1.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

1.1 SCALLOP RESOURCE

1.1.1 No Action

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

Under "No Action" for FY 2011 and FY 2012, the overall ABC for each year would be identical to that of FY 2010 (29,578 mt; 65.2 M lb), resulting in an ABC for the fishery of 26,219 mt (57.8 M lb), after accounting for discards (3,363 mt; 7.4 M lb). Under "No Action," in open areas for both FY 2011 and FY 2012, full-time limited access scallop vessels would receive the same allocation as in FY2010: an allocation of 38 open area DAS. Part-time and occasional vessels would receive a pro-rata share of 40% and 1/12th, respectively, which is equivalent to 15 and 3 open area DAS, respectively. The FY 2010 trip allocations for access areas would also roll over into FYs 2011 and 2012. Full-time vessels would receive 2 Elephant Trunk Access Area (ETA) trips, one trip in Delmarva (DMV), and one trip in the Nantucket Lightship Access Area (NLA), In addition, under "No Action," the Hudson Canyon Access Area would remain closed.

Overall, No Action has negative impacts on the environment compared to the other scenarios because it has the lowest LPUE, and highest bottom area swept the first year. Thus fishing gear is on the bottom longer compared to the other scenarios. Long term biomass is similar, even higher in some years, but landings are lower than all the other scenarios. Since Hudson Canyon remains closed, biomass remains high, but that yield is not converted into catch under No Action.

1.1.2 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 1). 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.

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.

Several important modifications have been made to these projections compared to the ones used last year for 2010 (FW21). Primarily, the fleet dynamics model within the SAMS model has been adjusted. The fleet dynamics model predicts where effort is going to go into each of the sub-areas in the SAMS model. In the past, effort per area was proportional to exploitable biomass in that area. This works when exploitable biomass and LPUE are similar, which has been the case until very recently. In the last few years the PDT is seeing a divergence and areas with the highest exploitable biomass (like the Channel) are not the same areas with highest LPUE like the New York Bight. So the fleet dynamics model has been adjusted to direct effort into areas with highest LPUE rather than highest exploitable biomass which is expected to mirror how the fishery would react more accurately. Once this change is made fishing mortality is reduced because effort is highest in areas with highest LPUE and lower in areas with higher exploitable biomass, which has higher impacts on F because scallops are smaller and discard mortality is likely higher. For example, when more effort is moved to the SAMS area which includes the New York Bight the catch per unit of effort increases and fishing mortality is lower, so more DAS can be allocated for the same fishing mortality rate. In addition, the SAMS projections for this action include overall LPUE of around 2,200 pounds, compared to 1,700 pounds used in FW21. That 500 pounds makes a big difference in terms of total catch and fishing mortality.

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. Projections are run out 14 years to provide long-term impacts as required by law. After year two, the model uses the same assumptions for allocations in 2013 and beyond. Therefore, the only difference between the overall performance of the scenarios is during the first 2 years. For this analysis F_{target} has been set at $F = 0.28$ in 2013 and beyond.

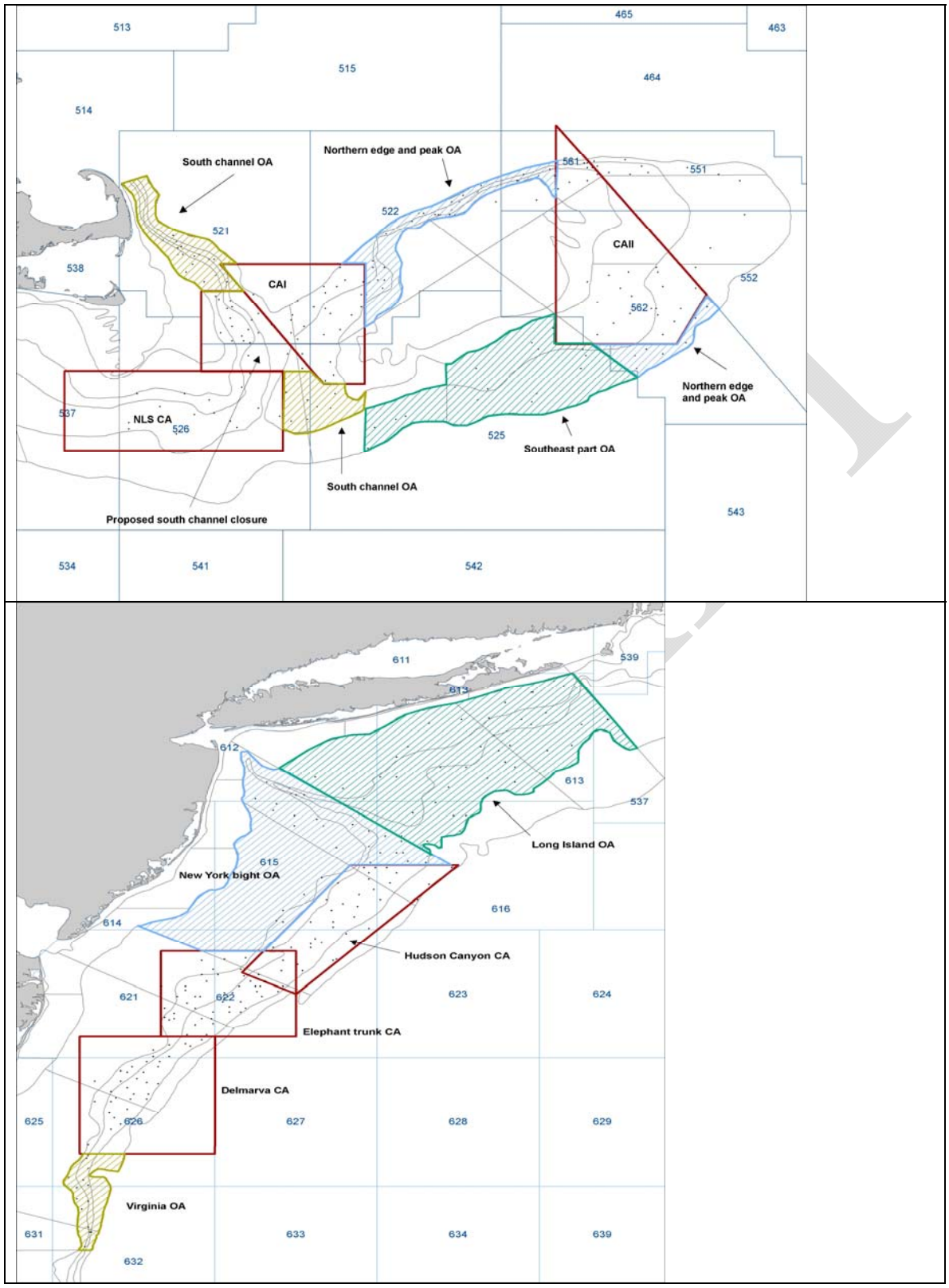
Table 1 is a summary of the options considered for 2011 and 2012. For 2013, the same allocations were considered for all scenarios: 35 open area DAS, 0.5 trips in Delmarva, 1.5 trips in Hudson Canyon, one trip in NL and 1 trip in CA2.

Table 1 – Framework 22 scenarios under consideration

	CA1	CA2	NL	HC	Del	ET	Total	Channel	OA DAS
Option 1									
2011	1.5	0.5	-	1	1	-	4	open	32
2012	0.5	1	0.5	1.5	0.5	-	4	open	34
Option 2									
2011	2	-	-	1	1	-	4	open	32
2012	-	1	1	1	1	-	4	open	34
Option 3									
2011	2	1	-	1	1	-	5	closed	22
2012	-	1	0.5	1.5	0.5	-	6	Open (2.5)	23
No Action									
2011	-	-	1	-	1	2*	4	open	38
2012	-	-	-	-	1	2*	3*	open	38
SQ - 2010									
2011	1.5	0.5	-	1	1	-	4	open	38
2012	0.5	1	0.5	1.5	0.5	-	4	open	38

** Trips may be allocated to this area, but there is not sufficient biomass in this area to support that effort, so trips will not be complete and catch for the area will be substantially lower than 2 trips typically produce, closer to 5 million compared to 12 million pounds.*

Figure 1- SAMS model areas, with statistical areas and stratum boundaries on Georges Bank and the Mid-Atlantic



1.1.2.1 Projected biomass by area

- Total biomass is similar for all scenarios considered (Figure 2).
- Biomass is expected to increase modestly over the long term because of growth of scallops in the Channel.
- Long-term projections are about 160,000 mt.
- Over the course of this action, 2011-2013 biomass is expected to increase moderately.
- Figure 3 shows that the mean biomass for the preferred alternative, Alternative 1, will increase slightly and is relatively certain. The confidence interval does get wider the further out the estimate is, after 2013, but that year is a default year and will be replaced with future specifications in a subsequent framework.
- Since effort is reduced in open areas under the hybrid overfishing definition (0.38 in open areas) compared to recent years when open area F has been higher, over the long-term yield will be higher.

Figure 2 - Comparison of projected total scallop biomass for the scenarios under consideration

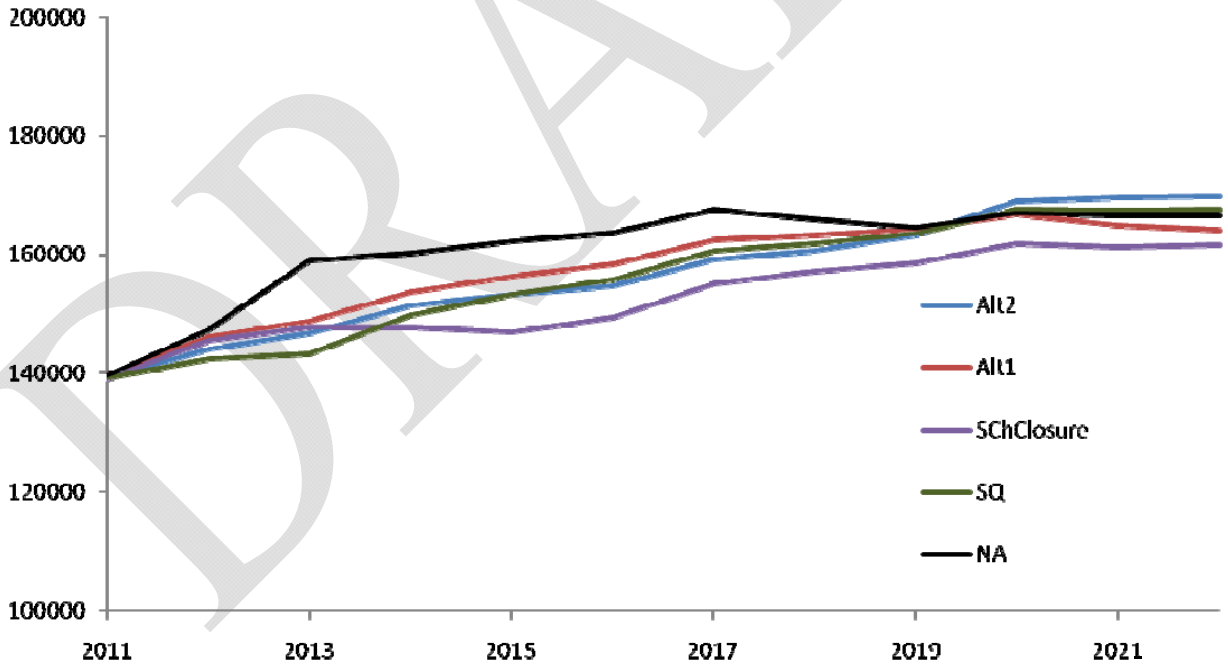
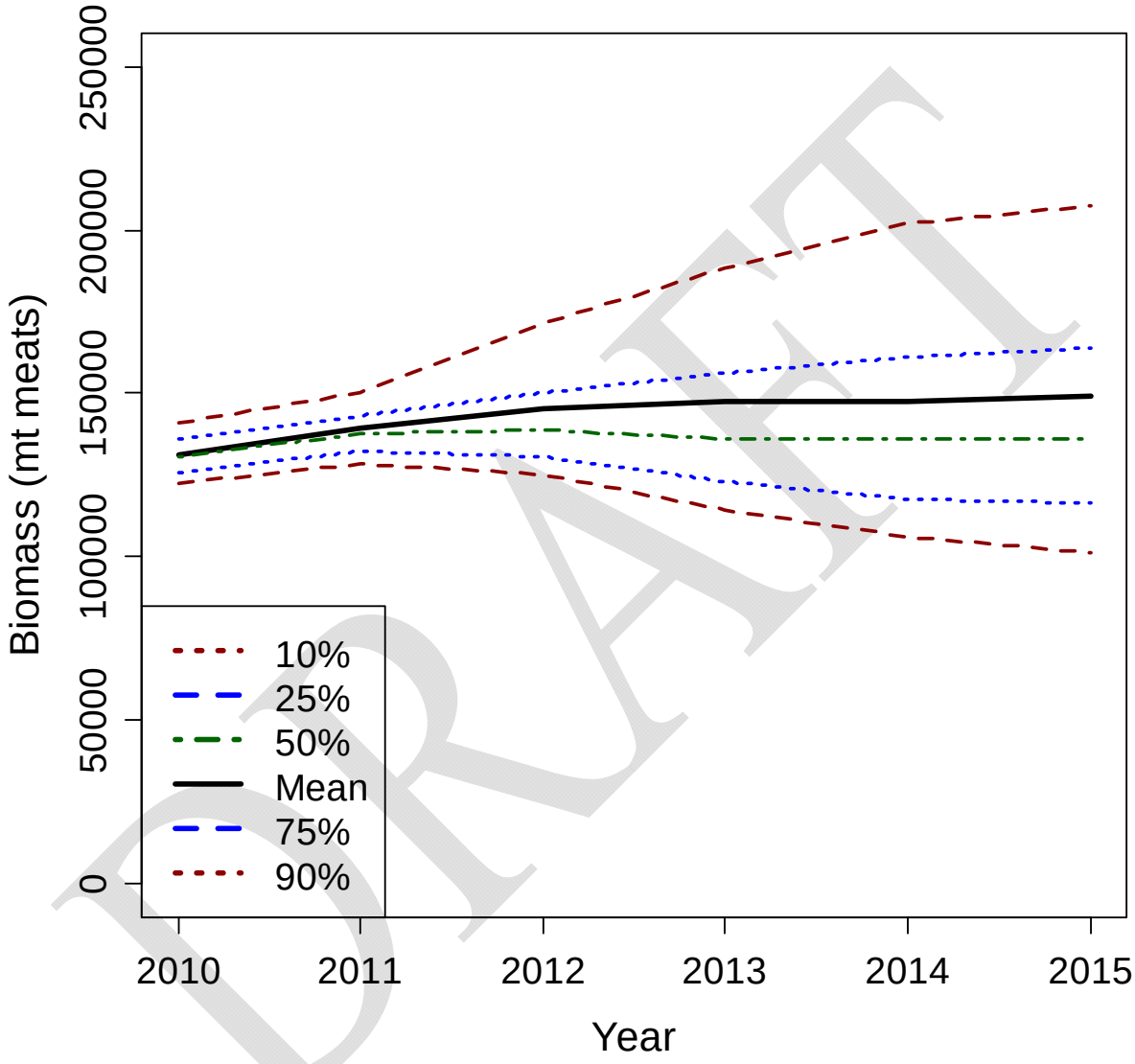


Figure 3 - Projected biomass for the final Alternative 1 (2011-2013 allocation) including indicators of uncertainty and the mean estimate



1.1.2.2 Projected scallop landings by area

- Landings lowest for No Action because there is not sufficient biomass in ETA to support two trips.
- SQ scenario is higher because that includes more open area DAS. For that scenario to give 38 DAS, open area F is about 0.46 for both years, compared to the other scenarios that restrict open area F to be 0.38, the maximum for open area F under the hybrid overfishing definition.
- Alt 1 and 2 are more stable over time
- Channel scenario gives more catch in 2013 and 2014, but lower long term
- Figure 5 shows that the mean landings for the preferred alternative, Alternative 1, will increase slightly and is relatively certain. The confidence interval does get wider the further out the estimate is, after 2013, but that year is a default year and will be replaced with future specifications in a subsequent framework.

Figure 4 - Comparison of projected scallop landings for the scenarios under consideration

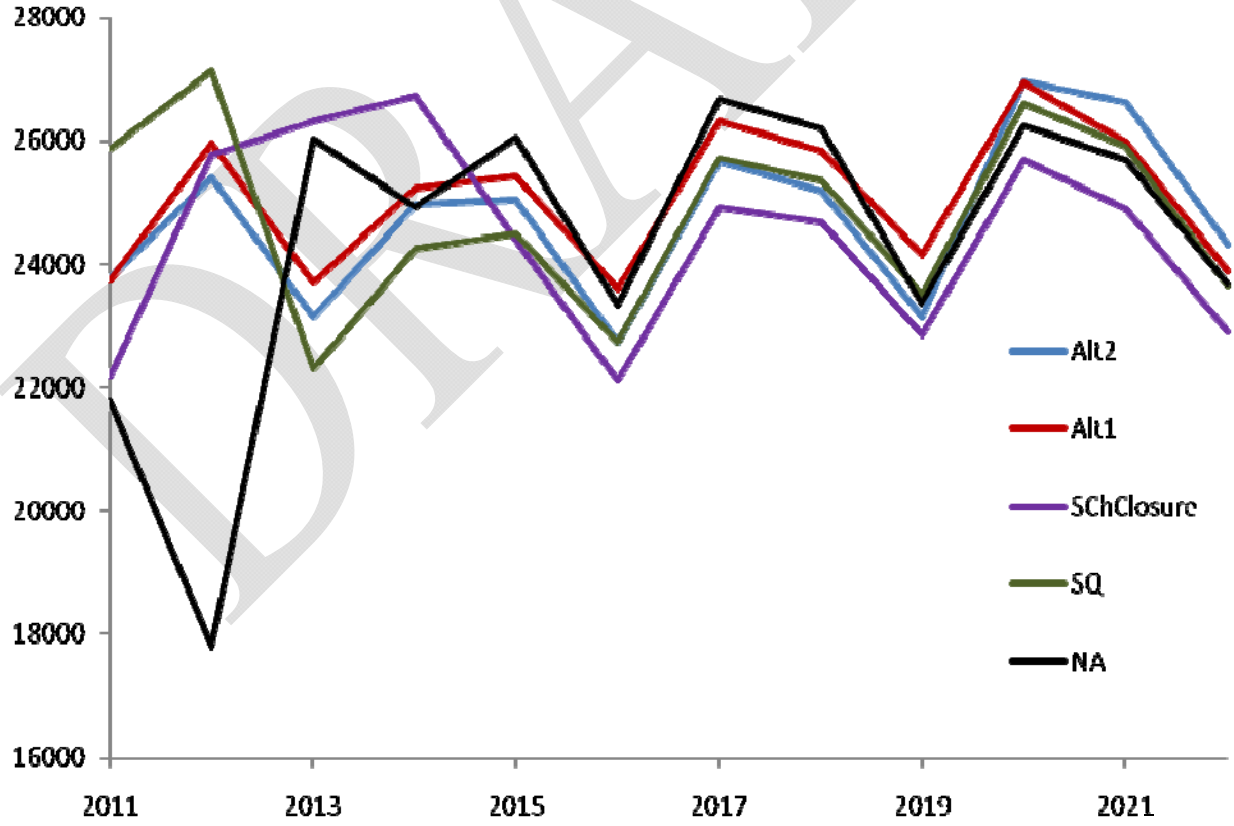
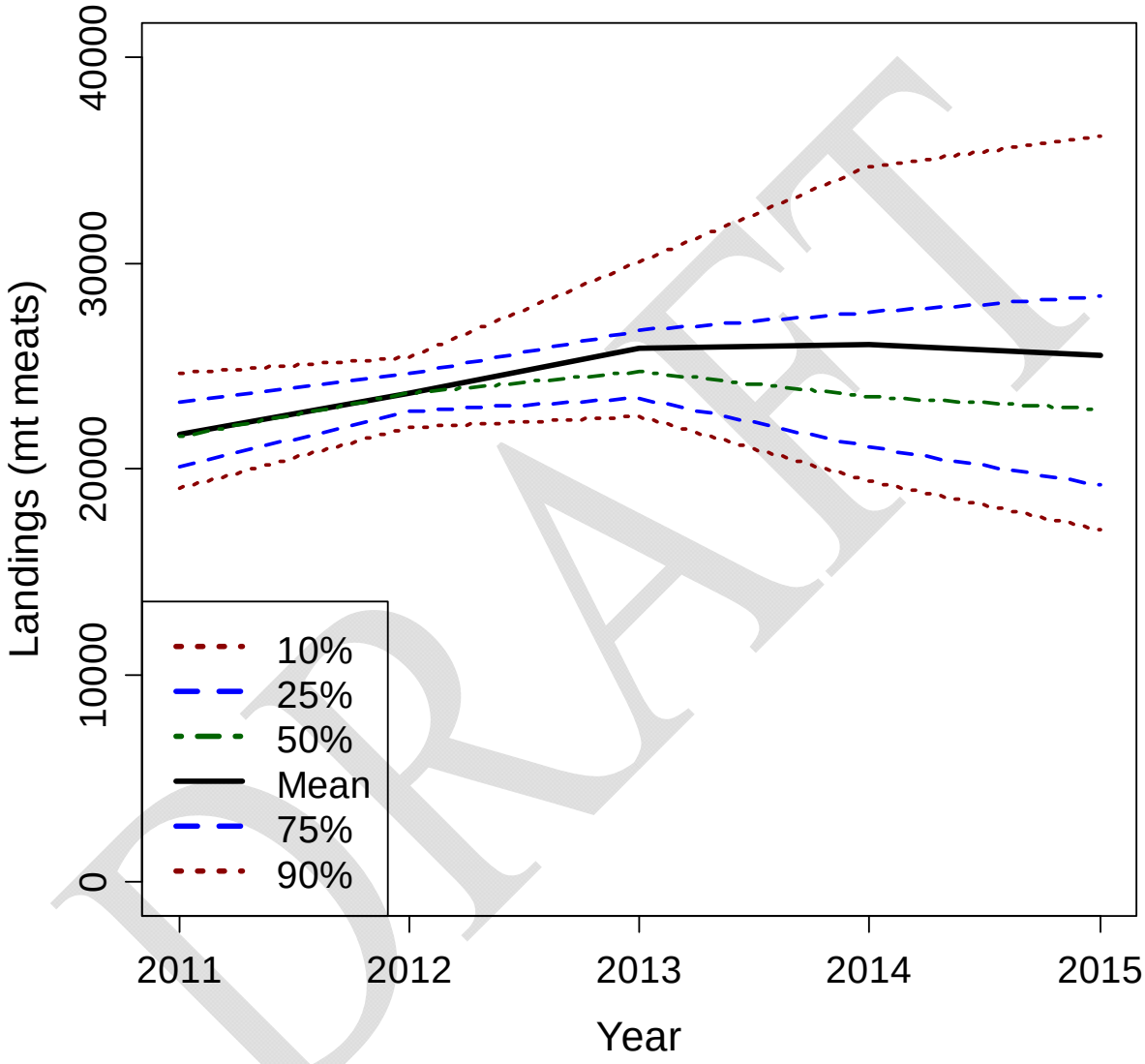


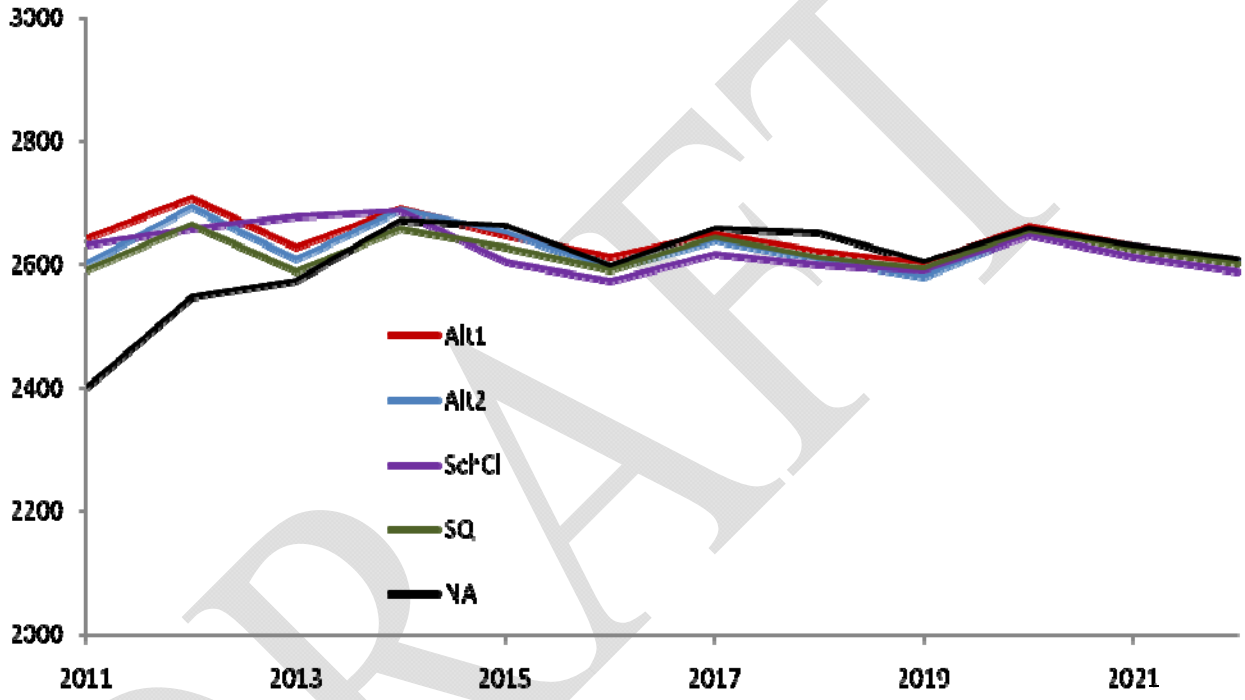
Figure 5 - Projected landings for the final Alternative 1 (2011-2013 allocation) including indicators of uncertainty and the mean estimate



1.1.2.3 Projected LPUE

- Long-term LPUE around 2600 for all scenarios
- When F is held at 0.38 in open areas LPUE stays closer to access area LPUE
- Open area LPUE is expected to be over 2400 lbs/day in 2011 and 2600 lbs/day in 2012

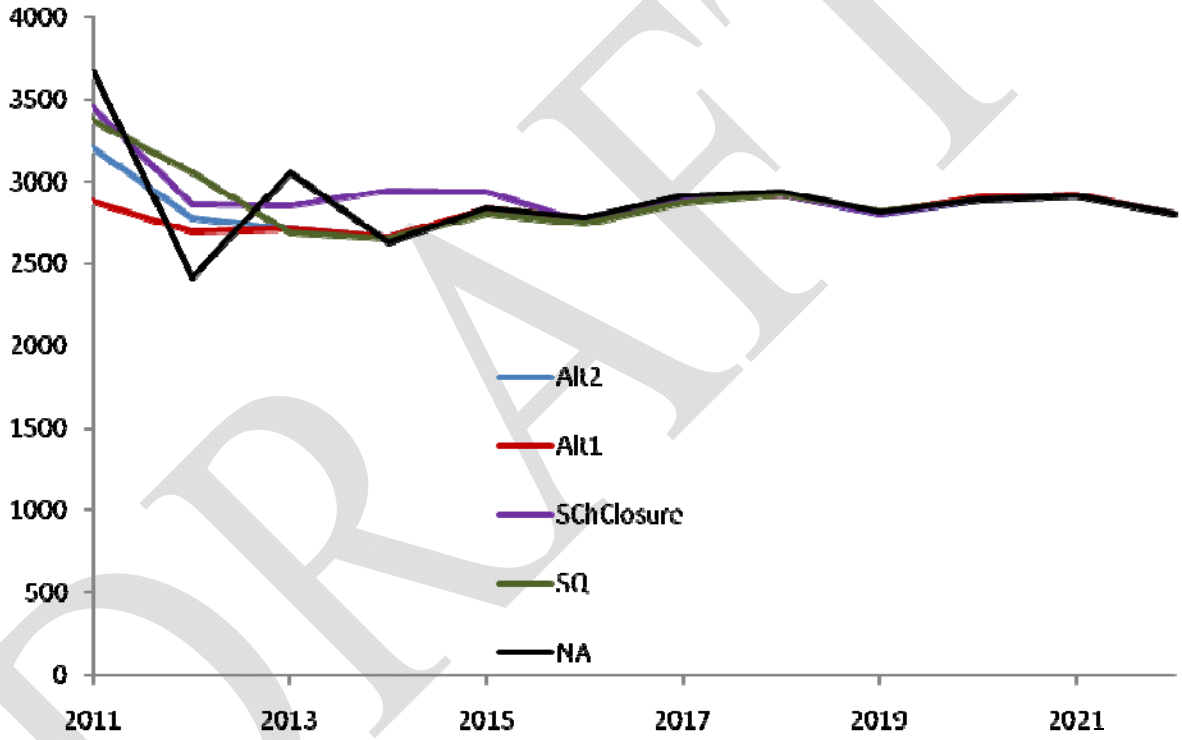
Figure 6 – Comparison of projected LPUE in open areas for the scenarios under consideration



1.1.2.4 Projected bottom area swept by area

- Model estimates that area swept in 2010 about 5,000 sq. nautical miles – and that is about what the fishery has been in recent years
- All scenarios are less than that, especially Alt 1 followed by Alt 2
- Long-term these come out around 3,000 – substantially lower than area swept has been in recent years

Figure 7 – Comparison of projected area swept for the scenarios under consideration



1.1.3 Measures for limited access vessels

This framework includes the specific access area schedule and DAS allocations for all limited access scallop vessels.

YT Flounder Bycatch TAC in access areas
If the GB YT flounder bycatch TAC is reached in 2011 in or CAII, limited access vessels are permitted to use access area trips at a compensation rate in open areas. Analyses suggest that the compensation for Closed area II be ??? under the preferred alternative. Since the compensation rates are determined by estimating an equivalent level of mortality, the overall impacts of this alternative on the scallop resource are expected to be neutral. For example, the number of scallops harvested in ?? DAS in open areas in 2011 is expected to be equal to the number of scallops harvested on one 18,000 pound access area trip in Closed Area II.

1.1.4 Measures for General category vessels

This section includes the fleetwide max trip allocations for LAGC vessels by area. These trips are accounted for in the projections so will not have any additional impacts on the resource. If trips are not taken in these areas, LAGC catch is assumed to be taken in open areas instead. In general, catch rates are higher in access areas and many access areas are relatively close to shore, so it is assumed that most allocated trips will be taken.

1.1.5 NGOM and Incidental catch TAC

The alternative of 31,100 pounds is expected to reduce the change of excess fishing in federal waters in the NGOM based on results of the recent scallop survey of that area. The status quo alternative of 70,000 pounds increases that risk, but the PDT notes that a substantial portion of total catch from vessels with NGOM permits is coming from state waters, not included in updated 31,100 pound TAC. Neither alternative is expected to have substantial impacts on the resource or fishery since in recent years the catch levels have been below 20,000 pounds.

1.1.6 TAC set-asides for research and observers

Set-asides for observer coverage and research are now removed directly from the ABC for this fishery, rather than a percentage of what is allocated to the fishery. Amendment 15 included this revision as well as allocating a fixed poundage for RSA to be 1.25 million pounds. The biological projections take both of these set-asides into account before allocations are made so no additional impacts are expected on the resource.

1.1.7 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 could 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 2010 survey suggest that small scallops have settled in parts of the Great South Channel. The PDT recommended consideration of an area to the north of the Nantucket Lightship closed area and west of Closed Area I; the top left coordinate of the polygon is 41 20' N and 69 30' W and the bottom left coordinate is 40 50'N and 68 50'W (Figure ???). Recruitment on GB has been below average since 2001 and has only improved in the last few years. High numbers of small scallops (<70 mm) were caught on 2007, 2008, 2009, and 2010 survey tows in this area. The SMAST video survey of this area also found high scallop recruitment in this area.

Physical area of proposed closure

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

Table 2 – 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

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 (Figure 2 and Figure 6). The impacts of this closure are marginalized compared to years past because this alternative would close the area for only one year, compared to a three year option considered in the past. Therefore, total catch from this scenario is not much higher that the other scenarios considered, only right when the area reopens. Since catch

rates are equal to or better in other areas, to long-term catch from this scenario is actually less than other scenarios considered.

1.1.8 Minimizing Impacts of Incidental Take of Sea Turtles

1.1.8.1 Alternatives to minimize impacts of incidental take of sea turtles

1.1.8.1.1 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 15 - October 31).

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.

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.

1.1.8.1.2 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 turtle season, June 15 - October 31.

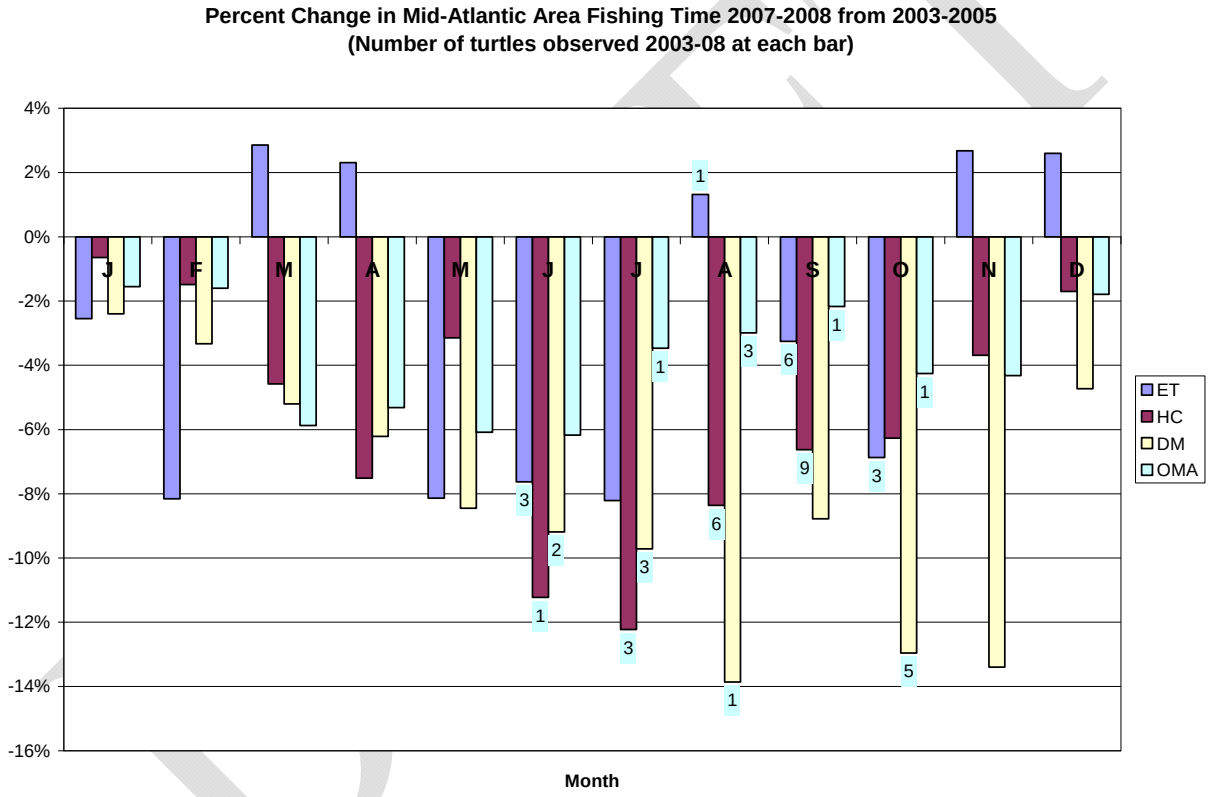
It is difficult to predict the impacts of this measure on the scallop resource because impacts are based on how vessels react to this restriction. If vessels respond by fishing in similar areas but shift effort to times of the year with greater meat weight yields (spring and summer) then impacts on the 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. 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.

1.1.8.1.3 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 for either the months of September and October or July through October.

The shorter period, September-October is 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 8). 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 8 – Percent change in Mid-Atlantic area fishing time by month in recent years compared to 2003-2005



Add paragraph about seasonal pattern from Delmarva closure in 2010.

1.1.8.1.4 Consider a seasonal closure for Hudson Canyon

This action is considering two seasonal closures for Hudson Canyon as well, but for 2012 only because this action will be implemented late, June 2011 at best.

The shorter period, August-September is expected to have some negative impact on fishing mortality, but not as much as the longer season from July-September, because that includes the month of July that has high meat weights compared to the annual average. By including that season, impacts on F are estimated to be above a 0.5% change from that RPM, which is greater than the amount discussed in the past has having more than a minor impact on the fishery.

1.1.9 Modifications to VMS

Neither of these measures expected to have a direct impact on the scallop resource. However, if enforcement is compromised more scallop mortality could result having negative impacts on the resource.

1.1.10 Modify the in-shell possession limit for LAGC vessels seaward of the VMS demarcation line

This alternative would reduce the possession limit seaward of the VMS demarcation line from 100 bu to something less (i.e. 65 or 75bu). (It should be noted that "bushels" here refers to the standard measurement, and that the orange baskets used in the fishery are recognized to be equal to 1.3 bushels.) NMFS Enforcement agents have voiced concerns that the regulations which allow for LAGC vessels to possess up to 100 bu of scallops seaward of the VMS Demarcation Line but prohibit vessels from possessing more than 50 bu when shoreward of the VMS Demarcation Line has influenced fishing behavior. There are reports that vessels are targeting more scallops and buoying them off to be landed the next day.

The PDT discussed that this activity did not seem to be illegal, but agreed that 100 bushels may be excessive. The additional bushels were permitted through Amendment 11 to acknowledge that there is seasonal and spatial variation in meat yield, so some flexibility is warranted, but 100 bushels may be too high. The PDT is not sure how prevalent this activity is and if there are any quality and mortality issues. The Committee decided to forward this issue to the AP to see how widespread this issue is and to ask the PDT if this is a significant problem or not and to consider what a more appropriate bushel equivalent would be to account for meat weight variations. The Committee requested that the PDT review the data available to analyze what the possession limit should be and what impacts on mortality may be and continue from there.

In addition, since the initiation of this action, Amendment 15 proposes to change the possession limit from 400 pounds to 600 pounds. This may make the current bushel number more in tune with the poundage.

Observer data was used to investigate the average pounds per bushel encountered from access area trips, where observers obtain the meat weight of one basket (1.3 bu) of shucked scallops per watch. Data from 2006-2009 was given by month and area (n = 19777). The mean pounds per basket was 8.01 (6.15 pounds per bu) with a standard deviation of 1.29. Weights were highest in March through July (max = 8.78 lbs/basket, May) and lowest in December (6.78 lbs/basket). By area they were highest in Nantucket Lightship (8.36 lbs/basket) and lowest in CAI and CAII (7.65 and 7.64 lbs/basket, respectively). While there were some outliers at both the low and high end of the range of data (Figure 9), it is not unreasonable to move forward with a possession limit based on the observed data instead of the status quo. At an average of 8 lbs/basket, and a

desired possession limit of 600 lbs, 75 baskets would be sufficient (97.5 bu). The standard deviation of the data set is 1.29, and it is probably not as helpful to look at the upper bound since we wish to err on the side of lower weights and be sure people are able to harvest their quota. The lower bound of the meat weight data is 6.71 lbs/basket, which would translate to a basket count of approximately 90 (117 bu). Data from VIMS survey samples had an average weight from Delmarva for August (the month with worst meat weights) of 7.34 with a standard deviation of 0.59. This yields a reasonable limit of about 80 baskets (104 bu). Based on this information and the updated possession limit the PDT would recommend a value of 100 bushels (status quo), or potentially somewhat higher to account for the increased possession limit. But the PDT was supportive of 100 bu. even with a 600 possession limit to further reduce incentive of shell stocking. Any measure that influences changes in fishing behavior, by increasing the in-shell possession limit, could have negative impacts on the resource if scallops are buoyed off and retrieved at a later time. Conversely, any measure that reduces incentive to shell stock, status quo, is viewed as having a positive impact on the resource.

Figure 9 - Histogram of shucked basket weights from observed trips in access areas, n = 19777

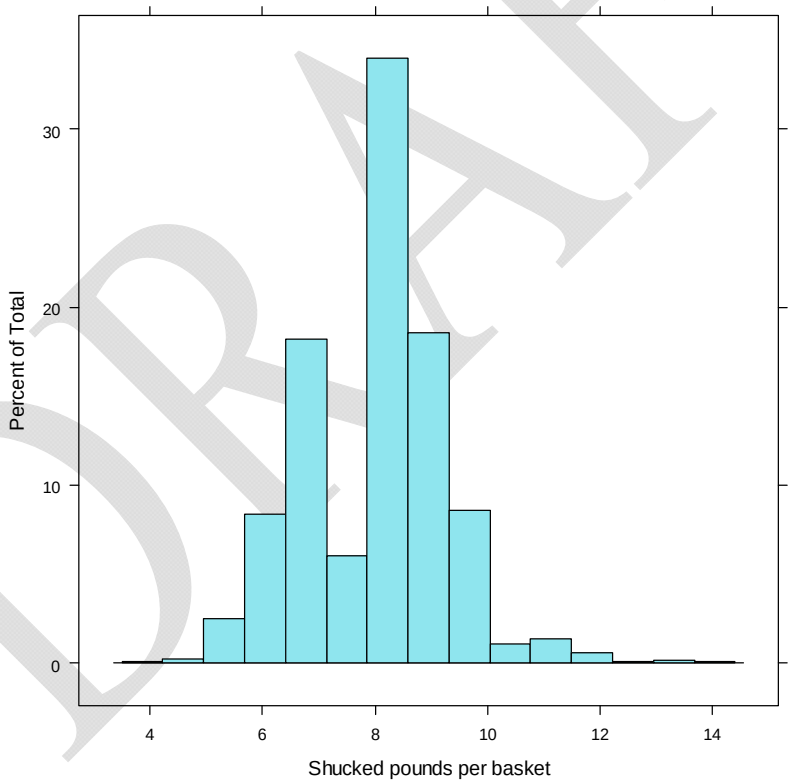


Figure 10 - Boxplot of meat weight per basket by month; black line is median, box encompasses interquartile range, and dots are outliers

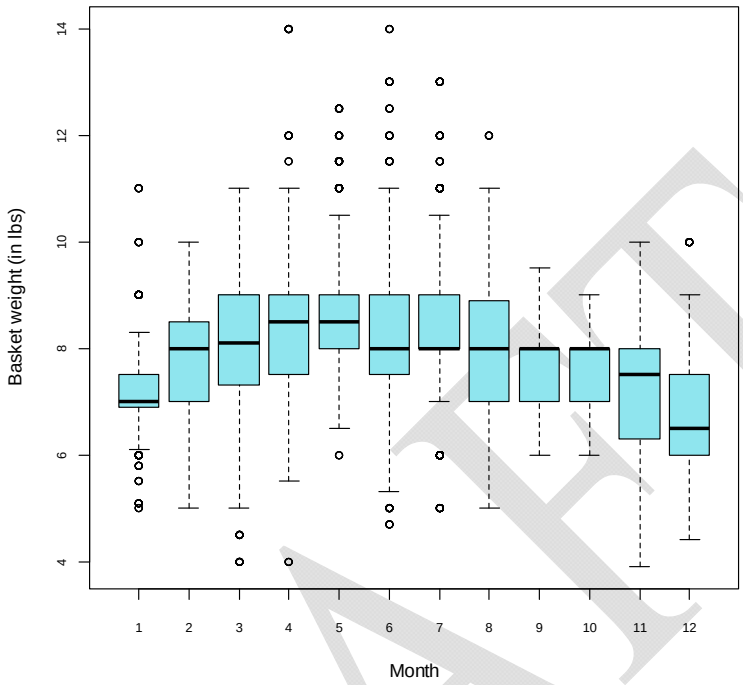
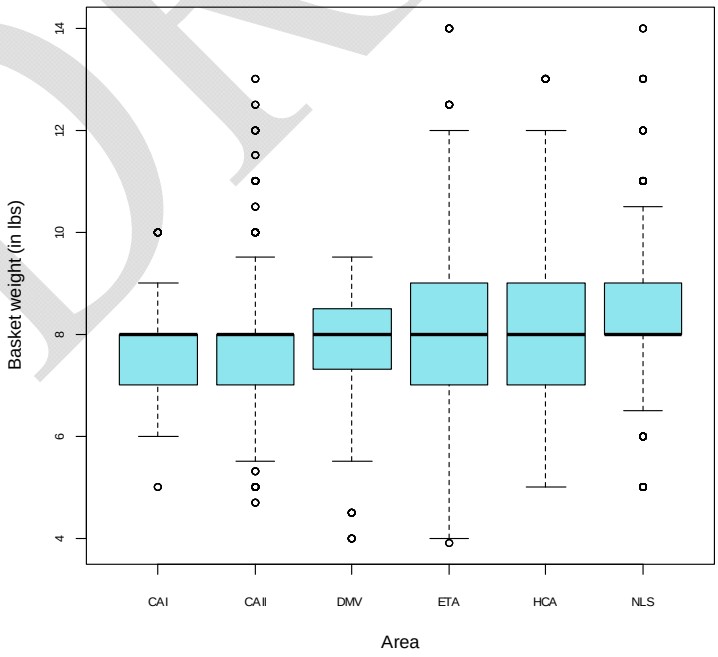


Figure 11 - Boxplot of meat weight per basket by area; black line is median, box encompasses interquartile range, and outliers



1.1.11 Extension of unused ETA trips through May 31, 2011

This alternative would allow full-time vessels to use any unused FY 2010 ETA trips through May 31, 2011. Since catch rates are low in the ETA this extension would hopefully reduce negative impacts on the scallop resource by shifting trips that would be taken between now and February 28, 2010 until the spring of 2010 before May 31 when scallop meat weights are larger. This would reduce fishing mortality of remaining trips that have not been taken.

1.2 IMPACTS ON PHYSICAL ENVIRONMENT AND EFH

To be handed out at meeting

1.3 IMPACTS ON PROTECTED RESOURCES

To be handed out at meeting

1.4 ECONOMIC AND SOCIAL IMPACTS OF FRAMEWORK 22 ALTERNATIVES

1.4.1 Introduction

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. The following analyses provide an analysis of economic impacts of the three allocation options, and compare these with no action and status quo projections. As the Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007) [1] 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." No action for the cost-benefit analysis of the Framework 22 alternatives is 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 21 (as defined in Section ? of the Framework document). Because some access areas will not be accessible to vessels due to the access area rotational closure schedule currently stated in the regulations, no action would result in less access area trips than in 2010 fishing year. Therefore, economic benefits of the proposed alternatives would exceed the benefits of the "no action" both in the short- and the long-term. Status quo projections show the results, however, when DAS and access area trip allocations were set at exactly the same values as in 2010 (i.e., 38 full-time DAS and 4 trips). It should be noted that, status quo allocations would result in F rates which are above the target F and are included here only for the analytical purposes to show the short and the long-term impacts of changes in the open area DAS allocations from their values in 2010.

1.4.2 Overview: Economic Cost and Benefits of the Framework 22 alternatives

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

- Both in the short-term (2011-2012) and the long-term (2011-2022), the sum of landings, revenues and economic benefits for the proposed options (Alt1, Alt2, and Schcl) will exceed the economic benefits for the 'No Action" alternative.
- Alternative 1 would result in largest landings compared to Alt2 and Schcl both in the short- and the long-term (Table 3). Furthermore, alternative 1 would result in a more stable stream of landings compared to Alt2 and Schcl. The difference between the maximum and minimum amount of landings during 2011-2022 is 7.1 million lbs for Alt1,

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

9.4 million lbs for Alt2 and 10.1 million lbs for Schcl. Status quo allocations would result in higher landings in the short-term, but lower landings over the long-run compared to Alt 1. In addition, fishing mortality rates would exceed the target F is the allocations were set at the same levels as in 2010.

- Alternative 1 would result in largest fleet revenues, compared to Alt2 and Schcl both in the short- and the long-term (Table 4 and Table 5). Present value (PV) of revenues for Alt1 would exceed the revenues for Alt2 by $6.5 million in the short-term (2011-2012), and by $53 million in the long-term (2011-2022).
- The difference in the PV of revenues for Alt1 and Schcl alternatives is larger, with Alt 1 revenues exceeding the revenues for Schcl by $33.5 million in the short- and by $98.9 million in the long-term (Table 5).
- Similarly, Alternative 1 would result in largest producer and consumer surpluses and total economic benefits compared to Alt2 and Schcl both in the short- and the long-term (Table 5). 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. The total economic benefits for Alt1 would exceed the benefits for Alt2 by $7 million and the benefits for Schcl by $30.5 million in the short-term.
- Over the long-term from 2011 to 2022, total economic benefits for Alt1 would exceed the benefits for Alt2 by $53.2 million and the benefits for Schcl by $95 million (Table 5).

Table 3. Estimated Landings (million lbs)

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	48.1	57.0	**52.3**	52.4	**48.8**
2012	**39.2**	**59.8**	57.2	56.0	56.8
2011-2012	87.3	116.8	109.5	108.4	105.7
2013-2022	556.0	539.1	553.5	546.3	541.3
Grand Total	643.3	656.0	663.1	654.7	646.9
Maximum difference in landings (million lbs) in 2012-2022	19.6	10.7	7.1	9.4	10.1

Table 4. Estimated Revenues (Undiscounted, million $)

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	364.5	433.4	**399.3**	402.1	**372.5**
2012	**290.2**	**446.8**	428.4	418.7	420.5
2011-2012	654.6	880.2	827.7	820.8	792.9
2013-2022	4150.2	4018.8	4118.6	4064.8	4025.6
Grand Total	4804.8	4899.1	4946.3	4885.6	4818.5
Maximum difference in revenues (million $) in 2012-2022	148.9	82.6	44.3	71.7	62.2

Table 5. Cumulative present value of estimated benefits (million $, Inflation adjusted values discounted at 7%)

Period	Data	No Action	SQ	Alt1	Alt2	Schcl
2011-2012	**PV of scallop revenue**	627.4	841.9	791.5	785.0	757.9
	Difference from No Action		214.6	164.1	157.7	130.6
	Difference from Alt1	-164.1	50.4		-6.5	-33.5
	PV of producer surplus	573.0	773.9	728.9	722.4	696.9
	PV of consumer surplus	26.9	36.8	34.1	33.6	35.2
	PV of total economic benefits	600.0	810.7	763.0	756.0	732.1
	Difference from No Action		210.7	163.0	156.0	132.2
	Difference from Alt1	-163.0	47.7		-7.0	-30.9
2013-2022	**PV of scallop revenue**	3339.2	3223.6	3307.5	3261.0	3242.2
	Difference from No Action		-115.6	-31.7	-78.2	-97.0
	Difference from No Action	31.7	-83.9		-46.6	-65.4
	PV of producer surplus	3067.1	2959.5	3037.7	2994.0	2976.1
	PV of consumer surplus	154.0	150.7	156.8	154.4	154.3
	PV of total economic benefits	3221.1	3110.1	3194.5	3148.4	3130.4
	Difference from No Action		-111.0	-26.6	-72.7	-90.7
	Difference from Alt1	26.6	-84.4		-46.1	-64.1
2011-2022						
PV of scallop revenue		3966.6	4065.5	4099.0	4046.0	4000.1
	Difference from No Action		99.0	132.5	79.4	33.6
	Difference from Alt1	-132.5	-33.5		-53.0	-98.9
PV of producer surplus		3640.2	3733.3	3766.6	3716.4	3673.0
PV of consumer surplus		180.9	187.5	191.0	188.0	189.5
PV of total economic benefits		3821.0	3920.8	3957.5	3904.3	3862.5
	Difference from No Action		99.8	136.5	83.3	41.5
	Difference from Alt1	-136.5	-36.7		-53.2	-95.0

The following sections describes the detailed results of the proposed options on landings, meat count, LPUE, effort, prices, revenues and total economic benefits.

1.4.2.1 Impacts of Framework 22 alternatives on landings, meat count and LPUE

Table 6. Estimated Landings (million lbs)

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	48.1	57.0	**52.3**	52.4	**48.8**
2012	**39.2**	**59.8**	57.2	56.0	56.8
2011-2012	87.3	116.8	109.5	108.4	105.7
2013	57.4	**49.2**	52.3	51.0	58.0
2014	55.0	53.5	55.6	55.0	**58.9**
2015	57.4	54.0	56.1	55.2	53.8
2016	51.4	50.1	52.0	**50.1**	48.7
2017	**58.8**	56.7	58.0	56.6	54.9
2018	57.8	55.9	57.0	55.5	54.4
2019	51.5	51.8	53.3	51.0	50.4
2020	57.9	58.6	**59.4**	**59.5**	56.7
2021	56.6	57.1	57.3	58.7	54.9
2022	52.2	52.2	52.7	53.6	50.5
2013-2022	556.0	539.1	553.5	546.3	541.3
Grand Total	643.3	656.0	663.1	654.7	646.9
Maximum difference in landings (million lbs) in 2012-2022	19.6	10.7	7.1	9.4	10.1

Table 7. Estimated average LPUE in all areas

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	2401	2590	2642	2602	2632
2012	2548	2664	2709	2694	2658
2013	2573	2588	2627	2608	2678
2014	2672	2659	2691	2689	2686
2015	2663	2627	2648	2652	2603
2016	2597	2591	2612	2593	2574
2017	2657	2643	2650	2639	2617
2018	2651	2610	2620	2608	2600
2019	2604	2593	2602	2579	2589
2020	2658	2653	2662	2651	2648
2021	2629	2626	2630	2630	2613
2022	2607	2601	2606	2606	2589

Table 8. Average Meat Count

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	18.4	18.4	18.4	18.4	16.6
2012	17.4	17.8	17.6	17.4	18.3
2013	18.0	17.7	17.5	17.4	18.0
2014	18.0	17.8	17.7	17.6	17.7
2015	18.2	18.1	17.8	17.8	17.7
2016	18.2	18.2	18.0	18.1	17.7
2017	18.2	18.3	18.2	18.2	17.7
2018	18.2	18.3	18.3	18.3	17.7
2019	18.3	18.3	18.3	18.4	17.7
2020	18.3	18.4	18.3	18.4	17.7
2021	18.3	18.4	18.3	18.4	17.8
2022	18.3	18.4	18.3	18.4	17.7

Table 9. Composition of landings by size category – Average lbs. by period (million lbs)

Period	Data	No Action	SQ	Alt1	Alt2	Schcl
2011-2012	Average of L-U10	2	6	6	6	6
	Average of L-1020	29	38	36	35	37
	Average of L-2030	11	13	11	11	8
	Average of L-3040	2	2	2	2	1
2013-2022	Average of L-U10	4	4	4	4	4
	Average of L-1020	38	38	39	38	38
	Average of L-2030	11	11	11	11	11
	Average of L-3040	2	2	2	2	2
Total Average of L-U10		4	4	4	4	4
Total Average of L-1020		37	38	38	38	38
Total Average of L-2030		11	11	11	11	10
Total Average of L-3040		2	2	2	2	2

1.4.2.2 Impacts of Framework 21 alternatives on prices, revenues

Table 10. Estimated ex-vessel price per pound of scallops (inflation adjusted in 2010 constant prices)

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	7.58	7.60	7.64	7.67	7.63
2012	7.40	7.47	7.48	7.47	7.40
2013	7.40	7.41	7.37	7.35	7.29
2014	7.42	7.44	7.41	7.40	7.38
2015	7.49	7.45	7.44	7.44	7.46
2016	7.48	7.47	7.46	7.44	7.49
2017	7.47	7.47	7.46	7.47	7.47
2018	7.46	7.44	7.43	7.45	7.44
2019	7.46	7.47	7.46	7.47	7.46
2020	7.50	7.48	7.47	7.48	7.47
2021	7.48	7.44	7.43	7.44	7.45
2022	7.48	7.48	7.47	7.45	7.50

Table 11. Estimated Revenues ($ million)

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	364.5	433.4	**399.3**	402.1	**372.5**
2012	**290.2**	**446.8**	428.4	418.7	420.5
2011-2012	654.6	880.2	827.7	820.8	792.9
2013	424.9	**364.2**	385.2	374.9	422.8
2014	408.0	397.5	412.2	407.5	**434.7**
2015	430.4	402.5	417.3	410.9	401.3
2016	384.6	374.6	387.8	**373.0**	364.9
2017	**439.1**	423.4	432.8	422.7	410.7
2018	430.8	416.2	423.2	413.7	404.6
2019	384.5	387.0	397.5	381.2	376.0
2020	433.8	438.5	**443.6**	**444.7**	423.3
2021	423.6	425.2	425.7	436.5	408.9
2022	390.5	389.9	393.3	399.8	378.4
2013-2022	4150.2	4018.8	4118.6	4064.8	4025.6
Grand Total	4804.8	4899.1	4946.3	4885.6	4818.5
Maximum difference in landings (million lbs) in 2012-2022	148.9	82.6	44.3	71.7	62.2

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

Table 12. Estimated Open Area DAS per FT vessel

Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011	38	38	32	32	22
2012	38	38	34	35	23
2011-2012	76	76	66	67	45
2013	32	33	35	35	25
2014	32	32	34	34	27
2015	49	48	50	49	29
2016	50	49	50	49	48
2017	50	49	51	49	49
2018	50	50	51	49	49
2019	49	50	51	50	48
2020	49	50	51	51	48
2021	49	50	51	51	48
2022	50	50	50	51	48
2013-2022	460	461	474	468	419
Grand Total	536	537	540	535	464

Table 13. Estimated Total DAS-used in all areas

Period	Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011-2012	2011	20,024	22,008	19,790	20,148	18,553
	2012	15,400	22,461	21,127	20,796	21,377
2011-2012 Total		35,424	44,469	40,917	40,944	39,930
2013-2022	2013	22,306	19,004	19,900	19,554	21,673
	2014	20,574	20,100	20,671	20,465	21,937
	2015	21,567	20,554	21,174	20,811	20,666
	2016	19,806	19,353	19,912	19,323	18,938
	2017	22,135	21,448	21,902	21,445	20,998
	2018	21,791	21,422	21,737	21,294	20,924
	2019	19,782	19,991	20,474	19,784	19,456
	2020	21,764	22,106	22,316	22,428	21,398
	2021	21,545	21,765	21,767	22,315	21,012
	2022	20,016	20,053	20,204	20,580	19,501
2013-2022 Total		211,286	205,796	210,057	207,999	206,503
Grand Total		246,710	250,265	250,974	248,943	246,433

Table 14. Estimated fleet trip costs in all areas ($ million)

Period	Fishing year	No Action	SQ	Alt1	Alt2	Schcl
2011-2012	2011	32.0	35.2	31.7	32.2	29.7
	2012	24.6	35.9	33.8	33.3	34.2
2011-2012 Total		56.7	71.2	65.5	65.5	63.9
2013-2022	2013	35.7	30.4	31.8	31.3	34.7
	2014	32.9	32.2	33.1	32.7	35.1
	2015	34.5	32.9	33.9	33.3	33.1
	2016	31.7	31.0	31.9	30.9	30.3
	2017	35.4	34.3	35.0	34.3	33.6
	2018	34.9	34.3	34.8	34.1	33.5
	2019	31.7	32.0	32.8	31.7	31.1
	2020	34.8	35.4	35.7	35.9	34.2
	2021	34.5	34.8	34.8	35.7	33.6
	2022	32.0	32.1	32.3	32.9	31.2
2013-2022 Total		338.1	329.3	336.1	332.8	330.4

1.4.2.4 Impacts of Framework 21 alternatives on producer and consumer surpluses and total economic benefits

Table 15. Present value of estimated benefits (Million $, Inflation adjusted values discounted at 7%)

Fishing year	Data	No Action	SQ	Alt1	Alt2	Schcl
2011	PV of producer surplus	322.7	386.6	356.9	359.1	332.8
	PV of consumer surplus	14.0	17.1	15.4	15.2	15.7
	PV of total benefits	336.7	403.7	372.4	374.2	348.5
2012	Sum of PSPV	250.3	387.3	372.0	363.3	364.1
	Sum of CSPV	13.0	19.7	18.7	18.4	19.5
	Sum of TOTBENPV	263.3	407.0	390.7	381.7	383.6
2013	Sum of PSPV	356.1	305.5	323.3	314.4	355.2
	Sum of CSPV	18.7	16.0	17.6	17.3	20.9
	Sum of TOTBENPV	374.9	321.5	340.9	331.7	376.0
2014	Sum of PSPV	333.3	324.6	336.8	332.9	355.0
	Sum of CSPV	17.3	16.7	17.8	17.7	19.4
	Sum of TOTBENPV	350.6	341.3	354.6	350.6	374.4
2015	Sum of PSPV	341.5	318.8	330.7	325.7	317.6
	Sum of CSPV	16.7	16.2	17.0	16.8	16.0
	Sum of TOTBENPV	358.2	335.0	347.7	342.5	333.6
2016	Sum of PSPV	295.6	287.8	298.1	286.5	280.2
	Sum of CSPV	14.6	14.4	15.1	14.6	13.8
	Sum of TOTBENPV	310.2	302.1	313.2	301.1	294.0
2017	Sum of PSPV	328.2	316.3	323.4	315.8	306.6
	Sum of CSPV	16.5	16.0	16.6	16.0	15.4
	Sum of TOTBENPV	344.7	332.3	340.0	331.8	322.0
2018	Sum of PSPV	312.6	301.5	306.6	299.7	293.0
	Sum of CSPV	15.8	15.5	15.9	15.3	15.1
	Sum of TOTBENPV	328.4	316.9	322.5	315.0	308.0
2019	Sum of PSPV	270.5	272.1	279.6	267.9	264.3
	Sum of CSPV	13.6	13.7	14.1	13.4	13.3
	Sum of TOTBENPV	284.0	285.8	293.6	281.2	277.6
2020	Sum of PSPV	296.9	300.0	303.5	304.2	289.5
	Sum of CSPV	14.5	15.1	15.4	15.3	14.7
	Sum of TOTBENPV	311.4	315.1	319.0	319.4	304.2
2021	Sum of PSPV	281.1	282.0	282.4	289.5	271.1
	Sum of CSPV	13.9	14.5	14.7	14.9	13.9
	Sum of TOTBENPV	295.0	296.6	297.0	304.5	285.0
2022	Sum of PSPV	251.4	250.9	253.2	257.3	243.5
	Sum of CSPV	12.4	12.5	12.7	13.1	11.9
	Sum of TOTBENPV	263.8	263.5	265.9	270.4	255.5

1.4.3 Social impacts of the alternatives under consideration

1.4.3.1 Summary of FW22 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 years when the area first reopens, since rotational area closures are designed to increase resource biomass and sustainability.

The economic impacts section of the document (1.4.2) describes the expected losses and gains in revenue and profit by year. Long- and short-term landings, revenues and economic benefits for all three alternatives developed by the PDT exceed that of the No Action alternative. Combined 2011 and 2012 revenues and profits are expected to be slightly higher under the "split fleet" trip alternative (Alt1) than the standard (Alt2) and South Channel (Schcl) closure alternatives. All alternatives except No Action have similar landings streams to 2010 in 2011 and 2012, and thus have a positive effect of consistency. Revenues are expected to be about $XXX dollars a year per full-time vessel, about $XXX less than the No Action alternative. Profits under all scenarios will also be higher compared to the No action alternative.

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 highest in 2011 and 2012 combined for status quo (44,469 DAS), followed by Alt2 (40,944 DAS) and Alt1 (40,917), with No Action (35,424 DAS) and Schcl (39,930) slightly lower.

When catch levels are stable from year to year that helps stabilize employment, spending, and market share. Measures under the Alt1, Alt2, and Schcl alternatives all create similar landings streams consistent with that from 2010, this stability should be more favorable for the industry and society overall than the No Action alternative.

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.

1.4.3.2 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. Reducing the TAC from status quo (70,000 lbs) to the value specified by the PDT based on the NGOM federal waters survey is unlikely to impact vessels that fish under this permit because the fishery has not come anywhere near the TAC in recent years. Maintaining the 70,000 lb TAC would provide a marginal source of revenue for these vessels, especially if a sporadic boom occurs in state waters, as expected by recent state surveys.

1.4.3.3 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.

1.4.3.4 Measure to comply with biological opinion as it relates to turtles

1.4.3.4.1 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 **Error! Reference source not found.**), 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.

1.4.3.4.2 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.

1.4.3.4.3 Consider a seasonal closure for Delmarva and/or Hudson Canyon

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.

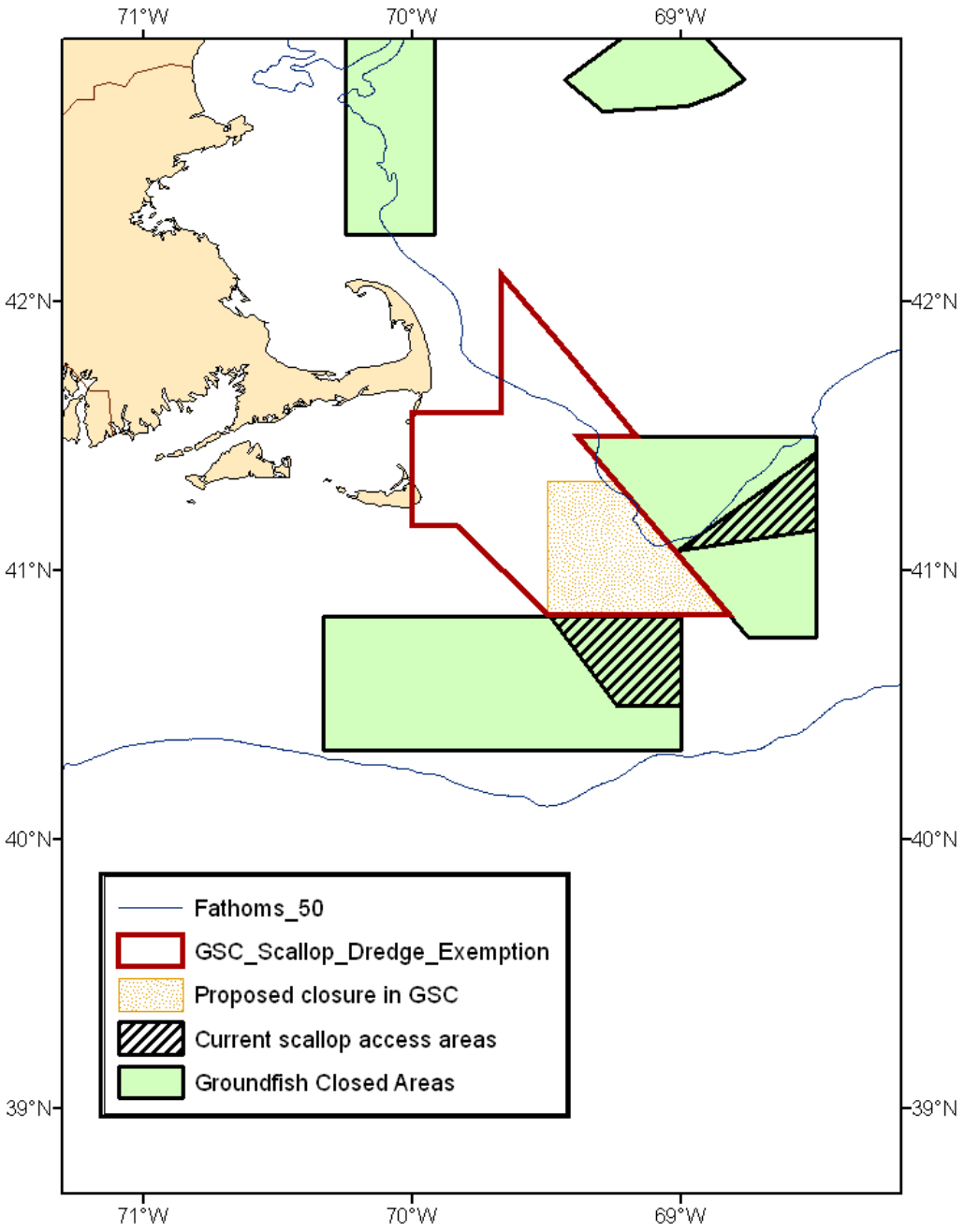
1.5 IMPACTS ON NON-TARGET SPECIES

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, as discussed in the following paragraphs.

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 12). 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 one-year area closure under consideration in this action.

Figure 12 – 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 22.

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 XXX.

1.5.1 Summary of Framework 22 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 1.1.2.4 for a description of the projected bottom contact time for the various scenarios considered. Alternatives 1 and 2 have lower area swept and open area DAS than the

status quo and No Action alternatives. The option with a one-year South Channel closure has higher area swept but lower open area DAS. Compared to 2010, all scenarios have substantially lower area swept projections.

Information specific to interactions with yellowtail flounder can be found in a separate document.

The only other measures under consideration in FW22 that may have direct impacts on non-target species are the measures related to compliance with the biological opinion as it relates to turtles. 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 RPM measures.