large reduction in DAS used in the first year, proposed (status quo target-F) action and no closure high-*F* (F=0.24) option DAS and crew days will be about 1% lower than the no action levels for the near-term from 2010 to 2016. Over the long-term DAS used and crew days will be 2% higher for the proposed action and 1% higher for the no closure high-F (F=0.24) option compared to the no action levels. The new closure options will increase DAS used slightly more over the long-term.

Because of lower DAS used, trip costs for the proposed action (about $35 million) will be lower compared to the costs with other options (ranging from $41 million to $51 million in 2010, Table 97). For the near-term period from 2010 to 2016, present value of the trip costs for the proposed action (NCLF20) and (NCLF24) are lower compared to No Action, but slightly higher than No action trip costs over the long-term from 2010 to 2023. Total DAS used and trip costs with the closure alternatives are expected to be higher than the no closure options both in 2010 and over the long-term (Table 98 and Table 99).

Table 93. Estimated DAS used (all areas)

Fishing Year	No Action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	28,715	22,053	25,740	32,020	28,189
2011	30,208	31,521	30,676	30,760	31,559
2012	34,800	35,264	34,250	33,579	34,703
2013	32,783	33,810	32,838	32,807	34,031
2014	34,803	35,331	34,684	34,087	35,155
2015	34,829	35,004	34,560	34,509	35,556
2016	33,852	35,181	34,991	34,529	35,165
2010-2016 Subtotal for the period	229,990	228,164	227,739	232,291	234,358
2017	35,070	36,385	35,809	35,117	35,858
2018	34,657	36,172	36,261	34,573	36,224
2019	33,222	35,050	35,183	34,005	34,685
2020	34,643	36,407	36,084	36,083	36,226
2021	35,199	36,636	36,430	36,880	36,906
2022	34,208	35,594	35,442	35,765	35,628
2023	36,798	36,520	37,238	36,845	36,680
2017-2023 Subtotal for the period	243,797	252,764	252,447	249,268	252,207
2010-2023 Grand total	473,787	480,928	480,186	481,559	486,565

Table 94. Estimated open area DAS used per full-time vessel

Fishing Year	No Action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	42	29	38	51	42
2011	29	30	29	27	28
2012	43	43	40	27	29
2013	27	29	27	27	29
2014	78	27	25	28	29
2015	77	26	24	28	29
2016	84	28	27	33	34
2010-2016 Average for the period	54	30	30	32	31
2017	73	24	24	24	24
2018	72	24	24	24	23
2019	81	27	27	26	26
2020	70	23	23	23	23
2021	72	23	24	23	23
2022	83	27	27	27	27
2023	75	24	23	23	24
2017-2023 Average for the period	75	24	24	24	24
2010-2023 Average	65	27	27	28	28

Table 95. Estimated DAS used per full-time vessel in all areas

Fishing Year	No Action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	80	62	72	89	79
2011	84	88	86	86	88
2012	97	99	96	94	97
2013	92	94	92	92	95
2014	97	99	97	95	98
2015	97	98	97	96	99
2016	95	98	98	96	98
2010-2016 Average for the period	98	102	100	98	100
2017	97	101	101	97	101
2018	93	98	98	95	97
2019	97	102	101	101	101
2020	98	102	102	103	103
2021	96	99	99	100	100
2022	103	102	104	103	102
2023	80	62	72	89	79
2017-2023 Average for the period	84	88	86	86	88
2010-2023 Average	97	99	96	94	97

Table 96. Percentage change in total fleet DAS used compared to No Action

Fishing Year	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	-23%	-10%	12%	-2%
2011	4%	2%	2%	4%
2012	1%	-2%	-4%	0%
2013	3%	0%	0%	4%
2014	2%	0%	-2%	1%
2015	1%	-1%	-1%	2%
2016	4%	3%	2%	4%
2011-2016	2%	0%	0%	2%
2010-2016	-1%	-1%	1%	2%
2017	4%	2%	0%	2%
2018	4%	5%	0%	5%
2019	6%	6%	2%	4%
2020	5%	4%	4%	5%
2021	4%	3%	5%	5%
2022	4%	4%	5%	4%
2023	-1%	1%	0%	0%
2017-2023	4%	4%	2%	3%
2010-2023	2%	1%	2%	3%

Table 97. Estimated Trip Costs (Million $, in undiscounted 2008 prices)

Fishing Year	No Action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	45.94	35.28	41.18	51.23	45.10
2011	48.33	50.43	49.08	49.22	50.49
2012	55.68	56.42	54.80	53.73	55.52
2013	52.45	54.10	52.54	52.49	54.45
2014	55.68	56.53	55.49	54.54	56.25
2015	55.73	56.01	55.30	55.21	56.89
2016	54.16	56.29	55.99	55.25	56.26
2010-2016 Total for the period	367.98	365.06	364.38	371.67	374.97
2017	56.11	58.22	57.29	56.19	57.37
2018	55.45	57.88	58.02	55.32	57.96
2019	53.16	56.08	56.29	54.41	55.50
2020	55.43	58.25	57.73	57.73	57.96
2021	56.32	58.62	58.29	59.01	59.05
2022	54.73	56.95	56.71	57.22	57.00
2023	58.88	58.43	59.58	58.95	58.69
2017-2023 Average for the period	390.08	404.42	403.92	398.83	403.53
2010-2023 Average	758.06	769.48	768.30	770.49	778.50

Table 98. Present discounted (3%) value of trip costs

Period	No Action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	46	35	41	51	45
2011-2016	290	297	291	289	297
2010-2016	336	333	332	340	342
2010-2016 Change from No Action		-3	-4	4	6
2017-2023	291	301	301	297	301
2010-2023	627	634	633	637	643
2010-2023 Change from No Action		7	6	10	16

Table 99. Present discounted (7%) value of trip costs

Period	No Action	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	46	35	41	51	45
2011-2016	255	261	256	254	261
2010-2016	301	296	297	305	306
2010-2016 Change from No Action		-5	-4	4	5
2017-2023	200	207	207	204	207
2010-2023	501	504	504	509	513
2010-2023 Change from No Action		3	3	8	12

5.4.2.5 Impacts of Framework 21 alternatives on producer benefits

Producer surplus for a particular fishery shows the net benefits to harvesters, including vessel owners and crew, and is measured by the difference between total revenue and operating costs (Appendix I). The results of the cost-benefit analyses indicate that there will be trade-offs in the short-term versus long-term benefits. Although producer benefits are estimated to decline from $305 million to $268 million with the proposed action in 2010, they are estimated to increase in the long-term by $76 million (at a 7% discount rate) to $111 million (at a 3% discount rate) compared to no action for the period 2010 to 2023 (Table 104, Table 105). If no discount was applied to the future benefits, the producer surplus would be $148 million higher than the no action producer surplus.

Because the landings and revenue will be lower with the proposed action (status quo *F* option) in 2010 compared to the other options, producer surplus will be lower as well (Table 100). Producer benefits will decline by $37 million, or by 12% compared to no action with the proposed action in 2010, by $2 million or by 2% with the high-*F* option (NCLF24), but would increase for the new closure alternatives (Table 101 and Table 102). Starting with the very next year in 2011, however, producer benefits for the proposed action will exceed no action benefits by $15 million in 2011, and by $11 million each year in 2012 and 2013 in terms of undiscounted values.

Proposed action producer benefits are also expected to exceed the benefits for other options during the next two years (2011-2012, Table 103). Over the near-term from 2010 to 2016, the present value of the producer surplus for the proposed action will be $12 million (at a discount rate of 7%) to $18 million higher (at a discount rate of 3%) than the no action benefits. The producer benefits with the high-F option with no closure (NCLF24) will be $5 million to $6 million less than no action, and the new closure high-*F* option benefits would be $13 to $14 million less than no action benefits. Only new closure low-*F* (CLF18) producer surplus will exceed the benefits for the proposed action over the same period (Table 103, Table 104, Table 105).

Over the long-term from 2010 to 2023, the cumulative present value of the producer benefits for the proposed action is expected to exceed the no action benefits by $76 million (at 7% discount rate) to $111 million (at 7% discount rate). The long-term producer benefits for the high *F* options both with no closure and new closure are estimated to result in lower producer benefits, while the new closure option with low *F* (CLF18) is estimated to exceed the status quo benefits by $10 million (at a 7% discount rate) to $12 million (at a 7% discount rate).

Table 100. Estimated Producer Surplus: Total Revenue – Trip Costs (Million $, in undiscounted 2008 prices)

Fishing Year	No action	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	305	268	303	332	309
2011	369	384	373	352	362
2012	406	417	399	354	372
2013	389	400	385	391	405
2014	410	417	406	409	423
2015	405	407	401	410	427
2016	368	381	379	389	398
Sub Total for 2010-2016	2,651	2,675	2,646	2,639	2,695
2017	402	414	407	405	412
2018	394	411	409	395	412
2019	339	362	364	347	358
2020	388	410	409	402	409
2021	391	413	410	411	415
2022	335	357	351	356	355
2023	401	407	408	408	409
Subtotal for 2017-2023	2,651	2,775	2,759	2,724	2,769
Grand total 2010-2023	5,302	5,450	5,405	5,362	5,464

Table 101. Change in Producer Surplus compared to No Action (Million $, in undiscounted 2008 prices)

Fishing Year	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	-37	-2	28	4
2011	15	4	-17	-7
2012	11	-6	-51	-34
2013	11	-4	2	16
2014	7	-4	-1	13
2015	3	-4	6	22
2016	14	11	21	30
Sub Total for 2010-2016	23	-5	-13	43
2017	12	5	3	10
2018	18	15	1	18
2019	23	25	8	19
2020	22	21	14	21
2021	22	19	20	24
2022	22	16	20	20
2023	6	7	7	7
Sub Total for 2017-2023	125	108	73	119
Sub Total for 2010-2023	148	103	60	162

Table 102. Change in Producer Surplus compared to No Action (Million $, in undiscounted 2008 prices)

Fishing Year	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	-12%	-1%	9%	1%
2011	4%	1%	-5%	-2%
2012	3%	-2%	-13%	-8%
2013	3%	-1%	1%	4%
2014	2%	-1%	0%	3%
2015	1%	-1%	1%	5%
2016	4%	3%	6%	8%
2017	3%	1%	1%	2%
2018	4%	4%	0%	5%
2019	7%	7%	2%	6%
2020	6%	5%	4%	5%
2021	6%	5%	5%	6%
2022	6%	5%	6%	6%
2023	1%	2%	2%	2%

Table 103. Change in Producer Surplus compared to status quo F-target (proposed action) (Million $, in undiscounted 2008 prices)

Fishing Year	No Action	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	37	35	64	41
2011	-15	-11	-32	-22
2012	-11	-17	-62	-45
2013	-11	-15	-9	5
2014	-7	-11	-8	6
2015	-3	-7	3	19
2016	-14	-2	8	17
2017	-12	-8	-10	-3
2018	-18	-2	-16	0
2019	-23	2	-15	-4
2020	-22	-1	-8	-1
2021	-22	-3	-2	2
2022	-22	-6	-2	-2
2023	-6	1	2	2

Table 104. Short and long-term cumulative present value of producer benefits compared to No Action (million $, in 2008 inflation-adjusted prices, discount rate of 7%)

Fishing Year	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	-37	-2	28	4
2011	14	4	-16	-7
2012	10	-5	-45	-30
2013	9	-3	2	13
2014	5	-3	-1	10
2015	2	-3	4	16
2016	9	8	14	20
Sub Total for 2010-2016	12	-6	-14	26
2017	8	3	2	6
2018	10	9	1	10
2019	12	13	4	10
2020	11	11	7	11
2021	11	9	9	12
2022	10	7	9	9
2023	2	3	3	3
Sub Total for 2017-2023	64	55	35	61
Sub Total for 2010-2023	76	49	21	86

Table 105. Short and long-term cumulative present value of producer benefits compared to No Action (million $, in 2008 inflation-adjusted prices, discount rate of 3%)

Fishing Year	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	-37	-2	28	4
2011	14	4	-16	-7
2012	10	-6	-48	-32
2013	10	-4	2	14
2014	6	-4	-1	11
2015	2	-3	5	19
2016	11	9	18	25
Sub Total for 2010-2016	18	-5	-13	35
2017	10	4	2	8
2018	14	12	1	14
2019	17	19	6	14
2020	16	15	10	15
2021	16	14	14	17
2022	15	11	14	14
2023	4	5	5	5
Sub Total for 2017-2023	93	80	53	88
Sub Total for 2010-2023	111	75	39	123

5.4.2.6 Impacts of Framework 21 alternatives on consumer benefits

Consumer surplus for a particular fishery is the net benefit that consumers gain from consuming fish based on the price they would be willing to pay for them. Consumer surplus will increase when fish prices decline and/or the amount of fish harvested goes up. In the short-term (2010), the consumer benefits for the proposed action and the high-F no closure option (NCLF24) and (CLF18) will be lower than the benefits for the no action alternative while the CLF24 option will have the same level of benefits (Table 106). Both over the near-term from 2010 to 2016 and over long-term from 2010 to 2023, however, the proposed action and the alternative options will have higher consumer surplus compared to the no action levels. The proposed action will result in the highest consumer benefits both in the near-term (2010-2016) and the long-term (2010-2023) compared to no action and the other alternatives (Table 107 and Table 108). Specifically, over the long-term from 2010 to 2023, the present value of the consumer benefits will increase by $10 million (at 7% discount rate) to $14 million (3% discount rate) compared to no action levels measured in constant 2008 prices.

Table 106. Estimated Consumer Surplus (undiscounted values in million $, 2008 inflation adjusted values)

Fishing Year	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	16	11	13	16	15
2011	20	22	22	20	21
2012	25	26	25	19	21
2013	21	23	22	23	25
2014	22	23	22	23	25
2015	21	21	20	22	23
2016	17	19	18	19	19
Sub Total for 2010-2016	142	146	143	143	148
2017	19	21	20	19	20
2018	18	20	19	18	19
2019	15	16	16	15	15
2020	17	19	18	18	18
2021	16	19	17	18	17
2022	14	16	15	15	15
2023	16	18	17	17	17
Subtotal for 2017-2023	114	128	121	119	121
Grand total 2010-2023	256	274	264	262	270

Table 107. Short and long-term cumulative present value of consumer benefits compared to No Action (million $, in 2008 inflation-adjusted prices, discount rate of 7%)

Fishing Year	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	-4	-3	1	-1
2011	2	1	-1	0
2012	1	0	-5	-3
2013	1	1	2	3
2014	1	0	1	2
2015	1	0	1	1
2016	1	1	1	1
Sub Total for 2010-2016	3	0	0	4
2017	1	1	0	1
2018	1	1	0	1
2019	1	1	0	1
2020	1	1	1	1
2021	1	0	1	1
2022	1	0	1	1
2023	1	0	0	0
Sub Total for 2017-2023	7	4	2	4
Sub Total for 2010-2023	10	4	3	8

Table 108. Short and long-term cumulative present value of producer consumer compared to No Action (million $, in 2008 inflation-adjusted prices, discount rate of 3%)

Fishing Year	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	-4	-3	1	-1
2011	2	1	-1	0
2012	1	0	-5	-4
2013	2	1	2	4
2014	1	0	1	3
2015	1	0	1	2
2016	1	1	2	1
Sub Total for 2010-2016	4	1	1	6
2017	1	1	0	1
2018	1	1	0	1
2019	1	1	0	1
2020	2	1	1	1
2021	2	1	1	1
2022	1	1	1	1
2023	1	1	1	1
Sub Total for 2017-2023	10	5	4	5
Sub Total for 2010-2023	14	6	4	11

5.4.2.7 Impacts of Framework 21 alternatives on total economic benefits

- Economic benefits include the benefits both to the consumers and to the fishing industry and equal the sum of benefits to the consumers and producers. There will be trade-offs between the short-term and long-term benefits and alternatives that result in highest landings and benefits in the short-term will in general result in lower benefits over the long-term.
- The total economic benefits for the proposed action (NCLF20) will be lower than the levels for other alternatives in the short-term (in 2010), but will exceed the levels for other alternatives in the long-term with the exception of the new Closure alternative with low *F* (CLF18). The alternative with new closure and low *F* (CLF18) results in slightly higher overall long-term benefits.
- The total economic benefits for the proposed action will be $41 million lower than and high-*F* no closure (NCLF24) benefits will be $5 million lower than no action benefits in 2010, while the total benefits of the new closure alternatives will exceed the no action benefits in the same year (Table 110).
- The proposed action benefits alternative exceed no action benefits by $15 million (at 7% discount rate) to $22 million (3% discount rate) in the near-term from 2010-2016, while the total benefits will decline by $5 million for the no-closure high-F option during the same period. The new closure high-F option is expected to reduce economic benefits by $12 to $13 million during the same period while the new closure low-*F* option would increase the benefits by $30 million to $40 million depending on the discount rate applied (Table 110 and Table 111). The Council did not select this alternative because new rotational area closure alternatives resulted in a higher area swept estimates in Mid-Atlantic which could have impacts on non-target species in those areas.
- Table 112 shows the present value of total benefits and its components when a 3% discount rate is used to convert future values to the present values. Table 113 shows the present values by applying a more conservative 7% discount rate.
- The proposed action will have positive long-term economic impacts and will increase the present value of total economic benefits to the nation by 86 million (at 7% discount rate, Table 113) to $125 million (at 3% discount rate, Table 112). The economic benefits for the high-*F* no closure (NCLF24) alternative exceed no action benefits by $54 million to $81 million, but will fall short of proposed action benefits by 32 million (at 7% discount rate) and $44 million (at 3% discount rate) over the period 2010-2023. This is because this option will generate $58 million less revenues (Table 81), $52 million less producer surplus, $4 million less consumer surplus and $56 million less benefits than the proposed option during the near-term period from 2011 to 2016 (Table 113). These levels correspond to the conservative estimate using a 7% discount rate, and with 3% discount rate the benefits with the NFL24 option will be even less compared to the proposed option as can be seen in Table 112.

Table 109. Total Economic Benefits: Consumer Surplus + Producer Surplus (Undiscounted in Million $, in 2008 prices)

Fishing Year	No action	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	320	279	316	349	324
2011	390	406	395	372	383
2012	431	443	425	374	393
2013	410	423	407	414	430
2014	432	440	428	432	448
2015	425	429	421	433	449
2016	385	400	397	408	417
Sub Total for 2010-2016	2,793	2821	2789	2782	2843
2017	421	435	427	423	432
2018	412	431	428	413	431
2019	354	378	380	362	374
2020	405	429	427	420	427
2021	407	432	427	429	433
2022	349	373	366	371	370
2023	417	425	425	426	426
Subtotal for 2017-2023	2,765	2903	2880	2843	2891
Grand total 2010-2023	5,558	5724	5669	5625	5734

Table 110. Short and long-term present value of total economic benefits compared to No Action (million $, in 2008 inflation-adjusted prices, discount rate of 7%)

Fishing Year	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	-41	-5	29	3
2011	16	5	-16	-6
2012	11	-5	-50	-33
2013	10	-2	3	16
2014	6	-3	0	12
2015	2	-3	5	17
2016	10	8	15	21
Sub Total for 2010-2016	15	-5	-13	30
2017	9	3	2	7
2018	11	10	1	11
2019	13	14	4	11
2020	12	11	8	11
2021	12	10	10	12
2022	11	7	10	9
2023	3	3	3	3
Sub Total for 2017-2023	71	59	37	64
Sub Total for 2010-2023	86	53	24	94

Table 111. Short and long-term present value of total economic compared to No Action (million $, in 2008 inflation-adjusted prices, discount rate of 3%)

Fishing Year	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	-41	-5	29	3
2011	16	5	-17	-7
2012	12	-5	-54	-36
2013	12	-3	4	18
2014	7	-3	0	14
2015	3	-4	6	21
2016	13	10	19	27
Sub Total for 2010-2016	22	-5	-13	40
2017	11	5	2	9
2018	15	13	1	15
2019	19	20	6	15
2020	18	16	11	16
2021	18	15	15	18
2022	17	12	15	15
2023	5	5	6	6
Sub Total for 2017-2023	103	85	56	94
Sub Total for 2010-2023	125	81	44	134

Table 112. Long-term cumulative present value of scallop revenue, producer and consumer surpluses and economic benefits (million $, in 2008 inflation-adjusted prices, discount rate of 3%)

Period	Data	No action	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010-2023	Present value of scallop revenue	5,028.7	5,147.1	5,110.1	5,078.2	5,168.1
	Difference from Status quo	-118.5		-37.0	-68.9	21.0
	% Difference from Status quo	0.0		0.0	0.0	0.0
	Difference from No Action		118.5	81.4	49.6	139.5
	% Difference from No Action		0.0	0.0	0.0	0.0
2010-2023	Present value of producer surplus	4,401.8	4,513.1	4,476.7	4,441.3	4,525.0
	Difference from Status quo	-111.2		-36.4	-71.8	11.9
	% Difference from Status quo	0.0		0.0	0.0	0.0
	Difference from No Action		111.2	74.8	39.4	123.2
	% Difference from No Action		0.0	0.0	0.0	0.0
2010-2023	Present value of consumer surplus	215.3	229.0	221.4	219.8	226.2
	Difference from Status quo	-13.6		-7.6	-9.2	-2.7
	% Difference from Status quo	-0.1		0.0	0.0	0.0
	Difference from No Action		13.6	6.0	4.4	10.9
	% Difference from No Action		6.34%	2.79%	2.05%	5.06%
2010-2023	Present value of total economic benefits	4,617.2	4,742.1	4,698.0	4,661.0	4,751.3
	Difference from Status quo	-124.9		-44.0	-81.1	9.2
	% Difference from Status quo		2.70%	1.75%	0.95%	2.90%
	Difference from No Action		124.9	80.9	43.8	134.1
	% Difference from No Action		2.70%	1.75%	0.95%	2.90%

Table 113. Long-term cumulative present value of scallop revenue, producer and consumer surpluses and economic benefits (million $, in 2008 inflation-adjusted prices, discount rate of 7%)

Period	Data	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010-2023	Present value of scallop revenue	4,032.4	4,111.9	4,085.1	4,061.8	4,131.2
	Difference from Status quo	-79.5		-26.8	-50.1	19.3
	% Difference from Status quo	0.0		0.0	0.0	0.0
	Difference from No Action		79.5	52.7	29.4	98.8
	% Difference from No Action		0.0	0.0	0.0	0.0
2010-2023	Present value of producer surplus	3,531.7	3,608.1	3,581.3	3,553.0	3,618.2
	Difference from Status quo	-76.3		-26.8	-55.1	10.1
	% Difference from Status quo	0.0		0.0	0.0	0.0
	Difference from No Action		76.3	49.5	21.2	86.5
	% Difference from No Action		0.0	0.0	0.0	0.0
2010-2023	Present value of consumer surplus	175.6	185.3	179.7	178.3	183.7
	Difference from Status quo	-9.6		-5.6	-7.0	-1.5
	% Difference from Status quo	-0.1		0.0	0.0	0.0
	Difference from No Action		9.6	4.0	2.7	8.1
	% Difference from No Action		5.49%	2.29%	1.52%	4.62%
2010-2023	Present value of total economic benefits	3,707.4	3,793.3	3,760.9	3,731.3	3,801.9
	Difference from Status quo	-86.0		-32.4	-62.1	8.6
	% Difference from Status quo		2.32%	1.44%	0.65%	2.55%
	Difference from No Action		86.0	53.5	23.9	94.6
	% Difference from No Action		2.32%	1.44%	0.65%	2.55%

5.4.3 Measures for limited access vessels (section 2.5)

This framework includes the specific access area schedule and DAS allocations for all limited access scallop vessels. The impacts of these measures are analyzed as part of the allocation alternatives analyzed, in Section 5.4.2 (Aggregate Economic Impacts) above. This section provides an analysis of the individual measures on limited access vessels other than these aggregate measures related to DAS and access area allocations.

5.4.3.1 Georges Bank Access Area Measures (Adjustments when YTF catch reaches 10% overfishing definition TAC limit, Section 2.5.5.1)

The proposed action and the alternatives include access into Nantucket Lightship (NLS) 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. The economic impacts of trip allocations for NLS are analyzed in Section 5.4.2 in combination with other open and access area measures. By itself, allocating a trip (per full-time) vessel to NLS in 2010 will have positive economic impacts on both limited access vessels

If the YT flounder bycatch TAC is reached, limited access vessels with unused Georges Bank access area trips would have their open area DAS allocations increased by a prorated amount calculated to achieve an equal amount of scallop mortality per 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. Analyses suggest that the compensation rate for Nantucket Lightship trips would be 5.4 DAS in 2010. 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. 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 status quo (proposed action), 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 5.4 open area DAS for a full-time vessel if the Nantucket Lightship Area closes in 2010 due to the YT TAC being reached.

There will be no change in the economic impacts as a result of this alternative since this measure is also the no action/status quo alternative. Although compensation for the lost pounds due to closure of the NLS will have a positive impact on vessels, the scallop pounds per trip could be lower than the allocated pounds for the Georges Bank access area trips due to the proration. In other words, this alternative will help to minimize loss in pounds and revenue due to the closure of access areas before a vessel takes its trip, without entirely compensating for the loss. Although the loss in landings and revenue due to the closure and proration of the open area trips cannot be predicted accurately at this time, in some cases the loss could be significant depending on the open area meat counts.

Using the same method above, catches from the additional 5.4 open area trips could be 9,284 pounds for 2010 compared to the 18,000 lbs. from the NLS for each trip. Evaluated at a scallop price of $7.31 per pound for the estimated price under the proposed action, for example, the reduction in revenue compared to the access area revenue could be about $67,886. The catch rates in the open areas vary, however, from one area to another and also according to the vessel size. Therefore, the revenue loss due to a yellowtail TAC closure will vary from one vessel to another depending on the open area fished. In general, the higher the meat count in the open areas, the higher the catches from these trips, and the smaller the loss.

5.4.3.2 Mid-Atlantic access area management (Section 2.4)

The proposed action and the alternatives include access into both Elephant Trunk and Delmarva for both the LA and LAGC fleets. The economic impacts of trip allocations for the Elephant Trunk and Delmarva areas are analyzed in Section 5.4.2 in combination with other open and access area measures. By itself, allocations for the highly productive areas of the Mid-Atlantic in 2010 will have positive economic impacts on both limited access and general category vessels.

The LPUE in these areas are estimated to be higher compared to the open areas. As a result, trip costs will lower since the same amount of scallops could be landed in a shorter time frame compared to areas with lower scallop abundance.

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

This action (Section 2.5.1.2) maintains the current policy of setting aside 2% of available TAC in access areas and 2% of the open area DAS for research and 1% of the estimated TAC for each access area and open area DAS to help fund observers. 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. This alternative is expected to have indirect economic benefits on the sea scallop fishery by improving scallop management through better data and information made possible by research into current issues in the fishery such as bycatch and from the collection of data by observers.

5.4.3.4 Research priorities for 2010 and recent RSA announcement (Section 2.5.1.3)

Changing the RSA process and the announcement for federal funding earlier than in previous years will expedite the process and will help the researchers to complete all compensation for research before the end of the fishing year. This process is expected to have indirect economic benefits on the sea scallop fishery by improving scallop management through better data and information made possible by timely research into current issues in the fishery.

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

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 economic impacts of a 10% TAC for the transition period on the limited access vessels were analyzed in Amendment 11 and Framework 19 documents. 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. This measure is not expected to impact the results of the cost-benefit analyses presented in Section 5.4.2 above since there will be no change in the overall landings, revenues, and producer and consumer benefits if the general category fishery scallop landings equal their total allocation.

The impacts on the revenues and profits of the limited access vessels will be negative, however, due to reduced DAS allocations (Table 15). Table 114 shows these impacts for each of the four options considered in this framework. The revenues are estimated by removing the set-asides for observers and research. Specifically, 1% of the estimated TAC for each access area and open area DAS would be set aside to help fund observers and 2% of the estimated TAC for each access area and open area DAS would be set aside to fund scallop-related research. The results show that the net revenue per full-time limited access vessel would decline by $38,494 for the proposed action or by 5% if there is a delay in general category IFQ implementation and the general category fishery is allocated 10% of the scallop TAC.

Table 114. The economic impacts of a delay in IFQ measures on limited access and general category vessels

Year/Scenario	Data	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
GENERAL CATEGORY TAC 5%	Total landings after set-asides (million lb.)	40.3	45.9	51.9	47.7
	General category TAC (million lb.)	2.0	2.3	2.6	2.4
	Open area DAS per full-time vessel	29	38	51	42
	Limited access landings	38	44	49	45
	Limited Access Fleet Revenue ($ million)	280	317	354	326
	General category Fleet Revenue	15	17	19	17
	Revenue per full-time vessel	822,236	931,799	1,039,951	958,750
	Trip costs per full-time vessel	95,632	111621	138854	122241
	Net revenue per full-time vessel	726,604	820,178	901,097	836,509
GENERAL CATEGORY TAC 10%	General category TAC(million lb.)	4.0	4.6	5.2	4.8
	Limited Access Fleet Landings (million lb.)	36.2	41.3	46.7	42.9
	Reduction in limited access open area DAS	3.5	4.1	5.1	4.5
	Limited access fleet revenue	265	300	335	309
	General category Fleet Revenue ($ million)	29	33	37	34
	Revenue per full-time vessel	778,961	882,757	985,217	908,290
	Reduction in revenue per full-time vessel	43,276	49,042	54,734	50,461
	Trip costs per full-time vessel	90,851	106,040	131,911	116,129
	Net revenue per full-time vessel	688,110	776,717	853,306	792,161
	Reduction in net revenue per limited access vessel	38,494	43,461	47,792	44,348
	% change in limited access net revenue per vessel with delay	-5%	-5%	-5%	-5%

5.4.4 Measures for general category vessels (section 2.6)

The economic impacts of the allocation alternatives on the sea scallop fishery are analyzed in Section 5.4.2 (Aggregate Economic Impacts) above. These analyses include the economic impacts both on the limited access and general category fisheries given that respectively 95% and 5% of the TAC is allocated to these fisheries. The impacts of the proposed action and alternatives on individual vessels are expected to be proportional to the aggregate impacts on revenues, fishing costs and net revenues (producer surplus). This section provides an analysis of the individual measures on general category vessels other than these aggregate measures.

5.4.4.1 Quarterly hard-TAC for transition period to IFQ (No Action if IFQ program is not implemented, Section 2.6.1.1)

This measure (2.6.1.1) will have positive impacts on the general category vessels by doubling their net revenues in 2010 compared to revenues with IFQ implementation (Table 114).

The economic impacts of a 10% TAC for the transition period were analyzed in Amendment 11 and Framework 19. The economic impacts of the level of general category TAC as determined in this action are within the range of impacts analyzed in Amendment 11 (Sections 5.4.8.5, 5.4.8.6 and 5.4.13 of Amendment 11) and Framework 19 (Section 5.4.10, 5.4.10.1.2). Under the status quo alternative, the total TAC for the general category fishery would be about 4.0 million pounds in 2010 and will vary between 4.6 million pounds (NCLF24) and 4.9 million pounds (CLF18) under the other alternatives (Table 114), very similar to the amounts estimated for Framework 19. These are double the amount general category vessels will receive if the IFQ program is implemented. Although management of the general category fishery by a hard TAC would create some derby-style fishing, the division of the total TAC into quarterly TACs will reduce the race to fish to some extent and lessen the negative economic impacts associated with derby fishing as analyzed in Section 5.4.10.1.1 of Framework 19 and discussed in Sections 5.4.8.5, 5.4.8.6 and 5.4.13 of Amendment 11.

Consistent with Amendment 11 and Framework 19 measures, Framework 21 would divide general category allocation (10% of total scallop TAC) into four quarters with higher proposed allocations during the spring and summer (Quarters 1 and 2) when meat weights are larger. Given that general category landings are expected to be 10% of the total scallop landings in 2008, the difference in the quarterly distribution of landings is not expected to have a significant impact on the scallop ex-vessel prices and the distribution of revenues. Table 16 describes the quarterly hard TAC for the proposed action if the IFQ program is not in place before March 1, 2010. Quarter 1 will likely close early before all access area trips are taken because the sum of all catch from access area trips is more than 35% of the annual catch.

5.4.4.2 Economic impacts of the IFQ program on the limited access and general category vessels

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. This will provide flexibility of the general category vessels and have positive impacts on their economic profits. The impacts of the overall IFQ program were assessed in the FSEIS to Amendment 11 and the economic impacts of the present options on the general category fishery combined with the IFQ management will be within the range of impacts discussed in the FSEIS to Amendment 11.

5.4.4.3 Georges Bank Access Area management (Section 2.6.2)

The proposed action and the alternatives include access into Nantucket Lightship (NLS) 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. The economic impacts of trip allocations for NLS are analyzed in Section 5.4.2 in combination with other open and access area measures. By itself, allocating access area trips to NLS in 2010 will have positive economic impacts on both limited access and general category vessels. The high biomass and LPUE in this area is estimated to be quite high and taking a trip to this area will lower fishing costs since the same amount of scallops could be landed in a shorter time frame compared to the open areas.

Under current regulations, if the 10% yellowtail flounder bycatch TAC for SNE is reached and the Nantucket Lightship access area closes, general category vessels are not permitted to fish in the area. 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. For the general category fishery, 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 has been taken. Limited access general category vessels could land scallops from other areas, however, as long as their landings do not exceed their IFQ allocations. Because they may have to land the pounds from less productive areas, closure could increase their fishing costs and lower their economic benefits from the scallop fishery. This discussion is only relevant for comparing the impacts on economic benefits under a closure scenario with the economic benefits if there was no yellowtail TAC and no closure requirement when that TAC is reached. The economic analysis guidelines require, however, that the impacts are compared with the impacts of the no action alternative. Since this measure is no action, there will be no change in economic impacts under the present regulations.

5.4.4.4 Mid-Atlantic access area management (Section 2.6.3)

The proposed action and the alternatives 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. The economic impacts of trip allocations for the Elephant Trunk and Delmarva areas are analyzed in Section 5.4.2 in combination with other open and access area measures. By itself, allocations for the highly productive areas of the Mid-Atlantic in 2010 will have positive economic impacts on both limited access and general category vessels. The LPUE in these areas are estimated to be higher compared to the open areas. As a result, trip costs will lower since the same amount of scallops could be landed in a shorter time frame compared to areas with lower scallop abundance.

5.4.4.5 Northern Gulf of Maine (NGOM) Hard-TAC

Proposed action includes a 70,000-pound hard-TAC for the NGOM, which is equivalent to the "No Action" scenario as specified in Framework 21. 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. The allocation of 70,000 pounds is more than what the fishery landed in 2008 and 2009, thus this TAC is not expected to reduce the landings and revenues for the LAGC NGOM fishery. As analyzed in Amendment 11 and Framework 19, this measure is, in fact, expected to have positive economic impacts on a larger number of vessels that are not qualified for limited access but qualifies for an NGOM permit since these vessels will have an opportunity to land scallops in this area when the resource conditions are favorable. At 70,000 pounds, and at an estimated price of about $7.31 in 2010 under the proposed option, this allocation could generate about half a million dollars in scallop revenue for the vessels that qualify for NGOM area access if the resource conditions make it possible to land the full TAC.

5.4.4.6 Incidental catch

The proposed action is equivalent to "No Action" and 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. As analyzed in Amendment 11 and Framework 19, removal of incidental catch from total landings before the trip and open area DAS allocations are determined will ensure that the fishing mortality targets are not exceeded. This measure will also have positive economic impacts on vessels that do not qualify for a LAGC permit because it will allow them to earn some income from the scallop fishery using their incidental permits. It may also provide more flexibility for vessels that do qualify for the LAGC permit but opt for this permit instead. As a result, this measure will have positive impacts on the resource, scallop yield, revenues and total economic benefits.

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

This measure will provide flexibility for the general category vessels to lease to other vessels and earn income on their unused quota during the fishing year. As a result, the proposed action would allow fishermen to combine their allocations and to benefit from an economically viable operation when the allocations of individual vessels are too small to make scallop fishing profitable. Under these conditions, general category scallop TAC is likely to be fully utilized by qualifiers with positive impacts on vessel revenues and profits as well as on overall economic benefits for the sea scallop fishery.

5.4.5 Consideration of New rotational area in the Channel north of Nantucket Lightship and west of Closed Area I (Section 2.7)

The proposed action does not include any new area closures. However Framework 21 alternatives included a new rotational area in the Great South Channel with large amounts of small scallops to be closed in fishing year 2010. The economic impacts of this alternative are analyzed in Section 5.4.2 in combination with other open and access area measures and with low-*F* (CLF18) and high-*F* (CLF20) options. The alternative with new closure and low *F* (CLF18) is estimated to increase scallop revenues by $31 million and total economic benefits by $15 million in the long-term for the period from 2010-2016 compared to the proposed action (Table 81 and Table 84). The high *F* option will reduce the total economic benefits by $28 million (CLF20) during the same period. If 2010 is not included, however, the proposed action (status quo alternative) resulted in larger economic benefits compared to the all other options. For example, for the 2010-2016 period, total scallop landings for the status quo are 431 million pounds and total scallop landings for CLF18 are 436 million pounds. This difference of 5 million pounds is mostly due to the higher landings in 2010 with the CLF18 option (7 million pounds higher), thus, landings and economic benefits would be higher for the NCLF20 (status quo) for the period 2011-2016 (Table 84). Nevertheless, the difference in the estimated economic benefits of the proposed action and the new closure with low *F* (CLF18) were small over the long-term, with the later option exceeding the cumulative value of economic benefits for the proposed action by $9 million over the 14 years from 2010 to 2023. The Council did not select this alternative because new rotational area closure alternatives resulted in a higher area swept estimates in Mid-Atlantic which could have impacts on non-target species in those areas.

5.4.6 Compliance with reasonable and prudent measure in recent biological opinion (section 2.8)

The economic impacts of the alternatives to comply with RPM on landings and revenues are provided in Section 5.3.1 of this document. The same section fully describes the model and the assumptions used in these analyses, and provides a discussion of the potential economic impacts. The economic impacts of these alternatives will vary with the Framework 21 alternatives and the window of time in which the measures are applied. The proposed action is a combination of the Delmarva closure in September and October with a limit on the maximum number of trips (at two per vessel) that can be taken in the Mid-Atlantic areas from June 15 to August 31. Because the effort is shifted to a relatively less productive season, total fleet trip costs are expected to increase slightly by $40,115, or by less than 0.2%. Since there is no change in the possession limit, the trips that are shifted from this season are expected to be taken outside of the turtle window, without a loss in total revenue as long as these measures do not have a significant impact on prices.

The proposed measures will lead to a change in the seasonal composition of landings and therefore could lead to a change in prices. In general, the reduction in landings during the turtle window is expected to increase prices during the period from July 15 to October 31, but expected to reduce prices for months outside of the turtle window. Whether the increase in scallop prices in the first period will offset the decrease in prices in the second period will depend on the magnitude of the shift, on the timing of the displaced effort and on the change in meat weight of scallops outside of the turtle window. If the shift in effort and landings comprise a small proportion of total effort and landings in the turtle window the impacts on prices will be low. Similarly if the displaced effort is distributed more or less evenly throughout the window it is shifted to, the impacts on prices will be small.

The proposed action is expected to minimize the effort shift from the turtle window compared to the other alternatives considered by the Council (**Table 74** through **Table 76** in Section **5.3.2.4**). Proposed measures would shift 10.3% of effort outside the turtle season, while the other alternatives would shift between 11.2% (Combined measure 1.1, Option A) and 16.8% (Combined measure 1.3, Option A) and as a result the proposed action will have the least impacts on prices. This impact cannot be quantified accurately, however, due to the factors explained below:

- With the proposed measure, the landings in the Mid-Atlantic access areas will decline slightly by 1.8 million pounds during the turtle window, which amounts to about 10.3% of the total landings from all areas (18.5 million) during the same window. Therefore, it is unlikely for this shift to have a significant impact on the scallop prices for this period. It is also not possible to quantify with certainty the extent of the increase in prices at this time since many factors that could impact prices, such as the quantity of exports, import prices, and size composition of scallops during and outside of the turtle window, and seasonal distribution of future landings are unknown at this time.

- Since there will be no change in the possession limit, the access area effort shifted from the turtle window will take place in the window November 1 to June 14, therefore 1.8 million more pounds will be landed in this window. Since total landings from all areas without the RPM measures are expected to be about 23.2 million pounds during this period, shifting 1.8 million pounds would increase landings by 8.1% during the window November 1 to June 14 and would probably lower the price of scallops. Again, it is unlikely for this shift to reduce prices significantly during this period especially if the displaced effort is distributed more or less evenly and if some vessels try to maximize their revenue by taking their trips during months when prices are relatively higher because of lower landings especially during the winter months.
- Since the reduction in landings during the turtle window (10.3%) is greater than the increase in landings (8.3%) outside of the turtle window, the percentage increase in prices could exceed the percentage decline in prices outside the turtle window, outweighing the decline in the later period. On the other hand, the meat-weights will be slightly lower (by 2.7%) for the landings that are shifted out of the turtle window and this could have a negative impact on prices. If the effort during the turtle window directed more on the areas with higher scallop abundance, however, the meat-weight composition of the landings could increase during this window, resulting in even higher prices.

The proposed action related to compliance with the biological opinion also applies to the general category fishery to some degree. Part of the combined option selected in this action includes a seasonal closure in the Delmarva access area from September 1 – October 31 to all scallop vessels, including general category vessels. While the RPM only specifies that these measures need to limit effort for the limited access fishery, the Council decided to restrict both fleets to be consistent with the seasonal closure in ETA and to further minimize impacts on turtles. In terms of the impacts, there are no positive or negative impacts expected from this measure on the general category fleet specifically. The access area trips for this fleet are allocated as a fleetwide number of trips, and tend to be used in the weeks following an opening. In the past few years all general category access area trips have been used in several weeks following an opening date for all areas, including Delmarva. Delmarva will open on March 1, 2010 and it is expected that all 713 trips will be used before September 1, so the seasonal closure should not have any impacts on fishing behavior or economic impacts.

5.4.7 Improvements to the observer set-aside program

5.4.7.1 Prohibit vessels from not paying for observers

If it was selected, 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 measure could improve the overall coverage of the scallop fishery and have indirect economic benefits from improved information and monitoring of the fishery and resource. The Council did not select this alternative, however, since there are currently two regulatory provisions in place that could be used to address this issue.

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

The proposed action includes a provision to limit the amount of observer compensation general category vessels can receive on observed trips in access areas to the equivalent of one day compensation regardless of trip length. Therefore, this alternative would eliminate a "loophole" for how compensation is granted and create a ceiling to discourage overages. If this ultimately improves the overall coverage of the scallop fishery there may be indirect economic benefits from improved information and monitoring of the fishery and resource.

5.4.8 Uncertainties and risks

The economic impacts presented in the following sections are analyzed using an updated estimate of prices, revenues and total net benefits using the economic model provided in Appendix I. The cost benefit analysis also included updated cost estimates fishing years obtained from the observer database and fixed cost surveys (Appendix I). These costs are used in calculating producer surplus for the proposed alternatives, which shows total revenue net of variable costs. These analyses are also based on the biological model simulations for landings, DAS and LPUE.

The numerical results (absolute values) of the economic cost/benefit analysis should be interpreted with caution and should be used in comparing proposed action with the other alternatives. The landings, DAS and LPUE were obtained from the biological model, which 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. The results for economic impacts would change if the actual landings, size composition of landings and LPUE are different than the forecasted values from the biological model. For example, the projected price in the last Framework 19 for 2008 fishing year was $7.66 per lb. corresponding to a projected landings of about 44.4 million lb, and for 2009 fishing year it was $7.55 assuming that the scallop landings will be around 45.9 million lb. The actual landings in 2008 were over 53 million lb., exceeding the projected levels in Framework 19 by 16%. In the same way, the actual landings for 2009 fishing year are expected to exceed the projected levels from the biological models which resulting in lower prices than estimated in the Framework 19 document.

The prices are estimated using the updated ex-vessel price model described in Appendix I. This model takes into account the impacts of changes in meat count, domestic landings, exports, price of imports, income of consumers, and composition of landings by market category (i.e., size of scallops) including a price premium on under count 10 scallops. The important changes in external factors, i.e., in exports, imports, value of dollar, export and import prices had some unpredictable impacts on scallop prices in recent years, first resulting an increase to over $8 per pound (in terms of 2008 prices) in 2005, then a consequent decline to about $7 per pound (in terms of 2008 prices) in 2006 even though there was not a significant increase in scallop landings in 2006 (about 56 million lb.) compared to 2005 (about 54 million lb.).

The estimated prices for the proposed action and the alternatives shown in Table 87 correspond to the price model output assuming that the import prices will equal to their average values in the recent years from 2005 to 2008, or about $4.5 per pound of scallops and assuming that exports will equal to 45% of the domestic landings. The actual price could be lower (higher) if exports decline (increase); import prices decline (increase) or disposable income of consumers decline (increase) in 2010 and the future years. The uncertainty regarding a possible economic recovery starting in 2010 also makes it almost impossible to accurately estimate the prices and costs for the future years for the scallop fishery.

Given that the future values of these external variables are uncertain, various sensitivity analyses can be conducted using a range of estimates for the exogenous variable. The following estimates for prices are generated by assuming that the import prices will decline by 10% to about $4 per pound in the future years. In fact, preliminary data for 2009 from January to September indicate import prices declined by 7% in this year compared to 2008. Given that 2009 corresponded to a global recession, this decline may be expected but may not continue in the future years. The price estimates shown in Table 115 provide a lower value for ex-vessel prices if import prices could in fact decline by 10% in 2010 from their previous levels. The results also show these price estimates are sensitive to the changes in import prices and about 10% lower than the prices estimated in Table 87 above. The revenue estimates for each option shown in Table 116 below are about 10% lower than the estimates provided in Table 88 above. The difference in revenues of the proposed action and the alternatives from the no action levels change only slightly, however. Lower prices reduce the negative impact of the proposed action from $47 million to $41 million in 2010. The proposed action is still estimated to increase scallop fleet revenue both in the medium term from 2010-2016 and the long-term from 2010 to 2023, however.

Similarly, the ranking of the alternatives in terms of the cumulative present value of the revenues, producer surplus, consumer surplus and total economic benefits compared to no action does not change when lower prices are used to estimate the impacts (Table 118). Proposed action benefits still exceed the no action benefits both in the medium-term (2010-2016) and in the long-term (210-2023). The percentage difference of the revenues, producer surplus, consumer surplus and total economic benefits compared to no action stay almost exactly the same whether lower or higher price estimates are used in the analysis (Table 119) Therefore, the results of the cost-benefit analyses of the proposed action and the alternatives do not change when the economic benefits are compared to the no action levels and in terms of ranking of the alternatives, the results are not sensitive to the values of price estimates obtained from the same price model, but using a different value for the import prices.

Sensitivity analyses can be conducted by changing the values of the other exogenous variables, such as disposable income or exports, or the composition of scallop landings in the terms of market size. Sensitivity analyses could also be conducted by using the confidence interval estimates of the coefficients of the price model. For example, a lower bound using 95% confidence interval estimate for the coefficient of the domestic consumption variable resulted in prices within a range of $6 or lower, while the upper bound resulted in prices within a range of $7.30 to $7.50. As the sensitivity analysis with lower import prices indicated, however, the change in the values of prices impacted only the absolute values of the economic benefits, but not the ranking of the alternatives compared to no action.

The change in the fishing costs would also impact the absolute values of economic benefits compared to no action values. For example, higher fuel prices would increase the trip costs per day-at-sea and increase the cost savings from the proposed action and other alternatives that have lower DAS and trip allocations compared to the no action. As a result, the net economic benefits of the proposed action relative to no action and other alternatives would increase especially in the short-term. A decline in fishing cost, will result in opposite effect because it would reduce the impacts of fishing costs in overall benefits. More discussion about the sensitivity analyses are provided in Appendix I.

Table 115. Estimated Prices (estimate in inflation adjusted 2008 prices)

Fishing Year	No Action	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	6.35	6.56	6.53	6.44	6.46
2011	6.32	6.27	6.28	6.31	6.29
2012	6.22	6.19	6.19	6.32	6.29
2013	6.33	6.29	6.28	6.25	6.21
2014	6.35	6.32	6.33	6.30	6.27
2015	6.39	6.37	6.39	6.35	6.35
2016	6.46	6.43	6.44	6.42	6.44
2017	6.46	6.44	6.44	6.46	6.45
2018	6.50	6.48	6.48	6.50	6.49
2019	6.53	6.51	6.51	6.52	6.52
2020	6.54	6.52	6.53	6.51	6.53
2021	6.56	6.53	6.55	6.53	6.55
2022	6.55	6.53	6.53	6.52	6.53
2023	6.56	6.56	6.55	6.55	6.55

Note: Projections assume that import prices will equal to $4 per pound of scallops and that scallop exports constitute 45% of the domestic landings.

Table 116. Estimated Revenues (estimate in inflation adjusted 2008 prices)

Fishing Year	No Action	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	315	272	309	345	318
2011	364	379	368	350	360
2012	391	401	384	346	362
2013	363	373	360	365	377
2014	372	378	368	370	382
2015	357	359	353	361	375
2016	317	329	327	334	341
2017	335	345	339	336	343
2018	319	333	331	319	333
2019	270	288	289	276	285
2020	296	313	312	307	312
2021	290	306	304	305	308
2022	246	261	257	260	260
2023	281	284	286	286	286

Table 117. Change in Scallop Revenue Compared to No Action (Undiscounted, in Million $ and 2008 prices)

Fishing Year	Status quo	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	-42	-6	30	3
2011	15	4	-14	-5
2012	10	-6	-45	-29
2013	10	-3	2	15
2014	6	-3	-2	11
2015	2	-3	4	18
2016	12	10	17	24
2010-2016	13	-8	-9	37
2017	11	4	2	8
2018	14	13	1	15
2019	18	19	6	15
2020	17	15	11	16
2021	16	14	15	17
2022	15	11	14	14
2023	3	5	4	4
2010-2023	106	73	45	125

Table 118. Short and long-term cumulative present value of scallop revenue (Million $, in 2008 inflation-adjusted prices, discount rate of 3%

Period	Data	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010-2016	PV of Revenues	13.0	-8.2	-8.6	36.8
	PV of Producer Surplus	16.6	-4.4	-12.4	30.6
	PV of Consumer Surplus	3.3	0.7	0.8	5.0
	PV of Total Economic Benefits	19.9	-3.8	-11.6	35.6
2010-2023	PV of Revenues	93.4	81.3	53.1	88.4
	PV of Producer Surplus	82.5	70.9	46.8	78.3
	PV of Consumer Surplus	9.0	4.7	3.2	4.8
	PV of Total Economic Benefits	91.5	75.7	50.0	83.0
2010-2023	PV of Revenues	106.3	73.1	44.5	125.2
	PV of Producer Surplus	99.1	66.5	34.3	108.9
	PV of Consumer Surplus	12.2	5.4	4.0	9.8
	PV of Total Economic Benefits	111.3	71.9	38.3	118.7

Table 119. Short and long-term cumulative present value of scallop revenue as a percentage difference from the no action levels

Period	Data	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010	PV of Revenues	-13%	-2%	9%	1%
	PV of Producer Surplus	-12%	-1%	9%	1%
	PV of Consumer Surplus	-27%	-18%	5%	-5%
	PV of Total Economic Benefits	-13%	-1%	9%	1%
2010-2016	PV of Revenues	1%	0%	0%	1%
	PV of Producer Surplus	1%	0%	-1%	1%
	PV of Consumer Surplus	3%	1%	1%	4%
	PV of Total Economic Benefits	1%	0%	-1%	2%
2010-2023	PV of Revenues	2%	2%	1%	3%
	PV of Producer Surplus	3%	2%	1%	3%
	PV of Consumer Surplus	6%	3%	2%	5%
	PV of Total Economic Benefits	3%	2%	1%	3%

5.4.9 Impacts on social environment

5.4.9.1 Summary of FW21 allocation scenarios and consideration of new rotational area in the great south channel compared to status quo

The short-term social impacts from area closures include less flexibility for businesses stemming from possible short-term decreases in revenue, which would affect more those businesses with smaller cash flows, or less access to economic and social resources. Closing the Great South Channel would in particular negatively impact those fishermen who fish predominantly on Georges Bank, since there are already a variety of restrictions on fishing in the area, and it would more negatively impact fishermen from surrounding areas, such as Cape Cod and the Islands. This would be offset by slighter higher revenues in the long-term, since rotational area closures are designed to increase resource biomass and sustainability.

The economic section of the document describes the expected losses and gains in revenue and profit by year. In year one (2010) revenues and profits are expected to decline for the proposed action compared to some of the other options under consideration. This will have associated impacts on the fishery, especially after such a robust 2009 fishing year. Revenues are expected to be about $800,000 dollars a year per full-time vessel, about $100,000 less than the No Action alternative. Profits will also be lower compared to the No action alternative. Again, such short-term decreases in revenue tend to affect more those businesses with smaller cash flows than they affect larger enterprises with better access to credit. And such decreases in revenue have repercussions for crew income and potentially employment levels, as well as to boat owner income.

One way to consider potential impacts on crew from the various scenarios is to evaluate the projected DAS used for each allocation scenario; DAS used is a measure of days crew are working on fishing trips. Total effort measured in terms of DAS used as a sum total of all areas is expected to be smaller in 2010 for the proposed action (22,053 DAS) compared to the other options including no action (28,715 DAS) and no closure high-*F* (25,740) alternatives (Table 93). The difference from the no action DAS used amounts to a 23% reduction for the proposed action and 10% reduction for the no closure high-*F* option (Table 96).

As a result, crew-days will change in the same percentage change to the DAS used, declining for all options except for CLF20. Although it is uncertain to what extent the reduction in crew-days will result in a reduction in the number of crew, thus employment in the fishery, given that this reduction is mostly limited to 2010 and that DAS-used are expected to increase considerably in the following years, vessel owners may prefer to employ the same crew even though vessels will be fishing less. Table 93 shows that one-year negative short-term impacts on DAS-used (thus on crew-days) will be reversed in the future years. Starting in 2011, the DAS used will likely be higher for the proposed action compared to no action. Total DAS used are expected to increase by 43% in 2011 for the proposed action from 22,053 days to 31,521, exceeding the no action levels by 4%. For the overall period from 2011-2016, total DAS-used (thus crew-days) will be 2% higher than the no action levels.

When catch levels are stable from year to year that helps stabilize employment, spending, and market share. However, in the few years after 2010, revenues are expected to increase and the cumulative impacts of the proposed action are more favorable for the industry and society overall than some of the other options under consideration.

The expected future increases in biomass from rotating closed areas would have more positive impacts on those more mobile fishermen who can switch areas more easily, and who have access to economic and social resources that enable them to more easily withstand fishing ups and downs. However, as discussed in Amendment 10, the general impacts from area management are likely to be more negative on fishermen on smaller vessels or on fishermen who have particular knowledge of particular locales, both of whom are less likely to practice mobile fishing strategies. Closing areas, if they are traditional fishing grounds, would create fewer options and less flexible fishing conditions for those fishermen.

5.4.9.2 TAC set-asides for observers (1%) and research (2%) and 2.4.1.3 Research priorities for 2010 and recent RSA announcement

Measures to allow for research and observers have, to the extent that they enhance understanding of the resource status and how it is used, can be expected to have positive social impacts in the long-term.

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

The continued allocation of 10% of projected scallop catch to the LAGC fishery instead of 5%, though obviously of positive benefit for the LAGC fishery, may have some geographic redistributions of the landings stream of scallops from ports that are predominantly limited access based to those that are predominantly LAGC, in the short-term.

5.4.9.4 Measures if IFQ program is delayed (Quarterly hard-TAC)

This measure continues the status quo of using a quarterly hard-TAC if implementation of Amendment 11 is delayed. In general, though a hard TAC can bring about derby fishing with its attendant negative impacts, the use of a quarterly hard TAC is designed to lessen that tendency and as such may lessen the negative impacts in the interim.

5.4.9.5 Northern Gulf of Maine (NGOM) Hard-TAC

This measure was previously analyzed in Amendment 11. In 2009, a total of 117 “LAGC-NGOM” permits were issued. A 70,000 lb TAC would provide a marginal source of revenue for these vessels until the resource status can be better determined.

5.4.9.6 Estimate of catch from LA incidental catch permits:

This measure was previously analyzed in Amendment 11. In general, given that only low mortality from incidental catch is expected, the impacts to the scallop fleet should be low. The impacts of the incidental catch permit alternative will have positive impacts on vessels that do not qualify for a limited access general category permit because it will allow them to still earn some income from scallops under the incidental catch permit. Furthermore, this alternative may provide more flexibility for vessels that do qualify for the limited access general category permit but opt for this permit instead, if fishing for more trips under 40 pounds is more advantageous than fishing for scallops under the 400 pound permit.

5.4.9.7 Measure to comply with turtle biological opinion

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

In general, the types of social impacts from this measure are similar to the impacts that can be expected from closing areas in general: those negatively impacted are fishermen who have traditionally fished in a given area, who have smaller vessels or who are homeported nearby and are less mobile. Given analyses elsewhere in the document (see Section 5.3.2.3), these impacts may be said to fall primarily on such smaller or less mobile vessels found in New Jersey and Virginia. Additionally, shifting effort out of summer months could have safety-at-sea implications.

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

Given the potential in loss of access trips to the Mid-Atlantic, the social impacts from loss of revenue could be substantial and would impact the Mid-Atlantic and Southern fleet disproportionately if these access trips were favored. Loss of revenue can not only impact fishermen and fishing households, but communities and the infrastructures that landing activity helps to sustain. Additionally, shifting effort out of summer months could have safety-at-sea implications.

5.4.9.7.3 Consider a seasonal closure for Delmarva

Given the economic assessments that a shift to seasons in which meat yields are higher would increase economic revenue to fishermen, this measure could have indirectly positive impacts. However, fishermen who combine scallop fishing with other fisheries could be negatively impacted to the extent that such seasonal shifts affect participation in other fisheries. Additionally, shifting effort out of fall months when weather is relatively calm compared to other times of the year could have safety-at-sea implications.

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

As described elsewhere in this document (see Section 5.3.2.3), this measure could have a significantly negative impact on the scallop fleet if the loss of possession limit was not compensated elsewhere. Loss of revenue of a large scale can not only impact fishermen and fishing households, but communities and the infrastructures that landing activity helps to sustain.

5.4.9.8 Prohibit vessels from not paying for observers

If this measure helps by making the observer program run more effectively it should have indirect benefits on the scallop fishery in general, and the observer service companies that provide this service. If a vessel fails to pay for an observer, that observer service provider can refuse future service, but that vessel can then go to a different vendor and potentially cause the same problem. And if a vessel is refused an observer because of non-payment it may put the agency (NMFS) in the position of assigning a waiver when that vessel should have otherwise been assigned an observer. This measure was designed to help ensure that the observer set-aside, which belongs to the public, is used fairly and vessels are not taking advantage of this system by not paying for observers and being granted waivers.

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

This measure, by closing a loophole in LAGC observer compensation, would have positive impacts in that in would ensure a perception of fairer use of compensation funds overall, and would help better meet the objectives of Amendment 11 that the LAGC fishery was intended to preserve the traditional day-boat character of the fishery.

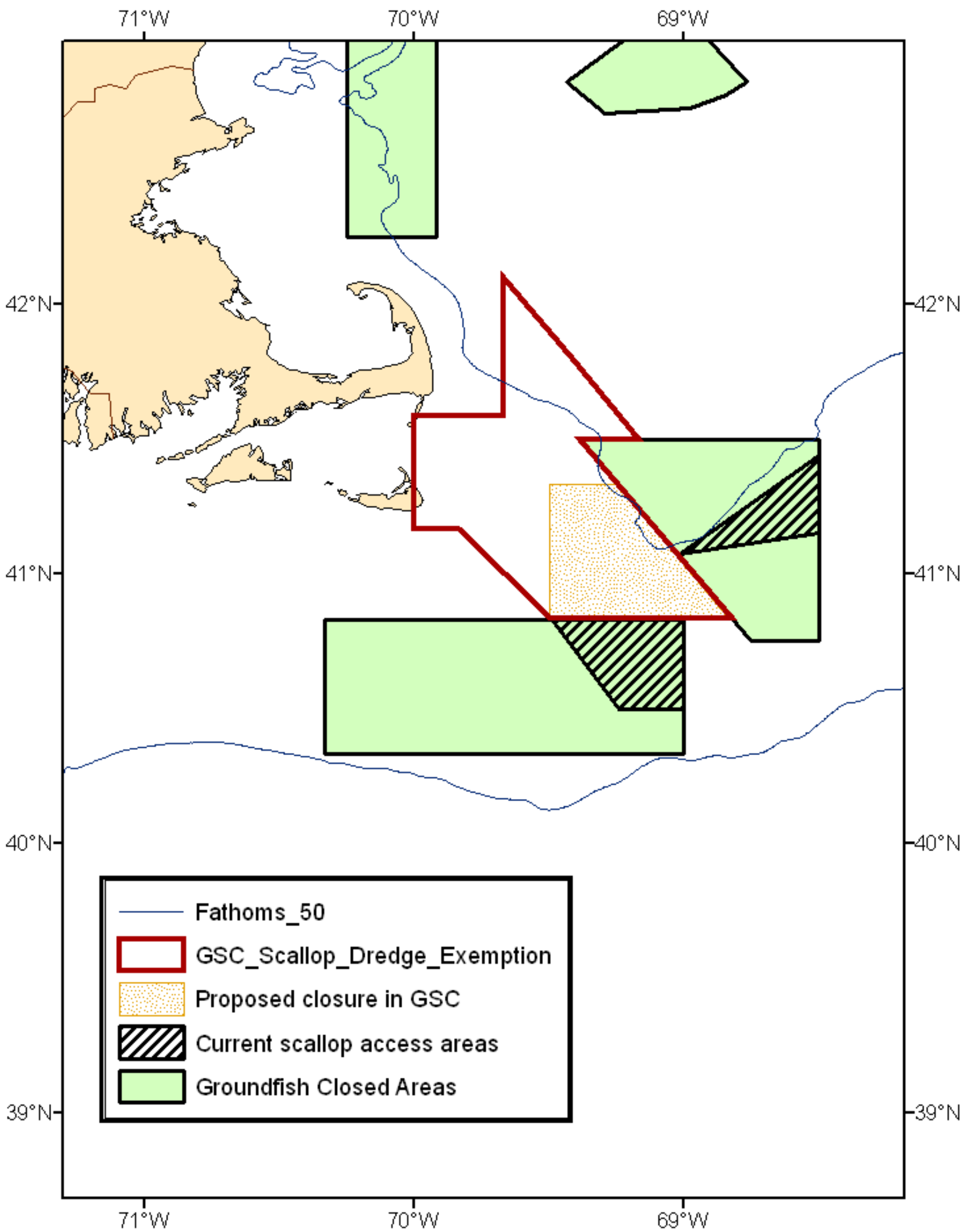
5.5 IMPACTS ON NON-TARGET SPECIES

The scallop fishery operates throughout the range of the scallop resource from Maine to North Carolina and results in the incidental catch of several other species. While some species are retained, other species are discarded due to restrictions in other fisheries or if the catch is not of value. Measures to minimize bycatch to the extent practicable in the scallop fishery pertain to all scallop vessels. The primary measures are the 10-inch minimum twine top restriction, and the bycatch TAC for yellowtail flounder in access areas. The 4-inch minimum ring size may also reduce finfish bycatch and reduces the bycatch of small scallops. The Northeast (NE) Multispecies and Monkfish FMPs also include measures to limit bycatch of species under the management of the specific FMP. The following measures in the FMPs apply:

The Northeast Multispecies FMP prohibits fishing in the Gulf of Maine/Georges Bank (GOM/GB) and Southern New England Exemption Areas unless a vessel is using exempted gear, is fishing under NE multispecies or scallop DAS, or is fishing under an exempted fishery. The prohibition prevents fisheries from occurring that might result in bycatch that could jeopardize the goals of the NE Multispecies FMP. Exempted fishery procedures in the NE Multispecies FMP allow a proven "clean" fishery to be implemented and allowed under the NE Multispecies FMP. Currently, the general category fishery can operate in two areas of the GOM/GB Exemption Area and in a portion of the SNE Exemption Area. In all three areas, vessels are restricted to 10 ½ ft dredges and may not possess any species other than scallops.

In addition, in the Great South Channel Sea Scallop Exemption Area within the GOM/GB Exemption Area, general category scallop vessels may not fish for scallops from April through June for one sub-area (the month of June for the other sub-area) (Figure 57). This period has been identified as the peak spawning for yellowtail flounder and protects high concentrations of yellowtail flounder from a portion of the scallop fleet. Note this area fully encompasses the new rotational area closure under consideration in this action.

Figure 57 – Great South Channel Sea scallop exemption area (outlined in red)



The Monkfish FMP allows vessels fishing for other species to harvest monkfish depending on the monkfish permit category, the declared fishing activity (i.e., multispecies DAS, scallop DAS, and/or monkfish DAS), the area fished, and the gear used. Unless otherwise restricted under another FMP, a vessel fishing outside of monkfish DAS, and while fishing for scallops under general category rules, is permitted to catch and retain up to 50 lb of monkfish tails per day, up to 150 lb total for the trip. This limitation prevents a scallop vessel using dredge gear from targeting monkfish and limits bycatch during scallop trips.

Other FMPs include overall quotas, state-by-state quotas, possession limits, and gear restrictions that may also reduce bycatch. The Skate and Summer Flounder/Scup/Black Sea Bass FMPs offer examples. The Skate FMP restricts possession of some species of skates and requires a permit to catch and land skate. Vessels fishing for scallops under general category rules would be restricted to the Skate FMP possession limits, limiting the impacts on skates as bycatch. Management measures for the summer flounder fishery include a state-by-state quota. When the quota is closed in a particular state, vessels can no longer land summer flounder in that state. When the quota is closed, scallop vessels from that state, fishing under general category rules, may have less incentive to fish in areas where summer flounder catch might be high since it could not be landed in the closed state.

These measures under other FMPs would continue to limit the impacts on bycatch species that are caught in the general category scallop fishery under all of the alternatives considered in Framework 21.

This action is not considering any measures that would trigger a skate baseline review based on the process approved in the Skate FMP. For more information see Section 6.1.3.

5.5.1 Summary of Framework 21 impacts on non-target species

None of the measures included in the proposed action are expected to have significant impacts on non-target species. This action has considered the potential impacts of the proposed action on non-target species (small scallops as well as finfish and other bycatch species) and in general, all the measures under consideration have positive or neutral impacts on non-target species. Many of the measures considered in this action concentrate fishing effort in areas with high scallop catch per-unit-of-effort, which reduces fishing time having positive impacts on bycatch rates.

Revising the area rotation schedule on Georges Bank is expected to keep high scallop biomass levels in the access areas in the foreseeable future, thus the areas will continue as a source to achieve optimum yield while minimizing effects on bycatch. This action maintains the YT bycatch TAC in access areas in GB and SNE. Overall, this action provides more flexibility to the fleet allowing the industry to better adapt to changing resource conditions. When the fleet is able to fish more efficiently, there may be a reduction in the amount of fishing time, with the potential to reduce bycatch. Limiting open area DAS keeps scallop biomass at target levels and maintains relatively high scallop LPUE. This keeps vessels from fishing long durations in marginal areas, where bycatch can be higher than normal.

See Section 5.1.2.5 for a description of the projected bottom contact time for the various scenarios considered. 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). This could have increased impacts on non-target species in these regions, but many if not all of the non-target species in these areas have possession limits or fishery wide quotas, so total impacts will be limited.

Furthermore, specific to southern New England yellowtail flounder, the Council is considering a fleetwide allocation of SNE TY to the scallop fishery as a sub-component of the overall fishery ACL. The Groundfish Committee is recommending that the scallop fishery be allocated 90% of the projected amount of SNE YT needed for 2010. If the Council adopts this in Framework 44 to the Groundfish FMP at the November 2009 Council meeting it is likely that amount will be allocated to the scallop fishery, thus less would be available to harvest for Groundfish vessels. This allocation is intended to control overall mortality on SNE YT. So even under FW21 scenarios that project more scallop effort in SNE, more SNE YT may be allocated to the scallop fishery to compensate for this shift of scallop effort and limit total mortality on SNE YT.

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. In summary, over the next seven years LPUE is projected to be 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 action continues a measure that has been in effect to reduce impacts on finfish bycatch; hard TAC of YT flounder in the NL access area. When that TAC is reached the area is closed to all scallop fishing. Limited access vessels are permitted to fish 5.4 DAS of compensation in open areas if they did not complete their NL access area trip before the closure. It is uncertain if vessels will have similar YT discard rates in NL compared to open areas since some vessels will fish those open area DAS in areas with higher, lower, or similar YT discard rates. In 2010 there is an overall allocation of SNE YT to the scallop fishery (included in Groundfish Framework 44), and if at the end of the year that is also exceeded, the Council intends to address any overages under Amendment 11 in the 2011 or 2012 fishing years. Therefore, this action is expected to minimize impacts on YT bycatch by maintaining the hard TAC in access area fishing as well as being held to an overall YT TAC in each stock area, as proposed in Framework 44. See Section 4.5 for more details.

The only other measures under consideration in FW21 that may have direct impacts on non-target species are the measures related to compliance with the turtle biological opinion. RPM Alternatives #1 and #2 will likely result in a reduction in scallop effort in the Mid-Atlantic during the summer and fall. This could have positive or negative impacts on non-target species depending on whether bycatch rates are substantially different in the Mid-Atlantic by season. Observer data for the scallop fishery is not available in the form necessary to evaluate seasonal differences in bycatch rates for the specific seasons and areas under consideration. For example, it would be difficult to conclude that a two-month closure of Delmarva in September and October would have an overall affect on bycatch rates of non-target species in that area if effort was fished different months of the year. Furthermore, it is not clear when effort will shift (what months of the year) so even if monthly bycatch rates were known, actual impacts on bycatch are uncertain because fishing behavior responses from these RPMs are uncertain. However, because there are possession limits and fishery quotas for most if not all of the non-target species in this region, total impacts on non-target species are expected to be limited as a result of any of the RMP measures.

5.6 CUMULATIVE EFFECTS

5.6.1 Introduction

The term "cumulative effects" is defined in the Council of Environmental Quality's (CEQ) regulations in 40 CFR Part 1508.7 as:

"The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

In 1997, the CEQ published a handbook titled, *Considering Cumulative Effects Under the National Environmental Policy Act*. The CEQ identified the following eight principles of cumulative effects analysis, which should be considered in the discussion of the cumulative effects of the proposed action:

1. Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions.
2. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken, no matter who (federal, non-federal, or private) has taken the actions.
3. Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.
4. It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
5. Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
6. Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.
7. Cumulative effects may last for many years beyond the life of the action that caused the effects.
8. Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accumulate additional effects, based on its own time and space parameters.

The following analysis will identify and characterize the impact on the environment by the Proposed Action and alternatives considered in Framework 21 when analyzed in the context of other past, present, and reasonably foreseeable future actions. Summary tables can be found following each of the text sections describing impacts. These tables contain brief summaries intended to distill the more detailed descriptions found in this section, and in Section 4.0 (Affected Environment), and Section 5.0 (Environmental Impacts). To enhance clarity and maintain consistency, the following terms are used to summarize impacts:

Table 120 - Terms used in cumulative effects tables to summarize cumulative impacts

Impacts Are Known	**Impacts Are Somewhat Uncertain**
High Negative/Positive	Potentially High Negative/Positive
Negative/Positive	Potentially Negative/Positive
Low Negative/Positive	Potentially Low Negative/Positive
Neutral	Potentially Neutral
No Impact	

**In some cases, terms like "more" and "most" are used for the purposes of comparing management alternatives to each other.*

5.6.2 Valued Ecosystem Components

This document was structured such that the cumulative effects can be readily identified by analyzing the impacts on valued ecosystem components (VECs). The affected environment is described in this document based on VECs that were identified specifically for Framework 21. The VECs identified for consideration in Framework 21 include: **Atlantic sea scallop resource; physical environment and essential fish habitat (EFH); protected resources; and fishery-related businesses and communities**. While these components of the environment have been identified as the main VECs for this action, there are other objectives required under the Magnuson Act such as net national benefits that are met under this action as well. For example, non-target species are described in Section 4.5 and impacts on this action are summarized in Section 5.6, but this topic is not included as a primary VEC for this particular action because this action does not propose any modifications to the current area rotation program that will have different impacts on non-target species that have not already been assessed in previous actions. The action does assess the potential impacts on yellowtail flounder in more detail since there is now a specific allocation of YT to the scallop fishery under the Multispecies FMP (See Section 5.5).

VECs represent the resources, areas, and human communities that may be affected by a proposed action or alternatives and by other actions that have occurred or will occur outside the proposed action. VECs are the focus of an EIS since they are the "place" where the impacts of management actions are exhibited. An analysis of impacts is performed on each VEC to assess whether the direct/indirect effects of an alternative adds to or subtracts from the effects that are already affecting the VEC from past, present and future actions outside the proposed action (i.e., cumulative effects). While the document includes a description of other potentially affected parts of the ecosystem such as bycatch and enforcement of scallop measures, these components are not included as a specific VEC for the cumulative effects. They have been described and discussed in terms of impacts, but they were not identified as primary valued ecosystem components.

Changes to the Scallop FMP have the potential to directly affect the sea scallop resource. Similarly, management actions that would alter the distribution and magnitude of fishing effort for scallops could directly or indirectly affect other species and their corresponding fisheries.

The physical environment and EFH VEC focuses on habitat types vulnerable to activities related to general category scallop fishing. The protected resources VEC focuses on those protected species with a history of encounters with the scallop fishery. The fishery-related businesses and communities VEC could be affected directly or indirectly through a variety of complex economic and social relationships associated with either the scallop fishery or any of the other VECs.

The descriptive and analytic components of this document are constructed in a consistent manner. The Affected Environment (Section 4.0) traces the history of each VEC and consequently addresses the impacts of past actions. The Affected Environment section is designed to enhance the reader's understanding of the historical, current, and near-future conditions (baselines and trends) to fully understand the anticipated environmental impacts of the management action proposed in this amendment. The direct/indirect and cumulative impacts of the Proposed Action and other alternatives are then assessed in Section 5.6.6 of this document using a very similar structure to that found in the Affected Environment section. This EIS, therefore, is intended to follow each VEC through each management alternative.

5.6.3 Spatial and temporal boundaries

The geographic area that encompasses the biological, physical, and human community impacts to be considered in the following cumulative effects analysis is described in detail in Section 4.0 of this document. The physical range of the Atlantic sea scallop resource in the northeast region of the US is from Maine to North Carolina. The physical environment, including habitat and EFH, is bounded by the range of the Atlantic sea scallop fishery in the northeast region from Maine to North Carolina and includes adjacent upland areas (from which non-fishing impacts may originate). For Protected Species, the geographic range is the total range of the Atlantic sea scallop fishery. The geographic range for human communities is defined to be those fishing communities bordering the range of the scallop fishery.

Overall, the temporal scope of past and present actions for scallops, the physical environment and EFH, protected species, fishery-related businesses and communities, and other fisheries is focused principally on actions that have occurred since 1996, when the Magnuson-Stevens Fishery Conservation and Management Act was enacted and implemented new fisheries management and EFH requirements. In 1996, the Magnuson-Stevens Act identified sustained participation of fishing communities as a new National Standard (#8), so consideration of fishery-related businesses and communities is consistent within this temporal scope. The temporal scope for marine mammals begins in the mid-1990s, when NMFS was required to generate stock assessments for marine mammals that inhabit waters of the U.S. EEZ creating the baseline against which current stock assessments are evaluated. For turtle species, the temporal scope begins in the 1970s, when populations were noticed to be in decline.

The temporal scope for scallops is focused more on the time since the Council first submitted the Scallop FMP in 1982, and particularly since 1994 when Amendment 4 to the FMP implemented the general category scallop permit. The Scallop FMP was developed with comprehensive analysis as part of a complete EIS, which this document serves to supplement and update. The FMP has been adjusted a number of times since 1982, and many elements of the management plan that are not specifically addressed in this amendment will continue to influence the status of the sea scallop resource.

The Atlantic sea scallop fishery has a long history dating back to the late 1800s. Section 1.3 summarizes the major changes in the scallop fishery and management program since the FMP was approved in 1982. Landings information for the scallop fishery date back to the early 1900s (Serchuck et al, 1979), but the temporal scope for fishery-related businesses and communities extends back to 1994 to consider impacts from the date the general category permit was first issued.

The temporal scope of future actions for all four VECs extends several years into the future. This period was chosen because of the dynamic nature of resource management and lack of specific information on projects that may occur in the future, which make it difficult to predict impacts beyond this time frame with any certainty. In addition, most measures proposed in this action are only in place for one year only.

5.6.4 Past, present and reasonably foreseeable future actions

Section 4.0 of this document summarizes the current state of the scallop resource and the limited access and general category scallop fisheries, and it provides additional information about habitat and protected resources that may be affected by the Proposed Action.

5.6.4.1 Past and Present actions

The impacts of past and present actions have been considered relative to the VECs in this amendment and are described below and presented in Table 122.

Scallop Resource

The Council established the Scallop FMP in 1982 and later implemented several Amendments and Framework Adjustments to modify the original plan. See Section 1.3 for a detailed description of past and present actions. One major action in the past (1994) includes Amendment 4, which implemented limited access for the directed scallop fishery that is primarily managed by DAS and other controls such as crew limits and gear restrictions. During that same year, large areas on Georges Bank were closed to scallop fishing because of concerns over finfish bycatch and disruption of spawning aggregations.

In 1999 Framework Adjustment 11 to the Scallop FMP allowed the first scallop fishing within portions of the Georges Bank groundfish closed areas since 1994. Since then, several other framework actions have provided controlled access in these areas. In 2004 Amendment 10 to the Scallop FMP introduced rotation area management and changed the way that the 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 had to use a portion of their total DAS allocation in the controlled access areas defined by the plan, or exchange them with another vessel to fish in a different controlled access area. Vessels could fish their open area DAS in any area that was not designated a controlled access area. The amendment also adopted several alternatives to minimize impacts on EFH, including designating EFH closed areas, which included portions of the groundfish mortality closed areas. The most recent action that provided controlled access in the access areas was Framework 18 for FY2006 and FY2007.

Several other actions have recently been implemented: Amendment 13, Framework 20 and the SBRM Amendment (Amendment 12 to the Scallop FMP). The Council approved Amendment 12 to the Scallop FMP in June 2007. This action is an omnibus amendment to all FMPs in the region and focuses on defining a standardized bycatch reporting methodology (SBRM). Section 303(a) (11) of the Magnuson-Stevens Fishery Conservation and Management Act requires that all FMPs include "a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery." The SBRM Omnibus Amendment will ensure that all FMPs fully comply with the Act. SBRM is the combination of sampling design, data collection procedures, and analyses used to estimate bycatch and to determine the most appropriate allocation of observers across the relevant fishery modes.

Scallop Amendment 13 was also approved by both the Council and NMFS in 2007, which re-activated the industry-funded observer program. Since 1999, vessels required to carry an observer are authorized to land more than the possession limit from trips in access areas, and in open areas, vessels are charged a reduced amount to help compensate for the cost of an observer. Observers were deployed through a contractual arrangement between National Marine Fisheries Service (NMFS) and an observer provider until June 2004. This arrangement was not renewed because of unresolved legal issues concerning the use of a contract to administer the industry-funded observer program. For some time, NMFS funded observers while a solution to this issue was investigated. As funding became insufficient, an interim rule went into effect that approved a new mechanism to use the observer set-aside funds through a non-contracted vendor. Amendment 13 was necessary to make this temporary mechanism part of the regulations. The Council selected final measures for that action at the February 2007 Council meeting and it was implemented on June 12, 2007. Amendment 13 also includes a provision to make changes to the observer set-aside program by framework action and the Council decided to address some issues raised with the current program in Framework 19.

The Council approved Framework 20 to the Scallop FMP at the June 2007 Council meeting and NMFS is expected to implement that action in the near term. Framework 20 considered measures to reduce overfishing for FY2007 through measures that were implemented by interim action earlier this year. At the November 2006 Council meeting, the Scallop PDT informed the Council that overfishing was likely to occur in 2007 under status quo measures implemented under Framework 18. The PDT presented several alternatives to reduce fishing mortality. The Council ultimately recommended that NMFS reduce the allocated number of trips for all scallop permit categories in the Elephant Trunk Access Area (ETA), delay the opening of the ETA, and prohibit vessels from possessing more than 50 bushels of in-shell scallops when leaving any controlled access area. NMFS agreed with the Council that the ETA has an unprecedented high abundance of scallops, which needs to be husbanded with precaution to effectively preserve the long term health of the scallop resource and fishery, and so implemented these measures by interim action.[6] This interim action became effective on December 22, 2006, and remained effective until June 20, 2007 (180 days). This interim action was then extended for an additional 180 days, and expired on December 26, 2007. Therefore, for the last two months of the 2007 fishing year (January-February 2008), management would have reverted back to status quo measures under FW18. Specifically, higher trip allocations would have been granted in the Elephant Trunk Area for both limited access and general category fisheries. Therefore, the Council approved Framework 20 to extend the reduced fishing effort measures implemented by interim action through the end of the 2007 fishing year. This action expired on March 1, 2008, when Framework 19 was scheduled to be in place.

Framework 19 set specifications to adjust DAS allocations and set the area rotation schedule for 2008 and 2009. Maintaining the fishing mortality target of $F = 0.20$ is expected to have positive impacts on the scallop resource by reducing the risk of overfishing and establishing measures to achieve optimum yield on a continuing basis. In addition, the Hudson Canyon area was closed in this action which will help the FMP achieve optimum yield by reducing mortality on small scallops. Framework 19 also revised the overfishing definition, which was expected to have positive impacts on the scallop resource. The updated model is less biased, uses more sources of data, and is an improvement on the previous model.

It also addressed new requirements for the general category fishery including quarterly hard-TAC allocations for the transition period to an IFQ program. This action also included the details of a cost recovery program that was approved in Amendment 11 for general category IFQ permit owners. In addition, Amendment 11 approved a hard-TAC for a Northern Gulf of Maine (NGOM) limited entry program. FW19 included the specific hard-TAC for that program for the next two fishing years. General category vessels were allocated 5% of the total catch in access areas in both FY2008 and 2009 under this framework. The last alternative related to Amendment 11 was an estimate of incidental catch mortality that will be removed from the total projected catch before allocations are made.

Other measures in Framework 19 included alternatives to address specific issues with the observer set-aside program. In addition, the action included a provision for a vessel to power down their VMS unit for a minimum of 30 days. This action also included a clarification about when a vessel can leave for an access area trip. Lastly, this action approved research priorities to be incorporated in the RSA program for FY2008 and FY2009. The Council selected final measures for that action at the October 2007 Council meeting and it was implemented on June 1, 2008. The final rule for Framework 19 to the FMP was published on May 29, 2008 (73 FR 30790).

Lastly, the Council approved Amendment 11 to the Scallop FMP (June 2007) and most of it was implemented in 2008. The full IFQ program is expected to be implemented before March 1, 2010. The main objective of the action was to control capacity and mortality in the general category scallop fishery. Since 1999, there has been considerable growth in fishing effort and

[6] The interim rule published by NMFS on December 22, 2006 (**71 FR 76945**), included all measures recommended by the Council, except the prohibition on a vessel leaving an access area with more than 50 bu. of in-shell scallop was limited to the ETA only and not all access areas as recommended by the Council.

landings by vessels with general category permits, primarily as a result of resource recovery and higher scallop prices. This additional effort is likely a contributing factor to why the FMP has been exceeding the fishing mortality targets. Without additional controls on the general category fishery, there is a great deal of uncertainty with respect to potential fishing mortality from this component of the scallop fishery; thus, the potential for overfishing is increased.

The action includes a limited entry program for the general category fishery. Each qualifying vessel would receive an individual allocation in pounds of scallop meat with a possession limit of 400 pounds. Qualifying vessels would receive a total allocation of 5% of the total projected scallop catch. The proposed action also includes a separate limited entry program for general category fishing in the Northern Gulf of Maine. In addition, Amendment 11 includes adjustments to limited access scallop fishing under general category rules. Another separate limited entry program for that activity is proposed with the same qualification criteria as the limited entry general category permit. Qualifying vessels will also receive an individual allocation in pounds, and the entire category will receive 5% of the total projected scallop catch. In addition, a separate limited entry incidental catch permit is proposed that will permit vessels to land and sell up to 40 pounds of scallop meat per trip while fishing for other species. Other measures are recommended as well.

The cumulative impacts of past and present management actions have resulted in substantial effort reductions in the scallop fishery. Sea scallop biomass has mostly increased since 1999. It is estimated that area rotation management will end overfishing and provide a healthy resource for scallop fishermen to harvest for the long-term. Overall, the realized reductions in effort have been positive for the scallop resource.

Physical Environment and EFH

The effects of mobile bottom-tending gear (trawls and dredges) on fish habitat have been recently reviewed by the National Research Council (NRC 2002). This study determined that repeated use of trawls/dredges reduce the bottom habitat complexity by the loss of erect and sessile epifauna and smoothing sedimentary bedforms and bottom roughness. This activity, when repeated over the long term also results in discernable changes in benthic communities, which involve a shift from larger bodied long-lived benthic organisms for smaller shorter-lived ones. This shift also can result in loss of benthic productivity and thus biomass available for fish. Therefore, such changes in bottom structure and loss of productivity can reduce the value of the bottom habitat for demersal fish, such as haddock and cod. These effects varied with sediment type, with lower level of impact to sandy communities, where there is higher natural disturbance to a high degree of impact to hard-bottom areas such as bedrock, cobble and coarse gravel, where the substrate and attached epifauna are more stable. Use of trawls and dredges are common in inshore and offshore areas. The primary gear used in the scallop fishery is dredge gear; however, there is some otter trawl gear used in the scallop fishery. It is assumed for this analysis that the effects of bottom tending mobile gear, particularly dredge gear, are generally moderate to high, depending upon the type of bottom and the frequency of fishing activities to demersal species affected by this action. These activities, which cause impacts to essential fish habitat for a number of federally managed species in a manner that is more than minimal and less than temporary in nature, have been mitigated by the measures in Amendment 10 and by other actions described in Table 121.

Amendment 10 implemented a series of year-round closed areas to scallop gear to protect EFH in those areas. Furthermore, a gear modification (4-inch ring size) was implemented to reduce mortality on small scallops and reduce contact with the bottom. Total DAS allocated under Amendment 10 were reduced, which had indirect benefits to EFH by reducing overall scallop fishing effort and thus reducing area swept by dredge gear. It should be noted that sea scallop EFH is not considered adversely affected by dredge or otter trawl fishing effort.

Table 121 includes a description of measures implemented by the Council in last major FMP amendments to minimize, mitigate or avoid adverse impacts on EFH.

In Amendment 13 to the Multispecies FMP the New England Council implemented a range of measures to minimize the impacts of bottom trawling in the Gulf of Maine, Georges Bank and Southern New England. In addition to the significant reductions in days-at-sea and some gear modifications (implemented through Scallop Amendment 10), the Council closed 2,811 square nautical miles (Habitat Closed Areas) to all bottom-tending mobile fishing gear, including scallop dredges. Framework 16 to the Scallop FMP/Framework 39 to the Multispecies FMP updated the Habitat Closed Area boundaries established by Amendment 10 to be consistent with those established by Amendment 13. On August 2, 2005, the portions of Framework 16/39 that modified the habitat closures to be consistent with A13 habitat closed areas were vacated by a court order. As a result, both the Amendment 10 and the Amendment 13 closures remain in effect. Table 121 includes a description of measures implemented by the Council in last major FMP amendments to minimize, mitigate or avoid adverse impacts on EFH, including measures established under other FMPs.

Framework 21 does not propose any changes to the current measures to minimize the adverse impacts of scallop fishing on EFH. No additional measures are needed at this time because most measures proposed in this action are expected to have neutral to positive impacts on EFH.

Table 121. Description of measures implemented by Council in last major FMP amendments to minimize, mitigate or avoid adverse impacts on EFH.

Measure	Source FMP (implemented by)	Description	Description of Habitat Impacts	Overall Habitat Impact
CLOSED AREA MEASURES				
Mortality Closure	Multispecies	Retention of existing groundfish closed areas in the Gulf of Maine, George's Bank and Southern New England. Addition of Cashes as a year round closure	Year-round closures provide habitat benefits to the areas within the closures. The addition of Cashes Ledge as a year-round closure will benefit EFH. Rare kelp beds are found in that area.	+
Habitat Closed Areas (MPAs)	Multispecies and Scallop	2811 square nautical miles closed to bottom-tending mobile gear indefinitely in five separate closed areas in GOM, GB and SNE.	Significant benefits to EFH by minimizing adverse effects of bottom trawling, scallop dredging and hydraulic clam dredging by prohibiting use.	+
Rotational Area Management (RAM)	Scallop	Amendment 10 implemented a rotational area management strategy which introduced a systematic structure that determines where vessels can fish and for how long. Framework adjustments will consider closure and re-opening criteria.	Expected to have positive effects on habitat because effort on gravelly sand sediment types is expected to decline. In general, swept area is expected to decline in most of the projected scenarios (especially in the Mid-Atlantic region), which could have positive impacts on EFH.	+
Habitat Closed Areas (MPAs)	Monkfish	Amendment 2 closed Oceanographer and Lydonia Canyons to trawls and gillnets on a monkfish DAS.	Precautionary action taken to ensure that any expansion of the monkfish fishery as a result of the other measures in Amendment 2 will not affect sensitive deep-sea canyon habitats for which EFH is designated.	+
EFFORT REDUCTION MEASURES				
Monkfish DAS usage by limited access permit holders in scallops and multispecies fisheries	Monkfish	Retain current requirement for vessels to use both monkfish DAS and scallop or multispecies DAS simultaneously	This alternative relies on the scallop and multispecies management plans to set DAS levels (with the exception of when DAS fall below 40 DAS). As DAS have been reduced by management actions over the past two years, consequent impacts on habitat by the directed monkfish fishery have been reduced proportionally. Further reductions are possible depending on management actions in these two plans.	+
Capacity Control	Multispecies	DAS can be transferred with restrictions and new measures for "reserve days"	Any measure that is intended to reduce the amount of time fishing by mobile gear will likely have benefits to EFH. These measures reduce amount of latent effort as well.	+
DAS Reductions	Multispecies	Mix of adaptive and phased effort reduction strategies. A days (60% of effective effort) B days (40% of effective effort) C days (FY01 allocation).	Reducing DAS will likely benefit EFH by reducing the amount of time vessels can fish.	+

Measure	Source FMP (implemented by)	Description	Description of Habitat Impacts	Overall Habitat Impact
		Provides opportunity to fish on stocks that do not need rebuilding.		
DAS Limits	Scallops	Amendment 10 implemented a new program that allocates specific number of DAS for open areas and controlled access areas.	The total DAS allocation in open areas is significantly less than the Status quo DAS allocation. Less DAS translates into less fishing effort, so positive for EFH. Furthermore, CPUE in controlled access areas is expected to be greater, thus the gear is expected to spend less time on the bottom.	**+**
Possession Limits	Scallops	Reduced possession limit for limited access vessels fishing outside of scallop DAS	Vessels with limited access permits are currently allowed to possess and land up to 400 lbs per trip of shucked scallop meats when not required to use allocated DAS; this measure will reduce possession limit to 40 lbs/trip) and reduce fishing effort by vessels that have been targeting scallops under the higher general category possession limit. Scallops harvested under this provision cannot be sold.	**+**
GEAR MODIFICATION MEASURES				
Minimum mesh size on directed MF DAS	Monkfish	Mobile gear vessels are required to use either 10-inch square or 12-inch diamond mesh in the codend. Gillnets must be at least 10 inches	The mesh size regulations do not have a direct effect on habitat, but may indirectly minimize adverse effects of the fishery on complex bottom types by reducing the ability to catch groundfish, and therefore the incentive to target those fish in hard bottom areas.	**+**
Roller gear restriction	Monkfish	Establishes maximum roller gear diameter size for vessels fishing on a monkfish DAS.	Positive but not significant – sets maximum roller gear diameter equivalent to size currently in use in the area; prevents expansion of trawl effort into complex bottom areas and canyons.	**+**
Four inch rings	Scallop	Increase ring size on scallop dredge rig to 4" everywhere.	Four inch rings will slightly increase dredge efficiency for larger scallops, thus reducing bottom contact time in recently-opened areas where large scallops are abundant, but will reduce catch rates and increase bottom time in areas where medium-small sized scallops are prevalent.	**-/+**
OTHER MEASURES				
Observer Coverage	Multispecies	10% requested by 2006 for each gear type	If observers are able to collect data of interest to EFH management, increased coverage could indirectly benefit habitat.	**+**
TAC Set-Aside for research	Scallop	2% set-aside from TAC and/or DAS allocations to fund scallop and habitat research and surveys	Could indirectly benefit habitat when habitat research is funded and provides better information for future management decisions.	**+**

Protected Species
Before 2001, there were only three known interactions between sea turtles and scallop dredge gear (NMFS, 2007). By 2001, scallop fishing intensity in the Mid-Atlantic region increased following a general decline of scallop biomass in the Georges Bank region and closure of the groundfish Closed Areas in December 1994. Since turtle interactions in the high use areas and seasons are in part related to fishing effort, sea turtles may have benefited from reductions of fishing effort allocations in Amendments 4 and 7 to the Scallop FMP. During this time, DAS use declined from more than 40,000 DAS in 1993 to about 23,000 DAS in 1999, before increasing to about 31,000 DAS, in 2003 (NEFMC, 2005). The amendments and intervening framework adjustments also made other management changes, including new gear restrictions, although the effect of these changes on sea turtle interactions is unknown.

The extent of interactions between fishing with scallop dredges and sea turtles is still under investigation. Following the opening of the Hudson Canyon Access Area and increased observer coverage in the area, additional interactions between sea turtles and scallop dredge gear became known. New research is continuing to identify additional gear modifications and changes in fishing that could reduce interactions in the fishery.

The main goal of Amendment 10 to the Scallop FMP was to focus scallop fishing effort in areas where biomass is greatest with the rationale that actual fishing time is likely to be reduced as the overall catch per tow increases. Scallop management areas have been monitored through annual scallop surveys for scallop biomass and growth rates. When biomass in a closed area is high and the growth rates decline (i.e. the scallop resources are at maximum levels in the area) areas open to fishing at a controlled level. Conversely, closings occur when the reverse situation occurs (low biomass and high growth rate indicating a depleted scallop resource in the area). While Scallop Amendment 11 continued this management program, its purpose was to control capacity and mortality in the general category scallop fishery.

Certain general statements can be made regarding areas in the scallop management unit. Shifts in scallop effort from the Mid-Atlantic region to areas of Georges Bank may have had the effect of reducing potential risks to sea turtles. As the Georges Bank scallop resource is reduced and the Mid-Atlantic areas rebound a reverse shift in effort from an area of low use for turtles to high use areas in the Mid-Atlantic may potentially increase the risk of interactions from current levels. Accordingly, impacts to protected species could shift back and forth over the years under the management scheme implemented under Amendment 10. Since modifications to NEFMC management actions will occur through framework adjustments and plan amendments, they will undergo additional review to assess impacts to protected species.

The sea scallop FMP has several measures in place specifically to protect sea turtles. These include time area closures such as the seasonal Elephant Trunk closure in September and October in effect since that area opened in 2007 which will roll over in the current action. Also included are gear modifications and requirements designed to minimize impact of takes. In general, scallop effort has declined over the years and catch per-unit-of-effort has increased dramatically under area rotation. 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. More and more effort is concentrated in access areas with higher catch rates, so gear is in the water much less than in the past.

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 48). 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 49 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.

Five Biological Opinions for sea scallop the fishery have been issued since 2003. The latest BiOp was completed by NMFS on March 14, 2008 which summarized the overall impacts to threatened and endangered species. It concluded that the fishing operations being carried out under the Scallop FMP and as modified by Framework 19 were likely to adversely affect, but not jeopardize the continued existence of loggerhead, leatherback, Kemp's ridley and green sea turtles. ESA requires incidental take statement (ITS) and any reasonable and prudent measures (RPMs) necessary to minimize impacts along with implementing terms and conditions. One specific RPM in the most recent biological opinion included a requirement to limit scallop fishing. NMFS requested the Council develop measure to comply with that RPM in this action (FW21), See Section 2.8 for details. These measures would be implemented through FW21, therefore a future action, and are expected to have beneficial impacts on turtles by reducing effort in the Mid-Atlantic during times of the year when turtles are most likely to be present.

The alternatives under consideration in this action do not appear to have any adverse cumulative effects on protected species that would alter the prognosis for impacts of fishing under Amendment 10 and Framework Adjustment 19, although there are other sources of human-induced mortality and/or harassment of turtles in the action area. These include incidental takes in state-regulated fishing activities, vessel collisions, ingestion of plastic debris, and pollution. While the combination of these activities may affect populations of endangered and threatened sea turtles, preventing or slowing a species' recovery, the magnitude of these effects is currently unknown.

State Water Fisheries - Fishing activities are considered one of the most significant causes of death and serious injury for sea turtles. A 1990 National Research Council report estimated that 550 to 5,500 sea turtles (juvenile and adult loggerheads and Kemp's ridleys) die each year from all other fishing activities besides shrimp fishing. Fishing gear in state waters, including bottom trawls, gillnets, trap/pot gear, and pound nets, take sea turtles each year. However, information on the takes is limited. Given that state managed commercial and recreational fisheries along the Atlantic coast are expected to continue within the action area in the foreseeable future, additional takes of sea turtles in these fisheries is anticipated.

Vessel Interactions – NOAA Fisheries STSSN data indicate that interactions with small recreational vessels are responsible for a large number of sea turtles stranded each year within the action area. Collision with boats can stun or easily kill sea turtles, and many stranded turtles have obvious propeller or collision marks.

Pollution and Contaminants - Marine debris (*e.g.*, discarded fishing line or lines from boats) can entangle turtles in the water and drown them. Turtles commonly ingest plastic or mistake debris for food. Chemical contaminants may also have an effect on sea turtle reproduction and survival. While the effects of contaminants on turtles are relatively unclear, pollution may be linked to the fibropapilloma virus that kills many turtles each year (NOAA Fisheries 1997). If pollution is not the causal agent, it may make sea turtles more susceptible to disease by weakening their immune systems. Excessive turbidity due to coastal development and/or construction sites could influence sea turtle foraging ability. As mentioned previously, turtles are not very easily affected by changes in water quality or increased suspended sediments, but if these alterations make habitat less suitable for turtles and hinder their capability to forage, eventually they would tend to leave or avoid these less desirable areas (Ruben and Morreale 1999).

Low and Mid-frequency Sonar – See Section 5.6.5.

The factors discussed above, and other factors, potentially have had cumulative adverse effects on most protected species to varying degrees. Because of a lack of cause-effect data, little is known about the magnitude and scope of these factors and how they have contributed to the species' listing.

A number of activities are in progress that may ameliorate some of the negative impacts on marine resources, sea turtles in particular, posed by the activities summarized above. Education and outreach are considered one of the primary tools to reduce the risk of collision represented by the operation of federal, private, and commercial vessels.

NMFS' regulations require fishermen to handle sea turtles in such a manner as to prevent injury. Any sea turtle taken incidentally during fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to a series of procedures (50 CFR 223.206(d)(1)). NMFS has been active in public outreach efforts to educate fishermen regarding sea turtle handling and resuscitation techniques. NMFS has also developed a recreational fishing brochure that outlines what to do should a sea turtle be hooked and includes recommended sea turtle conservation measures. These outreach efforts will continue in an attempt to increase the survival of protected species through education on proper release guidelines.

There is an extensive network of STSSN participants along the Atlantic and Gulf of Mexico coasts. This network not only collects data on dead sea turtles but also rescues and rehabilitates live stranded turtles. Data collected are used to monitor stranding levels and identify areas where unusual or elevated mortality is occurring. The data are also used to monitor incidence of disease, study toxicology and contaminants, and conduct genetic studies to determine population structure. All states that participate in the STSSN are collecting tissue for genetic studies to better understand the population dynamics of the northern subpopulation of nesting loggerheads.

These states also tag live turtles when encountered through the stranding network or in-water studies. Tagging studies help provide an understanding of sea turtle movements, longevity, and reproductive patterns, all of which contribute to our ability to reach recovery goals for the species.

There is no organized formal program for at-sea disentanglement of sea turtles. However, recommendations for such programs are being considered by NMFS pursuant to conservation recommendations issued with several recent Section 7 consultations. Entangled sea turtles found at sea in recent years have been disentangled by STSSN members, the whale disentanglement team, the USCG, and fishermen. NMFS has developed a wheelhouse card to educate fishermen and recreational boaters on the sea turtle disentanglement network and disentanglement guidelines.

Actions taken to protect sea turtles include a Strategy for Sea Turtle Conservation and Recovery in Relation to Atlantic Ocean and Gulf of Mexico Fisheries (Sea Turtle Strategy), released by NMFS in June 2001, to address the incidental capture of sea turtle species in state and federal fisheries in the Atlantic and Gulf of Mexico. The major elements to the strategic plan include: continuing and improving stock assessments; improving and refining estimation techniques for the takes of sea turtles to ensure that ESA criteria for recovery are being met; continuing and improving the estimation or categorization of sea turtle bycatch by gear type and fishery; evaluating the significance of incidental takes by gear type; convening specialist groups to prepare take reduction plans for gear types with significant takes; and promulgating ESA and MSFCMA regulations implementing plans developed for take reduction by gear type. Actions taken under the Sea Turtle Strategy are expected to provide a net benefit to sea turtles.

In February 2003, NMFS issued a final rule to amend regulations protecting sea turtles to enhance their effectiveness in reducing sea turtle mortality resulting from shrimp trawling in the Atlantic and Gulf areas of the southeastern U.S. Turtle Excluder Devices (TEDs) have proven to be effective at excluding sea turtles from shrimp trawls; however, NMFS has determined that modifications to the design of TEDs needed to be made to exclude leatherbacks and large and mature loggerhead and green sea turtles. In addition, several approved TED designs did not function properly under normal fishing conditions. NMFS disallowed these TEDs. Finally, the rule requires modification to the try net and bait shrimp exemptions to the TED requirements to decrease mortality of sea turtles (68 FR 8456, 21 Feb 2003).

Significant measures have been taken to reduce sea turtle takes in summer flounder trawls and trawls that meet the definition of summer flounder trawls, which would include fisheries for species like scup and black sea bass, by requiring TEDs in trawl nets fished in the area of greatest turtle bycatch off the North Carolina and part of the Virginia coast from the North Carolina/South Carolina border to Cape Charles, VA. These measures are attributed to significantly reducing turtle deaths in the area (NMFS, 2007). In addition, NMFS issued a final rule (67 FR 56931), effective September 3, 2002, that closes the waters of Pamlico Sound, NC to fishing with gillnets with a mesh size larger than 4 1/4 inch (10.8 cm) stretched mesh ("large-mesh gillnet"), on a seasonal basis from September 1 through December 15 each year, to protect migrating sea turtles. The closed area includes all inshore waters of Pamlico Sound south of 35º 46.3' N. lat., north of 35º 00' N. lat., and east of 76º 30' W. long.

In December 2003, NMFS issued new regulations for the use of gillnets with larger than 8 inch stretched mesh in federal waters off of North Carolina and Virginia (67 FR 71895, 3 Dec. 2002). Gillnets with larger than 8 inch stretched mesh are not allowed in federal waters (3-200 nautical miles) north of the North Carolina/South Carolina border at the coast to Oregon Inlet at all times; north of Oregon Inlet to Currituck Beach Light, NC from March 16 through January 14; north of Currituck Beach Light, NC to Wachapreague Inlet, VA from April 1 through January 14; and, north of Wachapreague Inlet, VA to Chincoteague, VA from April 16 through January 14. Federal waters north of Chincoteague, VA are not affected by these new restrictions although NMFS is looking at additional information to determine whether expansion of the restrictions are necessary to protect sea turtles as they move into northern mid-Atlantic and New England waters. These measures are in addition to Harbor Porpoise Take Reduction Plan measures that prohibit the use of large-mesh gillnets in southern mid-Atlantic waters (territorial and federal waters from Delaware through North Carolina out to 72° 30'W longitude) from February 15-March 15, annually.

In May 2004, the agency issued regulations prohibiting the use of all pound net leaders, set with the inland end of the leader greater than 10 horizontal ft (3 m) from the mean low water line, from May 6 to July 15 each year in the Virginia waters of the mainstem Chesapeake Bay, south of 37º 19.0' N. lat. and west of 76º 13.0' W. long., and all waters south of 37º 13.0' N. lat. to the Chesapeake Bay Bridge Tunnel at the mouth of the Chesapeake Bay, and the James and York Rivers downstream of the first bridge in each tributary. Outside this area, the prohibition of leaders with greater than or equal to 12 inches (30.5 cm) stretched mesh and leaders with stringers, as established by the June 17, 2002 interim final rule, will apply from May 6 to July 15 each year. The action, taken under the ESA, is necessary to conserve sea turtles listed as threatened or endangered. NMFS also provides an exception to the prohibition on incidental take of threatened sea turtles for those who comply with the rule (69 FR 24997, 5 May 2004).

In July 2004, NMFS issued sea turtle bycatch and bycatch mortality mitigation measures for all Atlantic vessels that have pelagic longline gear onboard and that have been issued, or are required to have, Federal HMS limited access permits, consistent with the requirements of the ESA, the MSFCMA, and other domestic laws. These measures include mandatory circle hook and bait requirements, and mandatory possession and use of sea turtle release equipment to reduce bycatch mortality. This final rule also allows vessels with pelagic longline gear onboard that have been issued or are required to have Federal HMS limited access permits to fish in the Northeast Distant Closed Area if they possess and/or use certain circle hooks and baits, sea turtle release equipment, and comply with specified sea turtle handling and release protocols (69 FR 40733, 6 Jul 2004).

More recently, NMFS has published a final rule (70 FR 42508, July 25, 2005) that allows any agent or employee of NMFS, the FWS, the U.S. Coast Guard, or any other Federal land or water management agency, or any agent or employee of a state agency responsible for fish and wildlife, when acting in the course of his or her official duties, to take endangered sea turtles encountered in the marine environment if such taking is necessary to aid a sick, injured, or entangled endangered sea turtle, or dispose of a dead endangered sea turtle, or salvage a dead endangered sea turtle that may be useful for scientific or educational purposes. NMFS already affords the same protection to sea turtles listed as threatened under the ESA (50 CFR 223.206(b).

In 2006, NMFS finalized a rule (71 FR 50361, August 23, 2006) that requires modification of scallop dredge gear by use of a chain mat when the gear is fished in Mid-Atlantic waters south of 49 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, specific changes include increasing the size of the TED escape opening currently required for sea scallop trawl gear and moving the current northern boundary of the Summer Flounder Fishery-Sea Turtle Protection Area off Cape Charles, Virginia 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.

In 2008 a Loggerhead Sea Turtle Recovery Plan was published (NMFS and USFWS 2008) which did not include the Atlantic sea scallop fishery as a main source of mortality of the species. This document estimated loggerhead bycatch in the scallop fishery and the impact of takes on the population.

<u>Fishery-related Businesses and Communities</u>

All actions taken under the Scallop FMP have had effects on fishery-related businesses and communities. None have specifically been developed to primarily address elements of fishing related businesses and communities. In general, actions that prevent overfishing have long-term benefits on businesses and communities that depend on those resources. Some actions that limit participation, such as the limited entry program that was adopted under Amendment 4 had distributional impacts on individuals and ports that participated in the scallop fishery at that time. While short-term negative impacts may follow an action that reduces effort, past and present actions had positive cumulative impacts on vessels owners, crew and their families in the scallop fishery by increasing their fishing revenues, incomes and standard of living. These impacts of these past and present actions were also positive for the related sectors including dealers, processors, primary suppliers to the vessels that sell them gear, engines, boats, etc. The increases in gross profits for scallop vessels and in crew incomes have had positive economic benefits on these sectors indirectly through the multiplier impacts. Total landings have increased, catch per unit of effort has increased, and price has steadily increased as well.

The Passamaquoddy Native American Tribe has been awarded licenses in the State of Maine to harvest scallops in state waters since 1998. Since this is a state fishery, the state of Maine monitors these landings. However, the impact of this fishery on the overall scallop resource is minimal because the size of the fleet is small relative to the scallop fleet managed under this FMP.

Table 122 – Summary of effects from past and present actions

Action	Description	Impacts on Scallops	Impacts on Physical Env. and EFH	Impacts on Protected Species	Impacts on Fishery and Communities	
SCALLOP ACTIONS						
Scallop FMP	Restore adult scallop stock and reduce fluctuation in stock abundance	Positive	Positive	Positive	Positive	
Amendment 4	Changed the primary management mechanism from the meat-count standard to an effort control program for all resource areas	Positive	Positive	Positive	Positive	
Amendment 10	Implement area rotation program and other measures to prevent overfishing and minimize impacts on EFH	Positive	Positive	Positive	Positive	
Framework 18	Set management measures for FY2006 and FY2007	Positive	Neutral	Neutral	Positive	
Amendment 13	Implement the industry funded observer program	Positive	Neutral	Positive	Neutral	
Framework 20	Implement measure to reduce effort in January and February of 2007	Positive	Neutral	Neutral	Positive	
SBRM Amendment	Implement a bycatch reporting methodology	Potentially Neutral	No Impact	Potentially Positive	Potentially Neutral	
Framework 19	Set management measures for FY2008 and 2009, eliminated crew size restriction, LAGC IFQ program, obs and RSA program improvements, and VMS 30-day power down	Positive	Neutral	Neutral	Positive	
Amendment 11	Limited entry program for the general category fishery	Potentially Positive	Potentially positive	Neutral	Potentially positive for some and potentially negative for others	
SUMMARY OF IMPACTS FROM SCALLOP ACTIONS-		**Positive**	**Positive**	**Positive**	**Positive**	
PHYSICAL ENVIRONMENT AND EFH ACTIONS						
EFH Omnibus Amendment (1998)	Comply with 1996 SFA to describe and identify EFH and minimize impacts of fishing on EFH	Positive	Positive	Neutral	Neutral	
A13/A10 (Table 121)	Gear effects evaluation, minimize adverse impacts	Positive	Positive	Neutral	Negative	
SUMMARY OF IMPACTS FROM PHYSICAL ENV/EFH ACTIONS –		**Positive**	**Positive**	**Neutral**	**Neutral/Negative**	
PROTECTED RESOURCES ACTIONS						
Chain mat rule	Gear modification to address turtle bycatch in the Mid-Atlantic	Neutral	Neutral	Positive	Low Negative	
FISHERY AND COMMUNITY ACTIONS						
None Specific	N/A	N/A	N/A	N/A	N/A	
SUMMARY OF IMPACTS OF ALL PAST AND PRESENT ACTIONS ON EACH VEC		**Positive**	**Positive**	**Positive/Neutral**	**Positive/Neutral**	

P = Past action/impact   Pr = Presently occurring action/impact

5.6.4.2 Reasonably Foreseeable Future Actions

The impacts of reasonably foreseeable future actions have been considered relative to the VECs in this amendment and are described below and presented in Table 123. Overall, the impacts associated with reasonably foreseeable future actions to the VECs considered in this assessment are neutral and/or considered to be insignificant, as most impacts cannot be predicted at this time.

Scallop Resource

Several reasonably foreseeable future federal fishery management actions may affect the scallop resource. In general, the actions in the foreseeable future are expected to have positive impacts on the scallop resource overall.

- Amendment 15 to the Scallop FMP

The Council is considering Amendment 15 to the Scallop FMP and is expected to vote and approve it in June 2010. The primary need for this action is to bring the Scallop FMP in compliance with the re-authorized Magnuson-Stevens Conservation and Management Act (MSA). The Act was reauthorized in 2007 and included several new legal requirements. Foremost, the Act requires that each fishery use annual catch limits (ACLs) to prevent overfishing, including measures to ensure accountability. The Scallop FMP is required to be compliant with these new regulations by 2011 since the stock is not subject to overfishing. Therefore, the primary purpose of this A15 is to consider measures that will implement annual catch limits and accountability measures (AMs) to prevent overfishing, which will have a positive effect on the resource.

A15 is also considering measures that will adjust the current overfishing definition (OFD) to be more compatible with area rotation. Specifically, the new overfishing definition would average fishing mortality over time and not space; area-specific thresholds would be set based on past fishing mortality rates and area rotation policies. This more accurate model should increase the likelihood of successful management and be positive for the scallop resource.

Minor adjustments to the recently-implemented limited access general category management program that would affect the scallop resource are also being considered including an allowance of IFQ rollover; allocation of area-specific IFQ; modifications to the general category possession limit; and adjusting the restriction on maximum quota per fishing platform from 2% to 2.5% of the total general category allocation. These adjustments should increase the efficiency of the fleet and have a positive effect on the resource.

A range of options are being considered to address timing concerns and efficient use of resource for the RSA program which would be indirectly beneficial to the resource. This action will also consider measures to change the scallop fishing year because it is currently out of sync with the framework adjustment process and the timing of when scallop survey data are available for management decisions. Amendment 15 is considering changing the start of the fishing year from March 1 to May 1. It is too early to say what the overall impacts of Amendment 15 will be on each VEC until proposed measures are identified in June 2010, but most under consideration have neutral to positive impacts on the scallop resource.

- Multispecies Framework 44

Framework 44 to the Multispecies FMP will have an impact on the scallop resource because the fishery is dependent on the allocation of yellowtail flounder needed to harvest a certain amount of scallops. According to Amendment 16 to the Multispecies FMP a specific portion of the total ABC for YT will be allocated to the scallop fishery as bycatch. If approved, Framework 44 will allocate 100% of the yellowtail that is needed to harvest the projected scallop catch for 2010. Final action on this framework was made in November 2009 and it is expected to be implemented before May 1, 2010. This action is expected to have neutral impacts on the scallop resource for 2010 since 100% of the YT projected to be needed by the scallop fishery will be allocated. However, in the future (2011 and 2012), FW44 will only allocate 90%, so less effort may be allocated to the scallop fishery in those years; unless other modifications can be made to catch the same amount of scallops and less YT. If overall scallop effort has to be reduced in future actions to prevent exceeding YT allocations, there may be indirect beneficial impacts on the scallop resource as a result of less effort overall.

Physical Environment and EFH

In the spring of 2003, the New England Council initiated a Habitat Omnibus Amendment that will be considered Amendment 14 to the Atlantic Scallop FMP. It will also amend the Northeast Multispecies (Amendment 14), Monkfish (Amendment 4), Herring (Amendment 3) Skate (Amendment 2), Red Crab (Amendment 3) and Atlantic Salmon (Amendment 3) FMPs. This omnibus amendment will fulfill the five year EFH review and revision requirement specified in 50 CFR Section 600.815(a)(10). Although it is not known at this time how the recommendations might change fisheries or fisheries management, the intention is to provide additional habitat and species protection where it is needed.

Phase 1 of the EFH Omnibus has been substantially completed by the Council and includes new EFH designations for all species and life stages under management by the NEFMC, designation (but no management restrictions) of several habitat areas of particular concern (HAPC), an evaluation of the major prey species for species in the NEFMC fishery management units (FMU) and an evaluation of the potential impacts of non-fishing activities on EFH. Although the Council has completed Phase 1, the document and corresponding actions will not be submitted for implementation (and, therefore, no Record of Decision will be filed) until the completion of Phase 2 sometime in 2011. The potential exists for changes to the current suite of management measures to minimize adverse impacts on EFH (see Table 121) and/or additional measures to be implemented. The public will have the opportunity to comment on a combined Phase 1/Phase 2 document before final decisions are made by the Council.

- Amendment 15

Amendment 15 is considering measures to address the essential fish habitat (EFH) closed areas under the Scallop FMP if Phase II of the EFH Amendment is delayed. Specifically, this action would consider making the EFH closed areas consistent under both the Scallop and Groundfish FMP for scallop vessels if Phase II of the EFH Omnibus Amendment is delayed. If this measure is approved, there could be cumulative benefits for the scallop resource if more effort can be used in areas with higher catch per unit of effort.

Protected Species
NMFS recognizes that the specific nature of the interaction between sea turtles and scallop dredge gear remains unknown. The scallop dredge may strike sea turtles as it is fished, and this interaction would remain undocumented. Sea turtles could be taken when the dredge is being fished on the bottom or during haulback. NMFS does not know how the modified gear interacts with sea turtles on the bottom and in the water column. In order to understand the interaction, research is currently being conducted and is expected to continue. This work may provide more information on the interaction between sea turtles and scallop dredge gear in the water.

Currently there is an EIS in development for an Atlantic Trawl Rule to require the use of TEDs in trawl fisheries off the Northeast coast including the scallop trawl fishery. This rule consists of a series of temporal and spatial requirements for TED use. The scoping period has ended for this EIS and it is not clear when decision on this action will be made at this time. It is difficult to determine if there will be cumulative impacts on each VEC because this action is still early in development.

Fishery-related Businesses and Communities
Amendment 15 is considering measures that address capacity in the limited access scallop fishery and improve overall economic performance while considering impacts on various fisheries and fishing communities. Measures to improve the economic efficiency of the limited access fishery, an objective of National Standard 5, will also take into account the importance of fishery resources to fishing communities to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities (National Standard 8). This action will also include measures to minimize costs and unnecessary duplication (National Standard 7). There is some trepidation that stacking and leasing will lead to consolidation and loss of jobs, which would be a negative impact on businesses and communities.

Amendment 15 is considering implementation of Community Fishing Associations in the LAGC fishery. The establishment of CFAs could have positive impacts on the participants by allowing fishermen to combine their allocations and to fish using fewer vessels in order to reduce fishing costs. This will provide an opportunity for fishermen to establish and benefit from an economically viable operation when the allocations of individual vessels are too small to make scallop fishing profitable. Under these conditions, general category scallop TAC is likely to be fully utilized by qualifiers with positive impacts on revenues and producer and consumer benefits.

Table 123 – Summary of effects from reasonably foreseeable future actions

Action	Description	Impacts on Scallops	Impacts on Physical Env. and EFH	Impacts on Protected Species	Impacts on Fishery and Communities	
Scallop Actions						
Amendment 15	Implement ACLs, adjust OFD, address overcapacity in the LA fishery	Neutral to positive	Neutral to positive	Neutral	Potentially negative to potentially positive	
SUMMARY OF IMPACTS FROM SCALLOP ACTIONS-		**Neutral to Positive**	**Neutral to positive**	**Neutral to potentially positive**	**Neutral/ potentially positive**	
Physical Environment and EFH Actions						
Phase I EFH Omnibus	Review EFH designations, consider HAPC alternatives, describe prey species, evaluate non-fishing impacts	Positive	Positive	Neutral	Neutral	
Phase II EFH Omnibus	Review gear effects and minimize adverse impacts	Potentially neutral	Positive	Potentially Neutral	Potentially positive or negative	
A15 –Measure to address inconsistent EFH boundaries	Make EFH closed areas consistent under both Scallop and Groundfish FMP for scallop vessels if Phase II of the EFH Omnibus Amendment is delayed	Potentially positive	Potentially positive	Potentially positive	Positive	
SUMMARY OF IMPACTS FROM PHYSICAL ENV/EFH ACTIONS –		**Positive**	**Positive**	**Neutral**	**Neutral**	
Protected Resources Actions						
Sea turtle strategy	NMFS program to address incidental capture of turtles in state and federal fisheries	No Impact	No Impact	Positive	Low Negative	
Atlantic take reduction team	Requirements to reduce interaction with marine mammals	No Impact	No Impact	Positive	Low Negative	
Use of TEDS in trawl gear	Action under consideration that could require the use of TEDs in trawl fisheries off the Northeast coast including the scallop trawl fishery	No Impact	No Impact	Positive	Potentially negative to potentially positive	
SUMMARY OF IMPACTS FROM PROTECTED RESOURCES ACTIONS		**No Impact**	**No Impact**	**Positive**	**Low Negative**	
Fishery Community Actions						
A15 - Stacking and Leasing of LA Permits	Reduce excess capacity in the LA fleet by allowing vessels to stack and lease permits.	Neutral to positive	Neutral to positive	Neutral to Positive	Potentially positive or negative	
A15 - Implementation of Community Fishing Associations (CFAs)	Allow non-profit organizations to hold quota on behalf of represented communities and allow fishermen to lease and fish the quota.	No Impact	No Impact	No Impact	Positive for vessels in CFAs	
SUMMARY OF IMPACTS OF ALL FUTURE ACTIONS ON EACH VEC		**Potentially Positive**	**Neutral/ Potentially Positive**	**Neutral/ Potentially Positive**	**Neutral**	

5.6.5 Non-fishing impacts

The impacts of the following non-fishing activities are discussed in relation to scallop EFH in Section 4.2 of this document. Although they are presented in relation to the physical environment and EFH, the non-fishing impacts relate to all VECs identified in this amendment and are considered in this analysis (Table 124). Other non-fishing impacts that are important for consideration are also discussed below. The non-fishing impacts discussed in this section include:

- Vessel operations and marine transportation;
- Dredge and fill activities;
- Pollution/water quality;
- Agricultural and silvicultural/timber harvest runoff;
- Pesticide application;
- Water intake structures/discharge plumes;
- Loss of coastal wetland;
- Road building and maintenance;
- Flood control/shoreline stabilization;
- Utility lines/cables/pipeline installation;
- Oil and gas exploration/development/production;
- Introduction of exotic species;
- Aquaculture operations;
- Marine mining; and
- Other potential sources.

Low and mid-frequency sonar may pose an additional threat to protected species. According to the June 2006 National Marine Fisheries Service's Biological Opinion (BO), issued under Section 7(a)(2) of the Endangered Species Act, regarding the effects of the U.S. Navy's proposed 2006 Rim of the Pacific Naval Exercise and the Permits, Education and Conservation Division's proposal to issue an incidental harassment authorization (IHA) for exercises associated with endangered and threatened species, acoustic systems are becoming increasingly implicated in marine mammal strandings. Citing the Joint Interim Report on the Bahamas Marine Mammal Stranding Event of 15–16 March 2000, DOC and the Department of the Navy (DON), 2001, the document discusses that mass strandings in particular have been linked to mid-frequency sonar.

Summarizing various theories associated with the impacts of low and mid-frequency sonar, the BO states that marine mammals become disoriented or that the sound forces them to surface too quickly, which may cause symptoms similar to decompression sickness, or that they are physically injured by the sound pressure. The biological mechanisms for effects that lead to strandings must be determined through scientific research, according to the NMFS document, which also provides an extensive overview of the issue. The Biological Opinion, the IHA permit issued on July 2006 and other related documents are available through NMFS at http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications.

More recent information on the impacts of low and mid-frequency sonar is provided in a request from the U.S. Navy for an authorization under the Marine Mammal Protection Act (MMPA) to take marine mammals by harassment, incidental to conducting operations of Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active (LFA) sonar over a five-year period (72 FR 37404, July 9, 2007).

Federal legislation being debated in Congress could override a lawsuit settlement agreement and exempt the military from the “harassment” provisions of the MMPA, easing the restrictions that now limit the deployment of low frequency sonar by the U.S. Navy.

The **National Offshore Aquaculture Act** is proposed to provide the necessary authority to the Secretary of Commerce to establish and implement a regulatory system for aquaculture in Federal waters. The bill would: authorize the Secretary to issue offshore aquaculture permits and establish environmental requirements where existing requirements under current law are inadequate; exempt permitted offshore aquaculture from legal definitions of fishing that restrict size, season, and harvest methods; authorize the establishment of a research and development program in support of offshore aquaculture; require the Secretary to work with other Federal agencies to develop and implement a streamlined and coordinated permitting process for aquaculture in the EEZ; authorize to be appropriated “such sums as may be necessary” to carry out this Act; and provide enforcement for the Act.

In addition, one way the United States plans to meet its present and future energy demands is through the importation of **Liquefied Natural Gas (LNG).** Currently, the United States has four onshore LNG import terminals in coastal port areas: Everett, Massachusetts, Cove Point, Maryland, Elba Island, Georgia, and Lake Charles, Louisiana. These four existing import terminals have been around since the 1970s. There is an additional onshore import facility located in Penuelas, Puerto Rico. This facility began importing liquefied natural gas in August 2000.

Due to potential hazards associated with onshore LNG terminals, many state and local governments have opposed the construction of any new onshore LNG terminals. For example, there have been numerous proposals for onshore LNG terminals along the coast of Maine. Most of these proposals (Harpswell, Hope Island, Cousins Island, Sears Island, and Pleasant Point) have either been rejected by local voters or withdrawn. Most opponents to onshore LNG terminals maintain that LNG is unsafe, harms the environment, and disrupts commercial fishing. Companies, like ChevronTexaco and Shell, are now moving towards developing LNG terminals offshore on the outer continental shelf.

In April 2005, Gulf Gateway Energy Bridge (formerly known as El Paso Energy Bridge) became the world’s first offshore LNG terminal to begin operation. Gulf Gateway is located 116 miles offshore of the Louisiana coastline. To date, including Gulf Gateway, there are three offshore LNG projects that have been approved. These three LNG terminals are all located in the Gulf of Mexico. Port Pelican’s (ChevronTexaco) proposed site is located thirty-six miles off the

Louisiana coastline, while Gulf Landing's (Shell) is located thirty-eight miles offshore of Louisiana.

Nationally, seven proposed offshore LNG terminals are currently under review, including a potential terminal to be built offshore of Gloucester, Massachusetts. The other projects under review include: Cabrillo Port (fourteen miles offshore of Ventura County, California), Clearwater Port (fourteen miles offshore of southern California), Main Pass Energy Hub (offshore of Alabama, Louisiana, and Mississippi), Compass Port (offshore of Alabama and Mississippi), Pearl Crossing (forty-one miles offshore of Louisiana), and Beacon Port (offshore of Louisiana). The application for the proposed offshore LNG terminal off the coast of Gloucester (Gateway and Neptune projects) have been approved.

The two primary effects on the commercial and recreational fishing industries from offshore LNG terminals are the indirect impacts of displaced fishing effort and the potential for adverse impacts on fish stocks resulting from adverse impacts on EFH due to the vaporization process, where LNG is converted from a liquid to gaseous state. The degree to which the scallop fishery in particular may be impacted can not be fully understood until an LNG terminal has completed the sitting process. However, a recent EIS filed by the U.S. Coast Guard and the Maritime Administration on the Main Pass Energy Hub plan indicates that the "open-loop" vaporization process, which pushes seawater through a radiator-type structure that warms and vaporizes the super-cooled LNG and discharges that water back into the sea, would affect fish eggs and larvae as well as other zooplankton and phytoplankton. The resulting impacts are limited to the water discharge plumes, and while no firm data on the size of such plumes have been provided, the report states that the effects will not be serious or long lasting. The report concludes that none of the potential impacts on EFH would be expected to result in population-level impacts or a reduction in biomass for any stocks.

According to preliminary documents filed with the U.S. Coast Guard and the Federal Energy Regulatory Commission, displacement of fishing effort would be limited to a less than one nautical mile radius circle that would be closed to all fishing and recreational activities during the offloading of LNG. Additionally, a security zone of less than one quarter of a nautical mile would be maintained around the LNG tankers as they transit to and from the offload facility. While these closures may displace a limited amount of fishing effort, the total amount of fishable bottom impacted is expected to be minimal, and the effort displaced would not likely have an adverse impact on neighboring, or any other, fishing areas.

Onshore LNG facilities are currently being proposed or planned for construction in Pleasant Point, ME; Somerset, MA; Providence, RI; Long Island Sound, NY; Logan Township, NJ; Philadelphia, PA; and an expansion of an existing facility in Cove Point, MD.

Depending on the specific location and type of LNG facility, a range of impacts to fisheries and/or fisheries habitat may result from both construction and operation of terminals. Due to the large size of LNG tankers, dredging may need to occur to access onshore terminals. Dredging can result in direct loss of fish and/or shellfish habitat and can elevate levels of suspended sediment within the water column. As with other dredging, suspended sediments can impact various life stages of fish and shellfish. Further, the construction of pipelines and fill associated with site construction can have adverse impacts on inter-tidal habitats and salt marshes in the area.

Although only two **offshore wind energy projects** have formally been proposed in the northeast region, at least 20 other separate projects may be proposed in the near future. Cape Wind Associates (CWA) proposes to construct a wind farm on Horseshoe Shoal, located between Cape Cod and Nantucket in Nantucket Sound, Massachusetts. A second project is proposed by the Long Island Power Authority (LIPA) off of Long Island, New York. The CWA project would have 130 wind turbines located as close as 4.1 miles offshore of Cape Cod in an area of approximately 24 square miles, with the turbines being placed at a minimum of 1/3 mile apart. The turbines will be interconnected by cables, which will relay the energy to shore to the power grid. If approved, vessels from southern New England may experience an increase in costs associated with having to steam around the wind farms on their way to and from fishing grounds on Georges Bank.

The Army Corps of Engineers has developed a DEIS and has completed a scoping process for the proposed Cape Wind Associates (CWA) project on Horseshoe Shoal. If constructed, the turbines would preempt other bottom uses in an area similar to oil and natural gas leases. The potential impacts associated with the CWA offshore wind energy project include the construction, operation and removal of turbine platforms and transmission cables; thermal and vibration impacts; and changes to species assemblages within the area from the introduction of vertical structures. A thorough analysis of the effects of these impacts on fishing has not yet been conducted, but data indicate that there would not be a substantial impact on the scallop fishery as there is little scallop fishing activity in this area. While EFH may be adversely impacted in the vicinity of the wind turbines, the extent of this proposal is not sufficient to have any population-level impacts on resource biomass or health.

Non-fishing activities pose a risk to EFH for all species as well as to each scallop life stage's EFH. Many of the non-fishing impacts are unquantifiable, but are likely negative. In general, the greatest potential for adverse impacts to scallops and scallop EFH occurs in close proximity to the coast where human-induced disturbances, like pollution and dredging activities, are occurring. Because inshore and coastal areas support essential egg, larval and juvenile scallop habitats, it is likely that the potential threats to inshore and coastal habitats are of greater importance to the species than threats to offshore habitats. It is also likely that these inshore activities will continue to grow in importance in the future. Activities of concern include: chemical threats; sewage; changes in water temperature, salinity and dissolved oxygen; suspended sediment and activities that involve dredging and the disposal of dredged material.

Impacts of non-fishing activities on all the VECs that were considered in this EIS were evaluated to be low to moderately negative.

Table 124 – Summary of effects from non-fishing activities

Action	Description	Impacts on Scallops	Impacts on Physical Env and EFH	Impacts on Protected Species	Impacts on Fishery and Communities
P, Pr, RFFA Vessel operations, marine transportation	Expansion of port facilities, vessel operations and recreational marinas	**No Impact at Site**	**Potentially Negative Inshore** – may lead to destruction of habitat	**Negative at Site** – inshore species impacted by reduced water quality and haul out activity	**Potentially Negative** if loss of fishing opportunities occur
P, Pr, RFFA Beach nourishment, dredge and fill activities	Offshore mining of sand for beaches Placement of sand to nourish beach shorelines	**Negative at Site** – entrainment, sedimentation and turbidity impacts to fish in area in and around borrow site **Negative at Site** – may displace fish, remove benthic prey and increase mortality of early life stages	**Negative at Site** – may lead to destruction of habitat in and around borrow site **Negative at Site** – may result in burial of structures that serve as foraging or shelter sites	**Negative at Site** – mining activity increases noise and reduces water quality **Negative at Site** – turtles susceptible to impacts from beach nourishment	**Negative at Site** – potential loss of fishing opportunities **Positive at Site** – restoration of an eroding shore may protect or restore recreational beaches
P, Pr, RFFA Pollution/water quality	Land runoff, precipitation, atmospheric deposition, seepage, or hydrologic modification Point-source discharges	**Negative at Site** – impacts primarily inshore	**Negative at Site** – impacts primarily inshore, leads to destruction of habitat and EFH	**Negative at Site** – inshore species impacted by impaired biological food chain and poor water quality due to nutrient loading	**Negative at Site** – potential loss of fishing opportunities, human health issues
P, Pr, RFFA Agriculture and timber harvest runoff	Nutrients applied to agriculture land are introduced into aquatic systems	**Negative at Site** – impacts primarily inshore	**Negative at Site** – impacts primarily inshore, leads to destruction of habitat	**Negative at Site** – inshore species impacted by impaired biological food chain and poor water quality due to nutrient loading	**Negative at Site** – potential loss of fishing opportunities
P, Pr, RFFA Pesticide application	Substances that are designed to repel, kill, or regulate the growth of undesirable biological organisms	**Negative at Site** – impacts primarily inshore	**Negative at Site** – impacts primarily inshore, leads to destruction of habitat and EFH	**Negative at Site** – inshore species impacted by impaired biological food chain and poor water quality due to nutrient loading	**Negative at Site** – potential loss of fishing opportunities, human health issues
P, Pr, RFFA Water intake structures/ discharge plumes	Withdrawal of estuarine and marine waters by water intake structures	**No Impact**	**Potentially Low Negative at Site** - discharge plumes may affect local oceanographic conditions	**Negative at Site** – intake structures can entrap protected species	**No Impact**

Action	Description	Impacts on Scallops	Impacts on Physical Env and EFH	Impacts on Protected Species	Impacts on Fishery and Communities
P, Pr, RFFA Loss of coastal wetland	Urban growth and development Development activities within watersheds and in coastal marine areas	**Potentially Low Negative at Site** – may result in habitat degradation	**Potentially Low Negative at Site** – may result in habitat degradation	**Negative at Site** – results in habitat loss for fish species that represent prey items and may result on habitat degradation potentially affecting nesting sites	**Potentially Low Negative at Site** – may result in biomass declines if spawning, health, or mortality are affected
P, Pr, RFFA Road building and maintenance	Paved and dirt roads Poorly surfaced roads can substantially increase surface erosion	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data
P, Pr, RFFA Flood control/ shoreline stabilization	Protection of riverine and estuarine communities from flooding events Dikes, levees, ditches, or other water controls	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data
P, Pr, RFFA Utility lines/cables/ pipeline installation	Dredging of wetlands, coastal, port and harbor areas for port maintenance	**Negative at Site** – impacts primarily inshore	**Negative at Site** – impacts primarily inshore, leads to destruction of habitat	**Negative at Site** – dredging activity increases noise and may lead to mortality or injury of protected species	**Negative** – potential loss of fishing opportunities
P, Pr, RFFA Oil and gas exploration/ development	General exploration and development, as well as hydrocarbon spills associated with the transportation, loading and offloading of oil and gas products	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data
P, Pr, RFFA Exotic Species	Introduction of non-indigenous and reared species	**Potentially Negative**- while no direct evidence exists, it is likely that invasive species may affect overall ecosystem health and the biomass of marketable species	**Potentially Negative**- exotic species (ex., tunicates) found to adversely impact EFH and displace marketable and forage species	**Potentially Negative**– ecosystem effects of non-native species	**Potentially Negative**- while no direct evidence exists, it is likely that invasive species may affect overall ecosystem health and the biomass of marketable species
P, Pr, RFFA Marine Mining	Offshore mining as well the mining of gravel from beaches	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data	**Potentially negative –** no data
P, Pr, RFFA Low and mid-Frequency Sonar	Used in military exercises; considered a potential source of serious injury and mortality	**Potentially negative** – may negatively impact species in immediate vicinity of exercises using sonar	**No impact**	**Potentially Negative**- literature documents cetacean mortalities in vicinity of exercises using sonar	**Potentially negative** – potential loss of fishing opportunities, but exercises related to national security

RFFA National Offshore Aquaculture Act of 2005 (currently proposed)	Legislation would grant DOC authority to issue permits for offshore aquaculture in federal waters	**Potentially negative**- may negatively impact species by reducing water quality near aquaculture sites	**Potentially negative**- may negatively impact habitat by reducing water quality near aquaculture sites	**Potentially negative** - may be negative if activities result in interactions with protected species	**Potentially neutral** -may be positive for communities near sites; negative if prices of commercially harvested fish are impacted
RFFA Liquefied Natural Gas (LNG) terminals - several LNG terminals are proposed, including RI, NY, NJ and DE (w/in 5 years)	Transportation of natural gas via tanker to terminals located offshore and onshore	**Potentially Negative**– short-term disruption of habitat during construction could negatively impact organisms	**Negative** - habitat negatively impacted during construction phase and when vessels anchor to offload gas	**Negative** – may disrupt protected species during construction through increased noise and poor water quality	**Negative** - security zones around LNG facilities restrict access to fishing areas Positive – location of LNG facilities offshore may protect or improve communities
RFFA Offshore Wind Energy Facilities - several facilities proposed from ME through NC, including off the coast of NY/NJ and VA (w/in 5 years)	Construction of wind turbines to harness electrical power	**Potentially Negative**– short-term disruption of habitat during construction could negatively impact organisms	**Negative** – habitat negatively impacted during construction phase	**Potentially Negative**– may disrupt protected species during construction through increased noise and poor water quality	**Negative** – if fishing activity is precluded in area where turbines are located Negative – aesthetic impacts **Positive** – renewable clean energy resource
SUMMARY OF IMPACTS OF NON-FISHING ACTIVITIES – Overall, impacts are variable but greatest on the physical environment and EFH, but found to be low to moderately adverse; lack of data precludes more in-depth analysis of impacts on other VECs		**Potentially Negative**	**Potentially Negative**	**Potentially negative**	**Potentially Negative**

5.6.6 Cumulative Effects Analysis

Below is a description of the expected cumulative effects of the measures under consideration for Framework 21. First is a summary paragraph related to the direct and indirect impacts on each VEC. This description is based on the information provided in Table 125, a summary of the direct and indirect impacts of the measures under consideration on each VEC (scallop resource, EFH, protected resource, fishery related businesses and communities and other fisheries). The proposed action is highlighted in that table in grey.

For each VEC, there is also a summary paragraph describing the cumulative effects of the measures under consideration in terms of how the past, present and reasonably foreseeable future actions impact each VEC, as well as non-fishing activities and direct/indirect impacts of Framework 21. This discussion for each VEC is based on information summarized in previous sections and tables on the past, present, and reasonably foreseeable future actions, non-fishing impacts, and direct and indirect impacts of Framework 21. Lastly, Section 5.6.6.1 is a summary of the cumulative effects of the proposed action only, in terms of the magnitude and extent of cumulative impacts on a VEC-by-VEC basis in combination with other actions (past, present, and reasonably foreseeable future actions) as well as the effects from non-fishing actions.

Scallop Resource

Summary of direct and indirect impacts on the scallop resource

In general, most alternatives under consideration have neutral to positive indirect/direct impacts on the scallop resource when compared to the No Action. Overall allocation alternatives under consideration for 2010 are lower than recent years because of a reduction in access area trips (from five to four) and overall fishing mortality needs to be reduced since preliminary results suggest it has been higher than projected in recent year. The two scenarios that do not close the Channel have higher LPUE and lower area swept in the near-term, which would positively affect the resource. Projected exploitable biomass is similar overall when comparing the various scenarios, but does vary by area. Biomass in open areas is lowest under alternatives that close the Channel and the No Action alternative. Compared to the No Action alternative, the proposed action (NCLF20) has higher LPUE averages for both open and access areas; thus, lower impacts for the higher yield. The No Action alternative could have a negative effect on the resource because *F* would be higher in the Elephant Trunk area than the biomass there can support, it also has the highest overall F rate projection. Establishing a new rotational area in the Channel would be beneficial to the resource there, but could have negative impacts on the resource outside of the closure as effort is shifted and increased elsewhere. In general the measures for general category vessels related to Framework 21 are expected to have positive to neutral impacts on the scallop resource.

The alternatives to comply with RPM for turtles could have a wide range of impacts on the resource depending on how fishing behavior changes in accordance with the measures. The alternatives with seasonal closures in Delmarva for September - October are potentially beneficial for the resource if effort shifts to months in which meat weights are higher, because reducing effort in the area during months of lower meat yields will reduce mortality. A reduction in possession limits in either Elephant Trunk or Delmarva would also be a positive impact on the resource because lower effort levels would presumably cause an increase in stock biomass.

The alternatives to improve the observer set-aside program would not have direct impacts on the scallop resource, but could potentially have indirect positive impacts from better monitoring coverage leading to better management.

Summary of cumulative effects on the scallop resource

Overall, the cumulative effects on the scallop resource are neutral to positive. In terms of past and present actions such as the Scallop FMP, Amendment 4, and Amendments 10 and 11, there have been positive effects on the scallop resource. Other past EFH actions and actions in other FMPs have had neutral or positive effects as well (Table 122). In terms of reasonably foreseeable future actions, Amendment 15 is expected to have positive impacts on the scallop resource. There are also several EFH, protected resources and other fishery-related actions that are expected to have either no impact or potentially positive impacts. Therefore, the overall effects of reasonably foreseeable future actions on the scallop resource are potentially positive (Table 123). In addition, the effects of non-fishing activities on the scallop resource are mostly potentially negative (See Table 124). Lastly, the direct and indirect effects of the measures under consideration in Framework 21 are expected to have positive to neutral impacts on the scallop resource (Table 125). Thus, when the direct and indirect effects of the alternatives are considered in combination with all other actions (*i.e.,* past, present, and reasonably foreseeable future actions), the cumulative effects on the scallop resource are likely to be neutral to positive.

Physical Environment / EFH

Summary of direct and indirect impacts on EFH

In general, most alternatives under consideration have neutral to positive impacts on EFH when compared to the No Action alternative. Although scallop dredges have been shown to be associated with adverse impacts to some types of bottom habitat (NEFMC 2003), relative to the No Action Alternative this action proposes to decrease current levels of fishing activity in the U.S. EEZ, resulting in a positive effect on the physical environment and EFH. Several measures contained in this action reduce fishing effort overall and target that reduced effort on highly productive scallop bottom, reducing area swept and adverse impacts to designated EFH. No measure contained in this Framework is likely to increase adverse impacts to areas designated EFH relative to the No Action alternative, and the net impact is likely to be neutral to marginally positive. The specific impacts on EFH from each of the proposed measures are described within Section 5.2.

The overall habitat impacts of all the measures combined in this proposed action have minimal net effects. Relative to the baseline habitat protections established under Amendment 10 to the Atlantic Sea Scallop FMP, those impacts are negligible, and relative to the No Action alternative, those impacts are marginally positive. Therefore, measures to further mitigate or minimize adverse effects on EFH are not necessary.

Summary of cumulative effects on EFH

Overall, the cumulative effects on the physical environment/EFH are neutral to positive. In terms of past and present actions such as the Scallop FMP, Amendment 4, and Amendments 10 and 11, there have been positive effects on EFH. Other past EFH actions and actions in other FMPs have had mostly positive effects as well (Table 122). In terms of reasonably foreseeable future actions, there are several EFH actions that may have potentially positive effects on EFH. In addition, there are several reasonably foreseeable future scallop and other fishery-related actions that are expected to have no impact on EFH. Therefore, the overall effects of reasonably foreseeable future actions on EFH are neutral to potentially positive (Table 123). In addition, the effects of non-fishing activities on EFH are negative (See Table 124). Lastly, the direct and indirect effects of the measures under consideration in Framework 21 are expected to have mostly neutral impacts on EFH (Table 203). Thus, when the direct and indirect effects of the alternatives are considered in combination with all other actions (*i.e.,* past, present, and reasonably foreseeable future actions), the cumulative effects on the physical environment/EFH are likely to be neutral to positive.

Protected Resources

Summary of direct and indirect impacts on protected resources

Most alternatives under consideration in Framework 21 have neutral or potentially positive direct impacts on threatened and endangered sea turtles when compared to No Action. The specifications for 2010 include considerably less DAS than what was allocated in Framework 19 for 2008 and 2009, so cumulative impacts for allocation scenarios are expected to be positive relative to recent years. Access trips generally result in overall effort reductions and at best could be positive relative to turtle interactions because of reduced area swept. Alternatives involving closure of an area in the Great South Channel could result in effort shifts to the Mid-Atlantic and greater area swept scenarios, which could impact turtles negatively. However after the Channel reopens in 2013 LPUE is higher and area swept is lower, so impacts on protected resources would be reduced then.

In terms of the set-asides for observers and research there are indirect beneficial impacts on protected resources if that set-aside is used to learn more about the interactions of the scallop fishery and protected resources. Numerous turtle-related research projects have been funded through the Scallop RSA program to date, and that topic is a high priority for future research proposals. In addition, much of the information known about when and where interactions have occurred are from data collected through the observer set-aside program. So both these programs are expected to have continued indirect benefits on protected resources.

If the yellowtail 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 5.4 DAS. If the area closes early those DAS could be used in open areas in the Mid-Atlantic, especially if southern vessels do not get a chance to use their trip in the NLCA. Those additional DAS could have negative impacts on protected resources if fished during the time of year when turtles are present, but the amount of additional effort is limited.

The seasonal closure in ETA that will rollover under this framework (September 1-October 31) is expected to have positive impacts on protected resources. Preliminary analyses suggest that effort in ETA from the September and October closure has shifted into adjacent months. Specifically, access area trips not taken in September and October were taken mostly in August, November and December. Vessels have not increased open area effort during Sept and Oct as a result of the seasonal closure. It is difficult to say whether increased fishing in August has different impacts on turtles compared to Sept and Oct since turtles can be present during all three months. But any effort shifted after October is expected to have beneficial impacts because turtle takes have not occurred in that area after October.

The specific impacts on protected resources from each of the proposed measures are described within Section 5.3.

Summary of cumulative effects on protected resources

Sea turtles, have been, are, and will continue to be, negatively impacted by a variety of past, present, and reasonably foreseeable future activities which may be affecting the recovery of the species. The extent to which this may be happening cannot be quantified at this time but is potentially negative. As noted above, however, the measures presented in this action are unlikely to alter the impacts that occur as a result of both fishing and non-fishing activities but may positively impact some currently negative effects by instituting a limited access management program. **Overall, the cumulative effects on protected resources are neutral to potentially positive**.

In terms of past and present actions, there have been positive to neutral effects on protected resources (Table 122). In terms of reasonably foreseeable future actions, there are several protected resource related actions that may have positive effects on protected resources. In addition, there are several reasonably foreseeable future scallop and other fishery-related actions that are expected to have potentially positive impacts on protected resources. The activities that are negatively impacting sea turtles will continue to be addressed through fishery management plans as well as by the agency to ensure sea turtles are protected. One of the goals of NMFS's Sea Turtle Strategy is to develop and implement plans to reduce takes of sea turtles in Atlantic Ocean and Gulf of Mexico fisheries. Implementation of these plans will have a net beneficial impact on sea turtle species. NMFS also intends to continue outreach efforts to educate fishermen regarding sea turtles. Future anticipated research will likely enhance knowledge concerning the nature of the interactions between sea turtles and sea scallop dredge gear, potentially leading to the implementation of alternative management measures that may confer benefits to animals in areas where overlap with the fishery occurs. Therefore, the overall effects of reasonably foreseeable future actions on protected resources are neutral to potentially positive (Table 123). In addition, the effects of non-fishing activities on protected resources are potentially negative (See Table 124).

Lastly, the direct and indirect effects of the measures under consideration in Framework 21 are expected to have mostly potentially positive impacts on protected resources (Table 125). Thus, when the direct and indirect effects of the alternatives are considered in combination with other actions (*i.e.,* past, present, and reasonably foreseeable future actions), the cumulative effects on protected resource are likely to be neutral to potentially positive.

Fishery-Related Businesses and Communities

Most alternatives under consideration in Framework 21 have neutral or potentially positive impacts on fishery-related businesses and communities compared to No Action. The aggregate economic impacts of the proposed measures and other alternatives including access area allocations, proposed Great South Channel area closure, open area DAS allocations, general category measures, and RPM alternatives are analyzed in Section 5.4 relative to No Action. The combined impacts of the proposed area rotation and DAS measures are expected to be negative in the short term compared to 2009 and positive in the long-term on fishery related businesses and communities.

In the short-term (i.e. fishing year 2010), landings, revenues and economic benefits for the proposed action could fall short of landings and economic benefits for the 'No Action" alternative. Over the near-term from 2011 to 2016, landings, revenues, producer and consumer surpluses and total economic benefits for the proposed action (status quo F) are expected to exceed the "No Action" levels. The total economic benefits for the proposed action will be $41 million lower than no action benefits in 2010 (Table 110). However, the proposed action benefits exceed no action benefits by $15 million (at 7% discount rate) to $22 million (3% discount rate) in the near-term from 2010-2016 (Table 110 and Table 111).

Table 80 indicates that over the long-term (2010-2023) the cumulative landings with No Action will be 27 million pounds less than the landings expected with the proposed action, resulting in lower economic benefits over the long-term compared to the proposed measures. Over the long-term from 2010 to 2023, the proposed action will generate $80 million (at 7% discount rate) to $118 million (at 3% discount rate) more revenues than the no action alternative. The proposed action will result in the highest consumer benefits in the long-term (2010-2023) compared to no action and the other alternatives (Table 107 and Table 108). The producer benefits (surplus) will increase by $76 million to $111 million with the proposed measures compared to no action. The proposed action will have positive long-term economic impacts and will increase the present value of total economic benefits to the nation by $86 million (at 7% discount rate) to $125 million (at 3% discount rate) compared to no action benefits (Table 81).

The economic impacts of the DAS adjustments if the LAGC IFQ program is not implemented by March 1, 2010 would be positive for the general category limited access fishery since it could result in short-term geographic redistribution of landings to ports that are predominantly LAGC. The economic impacts on the limited access vessels will be negative, however, since the revenues of these vessels would be reduced by 5% due to the reductions in open area DAS if general category was allocated 10% of the scallop TAC. However a quarterly hard-TAC for the transition period to limited entry could bring about derby fishing and its attendant negative impacts, but the quarterly nature is intended to lessen those impacts. The NGOM hard-TAC would provide a marginal source of revenue for permitted vessels until the resource status can be determined, which would be positive for fishing communities in that area. The estimate of catch from LA incidental permits would have positive impacts on vessels that do not qualify for a LAGC permit because it would allow them to earn some income from scallops under the incidental permit and provide increased flexibility. Finally the alternative to allow leasing of partial general category IFQ allocations would increase flexibility and efficiency in the LAGC fleet and have positive impacts on related businesses and communities. Therefore, direct and indirect impacts of the proposed measures and alternatives are expected to be positive on fishery related businesses and their communities compared to No Action.

The economic impacts of the alternatives to comply with RPM on landings and revenues are provided in Section 5.3.1 of this document. The proposed action is a combination of the Delmarva closure in September and October with a limit on the maximum number of trips (at two per vessel) that can be taken in the Mid-Atlantic areas from June 15 to August 31. Because the effort is shifted to a relatively less productive season, total fleet trip costs are expected to increase slightly by $40,115, or by less than 0.2%. Since there is no change in the possession limit, the trips that are shifted from this season are expected to be taken outside of the turtle window, without a loss in total revenue as long as these measures do not have a significant impact on prices. The proposed measures will lead to a change in the seasonal composition of landings and therefore could lead to a change in prices. In general, the reduction in landings during the turtle window is expected to increase prices during the period from July 15 to October 31, but expected to reduce prices for months outside of the turtle window. The proposed action is expected to minimize the effort shift from the turtle window compared to the other alternatives considered by the Council, thus is not expected to have a significant impact on prices, revenues and total economic benefits.

Most of the other measures in this action will not change economic impacts for the scallop fishery, or are expected to have indirect economic benefits.

Summary of cumulative effects on fishery-related businesses and communities

Overall, the cumulative effects on the fishery-related businesses and communities are neutral to potentially positive. In terms of past and present actions such as the Scallop FMP, Amendment 4, and Amendment 10, there have been positive effects on the scallop fishing community. Other past EFH actions and actions in other FMPs have had neutral or low negative effects (Table 122). In terms of reasonably foreseeable future actions, there are several scallop related actions that are expected to have positive impacts overall. There are also several EFH, protected resources and other fishery-related actions that are expected to have potentially positive or low negative impacts on fishery-related businesses and communities. Therefore, the overall effects of reasonably foreseeable future actions on the fishery-related businesses and communities are neutral (Table 123). In addition, the effects of non-fishing activities on the fishery-related businesses and communities are mostly potentially negative (See Table 124). Lastly, the direct and indirect effects of the measures under consideration in Framework 21 are expected to have neutral to potentially positive impacts on the fishery-related businesses and communities overall (Table 203). Thus, when the direct and indirect effects of the alternatives are considered in combination with other actions (*i.e.,* past, present, and reasonably foreseeable future actions), the cumulative effects on fishery-related businesses and communities are likely to be neutral to potentially positive.

Table 125 – Cumulative effects of alternatives under consideration on the four Framework 21 VECs (proposed action is in bold)

Section	*Alternative Name*	*Scallop Resource*	*Phys. Env / EFH*	*Protected Resources*	*Fishery-related businesses and communities*
2.2.1	*No Action*	*Low negative*	*Neutral*	*Neutral to potentially low negative*	*Low negative*
2.2.2	*No Action if IFQ program is not fully implemented by March 1, 2010*	*No impact*	*No impact*	*Neutral*	*Low positive for LAGC fleet, low negative for LA fleet*
2.2.3	*Measures in effect March 1, 2010 until FW21*	*No impact*	*No impact*	*No impact*	*No impact*
2.4	*Framework allocation Scenarios*				
2.4	***NCLF20***	***Low positive in short-term***	***Low positive in short-term***	***Low positive***	***Negative in short-term (2010), positive in long-term***
2.4	*NCLF24*	*Low positive in short-term*	*Low positive in short-term*	*Low positive*	*Low negative in short-term (2010), low positive in long-term*
2.4	*CLF20*	*High negative*	*High negative*	*Low negative*	*Low positive in short-term, low positive in long-term*
2.4	*CLF18*	*Low negative in short-term*	*Low negative in short-term*	*Low negative*	*Low positive in short-term, positive in long-term*
2.5.1.1	*Adjustments when YTF catch reaches 10% TAC limit*	*Potentially negative*	*Potentially negative*	*Potentially negative*	*No impact*
2.5.1.4	*DAS adjustments if the LAGC IFQ program is not implemented by March 1, 2010*	*No impact*	*No impact*	*No impact*	*Positive for LAGC fleet, negative for the limited access fleet*
2.6	*Measures for General Category Vessels*				

2.6.1	*Measures if IFQ program is delayed*	*No impact*	*No impact*	*Neutral*	*Positive for LAGC fleet in short-term*
2.6.1.1	*Quarterly hard-TAC for transition period to limited entry*	*No impact*	*No impact*	*Potentially low positive*	*Potentially low positive compared to annual TAC*
2.6.2.1	*Yellowtail flounder bycatch TAC*	*Low positive*	*Low positive*	*Potentially negative*	*Positive*
2.6.4	*NGOM hard-TAC*	*Neutral*	*Neutral*	*No Impact*	*Low positive*
2.6.5	*Estimate of catch from LA incidental permits*	*No impact*	*No impact*	*No impact*	*Low positive*
2.6.6	***Allow leasing of partial general category IFQ allocations during the fishing year***	***No impact***	***No impact***	***No impact***	***Low positive***
2.7	*Consideration of new rotational area in the Great South Channel*				
2.7.1.1	***No Action***	***Potentially positive***	***Potentially positive***	***Neutral***	***Potentially positive***
2.7.1.2	*Close new rotational area in the Channel north of NLS and west of CAI*	*Potentially negative*	*Potentially negative*	*Potentially negative*	*Positive*
2.8	*Alternatives to comply with RPM*				
2.8.1.1	*Restrict number of OA DAS an individual can use in the Mid-Atlantic during a certain window of time*	*Potentially negative to potentially positive*	*Potentially negative to potentially positive*	*Positive*	*Low negative, especially to small vessels homeported in the Mid-Atlantic*
2.8.1.2	*Restrict number of AA trips in the Mid-Atlantic that can be used during a certain window of time*	*Potentially negative to potentially positive*	*Potentially negative to potentially positive*	*Positive*	*Low negative*
2.8.1.3	*Consider a seasonal closure for Delmarva*	*Potentially positive*	*Potentially low positive*	*Positive*	*Neutral to low positive if possession limit increased*

2.8.1.4	*Reduce possession limits in ETA and/or Delmarva to reduce fishing time*	*Positive*	*Positive*	*Positive*	*Negative*
2.8.1.5.1	*Combined RPM 1: Reduced possession limit on any access area trip in ETA and/or Delmarva and seasonal closure of Delmarva*	Potentially positive to potentially negative	Potentially low positive	Positive	*Neutral to Low Negative*
2.8.1.5.2	*Combined RPM 2: Limit number of ETA trips with a reduced possession limit and seasonal closure in Delmarva*	Potentially positive to potentially negative	Potentially low positive	Positive	*Neutral to Low Negative*
2.8.1.5.3	***Combined RPM 3: Limit the number of MA access area trips that can be taken during turtle window and seasonal closure in Delmarva.***	Potentially positive to potentially negative	Potentially low positive	Positive	*Neutral to Low Negative*
2.9	*Improvements to the observer set-aside program*				
2.9.1.1	*No action*	*No impact*	*No impact*	*No impact*	*No impact*
2.9.1.2	*Provisions to discourage vessel owners from not paying for deployed observers*	*Potentially low positive*	*Potentially low positive*	*Potentially low positive*	*Potentially low positive*
2.9.2	***Limit the amount of observer compensation general category vessels can get per observed trip in access areas***	***Potentially low positive***	***Potentially low positive***	***Potentially low positive***	***Potentially low positive***

5.6.6.1 Summary of Cumulative Effects of the proposed action

To determine the magnitude and extent of cumulative impacts of the proposed action, the incremental impacts of the direct and indirect impacts should be considered, on a VEC-by-VEC basis, in addition to the effects of all actions (those effects identified and discussed relative to the past, present, and reasonably foreseeable future actions of both fishing and non-fishing actions). In general, while the management measures proposed result in cumulative impacts in some cases, none of the impacts discussed indicate a potentially significant impact. Section 5.6.6 above summarizes the expected cumulative effects of the measures that were considered in this amendment; this section focuses on the proposed action.

Overall, the cumulative effects of the proposed action are neutral to low positive. Table 126 summarizes the cumulative effects of the proposed action relative to the past, present, and reasonably foreseeable future fishing and non-fishing actions for each of the VECs considered. In general, the impacts of the past, present, and reasonably foreseeable future actions on all of the VECs identified in this action are positive to neutral. There are several future actions that may have potential low negative or positive impacts, but overall the expected impacts are neutral. Furthermore, there are potentially negative impacts of non-fishing activities in this region on the various VECs identified. As for the direct and indirect impacts of the proposed action on each VEC, the overall impacts are expected to be positive to neutral.

Table 126 – Summary of cumulative effects of the proposed action

	Scallop Resource	**Physical Habitat/EFH**	**Protected Resources**	**Fishery-Related Businesses and Communities**	**Summary of all VECs**
Direct/Indirect Impacts of Proposed Action	Neutral to positive	Neutral	Neutral or potentially positive	Neutral or Positive	Neutral to positive
Past and Present Fishing Actions Impacts	Neutral to positive	Positive	Neutral to positive	Low negative to positive	Neutral to positive
Reasonably Foreseeable Future Fishing Actions Impacts	Neutral to potentially positive	Neutral to potentially positive	Neutral to potentially positive	Low negative to positive	Low negative to potentially positive
Non-Fishing Actions Impacts	Potentially negative	Potentially negative	Potentially negative	Potentially negative	Potentially negative
Cumulative Effects	Neutral to positive	Neutral to positive	Neutral to potentially positive	Neutral (some low negative and some positive)	Neutral to low positive

6.0 COMPLIANCE WITH APPLICABLE LAW

6.1 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

6.1.1 National standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act requires that fishery management plans (FMPs) contain conservation and management measures that are consistent with the ten National Standards:

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

All four FW21 scenarios were developed by the PDT to meet the goals of the FMP to prevent overfishing. In the past fishery specifications have been set at 80% of overfishing threshold (F=0.29). However, the PDT is authorized to recommend precautionary measures to prevent overfishing and ensure that optimum yield is achieved on a continuing basis. For example, in Framework 19 (specifications for 2008 and 2009) the PDT and Council also recommended a lower fishing mortality target of 0.20 to prevent localized overfishing in open areas and to account for other constraining issues on the fishery that lower optimum yield such as concerns about finfish bycatch.

In this action the Council learned that preliminary results for updated estimates of fishing mortality for 2008 and 2009 is at or just above the overfishing threshold of F=0.29, despite the fact Ftarget was set at 0.20 for those years. While these results are preliminary until the assessment is conducted this summer, the Council expressed concern that even with a target of 0.20 it appears overall fishing mortality was closer to 0.28 for 2008 and 0.30 for 2009. If F is higher than the threshold, overfishing is occurring. Thus, the Council determined that an overall reduction in fishing mortality is necessary in 2010 to ensure that overfishing is ended, if final analyses ultimately determine that overfishing was occurring in 2009. It was recognized that this target is conservative and may need to be revisited in the future, but currently there is concern that overfishing may be occurring based on preliminary results from 2009.

Since FW19 the PDT has improved the assumptions and models used to set Ftargets primarily based on adjustments made to how fishing mortality is estimated from open area DAS. Modifications have been made based on work the PDT did for developing alternatives in Amendment 15 to comply with new annual catch limit (ACL) requirements. Therefore, it is likely that projected targets now will be closer to realized landings and fishing mortality compared to projections used in previous frameworks. However, the Council was not comfortable supporting a higher F rate until these revised methods could be fully vetted through the assessment process this summer and other changes approved through the full amendment process within Amendment 15.

Setting the target fishing mortality rate at 0.20 is in recognition that fishing mortality is not uniformly distributed in the scallop fishery, but is prone to localized overfishing. Higher targets may be more justified in the future if the overfishing definition is modified so that it can be more spatially based. Furthermore, the analyses within this document support that in the longer term the proposed action will provide more yield and associated benefits.

(2) Conservation and management measures shall be based upon the best scientific information available.

This document uses information of known quality from sources acceptable to the relevant scientific and technical communities. Several sources of data were used in the development of this document. These data sources include, but are not limited to: permit data, landings data from vessel trip reports, data from the dealer weighout purchase reports, scallop survey data, and data from at-sea observers. Although there are some limitations to the data used in the analysis, these data are considered to be the best available.

In addition, the biological projections are based on the CASA model that is expected to generate more accurate results using a wide variety of data sources. The CASA model was reviewed approved for management use in the 2007 scallop assessment. Lastly, the Council's SSC reviewed and approved the Acceptable Biological Catch (ABC) for this fishery for 2010 based on updated analyses of biological uncertainty in the parameters used to assess the scallop resource. This is considered the best available science to set MSY in order to prevent overfishing.

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Under the Atlantic Sea Scallop FMP, the target fishing mortality rate and stock biomass are applied to the scallop resource from NC to the US/Canada boundary. This encompasses the entire range of scallop stocks under Federal jurisdiction. See Section 4.1 for a description of the scallop resource.

(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The management measures proposed in this action do not discriminate between residents of different States. This action includes allocation measures, but they do not discriminate between vessels from various states. Limited access vessels are relatively mobile and are expected to fish in various access areas. Limited access vessels are permitted to trade access area trips with other vessels; therefore, if an area is far from their homeport and they do not want to fish in that area, they can trade for a trip closer to their homeport. In 2010 there are access areas in the Mid-Atlantic and Georges Bank. General category vessels are not allocated individual access into access areas; it is a fleetwide allocation of trips for that fishery. Thus, general category vessels can decide to participate in an access area program or not. Therefore, if a vessel is relatively small and cannot fish far offshore or travel great distances to fish in an access area, that vessel can fish in open areas.

Some of the RPM alternatives had the potential to have higher distributional impacts on some vessels homeported from southern states and that is one of the primary reasons the Council did not select those measures as part of the proposed action. Instead the RPM measures were modified so that distributional impacts would be minimized.

(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

The Proposed Action should promote efficiency in the utilization of fishery resources by allocating effort in areas with higher catch rates. For example, catch per unit of effort is expected to be higher in access areas; therefore, since more effort is allocated in these areas then open areas under the proposed action, then vessels will spend less time, money and fuel on access area trips. In general, area rotation intends to maximize yield and reduce fishing impacts by allocating effort in areas with higher concentrations of scallops.

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The Proposed Action takes into account variations among and contingencies in fisheries, fishery resources, and catches. This action enhances the ability of the FMP to adapt to changing resource conditions. The access program is expected to allow the FMP to reduce fishing effort in open areas, increasing the scallop biomass in open areas, and potentially allowing the FMP greater flexibility to achieve optimum yield through rotational area management in the future. It was noted at the final Council meeting that while it would be desirable for the industry to maintain consistent landings from year to year, this is difficult due to the high variability in scallop recruitment. Variations in annual catch and allocations need to be expected under area rotation, a system that is designed to optimize yield from variable recruitment patterns by area and year.

Specifically, in 2000-2004 there was very high recruitment observed during 1998-2001 on Georges Bank and during 1998-2004 in the Mid-Atlantic, and that has provided increased catch and revenue for the fishery in recent years. However, in the middle of this decade recruitment has been average in the 23Mid-Atlantic and low on Georges Bank. As the large year classes ave been fished down, they have not been fully replaces by the more limited mid-decadal year classes. Recruitment on Georges Bank has increased recently, but these scallops will still be small in 2010, so that yield per recruit would be optimized if harvesting would be delayed to 2011 and beyond, rather than in 2010.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The Council considered the costs and benefits associated with the Proposed Action when developing this action. The proposed action does not introduce any new measures that duplicate measures already in place. Area rotation and DAS controls were implemented in 1994; the full area rotation program was implemented in June 2004. Both these types of measures are necessary components of the FMP to achieve the annual mortality targets and prevent the stock from becoming overfished. The increase in the average size of scallops landed, a primary objective of both the FMP and the proposed action, continues to be a major factor that minimizes harvesting costs. The management measures proposed in this amendment are not duplicative and were developed in close coordination with NMFS and the Mid-Atlantic Fishery Management Council.

(8) *Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.*

In the Amendment 10 FSEIS, the characteristics and participation of fishing communities involved in the scallop fishery were discussed in Section 7.1.1.3, and the impacts of rotation area management were discussed in Section 8.8. This document includes an update of fishery and community information in Section 4.4. The economic and social impacts, which affect fishing communities, are analyzed and discussed in Sections 5.4 and 5.5. The proposed action will not change these impacts anticipated under Amendment 10, except that fishing communities near the proposed access areas will benefit from higher landings and economic activity, while fishing communities distant from these areas are likely to experience some adverse social impacts.

The proposed action, however, is not expected to jeopardize the sustained participation of fishing communities that have depended on the scallop resource. The area rotation and DAS adjustments are expected to continue to ensure a healthy resource that will be able to support historical levels of participation by fishing communities.

In the short-term (i.e. fishing year 2010), landings, revenues and economic benefits for the proposed action could fall short of landings and economic benefits for the 'No Action" alternative. As a result, revenues, producer and consumer surpluses, and total economic benefits for the proposed action will be lower than the levels for other alternatives in the short-term (2010)(Table 81 to Table 85), but will exceed the levels for other alternatives in the long-term with the exception of the new closure alternative with low *F* (CLF18). The proposed action will have positive long-term economic impacts and will increase the present value of total economic benefits to the nation by $86 million (at 7% discount rate) to $125 million (at 3% discount rate) compared to No Action.

(9) *Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.*

Bycatch in the scallop fishery has been greatly reduced and minimized by the success of the FMP to increase scallop biomass and reduce the amount of time fished on a DAS. The FMP has also implemented several gear restrictions that have successfully reduced bycatch. These effects are discussed in detail in Section 6.1.9 of the Amendment 10 FSEIS, and in related sections of that document.

Because the proposed action includes access to areas that are otherwise closed to achieve groundfish conservation, the proposed action in this framework adjustment includes several measures to minimize bycatch and to ensure groundfish mortality does not increase to a point that it would threaten the rebuilding prognosis for overfished groundfish. These measures include a precautionary TAC for yellowtail flounder (a species vulnerable to capture by scallop dredges), seasons for access (to avoid peak groundfish spawning months), and enhanced sea sampling made possible from the industry-funded observer program (to monitor and assess bycatch). In addition, the proposed action will continue the regulations to use a minimum 4-inch ring in scallop dredges and a 10-inch minimum twine top. The Amendment 10 analysis showed that both these measures would reduce finfish bycatch by reducing fishing time and allowing greater escapement of small finfish. Lastly, an amendment to the Scallop FMP was implemented recently that will bring the FMP in compliance with SBRM requirements related to sampling discards.

A summary of the impacts of these measures are analyzed and described in Section 5.6. Skate bycatch is also analyzed and discussed in the skate baseline review (Section 6.1.3). Bycatch of protected species is analyzed in Section 5.3. Overall, the proposed action has lower impacts on bycatch of finfish and sea turtles because it allocated less effort than the No Action alternative as well as other options considered. Fewer DAS translates into less time gear is on the bottom potentially interacting with bycatch.

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Section 6.1.10 in the Amendment 10 FSEIS discusses the effect of current scallop management and of rotation area management on safety. This action does not propose any new measures that would change the findings in Amendment 10. Some of the measures related to reasonable and prudent measures (Section 2.8) are expected to potentially shift effort from the Mid-Atlantic and from the summer and fall to the spring and winter. Fishing is dangerous all times of the year, but some of the more restrictions alternatives would limit when vessels could fish in warmer months. The proposed action restricts the limited access fishery to 2 of the 3 access area trips between June15-October 31, so only one trip would need to be taken in the winter and spring. It should be noted that many vessels fish Mid-Atlantic access areas during the winter and spring as it is, so the proposed action is not expected to have large impacts on fishing behavior, thus safety at sea.

6.1.2 Other Required Provisions of the M-S Act

Section 303 of the Magnuson-Stevens Fishery Conservation and Management Act contains 14 additional required provisions for FMPs, which are discussed below. Any FMP prepared by any Council, or by the Secretary, with respect to any fishery, shall:

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the National Standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States

participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law;

Since the domestic scallop fishery is capable of catching and processing the allowable biological catch (ABC), there is no total allowable level of foreign fishing (TALFF) and foreign fishing on sea scallops is not permissible at this time.

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any;

The fishery and fishery participants are described in detail in Section 4.4 of Amendment 11 to the Scallop FMP. Section 4.4 in this document describes the scallop permits by category as well as the active scallop vessels by permit type that could be affected by this action. The number of trips and average scallops landed per category are also included in that section as well.

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

The present and probable future condition of the resource and estimates of MSY and OY are given in Section 8.2.2.2 of Amendment 10 to the Scallop FMP. The SSC reviewed the most recent work on assessing this resource and determined that acceptable biological catch be set at 29,578 mt (65.2 million pounds), including an estimated 3363 mt – 7.4 million pounds - for non-yield fishing mortality (discards and incidental mortality). Therefore, the overall ABC for the fishery, excluding discards and incidental mortality is 26,211 mt (57.8 million pounds). 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 (Section 2.3).

This level was recommended by the Science and Statistical Committee (SSC) and various sources of scientific uncertainty were considered when setting this value. ABC calculations were based on the assumption of uniform fishing, and in particular, that there were no EFH or rotational closures. This is consistent with the current FMP overfishing definition, which defines overfishing relative to a "whole stock" fishing mortality. Therefore, the ABC calculation gives what would be an appropriate catch if all areas were open. That is not the case in the plan since there are Groundfish mortality closed areas and EFH closed areas that are not accessible to the fishery, as well as scallop rotational areas that are only available to the fishery at certain times and effort is limited.

Current domestic landings and processing capabilities are around 50 million lbs. Total landings have been above that level in some years since 2004, and are expected to be closer to 56 million pounds for 2009. Landings under this action are expected to be less than 50 million pounds, (about 42 million pounds under the proposed action).

(4) assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3);

(B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing; and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

The US fishery is expected to harvest 100% of OY and domestic processors are expected to be able to process 100% of OY.

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, charter fishing, and fish processing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, economic information necessary to meet the requirement and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors;

The FMP and existing regulations specify the type of reports and information that scallop vessel owners and scallop dealers must submit to NMFS. These data include, but are not limited to, the weight of target species and incidental catch which is landed, characteristics about the vessel and gear in use, the number of crew aboard the vessel, when and where the vessel fished, and other pertinent information about a scallop fishing trip. Dealers must report the weight of species landed by the vessel, the date of landing, and the ex-vessel price for each species and/or size grade. Important information about vessel characteristics, ownership, and location of operation is also required on scallop permit applications. Dealers are also surveyed for information about their processing capabilities.

All limited access scallop vessels and general category vessels are required to operate vessel monitoring system (VMS) equipment to record the location of the vessel for monitoring compliance with DAS regulations. An at-sea observer is also placed on scallop vessels at random to record more detailed information about the catch, including size frequency data, the quantity of discards by species, detailed gear data, and interactions with protected species.

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery;

The action proposed in this amendment does not alter any adjustments made in the Scallop FMP that address opportunities for vessels that would otherwise be prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fisheries. No consultation with the Coast Guard is required relative to this issue.

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent

practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

Essential fish habitat was defined in earlier scallop actions. This amendment does not further address or modify those EFH definitions. There are no additional impacts to the physical environment or EFH expected from the action proposed in this amendment.

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

Data and research needs relative to the Atlantic sea scallop and its associated fisheries are described in Section 5.1.8 of Amendment 10. Other data, already collected include fishery dependent data described in Section 6.2.4 of Amendment 10 and fishery-independent resource surveys that provide an index of scallop abundance and biomass.

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on-- (A) participants in the fisheries and fishing communities affected by the plan or amendment; (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants; and (C) the safety of human life at sea, including weather and to what extend such measures may affect the safety of participants in the fishery;

The impacts of the scallop management program in general have been analyzed in previous scallop actions (Amendment 10, Amendment 11, Framework 16, Framework 18 and Framework 19). Any additional impacts from measures proposed in this action on fishery participants are summarized in Section 5.4. Safety in the scallop fishery was described in Section 8.1.5.6 of Amendment 10 and nothing proposed in this action will affect safety of human life at sea.

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

Overfishing reference points describing targets and thresholds for biomass and fishing mortality are presented and explained in Section 5.1.1 of Amendment 10. These reference points were slightly modified by Framework 19 (See Section 2.6 of FW19 for details). This action is designed to meet the fishing mortality target of 0.20, which is expected to prevent overfishing.

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the

extent practicable and in the following priority-- (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided;

This action does not include changes to the current SBRM. This methodology is expected to assess the amount and type of bycatch in the scallop fishery and help identify ways the fishery can minimize bycatch and mortality of bycatch which cannot be avoided. The scallop fishery also has an industry funded observer set-aside program that provides additional funding (portion of total scallop catch set-aside) to put observers on scallop vessels. A summary of the extent of observer coverage in this fishery can be found in Section 4.5.3.

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

This Proposed Action does not address recreational fishing regulations.

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery, including its economic impact, and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors;

A detailed description of the scallop fishery is included in Section 7.1 of Amendment 10, Section 4.4 in Amendment 11, and Section 4.4 of this action. These sections provide information relative to scallop vessels, processors, and dealers.

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate, taking into consideration the economic impact of the harvest restrictions or recovery benefits on the fishery participants in each sector, any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery and;.

This action does propose a reduction in total catch in the scallop fishery compared to recent years. However, over the long term the projected catch is above the average. The measures included in this action are expected to have long-term benefits for participating vessels, and the economic impacts on various sectors of the fishery have been considered. Section 5.4 is a detailed examination of the expected economic impacts of this action. Harvest from the Atlantic sea scallop fishery will continue to be reviewed, established, and analyzed through the biennial framework process. Recreational fishing for sea scallops is rare and does not affect the success of the FMP.

(15) 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.

The proposed action includes catch limits for certain sectors of the scallop fishery, as well as effort controls for the rest of the fishery that is not under a direct TAC or quota. This action covers 2010 only and will be followed by another action that will set specifications for the next two fishing years. Measures have been set at the fishing mortality target of F=0.20, so overfishing is not expected to occur.

The Council is currently developing an amendment to bring the Scallop FMP in compliance with new annual catch limits required under the reauthorized Magnuson-Stevens Act of 2007 (Amendment 15). The Scallop FMP is required to implement ACLs and accountability measures by 2011, and the Council is scheduled to make final decisions on that action in June 2010. In the meantime, this FMP is still required to have an ABC set by the SSC, and management measures are not allowed to exceed that ABC. The ABC for 2010 is 29,578 mt (65.2 million pounds), including an estimated 3363 mt – 7.4 million pounds - for non-yield fishing mortality (discards and incidental mortality). Therefore, the overall ABC for the fishery, excluding discards and incidental mortality is 26,211 mt (57.8 million pounds). Fishery allocations under the proposed action are set at F=0.20, and the annual catch associated with that fishing mortality level is projected to be 41.5 million pounds. One reason for a lower target is to recognize that the fishery is not uniform, and not all exploitable scallops that are part of the ABC estimate are accessible to the fishery; many are in closed areas.

6.1.3 Skate Baseline Review

The Skate FMP identified and characterized a baseline of management measures in other fisheries that provide additional conservation benefits to skate species. The FMP requires that if the Council initiates an action in another FMP that changes one or more of the baseline measures such that the change is likely to have an effect on the overall mortality for a species of skate in a formal rebuilding program, then a baseline review is required. It is important to point out that the skate baseline review is only required for skate species that are currently in a formal rebuilding program. Of the seven skate species managed under the Northeast Skate Complex FMP, only two species are in a formal rebuilding program: thorny and barndoor. Therefore, this baseline review will only evaluate the impacts of this framework action on the mortality rates of these two species.

A baseline review must be initiated if one of seven categories of management measures are changed which have been identified as beneficial for skates. The seven categories of management measures identified in the Skate FMP are: (i) NE Multispecies year-round closed areas; (ii) NE Multispecies DAS restrictions; (iii) Gillnet gear restrictions; (iv) Lobster restricted gear areas; (v) Gear restrictions for small mesh fisheries; (vi) Monkfish DAS restrictions for monkfish-only permit holders; and (vii) Scallop DAS restrictions (See Section 4.1.6 of the Skate FMP for more details).

The purpose of Framework Adjustment 21 is to set specifications and allocations for the 2010 fishing year, while making other management adjustments as necessary to achieve optimum yield. Framework 21 considered a host of measures, but only two technically trigger a skate baseline review. One measure includes the rotational access program on Georges Bank for 2010 fishing year. Since this program would allow limited access into portions of NE multispecies closed areas, a skate baseline review would normally be required. However, since this access program has already been approved under a previous scallop action (Framework 16/39 and Framework 18), the skate baseline review has already been conducted; therefore, no review is necessary based on this trigger. This action includes fewer trips on Georges Bank and does not include any modifications that would require further consideration for the skate baseline review.

This framework is considering a range of DAS allocation alternatives. Open area DAS allocations are estimated after the access area TACs are established in order to achieve the annual target mortality rate for the entire resource. If access area DAS increase, then open area DAS decrease, and vice versa. This framework considered a range of open area DAS from 29 to 52 pre full-time vessel in 2010. The proposed alternative projects that about 22,000 DAS will be used in all areas (open areas and access areas). DAS used in open areas will be much lower, fewer than 10,000 DAS expected (29 DAS multiplied by 340 full-time equivalent vessels).

The total estimate of 22,000 DAS under the proposed action is less than the baseline amount assessed in the Skate FMP of 34,000 DAS; therefore, the Skate PDT is not required to assess the potential impacts of Framework 21 in terms of the skate baseline review. There are other measures being implemented in this framework, but the impact of these measures on skate mortality is either non-existent or uncertain, and none of these measures fall within the list of seven categories of management measures that trigger a skate baseline review.

Table 127 – Summary of allocated open area DAS and DAS equivalent for access areas for Framework 19 scenarios

2010	# of access area trips	Individual open area DAS	Total Allocated Open Area DAS*	Projection of Total DAS used
No Action	4	42	14,280	28,715
Proposed	**4**	**29**	**9,860**	**22,053**

** Estimated by DAS allocation per full-time equivalent vessel (340 vessels)*

6.1.4 EFH Assessment

This essential fish habitat (EFH) assessment is provided pursuant to 50 CFR 600.920(e) of the EFH Final Rule to initiate EFH consultation with the National Marine Fisheries Service.

6.1.4.1 Description of Action

In general, the activity described by this proposed action, fishing for sea scallops, occurs throughout the U.S. EEZ, from about the NC/VA border to the coastal portions of the Gulf of Maine in the north. The concentrations of sea scallops, and thus the majority of scallop fishing activity, however, occur within a narrow depth band in the Mid-Atlantic from about the 40-meter isobath out to the 100-meter isobath, throughout the Hudson Canyon area, and around the perimeter of Georges Bank, including the Great South Channel. This range of activity encompasses designated EFH numerous species managed by both the New England and Mid-Atlantic Fishery Management Councils, as described in the Affected Environment section of this document. EFH designated for species managed under the Secretarial Highly Migratory Species FMPs are not affected by this action, nor is any EFH designated for species managed by the South Atlantic Council as all of the relevant species are pelagic and not directly affected by benthic habitat impacts.

Framework 21 recommends implementation of measures that set specifications for FY2010. Section 2.1 is a summary of the proposed action. The proposed action includes a specific Acceptable Biological Catch (ABC) level as required by the reauthorized Magnuson Act (2007) as well as fishery specifications for 2010 for both limited access and limited access general category vessels. Fishery allocations are based on an overall fishing mortality target of F=0.20 (Scenario NCLF20 – no new closure in the Channel and overall F of 0.20). Access areas available to the fishery this year include: Elephant Trunk, Delmarva, and Nantucket Lightship. This action considered closing a new access area in part of the Great South Channel, but that alternative was not selected as part of the final action.

After mortality from access areas is accounted for, the open area DAS allocations are set so that the overall fishing mortality equals 0.20 for the proposed action. Under this target the open area DAS allocations are less than 10,000 DAS for the fleet overall, equivalent to 29 DAS for full-time vessels, 12 DAS for part-time vessels and 3 DAS for occasional vessels. This actin includes a handful of other measures related to the observer program, compliance with turtle biological opinion, and other measures.

Table 128 lists the actions selected by the Council for implementation under Framework 21 to the Atlantic Sea Scallop FMP and their expected impacts on the physical environment and EFH.

Table 128 - Summary of Impacts to Physical Environment and EFH of Proposed Action

Measures	Physical Environment and EFH Impacts	Discussion
Allocation scenario	+	Overall, reduced open area DAS and number of access area trips as compared to status quo
Adjustments when yellowtail flounder catch reaches 10% TAC limit	-/0/+	Impacts are difficult to predict, given that shifts in fishing location upon implementation of this alternative are unknown
Compliance with reasonable and prudent measures in recent biological opinion	0	Some seasonal effort shift predicted from these measures but they are all confined to the same access areas so impacts on EFH neutral.
Northern Gulf of Maine (NGOM) TAC	0	Affects a very small proportion of overall scallop catch, and thus would have very minimal impacts on EFH, if any
Incidental catch estimation	0	Affects a very small proportion of overall scallop catch, and thus would have very minimal impacts on EFH, if any
TAC set asides for observers and research	0/+	Indirect positive benefits if research projects funded are related to EFH
Improvements to the observer set-aside program	0	Administrative
Other measures	0	Administrative

6.1.4.2 Potential adverse impacts on the action on EFH

Although scallop dredges have been shown to be associated with adverse impacts to some types of bottom habitat (NEFMC 2003), relative to the No Action Alternative this action does not propose to increase current levels of fishing activity in the U.S. EEZ. Several measures contained in this action reduce fishing effort overall and target that reduced effort on highly productive scallop bottom, reducing area swept and adverse impacts to designated EFH. No measure contained in this Framework is likely to increase adverse impacts to areas designated EFH relative to the No Action alternative, and the net impact is likely to be marginally positive.

6.1.4.3 Proposed measures to avoid, minimize, or mitigate adverse impacts of this action

The overall habitat impacts of all the measures combined in this action have minimal net effects. Relative to the baseline habitat protections established under Amendment 10 to the Atlantic Sea Scallop FMP, those impacts are negligible; relative to the No Action alternative, those impacts are marginally positive. Therefore, measures to further mitigate or minimize adverse effects on EFH are not necessary.

6.1.4.4 Conclusions

Section 5.7 (Cumulative Effects Analysis) demonstrates that the overall habitat impacts of all the measures combined in this action have marginally positive impacts on habitat relative to the No Action alternative. The action proposed under this amendment will have no more than a minimal adverse effect on EFH of federally managed species. Because there are no additional adverse impacts associated with this action, an abbreviated consultation may be the only required action.

6.2 NEPA

NEPA provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is designed to meet the requirements of both the M-S Act and NEPA. The Council on Environmental Quality (CEQ) has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508). All of those requirements are addressed in this document, as referenced below.

6.2.1 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b). They are included in this document as follows:

- The need for this action is described in Section 1.2;
- The alternatives that were considered are described in Section 3.0 (alternatives including the proposed action);
- The environmental impacts of the proposed action are described in section 5.0; and,
- The agencies and persons consulted on this action are listed in Section 6.2.3.

While not required for the preparation of an EA, this document includes the following additional sections that are based on requirements for an Environmental Impact Statement (EIS).

- An Executive Summary can be found on page iii;

- A table of contents can be found on page xv;
- Background and purpose are described in Section 1.0;
- A summary of the document can be found in the Executive Summary;
- A brief description of the affected environment is in Section 4.0;
- Cumulative impacts of the proposed action are described in Section 5.6;
- A determination of significance is in Section 6.2; and,
- A list of preparers is in Section 6.2.3.

6.2.2 Finding of No Significant Impact

National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. On July 22, 2005, NOAA published a Policy Directive with guidelines for the preparation of a Finding of No Significant Impact (FONSI). In addition, the Council on Environmental Quality (CEQ) regulations at 40 CFR 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a finding of significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria, the recent Policy Directive from NOAA, and CEQ's context and intensity criteria. These include:

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

Response: No, the proposed action is not reasonably expected to jeopardize the sustainability of the sea scallop resource. This action sets specifications for fishing year 2010 by modifying the rotational area management program implemented by Amendment 10. None of the modifications are expected to cause increases in fishing mortality that would jeopardize the sustainability of the scallop resource. The action is designed to be consistent with the mortality targets adopted in Amendment 10 and the overall target has been set at a level less than ABC taking into account sources of biological and management uncertainty.

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

Response: No, the proposed action is not reasonably expected to jeopardize the sustainability of any non-target species. A general description of the non-target species is summarized in Section 4.5, and a complete bycatch analysis of the scallop fishery was completed in Amendment 10. Section 5.5 summarizes the overall impacts of this action on non-target species. In general, this action does not increase overall fishing effort above levels assessed in Amendment 10, thus there is no indication that impacts on non-target species will be different.

Due to the distribution and behavior of yellowtail flounder, bycatch in the scallop fishery has been documented and is expected to continue under this action. Therefore, specific measures are in place to close access areas on Georges Bank when 10% of the yellowtail flounder TAC is reached on trips in the Nantucket Lightship area. In addition, since closed areas are considered beneficial to the recovery of thorny and barndoor skate, this document analyzes the impacts of controlled access into portions of the mortality closed areas on skate rebuilding (Section 6.1.3). No additional impacts are expected.

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

Response: No, the proposed action is not reasonably expected to cause substantial damage to the ocean and coastal habitats and/or EFH. The conclusion in the EFH Assessment (Section 6.1.4) is that overall habitat impacts of all the measures combined in this action have minimal net effects. Relative to the baseline habitat protections established under Amendment 10 to the Atlantic Sea Scallop FMP, those impacts are negligible, and relative to the No Action alternative, those impacts are marginally positive. Specifically, this action does not allow access into the Habitat Closed Areas, and it maintains the requirement for scallop vessels to use 4-inch rings, which are believed to reduce impacts on benthic environments. Therefore, measures to further mitigate or minimize adverse effects on EFH are not necessary.

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

Response: No, the proposed action is not reasonably expected to have substantial adverse impacts on public health or safety.

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

Response: No, the proposed action is not reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species. Section 4.3 describes the endangered or threatened species that are found in the affected area. Section 5.3 summarizes the impacts of the proposed action on endangered and threatened species; overall, none of the proposed measures are expected to have a significant impact on these species. In fact, this action includes specific measures designed to minimize impacts on sea turtles by limiting effort in the Mid-Atlantic during the time of year when turtles are more likely to interact with scallop gear (Section 2.8 and 5.3).

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

Response: The proposed action is not expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area. Section 4.2 describes the physical environment of the affected area including the benthic environment and biological parameters of the scallop resource. In general, this action proposes to maintain fishing mortality at levels established under Amendment 10; therefore, no additional impacts on biodiversity and ecosystem function are expected as a result of this action.

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

Response: No, this action does not propose any significant social or economic impacts interrelated with significant natural or physical environmental effects. Because the proposed action improves flexibility and performance of the rotational area management program, which has not had significant social or economic impacts interrelated with significant natural or physical environmental effects in the past, none are expected to result from the proposed action.

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

Response: No, the effects on the quality of the human environment are not likely to be highly controversial. The proposed action will modify the rotational area management program and reduce short term landings, but positive impacts in the long-term are expected from this program; thus positive impacts on the human environment. Section 5.4 assess the expected impacts of the proposed action on the human environment, and Section 5.6 describes the potential cumulative effects of this action on the human environment. Overall, the proposed action is expected to have positive negative short-term impacts compared to No Action due to reduced landings and revenues, but long term beneficial impacts. Furthermore, landings are expected to increase quickly after 2010, thus any impacts will be temporary. Therefore, this action is not likely to be highly controversial since long term impacts are favorable for the proposed action compared to No Action.

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

Response: No, unique areas, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas are not located within the affected area; therefore, there are no impacts on these components of the environment from the proposed action.

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

Response: No, the effects on the human environment are not likely to be highly uncertain or involve unique or unknown risks. This action primarily proposes modifications to the existing rotational area management program. The risks and impacts of area rotation on the human environment have been discussed and analyzed in previous actions. Scallop vessels have been awarded access into portions of the Georges Bank closed areas since 1999; therefore, the likely effects on the human environment are well understood.

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

Response: No, the proposed action is not related to other actions with individually insignificant but cumulatively significant impacts. Section 5.6 describes fishing and non-fishing past, present and reasonably foreseeable future actions that occurred or are expected to occur in the affected area. Some measures within the proposed action do result in cumulative impacts in some cases, but none of the impacts discussed exceed the threshold that would indicate a significant impact. In summary, the sea scallop resource, EFH, protected species, and the human environment have been impacted by past and present actions in the area and are likely to continue to be impacted by these actions in the future. In general, the proposed action will modify the rotational area management program, which will have positive impacts on the long-term success of the program at preventing overfishing and achieving optimum yield on a continuing basis.

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

Response: No districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places are located in the affected area; therefore, there are no impacts on these resources from the proposed action.

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

Response: No, the proposed action is not reasonably expected to result in the introduction or spread of a nonindigenous species.

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

Response: No, the proposed action is not likely to establish a precedent for future action with significant effects, and it does not represent a decision in principle about future consideration. This action modifies an existing rotational area management program that is designed to be reviewed and adjusted every two years. Area rotation was established under Amendment 10, which was an EIS that assessed the long-term impacts of area rotation.

15) Can the proposed action reasonably be expected to threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment?

Response: No, the proposed action is not reasonably expected to threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment. This action does not propose any changes that would provide incentive for environmental laws to be broken.

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

Response: No, the proposed action is not reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species. Both target and non-target species have been identified and assessed in this document (Section 5.1, 5.5, and 5.6). In general, this action will modify the rotational area management program, which will have positive impacts on both target and non-target species.

FONSI DETERMINATION:

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for Framework 19, and in the SEIS for Amendment 10 to the Sea Scallop Fishery Management Plan, it is hereby determined that Framework 19 will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

______________________________ ______________________

Regional Administrator, Northeast Region, NMFS Date

6.2.3 List of Preparers; Point of Contact

Questions concerning this document may be addressed to:

Mr. Paul Howard, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 10950
(978) 465-0492

Framework Adjustment 21 was prepared and evaluated in consultation with the National Marine Fisheries Service and the Mid-Atlantic Fishery Management Council. Members of the Scallop PDT prepared and reviewed portions of analyses and provided technical advice during the development of the Environmental Assessment. The list of Scallop PDT members includes:

Table 129 – List of Scallop PDT members

Scallop Plan Development Team
Deirdre Boelke, PDT Chair, NEFMC
Emily Bryant, NMFS SF
Peter Christopher, NMFS SF
Rula Deisher, USCG
William DuPaul, VIMS
Demet Haksever, NEFMC
Dvora Hart, NEFSC
Kevin Kelly, ME DMR
Erin Kupcha, NMFS Observer Program
Jess Melgey, NEFMC
Kimberly Murray, NEFSC
Cate O'Keefe, SMAST
Julia Olsen, NEFSC
Jim St. Cyr, NMFS FSO
Sarah Thompson, NMFS NEPA
Carrie Upite, NMFS PR

In addition, other individuals contributed data and technical analyses for the document, Amy Van-Atten (NMFS Northeast Observer Program); Michelle Bachman (NEFMC staff – impacts on essential fish habitat); and Woneta Cloutier (NEFMC staff – administrative assistant for Scallop FMP).

6.2.4 Agencies Consulted

The following agencies were consulted in the preparation of this document:

New England Fishery Management Council

Mid-Atlantic Fishery Management Council
National Marine Fisheries Service, NOAA, Department of Commerce
United States Coast Guard, Department of Homeland Security

6.2.5 Opportunity for Public Comment

The proposed action was developed during the period December 2006 through October 2007 and was discussed at the following meetings. Opportunities for public comment were provided at each of these meetings. The public is also permitted to attend Scallop PDT meetings, and about half a dozen PDT meetings were held during this time period as well.

Table 130 – Summary of meetings with opportunity for public comment for Framework 19

PDT Meeting	Inn on the Square, Falmouth, MA	March 11-12, 2009
Committee Meeting	Hotel Providence, Providence, RI	April 2, 2009
Council Meeting to Initiate FW 21	Sheraton Harborside, Portsmouth, NH	April 9, 2009
PDT Meeting	NMFS, Gloucester, MA	May 13, 2009
Advisory Panel Meeting	Sheraton 4 Points, Revere, MA	June 17, 2009
PDT Meeting	Radisson Hotel, Plymouth, MA	July 22, 2009
PDT Meeting	Crowne Plaza, Warwick, RI	August 12, 2009
PDT Meeting	Holiday Inn, Mansfield, MA	August 24, 2009
Committee Meeting	Hotel Providence, Providence, RI	September 2, 2009
Advisory Panel Meeting	Crowne Plaza, Warwick, RI	September 15, 2009
Committee Meeting	Crowne Plaza, Warwick, RI	September 16, 2009
Council Meeting to update FW 21	Radisson Hotel, Plymouth, MA	September 24, 2009
PDT Meeting	Starboard Galley, Newburyport, MA	October 15, 2009
Committee Meeting	Hilton Providence, Providence, RI	November 3, 2009
Council Meeting to approve FW 21 final measure	Hyatt Regency, Newport, RI	November 18, 2009

6.3 MARINE MAMMAL PROTECTION ACT (MMPA)

Section 4.3 of this action contains a description of marine mammals potentially affected by the Scallop Fishery and Section 5.3 above provides a summary of the impacts of the proposed action as analyzed in Framework 19. A final determination of consistency with the MMPA will be made by the agency when Framework 19 is implemented.

6.4 ENDANGERED SPECIES ACT (ESA)

Section 4.3 of this action contains a description of marine mammals potentially affected by the Scallop Fishery and Section 5.3 above provides a summary of the impacts of the proposed action as analyzed in Framework 19. A final determination of consistency with the ESA will be made by the agency when Framework 19 is implemented.

6.5 ADMINISTRATIVE PROCEDURE ACT (APA)

Sections 551-553 of the Administrative Procedure Act established procedural requirements applicable to informal rulemaking by federal agencies. The purpose is to ensure public access to the federal rulemaking process, and to give public notice and opportunity for comment. The Council did not request relief from notice and comment rule making for this action, and the Council expects that NOAA Fisheries will publish proposed and final rule making for this action.

The Council has held fifteen meetings open to the public on Framework 21 (Table 130). The Council initiated this action at the April 2009 Council meeting and approved final measures at the November 2007 meeting. After submission to NMFS, a proposed rule and notice of availability for Framework 21 under the M-S Act will be published to provide opportunity for public comment.

6.6 PAPERWORK REDUCTION ACT (PRA)

The purpose of the Paperwork Reduction Act is to minimize paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. It also ensures that the Government is not overly burdening the public with requests for information. Framework 21 does not have any new collection of information requirements subject to the PRA.

6.7 COASTAL ZONE MANAGEMENT ACT (CZMA)

Section 307 of the Coastal Zone Management Act (CZMA) is known as the federal consistency provision. Federal Consistency review requires that "federal actions, occurring inside or outside of a state's coastal zone, that have a reasonable potential to affect the coastal resources or uses of that state's coastal zone, to be consistent with that state's enforceable coastal policies, to the maximum extent practicable". The Council previously made determinations that the FMP was consistent with each states coastal zone management plan and policies, and each coastal state concurred in these consistency determinations (in Scallop FMP). Since the proposed action does not propose any substantive changes from the FMP, the Council has determined that this action is consistent with the coastal zone management plan and policies of the coastal states in this region. Once the Council has adopted final measures and submitted Framework 19 to NMFS, NMFS will request consistency reviews by CZM state agencies directly.

6.8 DATA QUALITY ACT

Utility of Information Product

The proposed document includes: A description of the management issues, a description of the alternatives considered, and the reasons for selecting the preferred management measures, to the extent that this has been done. These actions propose modifications to the existing FMP. These proposed modifications implement the FMP's conservation and management goals consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as well as all other existing applicable laws.

This proposed framework is being developed as part of a multi-stage process that involves review of the document by affected members of the public. The public has had the opportunity to review and comment on management measures during several meetings. In addition, the public will have further opportunity to comment on this framework through the 45-day public hearing process, and again after the NMFS publishes a request for comments notice in the Federal Register.

The Federal Register notice that announces the proposed rule and the implementing regulations will be made available in printed publication and on the website for the Northeast Regional

Office. The notice provides metric conversions for all measurements.

Integrity of Information Product
The information product meets the standards for integrity under the following types of documents:

Other/Discussion (e.g., Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.)

Objectivity of Information Product
The category of information product that applies for this product is “Natural Resource Plans.”

In preparing specifications documents, the Council must comply with the requirements of the Magnuson-Stevens Act, the National Environmental Policy Act, the Regulatory Flexibility Act, the Administrative Procedure Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, the Data Quality Act, and Executive Orders 12630 (Property Rights), 12866 (Regulatory Planning), 13132 (Federalism), and 13158 (Marine Protected Areas).

This framework is being developed to comply with all applicable National Standards, including National Standard 2. National Standard 2 states that the FMP's conservation and management measures shall be based upon the best scientific information available. Despite current data limitations, the conservation and management measures proposed to be implemented under this framework are based upon the best scientific information available. This information includes complete NMFS dealer weighout data through 2008, and includes incomplete dealer weighout data for 2009. Dealer data is used to characterize the economic impacts of the management proposals. The specialists who worked with these data are familiar with the most recent analytical techniques and with the available data and information relevant to the scallop fishery.

The policy choices (i.e., management measures) proposed to be implemented by this document are supported by the available information. The management measures contained in the framework document are designed to meet the conservation goals and objectives of the FMP.

The supporting materials and analyses used to develop the measures in the framework are contained in the document and to some degree in previous amendments and/or FMPs as specified in this document.

The review process for this framework involves the New England Fishery Management Council, the Northeast Fisheries Science Center, the Northeast Regional Office, and NOAA Fisheries headquarters. The document was prepared by staff of the Council and Center with expertise in scallop resource issues, habitat issues, economics, and social sciences. The Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the specifications document. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the specifications document and clearance of the rule is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

6.9 E.O. 13132 (FEDERALISM)

The E.O. on federalism establishes nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. Previous scallop actions have already described how the management plan is in compliance with this order. Furthermore, this action does not contain policies with Federalism implications, thus preparation of an assessment under E.O. 13132 is not warranted.

6.10 E.O. 12898 (ENVIRONMENTAL JUSTICE)

The alternatives in this framework are not expected to cause disproportionately high and adverse human health, environmental or economic effects on minority populations, low-income populations, or Native American peoples.

6.11 EXECUTIVE ORDER 12866 (REGULATORY IMPACT REVIEW)

6.11.1 Introduction

The Regulatory Impact Review (RIR) provides an assessment of the costs and benefits of proposed actions and other alternatives in accordance with the guidelines established by Executive Order 12866. The regulatory philosophy of Executive Order 12866 stresses that in deciding whether and how to regulate, agencies should assess all costs and benefits of all regulatory alternatives and choose those approaches that maximize the net benefits to the society.

The RIR also serves as a basis for determining whether any proposed regulations are a "significant regulatory action" under the criteria provided in Executive Order 12866 and whether the proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act of 2180 (RFA).

This RIR summarizes the effects of the proposed observer program and other alternatives considered in this Framework 21. The Framework 21 document contains all the elements of the RIR/RFA, and the relevant sections are identified by reference to the document.

The purpose of and the need for action are described in Section 1.2. The description of the each selected alternative including the no action alternative is provided in Section 2.0.

6.11.2 Economic Impacts

Section 5.4 evaluated economic impacts of Framework 21 proposed measures and alternatives considered by the Council. Sources of uncertainty are identified in Section 5.4.16. The aggregate economic impacts of the proposed allocation alternatives are analyzed in Section 5.4.2. The numerical results are presented in the tables included in those sections. The individual measures considered by Framework 21 are discussed in Sections 5.4.3 through 5.2.7 and the relevant subsections shown below:

- Economic impacts of no action: Section 5.4.1
- Measures that will be in effect March 1, 2010 until Framework 21 is implemented: Section 5.4.1.1
- Aggregate Economic Impacts: Section 5.4.2
- Measures for limited access vessels in Section 5.4.3 including
    - Georges Bank access area management and adjustments when yellowtail flounder catches reach 10% TAC limit: Section 5.4.3.1
    - Mid-Atlantic access area management: Section 5.4.3.2
    - TAC set-asides for observers and research: Section 5.4.3.3.
    - Research priorities and recent RSA announcement: Section 5.4.3.4
    - DAS adjustments if the LAGC IFQ program is not implemented by March 1, 2010: Section 5.4.3.5
- Measures for general category vessels in Section 5.4.3 including
    - Quarterly Hard TAC for General Category Vessels: Section 5.4.4.1
    - Economic Impacts of the IFQ program: Section 5.4.4.2
    - Georges Bank access area management: Section 5.4.4.3
    - Mid-Atlantic access area management: Section 5.4.4.4
    - Northern Gulf of Maine Hard TAC: Section 5.4.4.5
    - Incidental Catch: Section 5.4.4.6
    - Leasing of partial general category IFQ allocations during the fishing year: Section 5.4.7
- Consideration of a new rotational area: Section 5.4.5
- Compliance with reasoanable and prudent measure in recent biological opinion: Section 5.4.7
- Uncertainties and risks: Section 5.4.8

6.11.2.1 Summary of Regulatory Impacts

The combined impacts of the proposed regulations on scallop fishery, on consumers and total economic benefits to the nation are analyzed in Section 5.4.2 and the economic impacts of the individual measures are discussed in subsections of 5.4.3 as indicated above. All the values for economic impacts are presented in terms of 2008 dollars except for the determination of the significant impacts, cumulative present value of the net economic benefits to the nation are also shown in terms of the 1996 dollars. No action here refers to continuation of all the measures and allocations that are specified in the present regulations, including trip allocations for access areas and open area allocation of 42 days per limited access vessel.

Summary of the aggregate impacts of the proposed measures

- The aggregate economic impacts of the proposed measures and other alternatives including the open area DAS and access allocations and TAC for the general category fishery are expected to be negative in 2010 compared to the no action alternative. In the short-term (i.e. fishing year 2010), landings, revenues and economic benefits for the proposed action (status quo, NCLF20), for no-closure high F (NCLF24) and closure low F (CLF18) will be lower than the landings and economic benefits for the 'No Action" alternative. The scallop revenues are expected to be $47 million lower (Table 81), the producer surplus $37 million lower (Table 82), consumer benefits $4 million lower (Table 83). Total economic benefits for the proposed action (NCLF20) will be $41 million ($32 million) lower that No Action levels in terms of 2008 (1996) prices (Table 84). Thus the proposed action will not have a short-term negative impact on the economy by $100 million or more in 2010. Table 85 shows percentage change from the No Action levels in 2010 and indicates that scallop revenues will decline by 13%, producer surplus by 12%, consumer surplus by 27% and total economic benefits (i.e., the sum of producer and consumer benefits) by 13%.

- This is because "No Action" open area DAS allocations would be higher than the allocations proposed for NCLF20 and NCLF24 and CLF20 alternatives, resulting in higher landings from open areas in 2010. On the other hand, open area DAS allocations (42 days) with the new closure option (CLF18) would be equivalent to the No Action scenario. Because this option results in higher overall LPUE compared to No Action, the revenues and economic benefits for CLF18 would be higher than the No Action levels in 2010. The Council did not select this alternative because new rotational area closure alternatives resulted in a higher area swept estimates in Mid-Atlantic which could have impacts on non-target species in those areas.
- The biological estimates for the "No Action" alternative show that this scenario will result in less than optimal long-term landings, thus will lower economic benefits compared to the proposed action and other alternatives. "No Action" alternative would allocate 3 trips to ETA, which is higher than the projected biomass in that area can support. Under "No Action", there is no access into areas on Georges Bank while the biomass in those areas can support one trip. Under "No Action," open area DAS allocations would also be higher than sustainable levels because the present conditions of biomass in those areas were not taken into account. For these reasons, the levels of exploitable biomass for the no action alternative will be less than the levels for the proposed action and all the other alternatives (Table 79).
- Over the near-term from 2011 to 2016, landings, revenues, producer and consumer surpluses and total economic benefits for the proposed action (status quo) and other alternatives, with the exception of no closure, high-F (NCLF24) alternative are expected to exceed the "No Action" levels. The cumulative present value of the revenues for the proposed action will exceed the no action revenues by $55 million (at 7% discount rate) to $62 million (at 3% discount rate) for the period 2011-2016 (Table 81 in Section 5.4.2.1). The revenues for the no-closure, high-F option will be $2 million (at 3% discount rate) to $3 million (at 7% discount rate) lower than the no action levels, however.
- Because increase in revenues over the long-term outweighs the decline in revenues in 2010, the proposed action and all the other alternatives will result in higher revenues than the No Action scenario. Over the long-term from 2010 to 2023, the proposed action will generate $80 million (at 7% discount rate) to $118 million (at 3% discount rate) more revenues than the no action alternative. The scallop revenues for High-F (NCLF24) options will exceed the no action revenues by $53 million (at 7% discount rate) to 81 million (at 3% discount rate).
- The proposed action will have positive long-term economic impacts and will increase the present value of total economic benefits to the nation by $86 million (at 7% discount rate) to $125 million (at 3% discount rate) from 2010 to 2023. The economic benefits for the high-*F* no closure (NFL24) alternative exceed no action benefits by $54 million to $81 million, but will be fall short of proposed action benefits by $32 million (at 7% discount

rate) and $44 million (at 3% discount rate) over the period 2010-2023. This is because this option will generate $58 million less revenues (Table 81), $52 million less producer surplus (Table 82), $4 million less consumer surplus (Table 83) and $56 million less benefits (Table 84) than the proposed option during the near-term period from 2011 to 2016. These levels correspond to a conservative estimate using a 7% discount rate, and with 3% discount rate the benefits with the NCLF24 option will be even less compared to the proposed option.

- The impacts of the proposed action and alternatives the general category fishery will be similar to the aggregate impacts summarized above and will negative in 2010 but positive over the long-term from 2010 to 2023.
- The impacts on employment measured by total crew-days (Crew*DAS) would be negative in 2010 but positive starting with 2011 fishing year since the proposed action would allocate less DAS in 2010 but more after 2010 fishing year compared to no action. The difference from the no action DAS-used amounts to a 23% reduction for the proposed action and 10% reduction for the no closure high-*F* option (Table 96). Only the new closure high-*F* option (CLF24) would increase DAS used and crew-days by 12% in 2010, while the new closure low-*F* (CLF18) option would reduce DAS used and crew-days by 2% in 2010. As a result, crew-days will change in the same percentage change to the DAS used, declining for all options except for CLF20 in 2010. Although it is uncertain to what extent the reduction in crew-days will result in a reduction in the number of crew, thus employment in the fishery measured by number of people employed, given that this reduction is mostly limited to 2010 and that DAS-used will increase considerably in the following years, the vessel owners may prefer to employ same crew for less fishing days in 2010 knowing that DAS-used will increase considerably in the following years. Starting in 2011, the DAS used will be higher for the proposed action compared to no action. Total DAS used and crew-days will increase by 43% in 2011 for the proposed action from 22,053 days to 31,521 days, exceeding the no action levels by 4%. For the long-term period from 2010 to 2023, total DAS-used (thus crew-days) for the proposed action will be 2% higher than the no action levels. The DAS-used and crew-days for high-*F* alternatives (NCLF24 and CLF20) and for CLF18 will exceed the "No Action" levels by 1% to 3%.
- The cumulative impacts of the measures from Framework 21 proposed measures, and the past actions including Amendment 10, Frameworks 18 and Amendment 11 to the scallop FMP, are estimated to be positive over the long-term. Adjustment of the open area DAS allocations, implementation of trip limits and allocations for the access areas and rotation area management had positive impacts on the scallop industry by increasing the revenues, producer and consumer surpluses and net benefits in the past. The Framework 19 measures were estimated to have positive impacts on consumer, producer and total economic benefits during 2008-2009 and total benefits were expected to increase by $42 million during 2008-2009 under the action implemented in Framework 19 in 2006 prices, and even more in terms of the 2008 prices. Because the proposed action for Framework 21 will reduce the total benefits by $41 million in 2010, the cumulative impacts of the proposed measures and the past actions would be neutral in the 2010 in the worst case scenario. The actions proposed by Framework 21 will are expected to increase fleet revenues, profits and total economic benefits compared to no action over the long-term,

however. As a result, cumulative economic benefits, which measure the sum of benefits from previous and proposed actions, are expected to be positive.

<u>Summary of the impacts the individual measures</u>

- Reauthorization of the MSA requires the SSC to set an acceptable biological catch (ABC), or maximum catch level that can be removed from the resource taking into account all sources of biological uncertainty. The Council is prohibited from setting catch limits above that level. This new requirement is expected to have long-term economic benefits on the fishery by helping to ensure that catch limits and fishing mortality targets are set at or below ABC. This should help prevent overfishing and optimize yield on a continuous basis.
- Providing access to the Nantucket Shoals Nantucket Lightship (NLS) for both the LA and LAGC fleets in 2010 will have positive economic impacts on both limited access and general category vessels
- Adjustments when yellowtail flounder catches reach 10% TAC limit will help to minimize loss in pounds and revenue due to the closure of access areas due to yellowtail quota before a vessel takes its trip.
- Providing access to Delmarva and Elephant Trunk areas will have positive economic impacts on both limited access and general category vessels because these areas has more biomass compared to open areas or other access areas.
- Open area DAS allocations are expected to prevent overfishing in the open areas and to have positive economic impacts over the long-term on scallop vessels when combined with controlled access area.
- TAC set asides for research and observer coverage and speeding up the RSA process are expected to have indirect economic benefits on the sea scallop fishery by improving scallop management through better data and information made possible by timely research into current issues in the fishery.
- Proposed action measure will provide flexibility for the general category vessels to lease and earn income their unused quotas to other vessels during the fishing year. As a result, this measure will have positive impacts on vessel revenues and profits.
- DAS adjustment for the limited access vessels if the LAGC IFQ program is not implemented by March 1, 2010 will have negative impacts on the revenues and profits of the limited access vessels due to reduced DAS allocations. This measure is not expected to impact the results of the cost-benefit analyses presented in Section 5.4.2 since there will be no change in the overall landings, revenues, and producer and consumer benefits.
- Management of general category fishery by a quarterly hard TAC during the transition period will reduce race to fish and lessen the negative economic impacts associated with derby fishing. This action is a continuation
- The proposed action does not include any new area closures. However Framework 21 alternatives included a new rotational area in the Great South Channel with large amounts of small scallops to be closed in fishing year 2010. The impacts of this alternative was analyzed as a part of the aggregate economic impacts (Section 5.4.2). This alternative was not selected because new rotational area closure alternatives resulted in a higher area swept estimates in Mid-Atlantic which could have impacts on non-target species in those areas.

- The economic impacts of the RPM measures will vary with the Framework 21 allocation alternatives and the window of time in which the measures are applied. The proposed action is a combination of the Delmarva closure in September and October with a limit on the maximum number of trips (at two per vessel) that can be taken in the Mid-Atlantic areas from June 15 to August 31. Because the effort is shifted to a relatively less productive season, total fleet trip costs are expected to increase slightly by $40,115, or by less than 0.2%. Since there is no change in the possession limit, the trips that are shifted from this season are expected to be taken outside of the turtle window, without a loss in total revenue. The proposed action is expected to minimize the effort shift from the turtle window compared to the other alternatives considered by the Council, thus is not expected to have a significant impact on prices, revenues and total economic benefits.
- Many measures that are discussed in Framework 21 are measures that were implemented with earlier actions, such as Framework 19, or measures that will be implemented when Amendment 11 is approved. In other words, for Framework 21 these actions constitute no action, and their impacts were analyzed in those documents. The following provides a summary of the impacts of these actions:
    - The specific measures that are included if this action is not implemented by March 1, 2010 will help to reduce the adverse impacts of exceeding the proposed allocations in Framework 21 in 2010 on the scallop resource over the long-term. Any excesses over the open area DAS-used or trip allocations for the access areas above the ultimate value allocated for 2010 will be reduced the following fishing year (2011). Therefore, these measures will have positive long-term impacts on landings, revenues, producer and consumer benefit and net national economic benefits.
    - The proposed action (no action) would continue to allow a vessel to carry any number of crew it wishes on an access area trip. No crew limit would give vessels the most flexibility, potentially reducing total fishing costs, thus would have positive economic impacts on scallop vessels.
    - As analyzed in Amendment 11, IFQ's will have positive economic impacts on general category vessels that qualify for limited access. Framework 19 includes a program, however, that could collect up to 3% of ex-vessel value of scallop product landed to recover the costs directly related to management, data collection and analysis, and enforcement of the general category IFQ program as mandated by the Magnuson Stevens Fishery Management Act (MSA). The positive economic impacts of IFQs for the general category limited access qualifiers are expected to exceed the costs of this cost recovery program.
    - 70,000 pounds of hard TAC for the Northern Gulf of Maine (NGOM) general category fishery is expected to have positive economic impacts on vessels that do not qualify for limited access but do for an NGOM permit because it allows them to land scallops in this area during favorable resource conditions.
    - Removal of incidental catch (50,000 lb.) before making allocations will ensure fishing mortality targets are not exceeded, thus will have positive impacts on the resource, scallop yield, on the revenues and profits of the scallop vessels.

6.11.2.2 Enforcement Costs

The enforcement costs and benefits of the proposed options for Framework 21 are within the range of impacts addressed in Section 8.9 of Amendment 10 FSEIS and Section 5.4.22 and Section 5.6.3 of Amendment 11. The qualitative analysis included a discussion of the pros and cons of the proposed alternatives from an enforcement perspective. The proposed measures by Framework 21 are very similar to the existing measures in terms of the enforcement requirements, since they include the continuation of the area specific trip allocations, area closures, open area DAS allocations, measures for reducing bycatch, and the continuation of observer coverage program. The enforcement costs and benefits of the quarterly hard TAC and IFQ management of the general category fishery were discussed in Section 5.4.22 of Amendment 11. The costs of implementing and enforcing the proposed action are not expected to compromise the effectiveness of implementation and enforcement of this action. Furthermore, there are several mechanisms and systems, such as VMS monitoring and data processing, already in place that will aid in monitoring and enforcement of this action. Therefore, the overall enforcement costs are not expected to change significantly from the levels necessary to enforce measures under the no action regulations.

6.11.2.3 Determination of Significant Regulatory Action

Executive order 12866 defines a “significant regulatory action” as one that is likely to result in: a) an annual effect on the economy of $100 million or more, or one which adversely affects in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; b) a serious inconsistency or interference with an action taken or planned by another agency; c) a budgetary impact on entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; d) novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this executive order.

The preceding analysis shows that Framework 21 would not constitute a “significant regulatory action” since it will not raise novel legal and policy issues, other than those that were already addressed and analyzed in Amendment 10 and Amendment 11. Overall impacts on net benefits are expected to be positive, an increase of $86 (at 7% discount rate) million to $125 million (at 3% discount rate) in terms 2008 prices for the long-term period 2010-2023. In terms of 1996 prices, the net benefits will increase by $67 (at 7% discount rate) million to $98 million (at 3% discount rate) for the long-term period 2010-2023. Therefore, the proposed regulations may not have an annual impact on the economy of $100 million or more. The proposed alternatives will not adversely affect in a material way the economy, productivity, competition, public health or safety, jobs or state, local, or tribal governments or communities in the long run. The proposed action also does not interfere with an action planned by another agency, since no other agency regulates the level of scallop harvest. It does not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients.

6.12 INITIAL REGULATORY FLEXIBILITY ANALYSIS

The purpose of the Regulatory Flexibility Analysis (RFA) is to reduce the impacts of burdensome regulations and record-keeping requirements on small businesses. To achieve this goal, the RFA requires government agencies to describe and analyze the effects of regulations and possible alternatives on small business entities. Based on this information, the Regulatory Flexibility Analysis determines whether the proposed action would have a "significant economic impact on a substantial number of small entities."

6.12.1 Problem Statement and Objectives

The purpose of the action and need for management is described in Section 1.2 and goal and objectives in Section 2.0 of the Framework 21 document.

6.12.2 Management Alternatives and Rationale

The proposed action is described in Sections 2.1 and no action alternative is described in Section 2.2 of the framework document.

6.12.3 Determination of Significant Economic Impact on a Substantial Number of Small Entities

6.12.3.1 Description of the small business entities

The RFA recognizes three kinds of small entities: small businesses, small organizations, and small governmental jurisdictions. It defines a small business in any fish-harvesting or hatchery business as a firm that is independently owned and operated and not dominant in its field of operation, with receipts of up to $4 million annually. The vessels in the Atlantic sea scallop fishery could be considered small business entities because all of them grossed less than $3 million according to the dealer's data for 1994 to 2008 fishing years (Table 133). According to this information, annual total revenue averaged over a million per limited access full-time vessel since 2004. According to the 2008 Dealer data total revenues per vessel, including revenues from species other than scallops, was equivalent to 1,079,722 per full-time vessel. Average scallop revenue per general category vessel was $88,702 in 2005 and $77,077, in 2008 fishing years. Average total revenue per general category vessel was higher, exceeding $250,000 in 2005 and 2006 fishing years, but lower than $135,000 in 2008 (Table 132).

The proposed regulations of Framework 21 would affect vessels with limited access scallop and general category permits. Section 4.4 (Fishery-related businesses and communities) of Amendment 11 document and Section 4.4 of Framework 21 provide extensive information on the number, the port, the state, and the size of vessels and small businesses that will be affected by the proposed regulations. The current information on the number of scallop permits for the years 1997 to 2008 are provided in Table 131. According to the recent permit data, there were 321 vessels that obtained full-time limited access permits in 2006, including 56 small-dredge and 11 scallop trawl permits. In the same year, there were also 34 part-time and 1 occasional limited access permit in the sea scallop fishery (Table 131). The number of active general category vessels has fluctuated in recent years and is described in Table 132. Therefore, the proposed alternatives of Framework 21 are expected to have impacts on a substantial number of small entities.

Table 131. Scallop Permits by category by application year

Permit category	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Full-time	204	203	213	220	224	234	238	242	248	255	256	254
Full-time small dredge	3	2	1	3	13	25	39	48	57	59	63	56
Full-time net boat	27	23	16	17	16	16	16	15	19	14	12	11
Total full-time	234	228	230	240	253	275	293	305	324	328	331	321
Part-time	16	11	12	16	14	14	10	4	3	3	2	2
Part-time small dredge	9	7	3	4	6	8	19	26	30	34	35	32
Part-time trawl	30	27	22	20	18	10	8	3	-	-	-	-
Total part-time	55	45	37	40	38	32	37	33	33	37	37	34
Occasional	2	3	4	4	5	4	3	3	1	2	1	1
Occasional trawl	24	19	20	16	19	15	8	5	5	-	-	-
Total occasional	26	22	24	20	24	19	11	8	6	2	1	1
Total Limited access	315	295	291	300	315	326	342	346	363	367	369	356

Table 132. Active scallop vessels by permit category by fish year (Dealer data, nominal values)

Permit Plan	Data	2004	2005	2006	2007	2008
General Category	Number of vessels	432	619	661	495	459
	Scallop pounds per vessel	6,553	11,493	10,439	10,026	10,621
	Average scallop revenue per vessel	34,043	88,071	69,181	65,190	72,077
	Average total revenue per vessel (?)	249,167	260,942	250,752		135,378
	Total scallop landings	2,831,030	7,113,906	6,900,329	4,963,101	4,545,828
	Total scallop revenue	14,706,711	54,515,676	45,728,570	32,268,982	30,849,009
	Ex-vessel price ($)	5.6	7.7	6.7	6.5	6.8

Table 133. Annual scallops landings and revenues per full-time limited access vessel (in 2008 prices)

FISHYEAR	Average landings by vessel	Average of scallop revenue per vessel	Average Ex-vessel price	Number of FT vessels
1994	71,362	498,666	6.99	210
1995	74,402	528,152	7.10	212
1996	76,672	592,591	7.73	209
1997	61,504	536,356	8.72	200
1998	53,041	425,029	8.01	205
1999	96,662	685,469	7.09	216
2000	139,496	854,240	6.12	229
2001	175,345	778,513	4.44	245
2002	183,792	853,554	4.64	262
2003	188,637	903,557	4.79	279
2004	198,101	1,153,173	5.82	295
2005	145,268	1,243,382	8.56	312
2006	152,778	1,050,665	6.88	314
2007	157,191	1,064,050	6.77	315
2008	145,191	1,007,801	6.94	316

6.12.3.2 Determination of significant effects

The Office of Advocacy at the SBA suggests two criteria to consider in determining the significance of regulatory impacts, namely, disproportional and profitability.

The disproportionality criterion compares the effects of the regulatory action on small versus large entities (using the SBA-approved size definition of "small entity"), not the difference between segments of small entities. Framework 21 is not expected to have significant regulatory impacts on the basis of the disproportionality criterion for the following reasons:

1. The majority of the permit holders in the sea scallop fishery are considered small business entities.

2. The proposed measures will affect all the vessels participating in the sea scallop fishery. Although these measures could affect some vessels within the scallop fleet differently than others as discussed in Section 5.4?(economic impacts section), these differential impacts are not relevant for disproportionality criterion. The changes in profits, costs, and net revenues due to Framework 21 are not expected to be disproportional for small versus large entities since all entities, that is, all vessels participating in the scallop fishery are considered small.

3. The proposed action is not expected to place a substantial number of small entities at a significant competitive disadvantage relative to large entities.

The profitability criterion will apply if the regulation significantly reduces profit for a substantial number of small entities. The proposed action is also status quo, thus is not expected to reduce significantly profit for a substantial number of small entities compared to status quo. Status quo is considered to be the scenario that has an overall fishing mortality of 0.20, does not include a new closure in the Channel (NCLF20) and *for practical purposes is No Action* in terms of how the Council would set specifications.

The *No Action* alternative, strictly defined, would roll over current specifications with open area allocation of 42 days and access area allocation of 4 trips per limited access vessel, 3 to ETA and 1 to DMV. As compared with the No Action alternative, however, the scallop revenues and net revenues (as a proxy for profits) will decline with the proposed alternative in the short- term, but increase in the long-term compared to no action as summarized below in Section 6.12.3.3. Although proposed action will considerably reduce revenues and profits in the very short-term, in 2010 fishing year, compared to No Action, starting in the next year 2011, revenues and profits of the scallop vessels are expected to increase compared to no action levels. As a result, the proposed action will not have significant impacts over the near-term from 2010 to 2016 and will have positive impacts on the revenues and profits of the majority of small business entities in scallop fishing industry over the long-term compared to the No Action alternative. The following section provides a summary of the economic impacts from the proposed action and discusses the mitigating factors. The relevant section of Framework 21, which discusses the rationale and impacts of these measures are also identified.

6.12.3.3 Economic impacts of proposed measures and alternatives

6.12.3.3.1 DAS and access area allocation alternatives

Rationale for the proposed allocation measures is provided in Executive Summary for Framework 21. Aggregate Economic impacts of these measured are analyzed in Section 5.4.2. The following sections provides an analysis of the impacts on the individual vessel and small business entities based on the fleetwide impacts analyzed in Section 5.4.2.

Summary of the aggregate impacts in the short- and medium term

The economic impacts under E.O. 12866 need not be identified at the vessel or firm level in the RIR, whereas, these levels remains the focus of the RFAA. The aggregate economic impacts of the proposed measures and other alternatives including Georges Bank, Elephant Trunk and Delmarva access area allocations, open area DAS allocations and TAC for the general category fishery are analyzed in Section 5.4.2 relative to no action and status quo from a net national benefit perspective and using a cost-benefit framework. The primary goal of RFAA analysis is to consider, however, the effect of regulations on small businesses and other small entities, recognizing that regulations frequently do not provide for short-term cash reserves to finance operations through several months or years until the positive effects of the regulation start paying off.

The potential economic impacts of the proposed action on the small business entities and on an average scallop vessel are expected to be proportional to the aggregate economic impacts *compared to No Action*. The proposed regulations will change the allocations of the scallop vessels in the same proportions. In 2010 fishing year, each limited access vessel's open area DAS allocations will decline in exactly the same percentage compared to the no action levels, and each general category vessel will be affected proportionally from the decline in overall TAC with the proposed action compared to the no action levels. Because the thrust of the RFA analysis is short- and medium-term in nature, the RFA analyses provided below are focused on the near-term (medium-term) impacts from 2010 to 2106 fishing years whereas cost-benefit analyses considered impacts also for the long-term from 2010 to 2023 fishing years.

The analysis of the fleetwide aggregate economic impacts indicated that the proposed action will have negative economic impacts in the first year, in 2010 fishing year, compared with the no action. As a result, the proposed action will have negative impacts on the revenues and profits of the scallop vessels and the small business entities in 2010.
These negative impacts will be transitory, however, and starting in 2011, the proposed action will have positive impacts on revenues and profits of the scallop vessels compared to no action. Even though the impacts were analyzed here for the medium-term from 2010 to 2016, the results show first year (2010) negative impacts of the proposed action will not carry over too long and the cumulative present value of the revenues and profits will exceed the levels for the no action starting with 2014. Furthermore, in the medium term from 2010 to 2016, the proposed action will have positive overall impacts on the revenues and profits of the scallop vessels.

The following sections provide an analysis of impacts on an average vessel in the scallop fishery based on the economic analyses provided in Section 5.4, by converting annual fleet revenues, costs and net revenues to a per full-time vessel equivalent level after removing the 3% set-asides and 5% for the share of the general category fishery.

<u>Impacts of the proposed action on the revenues and net revenues of the scallop vessels and mitigating factors</u>

- Each full-time limited access vessel will receive the same number of access area trips under both no action and under the proposed status quo option, although the later option would allocate those trips to more productive areas compared with no action. Because the proposed action will reduce the open area DAS allocations from 42 days to about 29 days for each full-time limited access vessel (and proportionally for the PT and OC vessels), the total landings will decline by 16% from 50 million with no action to 42 million for the proposed action in the first year of implementation, reducing revenues for an average vessel by about 13% (Table 134) in 2010. The percentage decline in revenues is less than the percentage decline in landings because the price per pound of scallops is estimated to be higher for the proposed action ($7.31 per pound) compared with no action ($7.07).
- The revenues for an average full-time limited access vessel is estimated to be $822,236 for the proposed action, about $128,224 (13%) lower than the no action revenues. The revenues for the no closure high-F alternatives are also expected to be lower than the no action levels (by $18,661). Average revenue per vessel are expected to be higher for the new closure alternatives, however.
- This decline in landings and revenues from the no action levels in 2010 will be followed by an increase starting with 2011. With the proposed action, the scallop revenues for an average vessel is expected to increase by 39% in 2011 (to over $1.1 million) and by 47% in 2013 (to over 1.2 million) from their level in 2010 fishing year exceeding the no action revenues by 4% in 2011 and by 3% in 2012, and 1% to 4% afterwards.
- The new closure alternatives will result in lower revenues compared to no action in 2011 and 2012 but higher revenues starting with 2013 as the closed areas open for fishing. The proposed action revenues per vessel will be higher than the revenues for all other alternatives from 2011 to 2013. The proposed action revenues for the medium-term from 2010 to 2016 will also be higher than the revenues for no action and other alternatives with the exception of new closure option (CLF18). As a result, the loss in revenues for the proposed action in 2010 (from the no action levels) will be recovered in the next 3 to 4 years.
- Therefore, the percentage decline in scallop revenues compared to no action will vary from vessel to vessel depending on their LPUE's with the proposed and no action, but in general, an average vessel in the scallop fishery will experience a 13% decline in their revenues in 2010 relative to their no action revenues. Because larger vessels with higher fishing power can land more pounds of scallops per day-at-sea (have higher LPUE) than smaller vessels, with less open area days compared to no action, the revenues they earn from these areas could decline by a larger amount than the revenues of the smaller vessels. This would reduce the proportion of the revenues they obtain from the open areas and thus could lead to decline in their overall revenues somewhat larger than 13% in the first year. On the other hand, the larger boats could be able to access productive areas farther from the port and fish in weather conditions that smaller vessels may not be able to. In the following years as the allocations increase, however, the revenues of the larger

vessel could increase relatively more than the average vessel. Since the general category vessels will receive 5% of the total scallop TAC, their revenues will be 13% less as well compared to no action as well.

- Table 134 compares the revenues per vessel for each alternative to the no action levels. Another way to look at the short-term to medium impacts of the proposed action and the alternatives for the RFAA purposes is to compare the cumulative present value of the revenues for a period of time. Such an analysis was provided in Section 5.4.2 (Aggregate economic impacts) and the results showed that the cumulative present value of the revenues for the proposed action will exceed the no action levels by $8 million to $15 million (or by 1%) over the near term 2010-2016 if discounted respectively by 3% and by 7%. The impacts on the present value of the revenues of the scallop vessels will be in the similar proportions to the fleetwide impacts. Therefore, the proposed action will have a positive impact on the revenues of the scallop vessels and other related business entities over the medium term from 2010 to 2016. The high-F options (NLCF24 and CLF20) will reduce the present value of the cumulative revenues by $9 to $10 million during the same period of time (Table 88 to Table 90 in Section 5.4.2.3).

Table 134. Average annual scallop revenue per average full-time (FT) vessel (in 2008 inflation adjusted prices and undiscounted values and after TAC set-asides)

Fishing year	Scenario	Fleet scallop revenue ($ million)	Revenue per FT vessel	Change from No Action	% Ch.in scallop revenue	% Ch. from 2010
2010	No Action	351	950,460			
	Status quo	303	822,236	-128,224	-13%	
	NFLF24	344	931,799	-18,661	-2%	
	CLHighF	384	1,039,951	89,491	9%	
	CLLowF	354	958,750	8,290	1%	
2011	No Action	405	1,098,875			16%
	Status quo	422	1,143,184	44,309	4%	39%
	NFLF24	410	1,111,654	12,779	1%	19%
	CLHighF	390	1,056,999	-41,876	-4%	2%
	CLLowF	400	1,085,171	-13,704	-1%	13%
2012	No Action	435	1,178,677			24%
	Status quo	446	1,208,776	30,099	3%	47%
	NFLF24	428	1,160,356	-18,320	-2%	25%
	CLHighF	385	1,042,740	-135,937	-12%	0%
	CLLowF	403	1,091,441	-87,235	-8%	14%
2013	No Action	404	1,094,949			15%
	Status quo	416	1,126,417	31,468	3%	37%
	NFLF24	400	1,085,166	-9,784	-1%	16%
	CLHighF	406	1,100,374	5,425	0%	6%
	CLLowF	420	1,139,137	44,188	4%	19%
2014	No Action	414	1,122,329			18%
	Status quo	421	1,141,255	18,926	2%	39%
	NFLF24	410	1,112,099	-10,230	-1%	19%
	CLHighF	412	1,116,055	-6,274	-1%	7%
	CLLowF	426	1,154,144	31,815	3%	20%
2015	No Action	397	1,076,303			13%
	Status quo	400	1,083,456	7,152	1%	32%
	NFLF24	393	1,065,941	-10,362	-2%	14%
	CLHighF	402	1,088,763	12,460	2%	5%
	CLLowF	417	1,130,584	54,281	4%	18%
2016	No Action	353	957,170			1%
	Status quo	366	992,640	35,470	4%	21%
	NFLF24	364	986,880	29,710	3%	6%
	CLHighF	372	1,007,814	50,644	5%	-3%
	CLLowF	380	1,030,613	73,443	8%	7%

- Proposed action is expected to reduce net revenues of the vessels by about 12% compared to the no action in 2010. These changes are proportional and same as the changes in the fleetwide producer surplus estimates provided in Section 5.4.2.5. Because the proposed action will allocate less (23% less) open area days in 2010 compared to no action and other alternatives, and also will allocate access area trips in more productive areas, it will reduce the trip costs (Table 135). The total trip costs for the scallop fleet will decline from $46 million for the no action to $35 million for the proposed action, that is, by about 23% in 2010 (Table in Section 5.4.2.4). Therefore, the revenues net of trip costs are estimated to decline by 12% in 2010 under the proposed action compared to no action, but expected to exceed no action levels by 4% in 2011, by 3% in 2013 and by 1% to 4% during the rest of the years up to 2016.

- For the RFAA purposes it is also important how the cumulative net revenues for the medium-term change with the proposed action compared to no action and other alternatives. Section 5.4.2 (Aggregate economic impacts) provided an analysis of the present value of changes in the producer surplus, which is equal to the sum of net revenues of the scallop vessel and includes the vessel profits and the crew income. Over the near-term from 2010 to 2016, the present value of the producer surplus for the proposed action will be $12 million (at a discount rate of 7%) to $18 million higher (at a discount rate of 3%) than the no action benefits. The producer benefits with the high-F option with no closure (NCLF24) will be $5 million to $ 6 million less than no action, and the new closure high-F option benefits would be $13 to $14 million less than no action benefits. Only new closure low-F (CLF18) producer surplus will exceed the benefits for the proposed action over the same period (Table 82).

- It will not take until year 2016, however, for the cumulative value of the net revenues (or producer surplus) for the proposed action to exceed the no action values. This is important since short-term losses if prolonged over the long-term could lead to business failures, while reduction in profits and net revenues for only one year may not have significant impacts on the viability of the vessels in a highly profitable industry like the scallop fishery if the net revenues improve quickly in the following years. Table 136 shows the estimated annual and cumulative net revenues for an average full-time vessel using different discount rates to express the present value of the net revenues.

- If the future net revenues were not discounted, the cumulative value of the revenues for the proposed action would almost equal to the no action levels by 2013 (with a negligible increase of $463, Table 136). The present value of the cumulative net revenues discounted at 3% or at 7% will slightly exceed the no action levels by 2014. In all cases, however, the cumulative value of the net revenues for the proposed action will decline by less than 5% (by 3% if undiscounted or discounted at 3%, and by 4% if discounted at 7%) in 2011, and by only about 1% in 2012 compared to the cumulative value of the net revenues under no action. Thus, in the near-term, whether it comprises 2010 to 2012, or 2010 to 2016 years, the proposed action will not have a considerable impact on the net revenues of the scallop vessels. Over the period from 2010 to 2016, the present value of the cumulative revenues will be about 1% higher for the proposed action.

Table 135. Average annual scallop net revenue (gross stock minus trip costs) per average full-time (FT) vessel (in 2008 inflation adjusted prices and undiscounted values and after TAC set-asides)

Fishing year	Scenario	Estimated trip costs per vessel	Estimated net revenue per vessel	Change from No Action	% Ch.in net revenue	% Ch. from 2010
2010	No Action	124,522	825,938			
	Status quo	95,632	726,604	-99,334	-12%	
	NFLF24	111,621	820,178	-5,760	-1%	
	CLHighF	138,854	901,097	75,159	8%	
	CLLowF	122,241	836,509	10,571	1%	
2011	No Action	130,996	967,879		0%	2%
	Status quo	136,690	1,006,494	38,615	4%	22%
	NFLF24	133,026	978,628	10,749	1%	5%
	CLHighF	133,390	923,610	-44,269	-4%	-11%
	CLLowF	136,855	948,316	-19,563	-1%	-1%
2012	No Action	150,909	1,027,767			8%
	Status quo	152,921	1,055,855	28,087	3%	28%
	NFLF24	148,524	1,011,832	-15,935	-2%	9%
	CLHighF	145,614	897,125	-130,642	-13%	-14%
	CLLowF	150,489	940,953	-86,815	-8%	-2%
2013	No Action	142,163	952,787			0%
	Status quo	146,616	979,801	27,014	3%	19%
	NFLF24	142,401	942,765	-10,022	-1%	1%
	CLHighF	142,267	958,108	5,321	0%	-8%
	CLLowF	147,574	991,563	38,776	4%	3%
2014	No Action	150,922	971,407			2%
	Status quo	153,212	988,043	16,636	2%	20%
	NFLF24	150,406	961,692	-9,714	-1%	3%
	CLHighF	147,817	968,238	-3,169	-1%	-7%
	CLLowF	152,449	1,001,695	30,289	3%	4%
2015	No Action	151,035	925,268			-3%
	Status quo	151,794	931,662	6,394	1%	13%
	NFLF24	149,868	916,073	-16,348	-1%	-2%
	CLHighF	149,647	939,116	24,210	1%	-10%
	CLLowF	154,188	976,396	38,669	5%	2%
2016	No Action	146,798	810,372			-15%
	Status quo	152,561	840,078	29,706	4%	2%
	NFLF24	151,737	835,143	24,771	3%	-10%
	CLHighF	149,734	858,080	47,708	5%	-17%
	CLLowF	152,492	878,121	67,749	7%	-8%

Table 136. Cumulative value of net revenues for a Full-time limited access vessel

Fishing Year	Net revenue per vessel (No action)	Net revenue per vessel (Proposed action)	Cumulative Net revenue per vessel (No action)	Cumulative Net revenue per vessel (Proposed action)	Change in cumulative net revenue for the proposed action form the no action level	*% Change in cumulative net revenue from no action*
Undiscounted values						
2010	825,938	726,604	825,938	726,604	-99,334	-12%
2011	1,000,845	1,040,790	1,826,783	1,767,394	-59,389	-3%
2012	1,099,549	1,129,469	2,926,332	2,896,863	-29,469	-1%
2013	1,054,318	1,084,250	3,980,651	3,981,113	463	0%
2014	1,112,269	1,131,281	5,092,919	5,112,394	19,475	0%
2015	1,096,695	1,104,228	6,189,615	6,216,622	27,008	0%
2016	996,113	1,032,702	7,185,728	7,249,324	63,597	1%
2010-2016						1%
Discounted at 7%						
2010	825,938	726,604	825,938	726,604	-99,334	-12%
2011	935,369	972,701	1,761,308	1,699,305	-62,003	-4%
2012	960,389	986,522	2,721,696	2,685,827	-35,869	-1%
2013	860,638	885,071	3,582,334	3,570,898	-11,436	0%
2014	848,545	863,049	4,430,878	4,433,947	3,068	0%
2015	781,929	787,299	5,212,807	5,221,246	8,439	0%
2016	663,752	688,133	5,876,559	5,909,379	32,820	1%
2010-2016						1%
Discounted at 3%						
2010	825,938	726,604	825,938	726,604	-99,334	-12%
2011	971,694	1,010,476	1,797,633	1,737,080	-60,553	-3%
2012	1,036,430	1,064,633	2,834,063	2,801,713	-32,350	-1%
2013	964,851	992,243	3,798,913	3,793,955	-4,958	0%
2014	988,236	1,005,128	4,787,150	4,799,083	11,934	0%
2015	946,019	952,517	5,733,169	5,751,600	18,432	0%
2016	834,229	864,872	6,567,398	6,616,472	49,075	1%
2010-2016						1%

Impacts of the proposed action on the profits of the scallop vessels and mitigating factors

- For the RFA analyses, it is also important to determine if the reduction in net revenues will wipe out the profits entirely in the short-term and if that could result in vessels not meeting their short-term and long-term costs and obligations, resulting in insolvency. The NMFS guidelines (NMFS, 2007) state that "Ultimately, the question the RFA analysis needs to answer is whether in the short and medium-term, the costs (or reduction in revenues) imposed by the regulation can be absorbed by the firm (due to higher than average profitability) or passed on to its customers".
- The proposed action will have negative impacts on the profits of the scallop vessels in 2010 compared to no action levels, but is expected to have positive impacts on profits starting with the following year in 2011.

- The extent of the negative impacts on profits in 2010 are uncertain, however, since these impacts will vary according to how the crew lay system would be adjusted in response to the decline in open area days from 42 days to 29 days and to the decline in revenues by 13% in 2010.
- As discussed in Appendix I, boat share is assumed to be 48% and the crew share is assumed to be 52% of the net stocks after paying 5% for the captain and for annual communication and association costs. Profits are estimated by deducting fixed costs from the boat share. Net crew income is estimated by deducting the trip costs from the crew shares. If there was no change in the crew lay system, the reduction in revenues would impact the profits considerably more than it impacts the crew shares since crew would benefit from the reduction in trip costs by 23% in 2010. If there was no change in the crew lay system, crew income per day-at-sea would probably increase if the cost savings from the reduction in effort went entirely to the crew. There is some evidence that the crew lay system was adjusted as the total DAS-used declined in response to the increase in stock abundance after 2000. For example, while in 1999 the crew received 54% of the gross stock, in the recent years this seems to be reduced to the 52% of the gross stock. On the other extreme, vessels owners may attempt to adjust the crew shares such that the entire decline in revenues are taken out of the crew shares, resulting in little impact on profits. This could reduce the crew income per day-at-sea considerably, however, would be inequitable to the crew and could lead the skillful crew leaving the boat for better paying opportunities on another vessel or in another fishery.
- In order to provide an estimate in the middle of this range of assumptions, the following analysis assumes the losses in net revenues in the first year will be shared by the vessel owner and the crew according to the same proportions of the lay system, i.e., 48% of the loss will be taken out of the boat share and 52% of the loss will be taken out of the crew shares in 2010. This would roughly result in equivalent reduction in boat and crew shares, in similar proportions to the reduction in net revenues, i.e., reduction in the producer surplus. This assumption is used only for 2010 and only for the proposed action (NCLF20) and no closure high-F option (NCLF24). In 2011, net revenues is expected to increase considerably and the proposed action revenues will exceed the no action levels. The new closure options results in higher net boat shares in 2010 compared to no action, so it is assumed that the crew lay system will stay the same (48% for boat/52% for crew) for these options. The estimated profits would be less (more) than shown in Table 137 if more of (less of) the reduction in net revenues were taken out of the boat share.
- The level of fixed costs will also impact the percentage reduction in profits. According to the observer data on fixed costs for the period 2001 to 2007, the fixed costs including maintenance, repairs, engine and gear replacement and hull and liability insurance averaged $162,000 per full-time vessel (Appendix I). The 2006 and 2007 fixed cost survey data included other cost items such as office, accounting, taxes and interest payments in addition to the repairs, maintenance and insurance. Using the survey cost data, total fixed costs are estimated to be $176,616 per full-time vessel in 2006 constant dollars and $188,343 in 2008 dollars (Appendix I). These estimates exclude vessel improvement costs (other than repairs and maintenance) which could be considered as discretionary investment and could be postponed when there is a temporary shortfall in cash earnings.

- Table 137 shows that, the estimated profits and the profit rate for the proposed action and the alternatives for 2010. The impacts of the proposed on profits would be negative in the first year compared no action. Profits could decline by 24.1% if there was no change in the lay system, and by 19.6% if the boat and crew shares were lowered in proportion to the reduction in net revenues (assuming that the reduction in net revenues are shared by the boat owner and the crew according to the proportions of the lat system, 48% for the boat, 52% for the crew). Despite the decline in estimated revenues in 2010, the profits per average vessel are still estimated to be positive, however, about $184,292 without a change in the crew lay system (with crew receiving the cost savings) and about $195,082 if crew lay system was adjusted. Table 137 also provides sensitivity analysis with prices about 10% lower than the predicted values (See also Section 5.4.8: Uncertainties and risks). The results show that profits will remain positive despite the decline in revenues and profits from the no action levels.
- The crew incomes shown in Table 137 do not include the captain's bonus, which is taken out of the gross stock before the boat and crew shares are determined. Captain's bonuses will decline in the same proportion as the revenue decline, i.e., by 13% in 2010.
- The percentage decline in profits and crew income in 2010 compared to no action will vary from vessel to vessel and from the average levels depending on their LPUE's with the proposed and no action. Because larger vessels with higher fishing power can land more pounds of scallops per day-at-sea (have higher LPUE) than smaller vessels, with less open area days compared to no action, the revenues they earn from these areas could decline by a larger amount than the revenues of the smaller vessels from the no action levels. This could lower the profits of the larger vessels relatively more given that fixed costs are larger for the bigger boats as well. Total revenues of the larger vessels are still expected to be higher than the smaller vessels, however, because they land more scallops from their open area days. The larger boats could be able to access productive areas farther from the port and fish in weather conditions that smaller vessels may not be able to. Since the trips costs per day-at-sea are larger for the bigger boats, their cost savings due to the reduction in open area effort will be larger than the average vessels. For these reasons, the impacts of the proposed action on the profits of the larger boats relative to the no action levels are not expected to be significantly different from the impacts on an average boat in the scallop fishery. That is, the decline in allocations with the proposed action will lower their net revenues and profits in 2010, but is expected to increase their revenues and profits over the medium term. In the following years as the allocations increase, the revenues of the larger vessels could increase relatively more than the average vessel, thus the increase in profits could be higher than relative to an average vessel.
- Although smaller scallop vessels in the fishery have lower revenues from the open areas, thus have, lower total revenues than an average vessel, their fixed costs and trip costs are substantially lower as well. For example, total fixed costs of the small boats with a 51 gross tons to 100 gross tons were about 60% of the fixed costs for an average vessel (Appendix I, Estimation of fixed costs). Therefore, the impacts of the proposed action on the profits of the small boats relative to the no action levels are not expected to be significantly different from the impacts on an average boat in the scallop fishery. That is, the decline in allocations with the proposed action will lower their net revenues and

profits in 2010, but is expected to increase their revenues and profits over the medium term.

- Since the general category vessels will receive 5% of the total scallop TAC, their revenues will be 13% less as well compared to no action as well.
- The estimated profits for various scenarios with prices and adjustments in the lay system is expected to provide some cushion for investments in vessel improvement (averaged about $53,375 in 2008 inflation adjusted prices) if the owner chooses to do so or if the price of scallops were lower and trip costs are higher than estimated. Therefore, existence of relatively high profits in the scallop fishery is expected to mitigate the decline in net revenues in the fishery in 2010 by 12% compared to the no action levels. The costs (i.e., reduction in revenues) imposed by the proposed regulation are not expected to result in business operations in the scallop fishery for the same reasons. In addition, relatively high landing and revenues experienced by the scallop fishery especially during the past couple of years is expected to result in some surplus over the costs that could be applied in years when the fishery is not doing so well. For example, the average revenue per FT vessels exceeded $1 million for the fishing years 2004-2008 and 2009 fishing year is going to be another high revenue year with landings and revenues expected to be at similar (if not higher) levels than in 2008, resulting in high profits and crew income in the scallop fishery.
- The allowance for carry-over days is another factor could also mitigate some of the negative impacts of the proposed action on net revenues and profits of the vessels, negative impacts on crew incomes and employment (in terms of crew-days =Crew*DAS-used) in 2010. The vessels that choose to save some of the open area days allocated in the past or in 2009 could use up to 10 days in 2010 to mitigate the decline in DAS allocations in 2010.
- The expected increase in the net revenues, profits of the vessels, crew shares and employment starting with 2011 will mitigate the negative impacts as the loss in revenues in 2010 recovered and overall DAS-used increased in the next 2 years. The proposed action is expected to increase vessel profits by 6.5% in 2011, and by 4% or over in 2012 and 2013 compared to the no action levels (Table 138). As a result, the annual profit rates (profits as a % of gross revenue) are expected to be higher for the proposed action compared to no action levels in the following years.

Table 137. Average boat shares, crew income and profits per average full-time (FT) vessel (in 2008 inflation adjusted prices and undiscounted values and after TAC set-asides)

Fishing year	Scenario	Net boat share	Net crew income	Profits	Change from no action	% Ch.from no action	*Profit rate (% of gross revenue)*
2010 No change in crew lay system	No Action	431,105	394,833	242,762			26%
	Status quo	372,635	353,969	184,292	-58,470	-24.1%	22%
	NFLF24	422,595	397,583	234,253	-8,509	-3.5%	25%
	CLHighF	471,913	429,185	283,570	40,808	16.8%	27%
	CLLowF	434,885	401,624	246,542	3,780	1.6%	26%
2010 Lay system changes	No Action	431,105	394,833	242,762			26%
	Status quo	383,424	343,180	195,082	-47,680	-19.6%	24%
	NFLF24	428,340	391,838	239,997	-2,765	-1.1%	26%
	CLHighF	471,913	433,916	278,839	40,808	16.8%	27%
	CLLowF	434,885	400,330	247,836	3,780	1.6%	26%
2010 No change in lay system Prices 10% lower	No Action	387,764	343,128	199,421			23%
	Status quo	335,141	309,240	146,798	-52,623	-26.4%	20%
	NFLF24	380,105	346,893	191,763	-7,658	-3.8%	23%
	CLHighF	424,491	372,611	236,148	36,727	18.4%	25%
	CLLowF	391,166	349,468	202,823	3,402	1.7%	24%
2010 Lay system changes Prices 10% lower	No Action	387,764	343,128	199,421			23%
	Status quo	346,238	298,142	157,896	-41,526	-20.8%	21%
	NFLF24	385,895	341,104	197,552	-1,869	-0.9%	24%
	CLHighF	419,545	377,558	231,202	31,781	15.9%	25%
	CLLowF	392,440	348,194	204,097	4,676	2.3%	24%

Table 138. Average boat shares, crew income and profits per average full-time (FT) vessel in the near-term (in 2008 inflation adjusted prices and undiscounted values and after TAC set-asides, no change in crew lay system)

Fishing year	Scenario	Net boat share	Net crew income	Profits	Change from no action	% Ch.from no action	Profit rate (% of gross revenue)
2011	No Action	498,782	469,097	310,439			28%
	Status quo	518,987	487,507	330,644	20,205	6.5%	29%
	NFLF24	504,609	474,019	316,266	5,827	1.9%	28%
	CLHighF	479,687	443,923	291,344	-19,095	-6.2%	28%
	CLLowF	492,533	455,783	304,190	-6,249	-2.0%	28%
2012	No Action	535,172	492,596	346,829			29%
	Status quo	548,897	506,958	360,554	13,725	4.0%	30%
	NFLF24	526,817	485,015	338,475	-8,354	-2.4%	29%
	CLHighF	473,184	423,941	284,842	-61,987	-17.9%	27%
	CLLowF	495,392	445,561	307,050	-39,779	-11.5%	28%
2013	No Action	496,992	455,795	308,649			28%
	Status quo	511,341	468,460	322,999	14,349	4.6%	29%
	NFLF24	492,531	450,234	304,188	-4,461	-1.4%	28%
	CLHighF	499,466	458,642	311,123	2,474	0.8%	28%
	CLLowF	517,142	474,421	328,799	20,150	6.5%	29%
2014	No Action	509,477	461,930	321,134			29%
	Status quo	518,107	469,936	329,765	8,630	2.7%	29%
	NFLF24	504,812	456,881	316,469	-4,665	-1.5%	28%
	CLHighF	506,616	461,622	318,274	-2,861	-0.9%	29%
	CLLowF	523,985	477,711	335,642	14,508	4.5%	29%
2015	No Action	488,489	436,779	300,147			28%
	Status quo	491,751	439,911	303,408	3,262	1.1%	28%
	NFLF24	483,764	432,309	295,421	-4,725	-1.6%	28%
	CLHighF	494,171	444,945	305,828	5,682	1.9%	28%
	CLLowF	513,241	463,155	324,899	24,752	8.2%	29%
2016	No Action	434,164	376,207	245,822			26%
	Status quo	450,339	389,740	261,996	16,174	6.6%	26%
	NFLF24	447,712	387,431	259,370	13,548	5.5%	26%
	CLHighF	457,258	400,822	268,916	23,094	9.4%	27%
	CLLowF	467,654	410,466	279,312	33,490	13.6%	27%

- Table 139 shows the estimated annual and cumulative profits for an average full-time vessel using different discount rates to estimate the present value of the profits. If the future profits were not discounted, the cumulative value of the profits for the proposed action would almost equal to the no action levels by 2013 (with a negligible increase of $599).
- The present value of the cumulative profits discounted at 3% or at 7% are expected to exceed the no action levels by 2014. The *cumulative value* of the profits for the proposed action will decline by about 5% in 2011, and slightly by 1.5% to 2% in 2012 compared to the cumulative value of the profits under no action. Thus, in the near-term (whether it comprises 3 years from 2010 to 2013, or 7 years from 2010 to 2016), the proposed action will not have a considerable impact on the profits of the scallop vessels. In addition,

relatively high levels of revenues and of profits in the sea scallop fishery during the recent years and measures such as carry-over open area days are also expected to mitigate some of the negative impacts in 2010. Over the period from 2010 to 2016, the present value of the cumulative profits will be about 1% higher for the proposed action.

- Because increase in revenues over the long-term outweighs the decline in revenues in 2010, the proposed action and all the other alternatives will result in higher revenues than the No Action scenario over the medium – and long-term, and the impacts on the profits will be positive as well. Over the long-term from 2010 to 2023, the proposed action will generate \$80 million (at 7% discount rate) to \$118 million (at 3% discount rate) more revenues than the no action alternative (Table 88 to Table 90 in Section 5.4.2.3).

Table 139. Cumulative present value of profits per average full-time (FT) vessel (in 2008 inflation adjusted prices and after TAC set-asides)

Fishing Year	Annual Profits		Cumulative profits		Change in profits from No Action	% Change in profits from No Action
	No action	Proposed Action	No Action	Proposed Action		
Cumulative undiscounted values						
2010	\$242,762	\$195,082	\$242,762	\$195,082	-47,680	-19.6%
2011	\$310,439	\$330,644	\$553,201	\$525,726	-27,475	-5.0%
2012	\$346,829	\$360,554	\$900,030	\$886,280	-13,750	-1.5%
2013	\$308,649	\$322,999	\$1,208,680	\$1,209,279	599	0.0%
2014	\$321,134	\$329,765	\$1,529,814	\$1,539,044	9,229	0.6%
2015	\$300,147	\$303,408	\$1,829,961	\$1,842,452	12,491	0.7%
2016	\$245,822	\$261,996	\$2,075,783	\$2,104,448	28,665	1.4%
Cumulative present values discounted at 7%						
2010	\$242,762	\$195,082	\$242,762	\$195,082	-47,680	-19.6%
2011	\$290,130	\$309,013	\$532,892	\$504,095	-28,797	-5.4%
2012	\$302,934	\$314,922	\$835,826	\$819,017	-16,809	-2.0%
2013	\$251,950	\$263,663	\$1,087,776	\$1,082,680	-5,096	-0.5%
2014	\$244,992	\$251,576	\$1,332,768	\$1,334,256	1,488	0.1%
2015	\$214,000	\$216,326	\$1,546,768	\$1,550,582	3,814	0.2%
2016	\$163,802	\$174,579	\$1,710,570	\$1,725,161	14,591	0.9%
Cumulative present values discounted at 3%						
2010	\$242,762	\$195,082	\$242,762	\$195,082	-47,680	-19.6%
2011	\$290,130	\$309,013	\$532,892	\$504,095	-28,797	-5.4%
2012	\$302,934	\$314,922	\$835,826	\$819,017	-16,809	-2.0%
2013	\$251,950	\$263,663	\$1,087,776	\$1,082,680	-5,096	-0.5%
2014	\$244,992	\$251,576	\$1,332,768	\$1,334,256	1,488	0.1%
2015	\$214,000	\$216,326	\$1,546,768	\$1,550,582	3,814	0.2%
2016	\$163,802	\$174,579	\$1,710,570	\$1,725,161	14,591	0.9%

Comparison of the impacts with the alternative options:

The analyses provided above and in Section 5.4 of the document compared the impacts of the alternative options. No Action alternative is expected to result in positive economic impacts on the small business entities and scallop vessels in the short-term, but negative impacts over the medium to long-term. No action alternative does not prevent overfishing and would results in suboptimal allocation of open area DAS and access area trips as discussed in Section 5.4.1. Consequently, No Action would have negative impacts on scallop stock biomass, on landings, revenues and economic benefits from the scallop fishery. In addition, since fishing mortality would be higher in the open areas, No Action would have higher impacts on area swept projections in SNE which has impacts on YT bycatch and turtles. This in turn, would have required more stringent measures to comply with RPM with negative short-term impacts on the scallop vessels.

The high-F options both with no closure (NCLF24) and new closure (CLF20) would have positive economic impacts on the scallop vessels in 2010, but negative impacts in the near-term period from 2010 to 2016 compared to no action. The comparative impacts of these alternatives on the net revenues of individual vessels will be proportional on their fleetwide impacts as estimated by the producer surplus in Section 5.4.2.5 and reproduced in Table 82 below. The present cumulative value for the producer surplus (total revenues minus fishing costs) for the no closure high-F option is expected to be $18 million less, and the new closure high F option $26 million less than the proposed option. Therefore, these alternatives are not expected to generate higher benefits for the scallop vessels in either in the medium-term (2010-2016) or in the long-term (2010-2023) compared to the proposed action.

The new closure low-F option (CLF18) would result in higher benefits for the scallop vessels in 2010. Although over the period from 2011 to 2016, this alternative will result in $27 million lower benefits compared to the proposed action, the positive impacts form the first year would outweigh the negative impacts in the next 6 years and over the long-term. Therefore, the new closure low-F option (CLF18) would generate higher benefits compared to the proposed action. This alternative would have undesirable biological impacts, however, because new rotational area closure alternatives resulted in a higher area swept estimates in Mid-Atlantic which could have impacts on non-target species in those areas. If the scallop fishery caused negative impacts on the non-target species, then more stringent measures would have to be taken to reduce effort with potentially negative economic impacts on the scallop vessels.

Table 140. Short and long-term cumulative present value of the producer surplus (million $, in 2008 inflation-adjusted prices, discount rate of 7% (except otherwise noted as 3%)

Period	Data	No action	No Closure $F = 0.20$ (Status Quo)	No Closure $F = 0.24$	Closure $F = 0.20$	Closure $F = 0.18$
2010 (not discounted)	PV of producer surplus	305	268	303	333	309
	Difference from Status quo	37		35	64	41
	Difference from No Action		-37	-2	28	4
2011-2016	PV of producer surplus	1,864	1,913	1,860	1,822	1,886
	Difference from Status quo	-49		-52	-90	-27
	Difference from No Action		49	-3	-42	22
	Difference from No Action (3%)		55	-3	-41	31
2010-2016	PV of producer surplus	2,169	2,181	2,163	2,155	2,194
	Difference from Status quo	-12		-18	-26	14
	Difference from No Action		12	-6	-14	26
	Difference from No Action (3%)		18	-5	-13	35
2017-2023	PV of producer surplus	1,363	1,427	1,418	1,398	1,424
	Difference from Status quo	-64		-9	-29	-4
	Difference from No Action		64	55	35	61
	Difference from No Action (3%)		93	80	53	88
2010-2023	PV of producer surplus	3,532	3,608	3,581	3,553	3,618
	Difference from Status quo	-76		-27	-55	10
	Difference from No Action		76	49	21	86
	Difference from No Action (3%)		111	75	39	123

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The aggregate impacts of the proposed measures could differ from the economic impacts of the individual measures as discussed in the relevant subsections of Section 5.4 and summarized in the following section.

6.12.3.3.2 Economic impacts of the individual measures

Acceptable Biological Catch

- Economic impacts are analyzed in Section 5.4.2.1
- Rationale is provided in Section 2.3 and in Executive Summary.
- **Summary of the impacts of the proposed option and mitigating factors**:

This new requirement is expected to have long-term economic benefits on the fishery by helping to ensure that catch limits and fishing mortality targets are set at or below ABC. This should help prevent overfishing and optimize yield on a continuous basis. Therefore, this measure is expected to have positive impacts on the landings and revenues, producer and consumer surpluses and net economic benefits to the nation.

- **Comparison of the impacts with the alternative options:** There are no alternatives that would generate higher economic benefits for the participants of the scallop fishery.

Adjustments when yellowtail flounder catches reach 10% TAC limit

- Rationale is provided in Executive Summary and in Section 2.5.1.1
- Economic impacts are analyzed in Section 5.4.3.1

- **Summary of the impacts of the proposed option and mitigating factors**: This alternative will continue the measures under no action and the allocation of prorated open area DAS will have the same impacts. It will help to minimize loss in pounds and revenue due to the closure of access areas due to yellowtail quota before a vessel takes its trip. As a result, this measure will have positive economic impacts on scallop vessels although the scallop pounds per trip could be lower than the allocated pounds for the Georges Bank access area trips due to the proration.
- **Comparison of the impacts with the alternative options:** There are no alternatives that would generate higher economic benefits for the participants of the scallop fishery.

TAC set-asides for observers and research

- Rationale is provided in Section 2.5.1.2.
- Economic impacts are analyzed in Section 5.4.3.3.
- **Summary of the impacts of the proposed option and mitigating factors:** Setting aside 2% of available TAC in access areas for research, and 1% to provide funding for observers is expected to have indirect economic benefits on the sea scallop fishery by improving scallop management through better data and information made possible by research and the observer program.
- **Comparison of the impacts with the alternative options:** There are no alternatives that would generate higher benefits for the scallop vessels.

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

- Rationale is provided in Section 2.5.1.4.
- Economic impacts are analyzed in Section 5.4.3.5
- **Summary of the impacts of the proposed option and mitigating factors:** 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 compared to 5% for status quo. As a result, open area DAS allocations for limited access vessels will be reduced resulting with negative impacts of revenues and profits of the limited access vessels in 2010.
- **Comparison of the impacts with the alternative options:** There are no alternatives to reducing open area DAS if LAGC IFQ program is not implemented by March 1, 2010.

Quarterly Hard TAC for General Category Vessels

- Rationale is provided in executive Summary.
- Economic impacts are analyzed in Sections 5.4.4.1
- **Summary of the impacts of the proposed option and mitigating factors**: This constitutes no action if the LAGC IFQ program is not implemented by March 1, 2010. General category TAC (% 10 of total scallop TAC) will be allocated on a quarterly basis to the general category fishery during the interim period to prevent overfishing of the scallop resource due to the expansion of the general category effort. As a result, this measure will have positive economic impacts over the long-term on the vessels that qualify for general category limited access fishery The division of the total TAC into quarterly TACs will reduce race to fish to some extent and lessen the negative economic impacts associated with derby fishing

- **Comparison of the impacts with the alternative options:** There is no other alternative to the no action alternative of 10% hard quarterly TAC for the general category fishery if LAGC IFQ program is not implemented by March 1, 2010.

Georges Bank Access Area management

- Rationale is provided in Section 2.6.2 and 2.6.2.1 and in Executive Summary.
- Economic impacts are analyzed in Section 5.4.3.1 and 5.4.4.3
- **Summary of the impacts of the proposed option and mitigating factors**: Allocation of one access area trip to the Nantucket Lightship area (NLS) is expected to have positive economic impacts. The biomass and LPUE in this area is estimated to be quiet high and trip costs will lower since the same amount of scallops could be landed in a shorter time frame compared to areas with lower scallop abundance. Providing allocations to high abundance areas will help increase yield, landings and revenues from the fishery both in the short-and the long-term, benefiting both limited access and general category vessels that participate in the scallop fishery. The proposed action (no action) also includes closure of the NLS area if the 10% yellowtail flounder bycatch TAC for SNE is reached (section 2.6.2.1). The yellowtail flounder bycatch TAC is shared between the limited access and general category fisheries; therefore, once the TAC is reached the area closes for both fleets. Since this measure is no action, there will be no change in economic impacts under the present regulations.
- **Comparison of the impacts with the alternative options:** There are no alternatives that would generate higher benefits for the scallop vessels. The only alternative is the no action. Because there is no trip allocation to the NLS area under no action, economic benefits would be lower both in the short and long-term compared to the proposed alternative.

Mid-Atlantic access area management

- Description is provided in Section 2.6.3 and rationale is provided in Executive Summary
- Economic impacts are analyzed in Section 5.4.3.2 and 5.4.4.4
- **Summary of the impacts of the proposed option and mitigating factors**:

The proposed action and the alternatives 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. The economic impacts of trip allocations for the Elephant Trunk and Delmarva are analyzed in Section 5.4.2 in combination with other open and access area measures. By itself, allocations for the highly productive areas of Mid-Atlantic in 2010 will have positive economic impacts on both limited access and general category vessels.

- **Comparison of the impacts with the alternative options:** There are no alternatives that would generate higher benefits for the scallop vessels. The only alternative is the "No Action" which would allocate would allocate 3 trips to ETA, which is higher than the projected biomass in that area can support. As a result, "No Action" would have negative impacts on the biomass and yield form the ETA.

Northern Gulf of Maine (NGOM) Hard-TAC

- Rationale is provided in Section 2.6.4 and in executive Summary
- Economic impacts are analyzed in Section 5.4.4.5
- **Summary of the impacts of the proposed option and mitigating factors**:

Proposed action includes a 70,000 pounds hard-TAC for the NGOM, which is equivalent to the "No Action" scenario as specified in the previous Framework action 19. This measure is expected to have positive economic impacts on a larger number of vessels that are not qualified for limited access but qualifies for an NGOM permit since these vessels will have an opportunity to earn some income from scallops in this area until the resource status can be better determined and becomes more favorable.

- There are no other alternative options.

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

- Rationale is provided in Executive Summary and in Section 2.6.6
- Economic impacts are analyzed in Section 5.4.4.7.
- **Summary of the impacts of the proposed option and mitigating factors**: Proposed action measure will provide flexibility for the general category vessels to lease and earn income their unused quotas to other vessels during the fishing year. This will allow fishermen to combine their allocations and to benefit from an economically viable operation when the allocations of individual vessels are too small to make scallop fishing profitable. As a result, this measure will have positive impacts on vessel revenues and profits.
- **Comparison of the impacts with the alternative options:** There are no other alternatives that would generate higher benefits for the scallop vessels. The only alternative is the "No Action" and it does not allow vessel to lease their unused quotas to other vessels during the fishing year.

Compliance with reasonable and prudent measure in recent biological opinion

- Rationale is provided in Section 2.8 and in the Executive Summary of the Framework 21 document.
- Economic impacts are analyzed in Section 5.3.1 and in Section 5.4.6.
- **Summary of the impacts of the proposed option and mitigating factors**:

The proposed action is a combination of the Delmarva closure in September and October with a limit on the maximum number of trips (at two per vessel) that can be taken in the Mid-Atlantic areas from June 15 to August 31. Because the effort is shifted to a relatively less productive season, total fleet trip costs are expected to increase slightly. Since there is no change in the possession limit, the trips that are shifted from this season are expected to be taken outside of the turtle window, without a loss in total revenue if as expected, this measure does not have a negative impact on prices. The proposed action includes a seasonal closure in the Delmarva access area from September 1 – October 31 to all scallop vessels, including general category vessel. This measure is not expected to affect general category fleet specifically since the access area trips for this fleet are allocated as a fleetwide number of trips, and tend to be used in the weeks following an opening and before September 1st.

Comparison of the impacts with the alternative options: There are no other alternatives that would generate higher benefits for the scallop vessels. The only alternative is the "No Action", but no action would not comply with the with reasonable and prudent measures to minimize the impacts of any incidental take. The economic impacts of the RPM measures will vary with the Framework 21 allocation alternatives and the window of time in which the measures are applied. The proposed action is expected to minimize the effort shift from the turtle window compared to the other alternatives considered by the Council, thus, there are no other alternatives that would generate higher benefits for the scallop vessels.

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

- Description is provided in Section 2.9.2 and Rationale is provided in the Executive Summary.
- Economic impacts are analyzed in Section 5.4.7.2.
- **Summary of the impacts of the proposed option and mitigating factors**: Proposed action includes a provision to limit the amount of observer compensation general category vessels can receive on observed trips in access areas to the equivalent of one day compensation regardless of trip length. Therefore, this action would eliminate a "loophole" for how compensation is granted and create a ceiling to discourage overages. If this ultimately improves the overall coverage of the scallop fishery there may be indirect economic benefits from improved information and monitoring of the fishery and resource.
- **Comparison of the impacts with the alternative options:** There are no other alternatives that would generate higher benefits for the scallop vessels.

6.12.3.3.3 Indirectly affected industries

Indirect impacts include the impacts on the sales, income, employment and value-added of industries that supply commercial harvesters, such as the impacts on marine service stations that sell gasoline and oil to scallop vessels. The induced impacts represent the sales, income and employment resulting from expenditures by crew and employees of the indirect sectors. Proposed action is expected to have negative indirect impacts in 2010 but positive indirect impacts over the medium-term from 2010-2016 compared to no action by increasing landings and revenues from the scallop fishery. But given that overall impacts of the proposed measures on the fleet revenues and profits will be slightly positive and small during 2010-2016, their indirect and induced impacts are not expected to be significant in the medium term. Over the long-term from 2010 to 2023, however, the proposed action will generate $80 million (at 7% discount rate) to $118 million (at 3% discount rate) more revenues than the no action alternative and will have positive indirect impacts on the indirectly affected industries.

6.12.3.3.4 Identification on Overlapping Regulations

The proposed regulations do not create overlapping regulations with any state regulations or other federal laws.

7.0 GLOSSARY

Annual fishing mortality target – a rate of removals that when applied over a fishing year is consistent with the objectives of the FMP.

Annual potential increase – the percent increase in total or relative biomass that would occur during a one-year interval if no fishing occurs (i.e. zero fishing mortality). Projection models take into account the size frequency distribution of the population, the expected growth of individuals at each size class, and natural mortality.

Area based management – in contrast to resource wide allocations of TAC or days, vessels would receive authorization to fish in specific areas, consistent with that area's status, productivity, and environmental characteristics. Area based management does not have to rotate closures to be effective.

Area rotation – a management system that selectively closes areas to fishing for short to medium durations to protect small scallops from capture by commercial fishing until the scallops reach a more optimum size. Closed areas would later re-open under special management rules until the resource in that area is similar to other open fishing areas. Area rotation is a special subset of area based management that relies on an area closure strategy to achieve the desired results when there are sufficient differences in the status of the management areas.

B_{max} – a theoretical value when the scallop stock with median recruitment is fished at Fmax. For a stock without a stock-recruitment relationship, like sea scallops, this stock biomass produces MSY when fished at Fmax.

Biological Opinion – an ESA document prepared by either the NMFS or USFWS describing the impacts of a specific Federal action, including an FMP, on endangered or threatened species. The Biological Opinion concludes whether or not the NMFS/USFWS believe that the actions are likely to jeopardize the continued existence of any of the protected species, and provides recommendations for avoiding those adverse impacts.

Closed rotation area – an area that is temporarily closed to postpone mortality on abundant, small scallops.

Consumer surplus - The net benefit consumers gain from consuming fish based on the price they would be willing to pay for them. Consumer surplus will increase when fish prices decline and/or landings go up.

Contagious recruitment – similar amounts of scallop settlement in related areas. When scallop settlement is above average in one area, it tends to be above average in neighboring areas.

Controlled access – a program that allows fishing in a specified area under rules that differ from the normal fishery management rules that apply to normal, open fishing areas. Often controlled access areas have a scallop TAC, a scallop possession limit, and area-specific trip and DAS allocations. Other regulations may apply to achieve certain conservation objectives.

Critical habitat – an area that has been specifically designated under the ESA as an area within the overall geographical region occupied by an endangered or threatened species on which are found the physical or biological features essential to conservation of the species.

Day-at-sea (DAS) – is each 24-hour period that a vessel is on a scallop trip (i.e. not declared out of the day-at-sea program) while seaward of the Colregs line.

Day-at-sea tradeoff – the number of days automatically charged for fishing for scallops in designated areas, regardless of the time actually fished.

Day-at-sea use – the amount of time that a vessel spends seaward of the Colregs line on a scallop trip.

Days-at-sea accumulated – days charged against a vessel's annual day-at-sea allocations, including day-at-sea tradeoffs. Trips in controlled access areas are often charged a pre-established amount of DAS, regardless of the actual duration of the trip.

Endangered species – a species that is in danger of extinction throughout all or a significant portion of its range.

ESA - Endangered Species Act of 1973 as amended.

Exploitable biomass - the total meat weight of scallops that are selected by fishing, accounting for gear and cull size, at the beginning of the fishing year[7].

F_{max} – a fishing mortality rate that under equilibrium conditions produces maximum yield-per-recruit. This parameter serves as a proxy for Fmsy for stocks that do not exhibit a stock-recruitment relationship, i.e. recruitment levels are driven mostly by environmental conditions.

Fixed costs - These costs include expenses that are generally independent of the level of fishing activity, i.e., DAS-used, such as insurance, license, half of repairs, office expenses, professional fees, dues, utility, interest, dock expenses, bank, rent, store, auto, travel, and employee benefits.

Fixed duration closure – a rotational closure that would be closed for a pre-determined length of time.

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7 The **average exploitable biomass** is different and is defined as the total meat weight of scallops that are selected by fishing averaged over the fishing year, accounting growth, natural mortality, fishing mortality, and gear and cull size.

Fixed rotational management area boundaries – pre-defined specifications of areas to be used to manage area rotation.

FMP – Fishery Management Plan.

Heterogeneity – spatial differences in the scallop resource, life history, or the marine environment.

Incidental Take Statement – a section of a Biological Opinion that allows the take of a specific number of endangered species without threat of prosecution under the ESA. For the Scallop FMP, an incidental take statement has been issued for a limited number of sea turtles to be taken by permitted scallop vessels.

IWC – International Whaling Commission; an international group that sets international quotas and/or establishes moratoria on harvesting of whales.

Localized overfishing – a pattern of fishing that locally exceeds the optimum rate, considering the age structure of the population, recruitment, growth, and natural mortality. This effect may cause mortality that is higher than appropriate on small scallops while under-fishing other areas with large scallops (assuming that the overall amount of effort achieves the mortality target for the entire stock). The combined effect is to reduce the yield from the fishery through the loss of fast-growing small scallops and the loss of biomass from natural mortality on very large scallops.

Long-term closure area – an area closed to scallop fishing for reasons other than achieving area rotation objectives. These areas may be closed to minimize habitat impacts, avoid bycatch, or for other reasons.

LPUE – Similar to catch per unit effort (CPUE), commonly used terminology in fisheries, LPUE in the Scallop FMP refers to the amount of landings per DAS a vessel achieves. This value is dependent on the scallop abundance and catch rate, but also depends on the shucking capacity of the crew and vessel, since most of the scallop catch must be shucked at sea. Since discard mortality for sea scallops is low, discards are not included as a measure of catch in the calculation of LPUE.

Magnuson Act – Magnuson Stevens Act of 1976 as amended.

Meat yield – the weight of a scallop meat in proportion to the total weight or size of a scallop. Scallops of similar size often have different meat yields due to energy going into spawning activity or due to the availability of food.

MMPA - Marine Mammal Protection Act of 1972 as amended.

NAAA - The Northwest Atlantic Analysis Area was a geographic area used in the habitat metric analysis. It's boundary to the North is the Hague line, the NC/SC border to the South, the coastline to the West, and the 500 fathom depth contour to the East.

NEPA – National Environmental Policy Act of 1972 as amended.

Net economic benefits - Total economic benefits measure the benefits both to the consumers and producers and are estimated by summing consumer and producer surpluses. Net economic benefits show, however, the change in total economic benefits net of no action.

NMFS – National Marine Fisheries Service.

Nominal versus real economic values - The nominal value of fishing revenues, prices, costs and economic benefits are simply their current monetary values unadjusted for inflation. Real values are obtained, however, by correcting the current values for the inflation.

Open area – a scallop fishing area that is open to regular scallop fishing rules. The target fishing mortality rate is the resource-wide target.

Operating expenses or variable costs - The operating costs measures the expenses that vary with the level of the fishing activity including food, ice, water, fuel, gear, supplies and half of the annual repairs.

Opportunity cost - The cost of forgoing the next best opportunity. For example, if a fisher's next best income alternative is to work in construction, the wage he would receive from construction work is his opportunity cost.

PDT – Scallop plan Development Team; a committee of experts that contributed to and developed the technical analysis and evaluation of alternatives.

Potential biomass increase - the annual change in the total biomass of scallop meats if no fishing occurs.

Producer surplus -Producer surplus for a particular fishery shows the net benefits to harvesters, including vessel owners and the crew, and is measured by the difference between total revenue and operating costs.

Recently re-opened area – an area that has recently re-opened to scallop fishing following a period of closure that postponed mortality on small scallops. The annual TAC and target fishing mortality rate is defined by time-averaged fishing mortality that allows the area-specific target to deviate from the norm. Special rules (i.e. day-at-sea allocations or trips with possession limits and day-at-sea tradeoffs may apply.

Recruitment – a new year class of scallops measured by the resource survey. Scallop larvae are pelagic and settle to the bottom after 30-45 days after spawning. The resource survey, using a lined dredge, is able to capture scallops between 20 – 40 mm, but more reliably at between 40 and 60 mm. Recruitment in this document refers to a new year class that is observable in the survey, at around two years after the eggs had been fertilized and spawned.

Recruitment overfishing – a high level of fishing mortality that causes spawning stock biomass to decline to levels that significantly depresses recruitment. Because sea scallops are very productive, this mortality rate is substantially higher than F_{max} and the biomass where recruitment is threatened is much lower than the present biomass target.

SAFE Report – A Stock Assessment and Fishery Evaluation Report, required by the Sustainable Fisheries Act. This report describes the present condition of the resource and managed fisheries, and in New England it is prepared by the Council through its Plan Development Teams (PDT) or Monitoring Committees (MC). The Scallop PDT is the MC for the Atlantic Sea Scallop FMP and prepares this report.

SMAST – School for Marine Science and Technology, University of Massachusetts Dartmouth

Scallop productivity – the maximum average amount of biomass that can be taken from a defined area.

Shucking – a manual process of cutting scallop meats from the shell and viscera.

Size selection – in the scallop fishery, size selection occurs at two points: when the fishing gear captures the scallop and when the crew culls the catch before shucking. At the first point, size selection depends on escapement through the dredge rings, twine top, or trawl meshes. At the second point, size selection depends on the size of the catch and marketability. Small scallops are less valuable and more time consuming to shuck a pound of meats. These factors influence whether the crew retains scallops at a smaller or larger size. Size selection by the fishery is the combined effect of mortality from landed scallops, from discard mortality, and from non-catch mortality from the fishing gear. Except under certain rare conditions, most of the mortality has been associated with the landed portion of the catch.

TAC – Total allowable catch is an estimate of the weight of scallops that may be captured by fishing at a target fishing mortality rate. The TAC could apply to specific areas under area based management rules.

Take – a term under the MMPA and ESA that means to harass, harm , pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct with respect to either a marine mammal or endangered species.

Ten-minute square – an approximate rectangle with the dimensions of 10-minutes of longitude and 10-minutes of latitude.

Threatened species – any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

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Appendix I

Economic model and sensitivity analyses for Framework 21 to the Scallop FMP

1.1 ECONOMIC MODEL

1.1.1 ESTIMATION OF PRICES, COSTS, PROFITS AND NATIONAL BENEFITS

The economic model includes an ex-vessel price equation, a cost function and a set of equations describing the consumer and producer surpluses. The ex-vessel price equation is used in the simulation of the ex-vessel prices, revenues, and consumer surplus along with the landings and average meat count from biological projections. The cost function is used for projecting harvest costs and thereby for estimating the producer benefits as measured by the producer surplus. The set of equations also includes the definition of the consumer surplus, producer surplus, profits to vessels, and total economic benefits.

1.1.2 Estimation of annual ex-vessel prices

Fish prices constitute one of the important channels through which fishery management actions affect fishing revenues, vessel profits, consumer surplus, and net economic benefits for the nation. The degree of change in ex-vessel price in response to a change in variables affected by management, i.e., scallop landings and meat count, is estimated by a price model, which also takes into account other important determinants of price, such as disposable income of consumers and price of imports.

Given that there could be many variables that could affect the price of scallops, it is important to identify the objectives in price model selection for the purposes of cost-benefit analyses. These objectives (in addition to developing a price model with sound statistical properties) are as follows:

- To develop a price model that uses inputs of the biological model and available data. Since the biological model projects annual (rather than monthly) landings, the corresponding price model should be estimated in terms of annual values.
- To select a price model that will predict prices within a reasonable range without depending on too many assumptions about the exogenous variables. For example, the import price of scallops from Japan could impact domestic prices differently than the price of Chinese imports, but making this separation in a price model would require prediction about the future import prices from these countries. This in turn would complicate the model and increase the uncertainty regarding the future estimates of domestic scallop prices.

In the past SAFE reports and Scallop Amendment and Frameworks, the average ex-vessel price for scallops was estimated from an annual price model as a function of total landings, average meat count of scallops landed, disposable income of consumers, and average import prices. Collection of price data by market category of scallops since 1998, however, made it possible to improve the price model by taking into account the changes in the size composition of scallops. The composition of scallops changed significantly in the last ten years toward larger sizes as a result of effort-reduction measures, area closures, and an increase in ring sizes implemented by the Sea Scallop FMP. The share of U10's increased to 27% in 2007 from 7% in 2000 and the share of count 11-20 scallops increased from 18% in 2000 to over 50% in 2007 (**Table 1**).

The scallop price by market category is affected by the relative abundance or supply of that size category relative to total scallop landings. Until the 2005 fishing year, U10 scallops had a significant price premium, but as their supply in landings increased, the difference in the annual average price of U10's and other size categories declined and in 2006, average price of U10s actually was lower than the price for other size categories (Table 2). The price model developed originally for Framework 18 captured these changes by estimating the prices by major meat count categories and including the relative share of each category in total supply of scallops as an explanatory variable.

Table 1. Composition of scallop landings by market category

Year	U10	11 to 20	21 to 30	Over 30
1999	19%	13%	29%	39%
2000	8%	21%	49%	22%
2001	4%	27%	56%	13%
2002	5%	16%	73%	5%
2003	7%	25%	65%	3%
2004	8%	45%	46%	2%
2005	14%	62%	22%	2%
2006	24%	55%	20%	1%
2007	26%	56%	14%	4%
2008	24%	55%	19%	1%

Table 2. Average annual price of scallops by market category (2008 prices)

Year	U10	11 to 20	21 to 30	Over 30
2000	7.8	7.9	7.3	6.4
2001	8.7	6.8	5.9	6.1
2002	7.2	4.7	4.4	4.7
2003	6.7	4.8	4.5	5.1
2004	5.7	4.8	4.8	5.3
2005	6.8	5.8	5.5	5.7
2006	8.8	8.6	8.5	8.3
2007	6.6	7.3	7.6	7.6
2008	7.2	6.9	6.8	6.2

In addition to the changes in size composition and landings of scallops, other determinants of ex-vessel price include level of imports, import price of scallops, disposable income of seafood consumers, and the demand for U.S. scallops by other countries. The main substitutes of sea scallops are the imports from Canada, which are almost identical to the domestic product, and imports from other countries, which are generally smaller in size and less expensive than the domestic scallops. An exception is the Japanese imports, which have a price close to the Canadian imports and could be a close substitute for the domestic scallops as well.

The ex-vessel price model estimated below includes the price, rather than the quantity of imports as an explanatory variable, based on the assumption that the prices of imports are, in general, determined exogenously to the changes in domestic supply. This is equivalent to assuming that the U.S. market conditions have little impact on the import prices. An alternative model would estimate the price of imports according to world supply and demand for scallops, separating the impacts of Canadian and Japanese imports from other imports since U.S. and Canadian markets for scallops, being in proximity, are highly connected and Japanese scallops tend to be larger and closer in quality to the domestic scallops. The usefulness of such a simultaneous equation model is limited for our present purposes, however, since it would be almost impossible to predict how the landings, market demand, and other factors such as fishing costs or regulations in Canada or Japan and in other exporting countries to the U.S. would change in future years.

Since the average import price is equivalent to a weighted average of import prices from all countries weighted by their respective quantities, the import price variable takes into account the change in composition of imports from Canadian scallops to less expensive smaller scallops imported from other countries. This specification also prevents the problem of multi-colinearity among the explanatory variables, i.e., prices of imports from individual countries and domestic landings. In terms of prediction of future ex-vessel prices, this model only requires assignment of a value for the average price of imports, without assuming anything about the composition of imports, or the prices and the level of imports from individual countries. The economic impact analyses of the fishery management actions usually evaluate the impact on ex-vessel prices by holding the average price of imports constant. The sensitivity of the results affected by declining or increasing import prices could also be examined, however, using the price model presented in this section.

The price model presented below estimates annual average scallop ex-vessel price by market category (PEXMRKT) as a function of

- Meat count (MCOUNT)
- Average price of all scallop imports (PIMPORT)
- Per capita personal disposable income (PCDPI)
- Total annual landings of scallop minus exports (SCLAND-SCEXP)
- Percent share of landings by market category in total landings (PCTLAND)
- A dummy variable as a proxy for price premium for Under 10 count scallops (DU10).

Because the data on scallop landings and revenue by meat count categories were mainly collected since 1998 through the dealers' database, this analysis included the 1999-2008 period. All the price variables were corrected for inflation and expressed in 2008 prices by deflating current levels by the consumer price index (CPI) for food. The ex-vessel prices are estimated in semi-log form to restrict the estimated price to positive values only as follows:

Log (PEXMRKT) = f(MCOUNT, PIMPORT, PCDPI, SCLAND-SCEXP, PCTLAND, DU10)

The coefficients of this model are shown in Table 3. Adjusted R^2 indicates that changes in meat count, composition of landings by size of scallops, domestic landings net of exports, average price of all imports, disposable income, and price premium on under 10 count scallops and 2005 dummy variable explain 82 percent of the variation in ex-vessel prices by market category. In contrast to the price model estimates for the earlier years, the coefficient for the landings net of exports was not statistically significant for the period 1999-2008 for the range of landings observed in this period probably because annual variation in landings in recent years were relatively small and the change in the composition of landings toward larger scallops had a larger impact on prices. If in actuality, the prices were more responsive to landings than were predicted with this model, the revenues *for the proposed action* would be higher than estimated in the FRM 21 document for year 2010.

In addition, values of the all the explanatory variables are held at the recent levels. For example, disposable income per capita and import prices are assumed to stay constant at the 2008 level. This is because it is not possible to predict accurately the changes in the future values of the explanatory variables and also because our goal is determine the response in prices to the change in landings and the composition in terms of market category given other things held constant. Therefore, future prices could be higher (lower) than predicted depending on the values of the explanatory variables. The changes in the future values of those variables are not expected to change, however, the relative ranking of the alternatives.

Table 3. Regression results for price model

Regression Statistics	
R Square	0.85
Adjusted R Square	0.82
Observations	40

Table 4. Coefficients of the Price Model

Variables	Coefficients	Standard Error	t Stat
INTERCEPT	-1.18096	0.49743	-2.37
MCOUNT	-0.00414	0.00185	-2.23
PIMPORT	0.21944	0.05449	4.03
PCDPI	0.06606	0.01124	5.87
SCLAND-SCEXP	-0.00131	0.00458	-0.29
DU10	0.05008	0.05106	0.98
PCTLAND	-0.23569	0.08327	-2.83

These numerical results should be interpreted with caution, however, since the analysis covers only 10 years of annual data from a period during which the scallop fishery underwent major changes in management policy including area closures, controlled access, and rotational area management.

1.1.3 Estimation of trip costs

1.1.4 Trip Costs

Data for variable costs, i.e., trip expenses include food, fuel, oil, ice, water and supplies and obtained from observer cost data for 1994-2008. The trip costs per day-at-sea (ffiwospda) is postulated to be a function of vessel crew size (CREW), vessel size in gross tons (GRT), fuel prices (FUELP), and dummy variables for trawl (TRW) and small dredge (DFT) vessels. This cost equation was assumed to take a double-logarithm form and estimated with data obtained from observer database. The empirical equation presented in Table 5 estimated more than 70% of the variation in trip costs and has proper statistical properties.

Table 5. Estimation of total trip costs per DAS used

The MODEL Procedure

Nonlinear GMM Summary of Residual Errors

Equation	DF Model	DF Error	SSE	MSE	R-Square	Adj R-Sq	Durbin Watson
lnffiwospda	6	206	24.9349	0.1210	0.7159	0.7090	1.8100

Nonlinear GMM Parameter Estimates

Parameter	Estimate	Approx Std Err	t Value	Approx Pr > |t|
intc	3.991271	0.3129	12.76	<.0001
grtco	0.286919	0.0499	5.75	<.0001
crewco	0.632637	0.1411	4.48	<.0001
dftco	-0.27828	0.0794	-3.51	0.0006
trwco	-0.39799	0.1559	-2.55	0.0114
fuelpco	0.84357	0.0846	9.97	<.0001

The result indicate that fuel prices have a significant impact on the trip costs. This model was estimated using for the limited access vessel data and characteristics and fuel prices for 2005 to 2008 (Table 6). Predicted costs differ from the actual costs because the actual costs are obtained form a small sample of vessels included in the observer data set, whereas predicted results are obtained from estimates for all vessels using the trip cost function in Table 5. The trips costs per day-at-sea increased a lot in 2008 because of the unusual increase in the average fuel prices in this year. For the purposes of the cost-benefit analyses, it is assumed that the average trip costs will be similar to the levels in 2007 rather than in 2008. The PPI for fuel and related products for 2009 for the months of January to November is about 10% lower than the levels in 2007, but given the recession the economy has experienced in 2009, these lower prices may not last either. For these reasons, for the purposes of the cost-benefit analyses it is assumed that the trip costs per day-at-sea will be closer to the 2007 levels rather than 2008 or 2009 levels, and will equal to $1600 for an average vessel in the fishery. Assuming a higher trip cost would increase the economic benefits of the proposed action as the sensitivity analyses below show.

Table 6. Comparison of actual and estimated values for trip costs

		Year			
		2005	2006	2007	2008
Estimated trip costs per DAS		1483.39	1445.47	1603.01	1896.45
Actual trip costs per DAS		1306.36	1672.22	1684.29	2094.69
% Difference		15.46	-8.16	-2.48	-1.94
DAS per trip		11.29	9.36	11.00	10.50
LPUE	Mean	2143.67	1365.38	1229.04	1158.69
Actual fuel costs per DAS		939.45	1265.24	1284.92	1703.74
Estimated fuel costs per DAS		1034.55	1022.35	1182.27	1545.78
% Difference		14.42	-12.15	-5.31	-0.61
Fuel price (06)		2.08	2.16	2.33	3.15
GRT	Mean	163.14	146.91	167.64	124.00
HP	Mean	857.00	897.55	1025.07	507.25
LEN	Mean	82.41	80.64	86.01	76.13
Built	Mean	1981.00	1989.18	1982.50	1976.25
% Fuel		0.72	0.75	0.77	0.81
% Fuel Predicted cpred		0.70	0.70	0.74	0.81
N		7.00	11.00	14.00	4.00

1.1.5 Estimation of fixed costs

The fixed costs include those expenses that are not usually related to the level of fishing activity or output. These are insurance, maintenance, license, repairs, office expenses, professional fees, dues, taxes, utility, interest, communication costs, association fees and dock expenses. According to the observer data on fixed costs for the period 2001 to 2007, the fixed costs including maintenance, repairs, engine and gear replacement and hull and liability insurance averaged $162,000 per full-time vessel (Table 7). Table 8 shows that fixed costs of the vessels varies by the ton class and larger vessels have higher fixed costs than the smaller boats.

Table 7. Annual fixed costs for full-time limited access scallop vessels by year (in 2006 inflation-adjusted prices and includes only those observations for insurance cost was available)

Data	2001	2002	2003	2004	2005	2006	2007	2001-2007
Number of vessels	7	20	36	50	40	24	39	216
Maintenance ($)	96,659	52,308	79,108	49,953	69,048	91,045	38,717	63,452
Repairs and replacement ($)	86,912	65,400	81,452	73,349	44,287	38,714	33,414	58,283
Insurance ($)	40,980	35,127	60,501	57,117	61,933	65,896	62,129	57,941
Total fixed costs ($)	224,552	141,719	206,304	155,711	159,542	171,252	122,631	161,819
GRT	148	156	157	156	156	144	150	153
HP	876	799	832	825	813	792	840	822

Table 8. Annual fixed costs of full-time limited access scallop vessels by ton class (2006 inflation adjusted prices, including only those observations for which insurance data were available)

Data	51-100 GRT	101-150 GRT	>150	Average (2001-07)
Number of vessels	18	75	123	216
GRT	75	129	180	153
HP	461	690	957	822
Maintenance ($)	32,657	60,145	70,585	63,452
Repairs ($)	26,152	47,860	70,255	58,283
Insurance ($)	46,784	48,615	65,295	57,941
Total fixed cost ($)	100,780	142,482	182,652	161,819
Ratio of fixed costs to the average for the fleet	0.62	0.88	1.13	1.0

The 2006 and 2007 fixed cost survey data included other cost items such as office, accounting, and interest payments in addition to the repairs, maintenance and insurance. The model shown in Table 9 is based on the fixed cost survey data and estimates fixed costs as a function of length, year built, horse power and a dummy variable for boats that have multispecies permit. The data included 196 observations and the fixed costs are estimated by using the 97 observations for vessels with dredge and trawl gear. Because the data on communications costs and association fees were missing for most observations, these costs were not included in the estimation but their average values for the scallop vessels were deducted from the gross stock when estimating net boat and crew shares (Table 10).

Table 9. Estimation of basic fixed costs

```
                           GMM with HCCME=1                              235

                          The MODEL Procedure

                   Nonlinear GMM Summary of Residual Errors

                DF    DF                                           Adj   Durbin
Equation     Model  Error       SSE       MSE  Root MSE  R-Square    R-Sq   Watson

lnfcbasic        5     92   15.8206    0.1720    0.4147    0.7283  0.7165   2.2736


                     Nonlinear GMM Parameter Estimates

                                     Approx                 Approx
            Parameter       Estimate     Std Err    t Value     Pr > |t|
```

```
intc            -242.988      65.7063      -3.70       0.0004
lenco           1.588635       0.1986       8.00       <.0001
bltco           32.51993       8.6562       3.76       0.0003
d10co           -0.51566       0.1039      -4.96       <.0001
hpco            0.168211       0.1174       1.43       0.1554


     Number of Observations     Statistics for System

     Used               97    Objective        2.3E-18
```

Table 10. Average association fee and communication costs by vessel size

	Average annual association fee	Average annual Communication Costs
All Vessels	1610	3446
Large (>=80 feet)	1895	3939
Medium (<80 feet)	1459	3185

Using the survey cost data, total fixed costs are estimated to be $176,516 per full-time vessel in 2006 constant dollars and $188,343 in 2008 dollars (Table 11). These estimates exclude vessel improvement costs (other than repairs and maintenance) which could be considered as discretionary investment and could be postponed when there is a temporary shortfall in cash earnings.

Table 11. Estimated fixed costs per full-time vessel

Data	2007	In 2008 Inflation adjusted prices
Estimated basic fixed costs	$176,516	$188,342
Improvement Costs (Difference)	$50,023	$53,375

1.1.6 Profits and crew incomes

As it is well known, the net income and profits could be calculated in various ways depending on the accounting conventions applied to gross receipts and costs. The gross profit estimates used in the economic analyses in the FSEIS simply show the difference of gross revenue over variable (including the crew shares) and fixed expenses rather than corresponding to a specific accounting procedure. It is in some ways similar to the net income estimated from cash-flow statements since depreciation charges are not subtracted from income because they are not out-of-pocket expenses.

Gross profits per vessel are estimated as the boat share (after paying crew shares) minus the fixed expenses such as maintenance, repairs and insurance (hull and liability). Based on the input from the scallop industry members and Dan Georgianna on the lay system, the profits and crew incomes are estimated as follows:

- The association fees, communication costs and a captain bonus of 5% are deducted from the gross stock to obtain the net stock.

- Boat share is assumed to be 48% and the crew share is assumed to be 52% of the net stocks.
- Profits are estimated by deducting fixed costs from the boat share.
- Net crew income is estimated by deducting the trip costs from the crew shares.

1.1.7 Consumer surplus

Consumer surplus measures the area below the demand curve and above the equilibrium price. For simplicity, consumer surplus is estimated here by approximating the demand curve between the intercept and the estimated price with a linear line as follows:

CS= (PINT*SCLAN-EXPR*SCLAN)/2

$$PVCS = \sum_{t=2000}^{t=2008} (CS_t / (1+r)^t)$$

Where: r=Discount rate.

CS_t= Consumer surplus at year "t" in 1996 dollars.

PVCS= Present value of the consumer surplus in 1996 dollars.

EXPR= Ex-vessel price corresponding to landings for each policy option.
PINT=Price intercept i.e., estimated price when domestic landings are zero.
SCLAN= Sea scallop landings for each policy option.

Although this method may overestimate consumer surplus slightly, it does not affect the ranking of alternatives in terms of highest consumer benefits or net economic benefits.

1.1.8 Producer surplus

The producer surplus (PS) is defined as the area above the supply curve and the below the price line of the corresponding firm and industry (Just, Hueth & Schmitz (JHS)-1982). The supply curve in the short-run coincides with the short-run MC above the minimum average variable cost (for a competitive industry). This area between price and the supply curve can then be approximated by various methods depending on the shapes of the MC and AVC cost curves. The economic analysis presented in this section used the most straightforward approximation and estimated PS as the excess of total revenue (TR) over the total variable costs (TVC). It was assumed that the number of vessels and the fixed inputs would stay constant over the time period of analysis. In other words, the fixed costs were not deducted from the producer surplus since the producer surplus is equal to profits plus the rent to the fixed inputs. Here fixed costs include various costs associated with a vessel such as depreciation, interest, insurance, half of the repairs (other half was included in the variable costs), office expenses and so on. It is assumed that these costs will not change from one scenario to another.

PS=EXPR*SCLAN- ΣOPC
ΣOPC = Sum of operating costs for the fleet.

$$PVPS = \sum_{t=2000}^{t=2008} (PS_t /(1+r)^t)$$

Where: r=Discount rate.

PS_t= Producer surplus at year "t" in 1996 dollars.
PVPS= Present value of the producer surplus in 1996 dollars.
SCALN= Sea scallop landings for each policy option.
EXPR= Price of scallops at the ex-vessel level corresponding to landings for each policy option in 1996 dollars.

Producer Surplus also equals to sum of rent to vessels and rent to labor. Therefore, rent to vessels can be estimated as:

RENTVES=PS – CREWSH

Rentves= Quasi rent to vessels
Crewsh= Crew Shares

1.1.9 Total economic benefits

Total economic benefits (TOTBEN) is estimated as a sum of producer and consumer surpluses and its value net of status quo is employed to measure the impact of the management alternatives on the national economy.

TOTBEN=PS+CS

Present value of the total benefits= PVTOTBEN= PVPS+PVCS

1.2 SENSITIVITY ANALYSES

The numerical estimates of the revenues, costs and benefits provided in Section 5.4.2 of the Framework 21 document should be used in comparing one option with another rather than is predicting the future values of the economic variables. The absolute values of the net economic benefits and its components would change if the actual landings, size composition of landings and LPUE are different than the forecasted values from the biological model.

The prices are estimated using the updated ex-vessel price model described in Section 1.1.2 above. This model takes into account the impacts of changes in meat count, domestic landings, exports, price of imports, income of consumers, and composition of landings by market category (i.e., size of scallops) including a price premium on under count 10 scallops. The important changes in these external factors, i.e., in exports, imports, value of dollar, export and import prices, and changes in disposable income will result in actual prices differing from the estimated prices. Section 5.4.8 of the Framework 21 document provided a sensitivity analysis using a 10% decline in the import prices. The results of this analyses showed that the e-vessel prices would decline in about the same proportion to the change in import prices. Lower prices would reduce the negative impact of the proposed action in the short-run, in 2010. But the proposed action was still estimated to increase scallop fleet revenue both in the medium term from 2010-2016 and the long-term from 2010 to 2023. Similarly, the ranking of the alternatives in terms of the cumulative present value of the revenues, producer surplus, consumer surplus and total economic benefits compared to no action is not expected to change when lower prices are used to estimate the economic impacts. Furthermore, the percentage difference of the revenues, producer surplus, consumer surplus and total economic benefits compared to no action would stay almost exactly the same whether lower or higher price estimates are used in the analysis. Therefore, the results of the cost-benefit analyses of the proposed action and the alternatives do not change when the economic benefits are compared to the no action levels and in terms of ranking of the alternatives, the results are not sensitive to the values of price estimates obtained from the same price model, but using a different value for the import prices.

In addition to the change in the values of the exogenous variables, the estimates for landings and prices are subject to statistical errors and variability. If the standard deviations in various variables and coefficients are taken into account, the range of values for revenues, consumer and producer surpluses and net economic benefits will fall within a confidence interval around the mean values. The ranking of the options in terms of their net economic benefits relative to each other are likely to stay the same, however, since statistical errors and variability would impact the no action and the proposed alternatives in the roughly same proportions. For example, a lower bound using 95% confidence interval estimate for the coefficient of the domestic consumption variable resulted in prices within a range of $6 or lower (Table 12). Assuming that the domestic landings has no impact on prices (given that t-value for the coefficient is still low) resulted in prices within a range of $7.30 to $7.50 (Table 14). Although the net economic benefits are lower (higher) prices, the proposed action was still estimated to increase scallop fleet revenue both in the medium term from 2010-2016 and the long-term from 2010 to 2023. Similarly, the ranking of the alternatives in terms of the cumulative present value of the revenues, producer surplus, consumer surplus and total economic benefits compared to no action did not change when lower (higher) prices are used to estimate the economic impacts (Table 13 and Table 15).

Table 12. Estimated Prices, lower bound for a 95% confidence interval (estimate in inflation adjusted 2008 prices)

Fishing Year	No Action	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010	5.8	6.2	6.0	5.7	5.9
2011	5.5	5.4	5.4	5.5	5.5
2012	5.3	5.2	5.2	5.5	5.4
2013	5.4	5.3	5.4	5.3	5.3
2014	5.4	5.3	5.4	5.3	5.2
2015	5.4	5.4	5.5	5.4	5.3
2016	5.6	5.6	5.6	5.5	5.5
2017	5.5	5.5	5.5	5.5	5.5
2018	5.6	5.5	5.5	5.6	5.5
2019	5.8	5.7	5.7	5.8	5.7
2020	5.7	5.6	5.6	5.6	5.6
2021	5.7	5.6	5.6	5.6	5.6
2022	5.8	5.7	5.8	5.7	5.8
2023	5.6	5.6	5.6	5.6	5.6

Note: Projections assume that import prices will equal to $4 per pound of scallops and that scallop exports constitute 45% of the domestic landings.

Table 13. Short and long-term cumulative present value of benefits using lower bound for prices (Million $, in 2008 inflation-adjusted prices, discount rate of 3%

Period	Data	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010-2016	PV of Revenues	2.5	-5.8	-4.3	21.2
	PV of Producer Surplus	6.1	-2.0	-8.1	15.0
	PV of Consumer Surplus	6.9	-0.2	-0.6	11.0
	PV of Total Economic Benefits	13.0	-2.2	-8.7	26.0
2010-2023	PV of Revenues	59.2	51.8	33.7	56.4
	PV of Producer Surplus	48.3	41.4	27.3	46.3
	PV of Consumer Surplus	22.3	15.9	10.6	16.9
	PV of Total Economic Benefits	70.6	57.3	37.9	63.1
2010-2023	PV of Revenues	61.6	45.9	29.4	77.6
	PV of Producer Surplus	54.4	39.3	19.2	61.3
	PV of Consumer Surplus	29.2	15.8	10.0	27.9
	PV of Total Economic Benefits	83.6	55.1	29.2	89.2

Table 14. Estimated Prices, assuming a "0" value for the coefficient of domestic consumption (estimate in inflation adjusted 2008 prices)

Fishing Year	No Action	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010	7.32	7.53	7.52	7.45	7.46
2011	7.35	7.30	7.30	7.32	7.31
2012	7.26	7.24	7.22	7.34	7.32
2013	7.37	7.33	7.31	7.28	7.25
2014	7.42	7.39	7.39	7.35	7.33
2015	7.45	7.44	7.45	7.41	7.43
2016	7.50	7.49	7.49	7.48	7.50
2017	7.54	7.52	7.52	7.53	7.52
2018	7.57	7.56	7.56	7.57	7.57
2019	7.56	7.56	7.56	7.56	7.56
2020	7.61	7.60	7.61	7.59	7.62
2021	7.63	7.62	7.64	7.62	7.65
2022	7.58	7.58	7.58	7.57	7.57
2023	7.65	7.65	7.64	7.63	7.64

Note: Projections assume that import prices will equal to $4 per pound of scallops and that scallop exports constitute 45% of the domestic landings.

Table 15. Short and long-term cumulative present value of benefits using assuming a "0" value for the coefficient of domestic consumption (Million $, in 2008 inflation-adjusted prices, discount rate of 3%

Period	Data	No Closure F = 0.20 (Status Quo)	No Closure F = 0.24	Closure F = 0.20	Closure F = 0.18
2010-2016	PV of Revenues	17.3	-9.9	-10.8	45.4
	PV of Producer Surplus	21.0	-6.1	-14.6	39.2
	PV of Consumer Surplus	2.8	0.9	1.2	4.4
	PV of Total Economic Benefits	23.8	-5.1	-13.4	43.6
2010-2023	PV of Revenues	113.7	99.0	64.7	107.5
	PV of Producer Surplus	102.8	88.6	58.3	97.4
	PV of Consumer Surplus	7.3	3.0	2.0	2.8
	PV of Total Economic Benefits	110.1	91.5	60.4	100.2
2010-2023	PV of Revenues	131.0	89.1	53.9	152.9
	PV of Producer Surplus	123.8	82.5	43.7	136.6
	PV of Consumer Surplus	10.2	3.9	3.2	7.2
	PV of Total Economic Benefits	133.9	86.4	46.9	143.8

The absolute value of the net benefits would change also if the disposable income increased during the future years. If it was assumed, as an example, the disposable income per capita will increase at an average of 3% rate per year, the ex-vessel prices would increase under all options, increasing the value of total net benefits. Because those options with lower fishing mortality result in higher yield compared to others, the economic benefits associated with the proposed action would increase slightly relative the options that result in higher landings in the short-term but lower landings in the long-term. The reverse would happen if disposable income declined by 3% over the same period. Even under this unlikely scenario, however, more conservative options would result in larger net economic benefits compared to the other alternatives. In general, however, the percentage differences in net benefits one option versus another is not expected change in any significant way by changes in prices.

The change in the fishing costs would also impact the absolute values of economic benefits compared to no action values. For example, higher fuel prices would increase the trip costs per day-at-sea and increase the cost savings from the proposed action and other alternatives that have lower DAS and trip allocations compared to the no action. As a result, the net economic benefits of the proposed action relative to no action and other alternatives would increase especially in the short-term. Table 16 shows provides a sensitivity analysis by assuming a 10% increase in the trip costs. A decline in fishing cost, will result in opposite effect because it would reduce the impacts of fishing costs in overall benefits.

Table 16. Short and long-term cumulative present value of benefits using assuming a 10% increase in trip costs (Million $, in 2008 inflation-adjusted prices, discount rate of 3%

Period	Data	No Closure *F* = 0.20 (Status Quo)	No Closure *F* = 0.24	Closure *F* = 0.20	Closure *F* = 0.18
2010-2016	PV of Revenues	14	-9	-10	41
	PV of Producer Surplus	18	-5	-14	34
	PV of Consumer Surplus	4	1	1	6
	PV of Total Economic Benefits	22	-4	-13	40
2010-2023	PV of Revenues	104	91	59	98
	PV of Producer Surplus	92	79	52	87
	PV of Consumer Surplus	10	5	4	5
	PV of Total Economic Benefits	102	84	56	93
2010-2023	PV of Revenues	118	81	50	139
	PV of Producer Surplus	110	74	38	121
	PV of Consumer Surplus	14	6	4	11
	PV of Total Economic Benefits	124	80	43	132

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