

6.0 ENVIRONMENTAL CONSEQUENCES – ANALYSIS OF IMPACTS

6.1 *Aggregated Impacts Of Preferred Alternatives*

6.1.1 Summary of Aggregated Biological Impacts

6.1.1.1 Scallop Resource

Unlike the projections for Amendment 10 using 2002 survey data, the new projections using 2003 data are considerably more optimistic and there are fewer differences between the effects of the fishery on the scallop resource, with and without access to the Georges Bank closed areas. In all cases, the projected biomass is well above the stock biomass target of 5.6 kg/tow.

Primarily, the biological impacts of the fishery on the scallop resource and the environment come from differences in the open fishing areas, because with access the Scallop FMP under Amendment 10 would allocate fewer DAS to fish in open fishing areas. This adjustment was contemplated in Amendment 10 because with the fishing effort in the Georges Bank closed areas, less effort in other open areas is needed to achieve the annual $F=0.2$ fishing mortality target for the entire scallop stock(s). Simply allocating Georges Bank closed area trips without adjusting the open area DAS allocations would cause the plan to exceed the annual mortality targets, possibly causing overfishing to occur.

Although impacts on total scallop biomass are very similar, with and without access, and the biomass is predicted to stay well above the biomass target through 2013, under all scenarios, there are considerably different effects on scallops in the open fishing areas. Section 6.2.11 below focuses on the biological impacts on the overall scallop resource, with ('A10 rotation' and 'FW16 rotation') and without access ('No Action' and '24,000 DAS', the latter representing a proxy for status quo) to the Georges Bank closed areas, an action proposed by this framework adjustment. It also compares the various impacts for the two access alternatives with one another.

Overall, the biological impacts on the scallop resource are not substantial. By 2008, total biomass is projected to be only 9% higher with access to the Georges Bank areas, compared to No Action (see Figure 23). Except for the proportion of landings made of large U10 scallops, the landings are also about the same (see Figure 24). Hence, the economic benefits of the options are also statistically indistinguishable over the ten-year simulation time frame. Thus, other considerations need to be used to distinguish between No Action and the proposed action that would allow scallop fishing in the Georges Bank closed areas. Some of these other considerations are described in the aggregate impact descriptions for groundfish, habitat, and protected species below. These effects mainly occur through a reduction of fishing time in the open areas of the Georges Bank and Mid-Atlantic, as well as an overall reduction of bottom contact time resulting from fishing being concentrated on the largest, most dense scallops if fishing is allowed in the Georges Bank access areas.

Within the three Georges Bank closed areas, the scallop resource will of course experience some changes due to the fishing effort in the access areas. Because growth has slowed down for the old, large scallops in the access areas, the planned fishing effort for the proposed action will cause biomass in these areas to decline toward an equilibrium condition after a long closure duration (portions of Closed Area I and Nantucket Lightship Area have only been fished for one year since 1994, and only two years for portions of Closed Area II). The projections show this effect in Figure 2.

The access area (open symbols) with the largest and most dense scallops, the Nantucket Lightship Area (circle symbol), is projected to see the greatest decline in biomass, from 55 kg/tow in 2003 to 35 kg/tow after the first rotation in 2007 and 23 kg/tow after ten years if the proposed mechanical rotation continues. Scallop biomass in the remaining closed part of the Nantucket Lightship Area is projected to remain constant at a low level⁴⁹.

Scallop biomass in the Closed Area I and Closed Area II access areas is projected to similarly decline, from around 19 - 23 kg/tow in 2003 to 14 - 20 kg/tow by 2007 after the first series of mechanical rotation, and then to 9 - 15 kg/tow after ten years of rotation.

Scallop biomass in the areas that would remain closed to scallop fishing within Closed Area I and Closed Area II (shaded diamonds and squares in Figure 2) are expected to increase from 7 - 12 kg/tow in 2003 to 18 - 21 kg/tow after 10 years of closure, assuming average recruitment. Because these areas would continue to be closed to scallop fishing, any above average recruitment in the closed areas would contribute to a more rapid increase in scallop biomass.

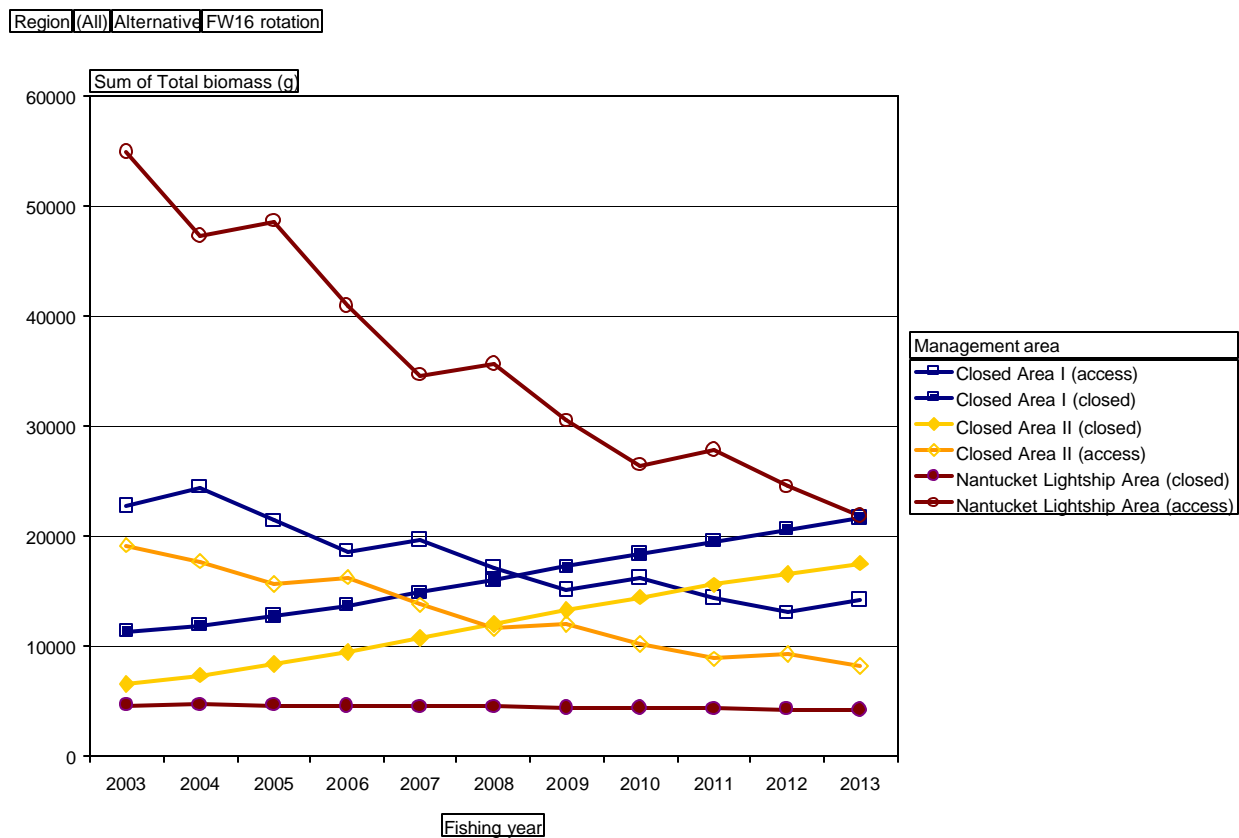


Figure 2. Projected changes in total biomass in the Georges Bank groundfish closed areas, comparing the biomass in access areas (open symbols) to the biomass in the areas that would remain closed under the framework adjustment (shaded symbols).

⁴⁹ The plotted mean results for the projections in all areas, assume recruitment at average levels, observed in the 1982-2002 survey time series. Recruitment is however variable, especially for specific areas, and the actual results may vary considerably from these averaged results.

The most notable differences of impacts on the scallop resource from the proposed action are in the open fishing areas of the Georges Bank and Mid-Atlantic regions. Because less fishing effort is required in the open areas to achieve the management plan’s fishing mortality targets, there would be less scallop mortality there.

As a result, the projections indicate a substantial increase in scallop biomass in the Georges Bank region. Although fishing mortality in the open parts of Georges Bank would be greater with no action, biomass is expected to increase from 2 kg/tow in 2003 to almost 5 kg/tow by 2010 before leveling off (Figure 3). This result is expected because the scallop resource on Georges Bank is recovering from chronically high fishing mortality before 1999 and below average recruitment in the past five years. Projections that reflect the reductions in fishing mortality associated with recent management actions⁵⁰, coupled with an assumption of average recruitment, indicate an increase in biomass.

Lower fishing effort in the open areas is expected with access (e.g. ‘FW16 rotation’) and therefore the recovery of scallop biomass is quicker, using the same assumptions that apply to the no action projection. In this case, the total biomass is projected to recover to over 5 kg/tow by 2007 (3 to 4 years earlier than the no action projection), and continue to increase up to almost 9 kg/tow by 10 years from now. Thus, after one round of mechanical rotation of access areas, in 2007, the open area scallop biomass is projected to be 43% higher than with no action! Over the 10-year period, open area scallop biomass is projected to be nearly double the amount anticipated under no action.

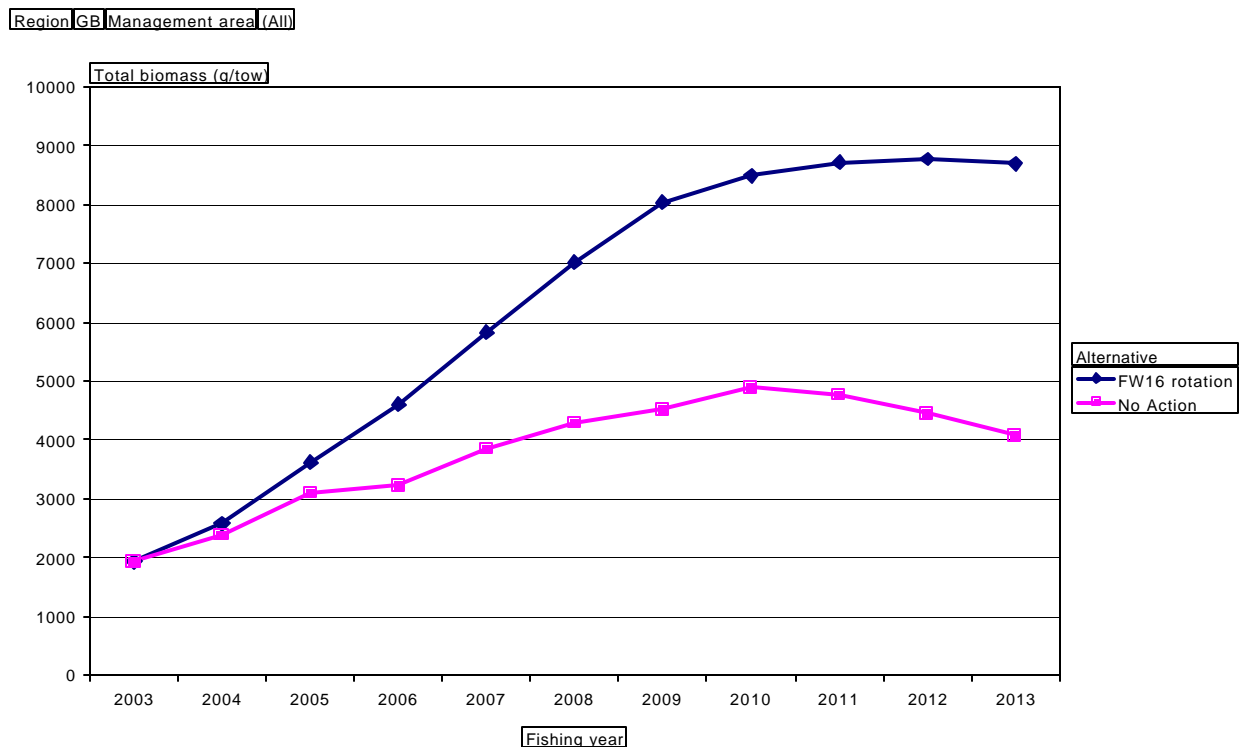


Figure 3. Difference in projected total biomass (weight per tow) in the open parts of the Georges Bank region.

⁵⁰ Recent actions include the effects of Amendment 7 regulations with the recent framework adjustments, the Amendment 10 DAS allocations that were assumed in the projections, plus the effect of 4-inch rings if they are also approved as part of Amendment 10.

What is important about higher scallop biomass in the open fishing areas, if the overall scallop biomass is near or above the target? Experience has shown that higher scallop biomass causes the catch rates to rise, increasing the total revenue per DAS. It also reduces bottom contact time, inducing the vessel to fish less per DAS and seek larger scallops that can be shucked more efficiently (i.e. more pounds per man-hour). This also has long-term benefits for minimizing impacts on bycatch (which is directly proportional to bottom contact time) and on habitat.

The landings per DAS (LPUE), a variable that contributes to economic efficiency and vessel profit, is expected to rise with No Action and with access (Figure 4). LPUE in the open areas of the Georges Bank region are projected to rise from the present 1,250 lbs./day to around 2,000 lbs./day with No Action, showing the same response as the projections of total scallop biomass. With access, however, LPUE is expected to rise more quickly and top off at over 2,500 lbs./day, or about 25% higher than with no action.

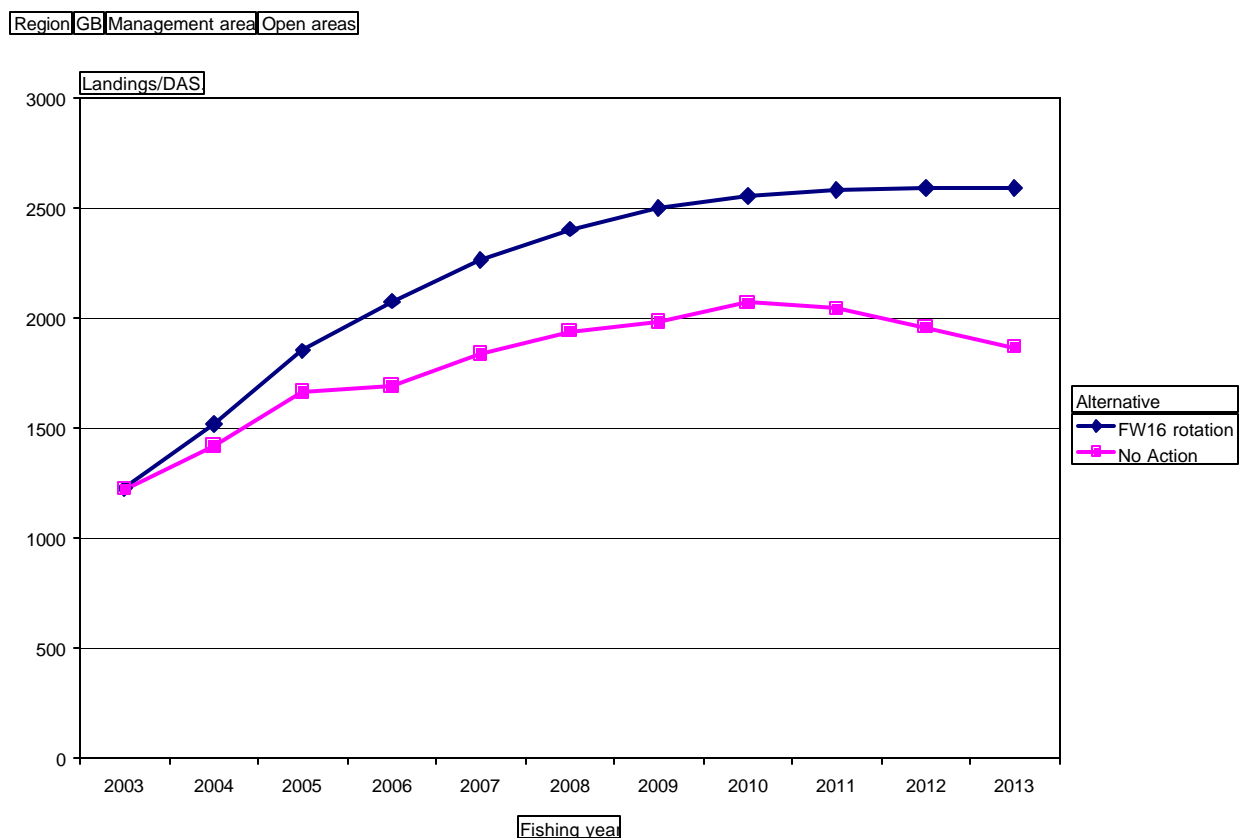


Figure 4. Difference in projected landings per DAS in the open portions of the Georges Bank region

The situation in the Mid-Atlantic is a bit different than for the open areas in the Georges Bank region, because the scallop resource in the Mid-Atlantic has experienced extraordinarily high levels of recruitment over the past five years and biomass has grown rapidly as a result, despite the chronically high fishing mortality in this area. Some attribute this recruitment phenomenon to a supply from the scallops in the Georges Bank closed areas, but there is no definitive evidence of this.

With No Action, the landings are projected to be unsustainable and biomass, after peaking in 2004, is projected to stop growing despite the closure of the Elephant Trunk Area, and then decline fairly rapidly from around 10 kg/tow in 2006 to about 3.5 kg/tow over the 10 years. While it can be argued that

actions would be taken after 2006 to stymie the declining biomass and prevent it from falling to unacceptable levels, No Action completely mitigates the effect of increasing biomass in the Elephant Trunk Area.

On the other hand, the lower fishing effort in the Mid-Atlantic that is expected with access is projected to allow the scallop biomass to increase to 12 kg/tow in the Mid-Atlantic by 2006 (Figure 5). This is 22% higher than with No Action! Over the ten years, access to the Georges Bank closed areas would allow the plan to reduce mortality in the open fishing areas and biomass in the Mid-Atlantic region would be nearly double the amount projected for No Action.

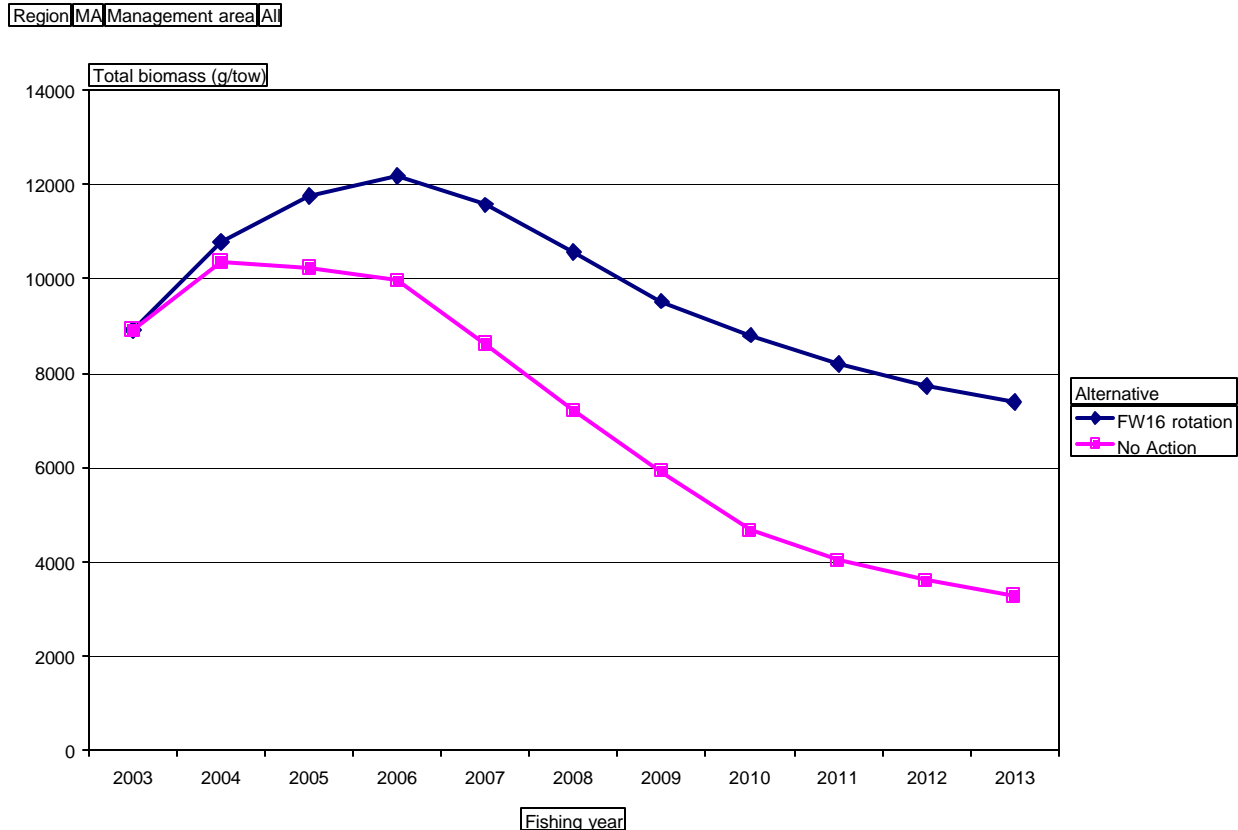


Figure 5. Difference in projected total biomass (weight per tow) in the Mid-Atlantic region.

Similar to the effects described above for the open areas in the Georges Bank region, catch per DAS (LPUE) is higher with access (e.g. ‘FW16 rotation’) than without (‘No Action’). With No Action, LPUE is projected to vary from 1,600 – 2,200 lbs./day through 2006, before increasing to about 2,400 lbs./day in 2007 when the Elephant Trunk Area is expected to re-open, then decline to 1,500 lbs./day by 2013, after the Elephant Trunk Area controlled access management is over.

With access, the LPUE is expected to increase to over 2,300 lbs./day from 2004 – 2006, and then increase again to over 2,500 lbs./day after 2007 – which appears to be sustainable even with the future recruitment assumed by the projection model⁵¹! The higher LPUE has implications for reducing area

⁵¹ The projection model assumes a historic level of recruitment for the survey time series, whose mean is equal to the time-series average recruitment. In the Mid-Atlantic region, this time series average is considerably less than the recruitment that has occurred since the 2000 survey.

swept, and as discussed below, reductions in impacts on bycatch (particularly summer flounder and monkfish) and protected species (sea turtles).

Region: MA Management area: All

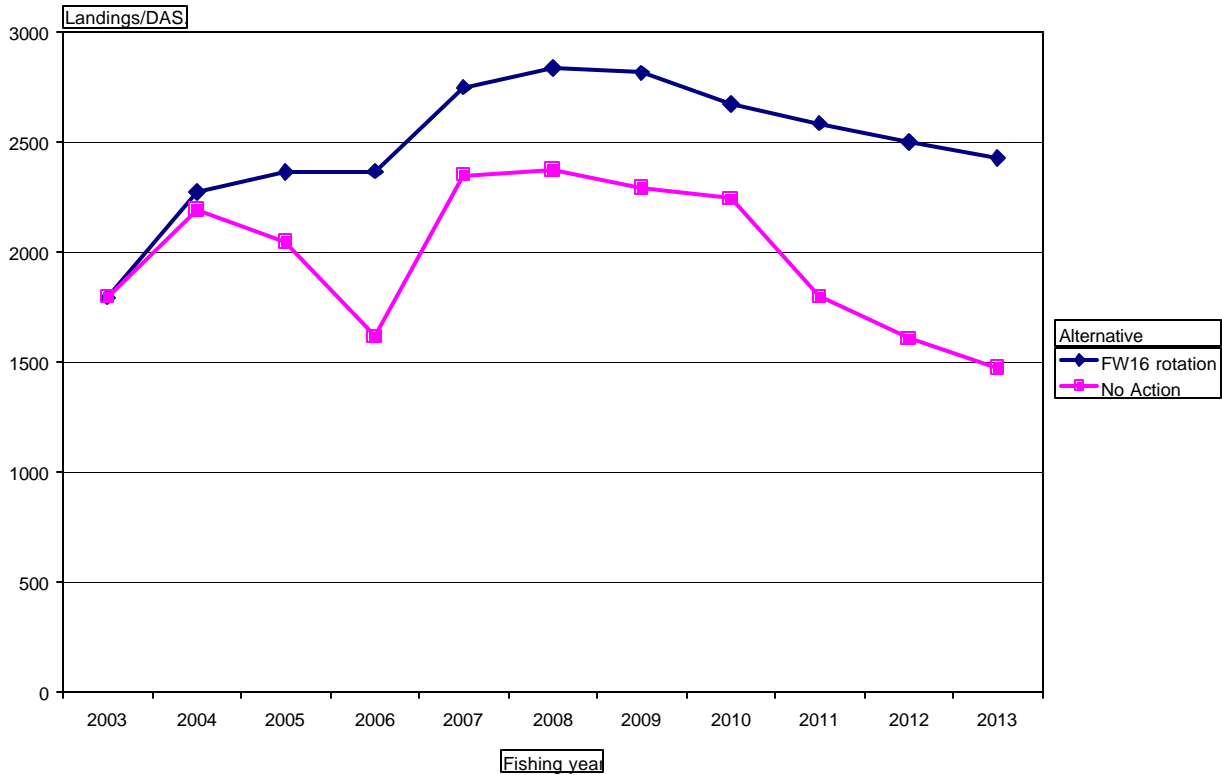


Figure 6. Difference in projected landings per DAS in the Mid-Atlantic region.

The main difference in future landings with and without access is that a greater fraction of the catch comes from more valuable U10 scallops, both in the short term and the long-term. Also, the higher landings with access are more sustainable over the long term than if there were no access. This is an intuitive result, because a greater amount of the scallop resource would be available for fishing with access than without access. Although scallops in the proposed access areas are not abnormally productive compared with scallops in other areas, the access areas contain a significant proportion of the scallop resource and would contribute to sustainable yield if fishing were allowed.

The Magnuson Act requires the plan to achieve a sustainable level of fishing effort, and that bycatch and habitat impacts be minimized to the extent practicable. In choosing the proposed action that allows access to important scallop resources within the Georges Bank closed areas, the Council acted to ensure long-term sustainability of the fishery, while reducing impacts on finfish bycatch, protected species, and potentially habitat.

6.1.1.1.1 Allocations

Trip and DAS allocations for the proposed action were analyzed in Section 6.2.11.1.3 and shown in Table 136 and Table 137 in the columns labeled “FW16”. These potential allocations were compared

with area rotation using the Amendment 10 rotation schedule, where vessels would be allowed to fish in Closed Area I and the Nantucket Lightship Area during 2004, and in Closed Area II only during 2005-2007. Due to changes in predicted Closed Area II scallop biomass when using the 2003 survey data, the proposed action provides a better inter-annual balance in the TACs and allocations.

Table 55 shows the allocations estimated to be most closely associated with the biological projection estimates of the allowable total scallop fishing effort (DAS use) in Section 6.2.11.1.1 to achieve the $F=0.2$ fishing mortality targets for each area, as adjusted by the SMAST video survey density estimates.⁵² Before deriving the limited access vessel allocations, five percent of the TAC was set-aside for funding scallop research (2%), funding the enhanced sea sampling program (1%), and for trips made by vessels with general category scallop permits (2%).

Assuming that the fleet of 292 active⁵³ limited access vessels takes the entire trip allocations and landings are at the applicable scallop possession limits, actual trip length for Nantucket Lightship Area trips is expected to average 5.5 to 5.7 DAS when the area would be open to scallop fishing in 2004, 2006, and 2007. Limited access vessels would be authorized to take one trip per year, and the maximum expected landings would be 72%, 81%, and 97% of the annual TACs, respectively. Increasing the Nantucket Lightship Area trips to two per vessel would exceed 133% of the TAC in each year (after accounting for the set-asides) and rounding down trips would more closely approximate the TAC.

Using the same assumptions, the actual trip length in Closed Area II is expected to range from 6.3 to 6.8 actual DAS, generating landings of 131, 72, and 80% of the TACs for 2004, 2005, and 2007, respectively. The maximum number of trips that may be taken by limited access vessels is two trips in 2004, and one trip each year in 2005 and 2007.

In Closed Area I, on the other hand, allocating just one trip per year is expected to exceed the TAC, with full vessel participation. Rounding down would allow no trips to be allocated in 2005 and 2006, so rounding up to one trip per year is the only option. By doing so, maximum landings is expected to be 171 and 196 percent of the TAC for 2005 and 2006, with a respective actual trip duration averaging 6.8 DAS to catch and land 18,000 lbs. of scallop meats on a full-time vessel.

As a result of simple rounding to the nearest trip, the total scallop catches in particular areas or overall may exceed the adjusted TACs, but would even out over the long term. Short-term and temporary catches that exceed the TACs are not expected to have any meaningful long-term consequences to the scallop stock. Overall, the allocations are expected to land 99, 96, 109, and 83 percent of the combined TACs for the four-year access program, respectively.

⁵² The SMAST video survey scallop density estimates were combined with the annual NMFS RV Albatross survey estimates, inversely weighted by precision as described in Section 6.2.11.1.

⁵³ The analysis does not take into account increases in the number of active limited access vessels since the 2002 fishing year, which partly offsets the effect of the assumption that all trips will be taken by active vessels and will have landings at the scallop possession limit. Data for the 2003 fishing year are presently incomplete.

Table 55. Additional controlled access trip and DAS allocations for scallop fishing by limited access vessels in the proposed Georges Bank access areas. These allocations would be added to the Hudson Canyon Area controlled access allocations. The analysis also shows the percent of the TACs expected to be taken if all trips are taken and land the maximum allowed under the applicable possession limit.

	2004	2005	2006	2007
Maximum trips allocated				
Closed Area I	0	1	1	0
Nantucket Lightship Area	1	0	1	1
Closed Area II	2	1	0	1
Maximum days allocated and charged				
Closed Area I	0	12	12	0
Nantucket Lightship Area	12	0	12	12
Closed Area II	24	12	0	12
Controlled access days	36	24	24	24
Maximum controlled access trips taken				
Full-time	3	2	2	2
Part-time	2	1	1	1
Occasional	1	1	1	1
Maximum possession limit				
Full-time	18,000	18,000	18,000	18,000
Part-time	10,800	14,400	14,400	14,400
Occasional	4,500	3,000	3,000	3,000
Potential percent of TAC landed				
Closed Area I		170.6%	195.9%	
Nantucket Lightship Area	71.7%		81.4%	97.2%
Closed Area II	131.1%	71.9%		80.0%
Combined	99.1%	95.9%	109.1%	83.3%
Average days used per trip and annual day-at-sea tradeoff per full-time vessel				
Closed Area I		6.8	6.8	
Nantucket Lightship Area	5.7		5.5	5.5
Closed Area II	6.8	6.5		6.3
Days charged, but not used	16.8	10.6	11.7	12.1
Total expected DAS use				
Closed Area I	-	1,897	1,888	-
Nantucket Lightship Area	1,591	-	1,531	1,536
Closed Area II	3,809	1,808	-	1,750
Total DAS used	5,400	3,705	3,418	3,286
Expected total trips	843	554	554	554
Closed Area I	-	277	277	-
Nantucket Lightship Area	281	-	277	277
Closed Area II	562	277	-	277

6.1.1.1.2 Other management measures in the proposed action

The above analysis describes the predicted impacts of controlled access to the scallops found within the access areas (Section 4.1.1), including the proposed action for the new mechanical rotation strategy and fishing mortality targets. The following discussion analyses the direct and indirect effects on the scallop resource from the habitat closed areas, minimum dredge ring size, minimum twine top mesh, finfish possession limits, access seasons, observers funded by a TAC set-aside, enforcement provisions, reporting requirements, allocations to part-time and occasional scallop vessels, and allowing access by vessels with general category scallop permits. In most cases, the analysis is provided in Section 6.2 and the rationale for the choice is given in Section 4.1. Further discussion and summary of impacts on the scallop resource, with an emphasis on the proposed action, is given below.

6.1.1.1.2.1 *Habitat closed areas*

Habitat closed areas remove scallops from the biomass that is available to the fishery. Due to low rates of movement by adult scallops, spawning and predation are the main effect of high scallop biomass in closed areas. Scallops are prolific spawners with a pelagic larval stage, allowing the spawn to be distributed widely, depending on timing and water current. Some studies of larval drift and water currents during spawning around these areas suggest that the scallop larvae are retained in the counter-clockwise gyre around Georges Bank, with some SW transport of larvae across the Great South Channel and the Nantucket Lightship Area. People have speculated that some of these larvae settle in the northern portions of the Mid-Atlantic resource area, but there is no definitive data to prove this phenomenon. Thus, the scallops that remain in closed areas may contribute to spawning potential, but it is probably only important when the resource is depleted, since otherwise there is plenty of spawning potential in the stock elsewhere.

Although the migration of adult scallops is very slow and generally of random direction (this was described in detail within the FSEIS for Amendment 10), scallops near the borders of the EFH closed areas (areas where scallop fishing will not be allowed) may act to re-supply the nearby scallop beds outside of the closed areas. Otherwise mortality on large scallops that remain in the EFH closed areas would eventually take its toll, recycling the energy and nutrients through the local environment.

Thus, the main effect of habitat closures on the scallop resource is to reduce yield, unless the scallop stock is depleted. If depleted due to overfishing elsewhere or long periods of poor recruitment, adult scallops in the habitat closed areas may ensure spawning activity, essentially an insurance policy. On the other hand, the habitat closed areas include some very productive scallop resource areas, particularly in the southern part of Closed Area I and the northern part of Closed Area II.

Amendment 10 estimated the effects on yield and the impacts from the adjustment to the habitat closed areas are not substantial. Most of the change in impacts occurs in the Closed Area I boundaries, and the new habitat closures make about as much scallop biomass available as they remove from the fishery. The TACs for the two habitat closure alternatives in Closed Area I are nearly the same.

6.1.1.1.2.2 *Gear restrictions*

There is little direct impact on the scallop resource within the proposed access areas from allowing vessels to use trawls. Although trawls tend to allow fishermen to target small scallops, the scallop resource in the access areas is composed of mainly large scallops. Also, NEFSC 2001 found no evidence that the Georges Bank groundfish closed areas had an effect on recruitment within the areas.

This implies that other than by removal as catch, the scallop fishery with either dredges or trawls does not impact scallop recruitment through alteration of the bottom.

Indirectly, requiring scallop vessels to use dredges has an impact on potential yield. Since scallop trawls are likely to catch large amounts of yellowtail flounder and other flatfish, the TACs for minimizing groundfish bycatch could prevent the fishery from catching the optimum yield of sea scallops. Thus, requiring vessels to use dredges could allow a higher yield than allowing scallop vessels to use scallop dredges and trawls.

Similarly, twine top mesh and configuration has little direct effect on the scallop resource. There may be some added escapement of small scallops through the mesh, but the effect in the access areas is likely to be insignificant. Indirectly, the twine top mesh improves escapement of some finfish species and could allow the proposed access program to produce optimum yield under constraints on finfish bycatch.

6.1.1.1.2.3 Groundfish catch limits

A TAC for yellowtail flounder bycatch could reduce scallop yield, if it requires closing the access areas prematurely, i.e. before the landings reach the scallop TACs. Indirectly, the effect on the scallop resource is much like a habitat or groundfish closure area, making less scallop biomass available to the fishery. Eventually the uncaught scallops will stop growing (many scallops in the groundfish closed areas are large and have low growth rates) and succumb to natural mortality.

The proposed action, however, changes the rotation order and fishing mortality targets from those analyzed in Amendment 10. These changes reduce the expected annual finfish catches and increase the probability that the access areas would remain open for the season. Under certain circumstances, the industry may take voluntary action to avoid bycatch if a finfish TAC exists. These voluntary actions would allow the access areas to remain open, increasing the availability of scallops to the fishery while minimizing bycatch and bycatch mortality.

6.1.1.1.2.4 Finfish possession limits

There is little direct effect on the scallop resource from the proposed finfish possession limits. Mainly, the possession limits are intended as a disincentive to stay in areas where bycatch is higher than normal and seek scallops in other parts of the access areas where finfish catches are lower. Although fishing for other species besides scallops on a scallop DAS would be very unlikely under current conditions, the finfish possession limits also keep fishermen from targeting groundfish in the closed areas during the access program.

6.1.1.1.2.5 Access seasons

Due to seasonal changes in meat yield⁵⁴ from the scallop spawning cycle, access seasons have a direct effect on the mortality associated with a scallop TAC. The scallop TACs were calculated on the basis of an annual average meat yield at scallop size, since it is difficult to predict when fishing will take place and spawning activity varies annually and by area.

⁵⁴ Meat yield is the weight of scallop meat for a given size scallop. A 110 mm scallop has a higher meat yield in the spring than it does in the fall, during spawning. Meat count, on the other hand, is the average number of scallops per pound in the catch, regardless of size. It is a function of the size frequency of scallops in the catch and the meat yield.

If scallop fishing takes place during the spring when the meat yield is highest, the access program would generate landings at the TAC amount with less fishing mortality and effort (and also bottom contact time). All things being equal, it would also minimize habitat impacts and bycatch by reducing the total amount of fishing time and area swept. Conversely, more scallop yield could be produced with the same impacts on the environment as the case if the fishing effort is spread throughout the year.

During the fall, scallops on Georges Bank divert more energy toward spawning and meat yield declines. As a result, more scallops could be harvested than anticipated if the fishing occurs mainly during the fall spawning season. Some of this effect is balanced by inter-annual growth of the individual scallops, particularly for the quicker growing scallops less than 110 mm. Since most scallops in the access areas are large and growth is slow, the seasonal change in meat yield is important. If the fishing activity is focused mainly during the fall spawning season when meat yield is lowest, a TAC would generate more fishing mortality and effort than anticipated, increasing fishing time, area swept, and potential impacts on habitat.

A major concern, however, was groundfish bycatch during the springtime. is uncertain (bycatch estimates were derived from sea sampling conducted during June 15, 2000 to January 31, 2001) and could be higher than in the fall (spawning activity for most species peaks in the spring and many species aggregate in the closed areas to spawn; Closed Area I and Closed Area II were originally closed during the spring to avoid fishing during peak spawning activity for cod and haddock). In addition, the Council was concern about the possibility that fishing activity could disrupt cod spawning. These concerns were given more weight than the effect of additional mortality on the scallop resource, caused by concentrating fishing effort during the fall spawning period.

6.1.1.1.2.6 At-sea observers

There is no direct effect of the proposed observer program on the scallop resource. Since the program would be funded by a TAC set-aside, it also would not change the amount of expected fishing effort or scallop mortality. The program however does effect total revenue for the scallop industry, but these economic effects are discussed elsewhere in this document.

6.1.1.1.2.7 Enforcement provisions

Trip declaration, landing requirements, and more frequent VMS polling have no direct impacts on the scallop resource. The direct impacts are mainly on the compliance cost, which are discussed elsewhere in this document. The more frequent VMS polling can, however, have an indirect effect on the scallop resource by collecting better position information. These data can be used in assessments to analyze the resource, the effects of fishing, and the effectiveness of management measures.

6.1.1.1.2.8 Part-time and occasional trip and DAS allocations

Since the total amount of trips, DAS use, and expected landings are expected to remain nearly the same as for the status quo, this proposed action is not expected to affect the scallop resource.

6.1.1.1.2.9 Area access for vessels with general category scallop permits

Since the number of trips that may be taken in the access areas is limited by a TAC set-aside, no direct effect on the scallop resource is anticipated. Nonetheless, the added fishing opportunities could attract capital to an open-access, lightly-regulated fishery, a major concern of the Scallop Plan Development Team.

Compliance costs for vessels using a general category permit to target scallops are considerably higher than they are in the open fishing areas, in relationship to the amount of revenue from landings. In addition, the access areas are considerably farther from shore than the normal scallop fishing areas for boats with general category permits. Inshore vessels that sometimes target scallops may spend funds to upgrade their vessels for offshore fishing. There are no limits on vessel upgrading, other than those that pertain to the vessel according to other fishing permits. Offshore vessels mostly use general category permits to land incidental scallop catches when targeting other species with trawls and other gears. Some offshore fishermen may decide to modify the vessel and purchase new dredges to target scallops in the access areas.

In either case, if there is a marginal economic benefit for the vessel, this proposed action could allow fishing effort and fishing power to increase. When the areas close to scallop fishing or scallop yield declines, vessels that have upgraded to fish in the access areas will look for other opportunities in the scallop fishery. If the added mortality is taken into account, it could reduce the limited access DAS allocations in the long run. If not taken into account, it could cause mortality to exceed the target or maximum threshold. At the very least, it could entice capitalization in a lightly-regulated fishery and create new stakeholders with interests in offshore scallop fishing.

At the present time, however, some vessels with general category permits have been unable to fish in the access areas that were formerly closed due to groundfish regulations. Many of these vessels are also facing more stringent regulations in other fisheries. Scallop landings by vessels with general category permits have been a small fraction of the total and appear to have declined when scallop prices declined from over \$5.00 per lb. in 1999 to under \$3.50 per lb. today. Taking these considerations into account, there is no immediate threat to the scallop resource by allowing vessels with general category permits to target scallops in the access areas. Over the longer term, the Council believes that the FMP has the tools needed to address these concerns should they develop.

6.1.1.2 Groundfish

Catches of regulated groundfish in the proposed access areas are expected to be less than 10% of the overall TAC in the Multispecies FMP to meet the groundfish mortality targets (see Section 6.2.5.1.1). This amount is less than a level that the Groundfish PDT identified as having a possible repercussion for meeting the groundfish mortality targets and having an effect on rebuilding overfished groundfish stocks. Yellowtail flounder is one species that the bycatch projections exceeding the 10% value, and for that species the proposed action sets a hard TAC for the access program that applies to each yellowtail flounder stock⁵⁵.

Thus, the groundfish catches in the access areas is expected to be limited and have a de minimis effect on groundfish biomass and overall mortality. More importantly, these catches are expected to be offset and possibly exceeded by reducing groundfish bycatch through reductions in effort

The proposed action includes two measures that could affect groundfish stocks. First, it changes the habitat protection areas adopted by Amendment 10 to the Scallop FMP so that they match the areas adopted by Amendment 13 to the Multispecies FMP. Second, it adopts a program that will allow scallop dredge fishing to take place in areas closed to protect groundfish stocks. These measures are not expected to have an adverse impact on groundfish resources or the groundfish fishery.

⁵⁵ The Nantucket Lightship Area falls within the boundaries of the Southern New England/Mid-Atlantic yellowtail flounder stock area. Closed Area I and Closed Area II fall within the Georges Bank yellowtail flounder stock area.

The habitat protection areas adopted by Amendment 10 to the Scallop FMP defined areas that were closed to scallop fishing in order to protect scallop EFH. Amendment 13 to the Northeast Multispecies FMP defined areas that were closed to mobile bottom-tending gear – including scallop dredges - to protect groundfish EFH. The areas closed under the respective amendments protected different areas in the vicinity of the Nantucket Lightship Closed Area (NLSA) and Closed Area I (CAI). Amendment 10 provided habitat protection to a larger area inside the NLSA but did not include the trapezoid area outside the NLSA. The additional area inside the NLSA, however, was determined not to be practicable for protection of groundfish resources in Amendment 13. In CAI, Amendment 10 provided protection to a wedge-shaped area that differed slightly from that adopted by Amendment 13. The Amendment 13 proposal was determined to better define the area that should be protected for groundfish by Amendment 13. By adopting the same habitat protection scheme as Amendment 13, this action adopts the level of protection for groundfish resources that was deemed practicable in Amendment 13.

The Northeast Multispecies FMP relies primarily on effort controls to control fishing mortality, including five year round closed areas. These areas were adopted over time for various reasons, but are generally accepted as designed to control groundfish mortality and provide protection to key spawning areas. In addition, mobile bottom tending gear has been prohibited in portions of these areas to protect groundfish EFH. The closed area access program implemented by this action could affect groundfish resources in the following ways:

- By changing the amount of groundfish caught by scallop dredges;
- By interfering with spawning activity in the closed areas (access is only granted to the three of the five year round closed areas);
- By damaging EFH in the closed areas;
- By interfering with access to the resource or markets by groundfish vessels.

The access program is subject to a number of constraints that make it unlikely that it will result in an increase in the amount of groundfish caught by scallop dredges. Scallop fishing causes incidental catches of groundfish, but the most significant catch is of yellowtail flounder, with only very small quantities of other species (Section 6.2.5.1.1.4). To control the catch of yellowtail flounder, the Council adopted a number of restrictions. First, all scallop dredges must use 10-inch twine tops, a modification that has been proven to significantly reduce catches of flounders. Second, there is a high level of observer coverage required in the programs so that incidental catches can be accurately tallied. Third, a hard TAC incidental catch limit for GB and SNE/MA yellowtail flounder has been included to control bycatch mortality. Once these TACs are caught, scalloping in the closed areas will cease. The TACs have been specifically designed so that if the entire TAC is caught, it will not result in catches of yellowtail flounder that are inconsistent with the management program adopted by Amendment 13.

Behavioral changes that may result because these TACs are implemented are subject to some debate. On the one hand, they may discourage fishermen from fishing in areas with high yellowtail flounder catches in order to catch higher-value scallop resource. Some argue, however, that these TACs may encourage a derby fishery to harvest the scallops as quickly as possible without regard to yellowtail flounder bycatch. If this alternative behavior occurs, the most damaging result will be a failure to harvest the available scallop yield since the access program may close earlier than anticipated. Even under this scenario the hard TAC will limit yellowtail flounder catches to those consistent with Amendment 13. Fourth, the access program shifts fishing effort from outside the closed areas to inside the closed areas. The impacts of this shift in effort on groundfish are difficult to quantify, because the finfish bycatch for scallop trips occurring in neighboring open fishing areas have not been sampled well. Access combined with open area DAS reductions may reduce groundfish incidental catches by scallop vessels since overall it will result in less fishing time to catch the available scallop resource. More importantly, it will place dredge vessels under a hard TAC for yellowtail flounder for a considerable amount of fishing time. Fifth,

the program increases the amount of yellowtail flounder that scallop dredge vessels are allowed to retain to 1,000 lbs. per trip (the current limit is 200 lbs. per trip). While this will not change the amount of yellowtail caught, it will allow scallop vessels to land more of their incidental catches rather than discard them at sea, reducing bycatch. This increased possession limit is unlikely to encourage targeting of yellowtail flounder because of the large price difference between scallops and yellowtail flounder. Finally, the program is limited to periods when fish are not aggregated for spawning. This will help keep incidental catches consistent with estimates based on available observer data.

Although the proposed access area program would potentially increase the bycatch of groundfish and yellowtail flounder in the areas that are otherwise closed to control groundfish mortality, the net effect of such action is expected to be positive because of the proposed effort reduction for open area DAS, although it is difficult to quantify. This is because according to the scallop overfishing definition fishing mortality target strategy, the proposed action will also reduce open area DAS allocations. Moreover, the amount of fishing time per DAS used in the access areas is considerably less than that in open fishing areas, due to the high catch rates and limited shucking capacity on a scallop vessel with seven crewmembers. Since bycatch in an area is directly proportion to the amount of fishing time, or total area swept, this value and where the effort occurs are a very important considerations.

In the open fishing areas, vessels often fish 18 to 24 hours per day. The 2003 average catch per day was estimated to be about 1,250 lbs./day in the Georges Bank region and 1,800 lbs./day in the Mid-Atlantic region. Particularly in Georges Bank, this rate is much less than the crew's ability to process the scallops, so fishing typically occurs around the clock. Including gear-handling time, this means that the gear is on the bottom fishing for 20 to 22 hrs./day when vessels customarily tow for 90 minutes. In contrast, the maximum landings in the controlled access areas is expected to be 2,400 to 3,000 lbs./day, but the catch by the gear is expected to be much higher than that. The amount of fishing time per DAS is thus reduced by the ratio of the vessel's catch to the crew's shucking capacity. Catches of 40 bushel, or 320 lbs. per dredge, on a tow lasting 10-15 minutes are not uncommon. Thus the actual fishing time per DAS drops to 1 to 3 hrs./day in the access areas.

This ratio of dredge catch to a vessel's shucking capacity was used in the projection model and multiplied by the dredge width to estimate area swept. The model also makes some simple assumptions about the distribution of fishing effort by region, because it has been observed that about 1/3rd of scallop fishing effort occurs in the Georges Bank region when the daily scallop catch in the two regions are equal. Differences in the daily catch rate influences this ratio, a factor taken into account by the projection model (see the Amendment 10 FSEIS, Appendix IV for a description of the method). When the daily scallop catches are higher on Georges Bank than in the Mid-Atlantic, more than 1/3rd of the scallop fishing effort occurred there, and vice versa.

Changes in scallop biomass have an effect on this ratio and were also used to predict future bycatch in the access areas (see Section 6.2.5.1.1). What is not known is how much effort would occur in the Mid-Atlantic vs. the Georges Bank region with a reduction in open area DAS. Due to the distribution of groundfish, most of the groundfish bycatch on scallop trips occurs on trips in the Georges Bank region, thus changes in scallop fishing effort in the open Georges Bank areas are important.

Taking the changes in scallop catches into account and the historic distribution of scallop fishing effort in relationship to the relative catch rates, combined with the DAS allocations and expected fishing time per DAS, the biological projection model (see Section 6.2.5.1.1.4) estimates total area swept by region.

With access, the estimated area swept in the Mid-Atlantic region is expected to decline from 3,000 nm² in 2003 to 2100 nm² in 2004, a decline of 30% (Figure 7). More DAS allocations are needed

in 2005-2006 without access (i.e. “No Action”) to achieve the $F=0.2$ scallop mortality target, so area swept in the open areas is expected to shoot up to nearly 9000 nm² in 2006, before dropping to 3,500 nm² when the Elephant Trunk Area re-opens for scallop fishing. After 2004, the area swept in the Mid-Atlantic region is 58 to 67% less with access compared to No Action.

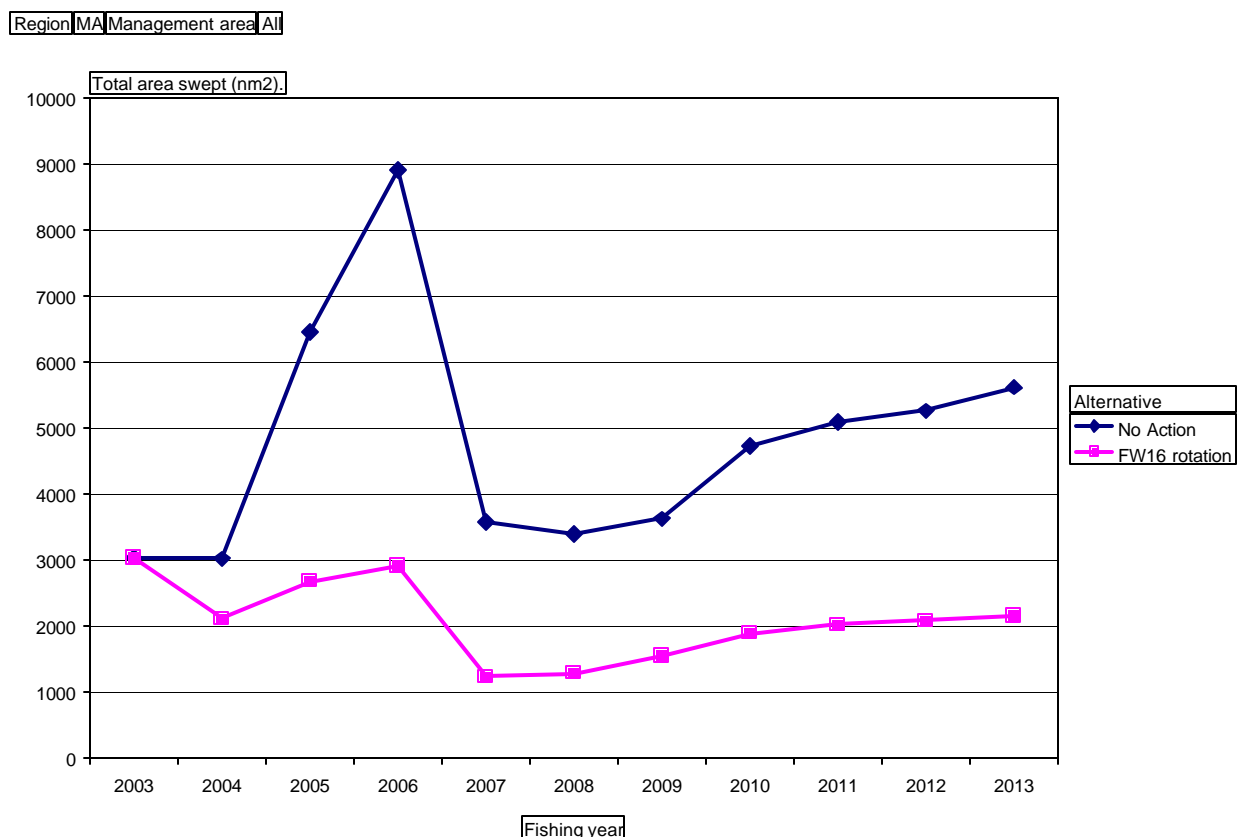


Figure 7. Difference in projected total area swept (nm²) in the Mid-Atlantic region.

Groundfish are not found in abundance within the Mid-Atlantic region, so have very little bearing on groundfish mortality and impacts on the groundfish resource. Scallop fishing effort in the open Georges Bank areas is an entirely different story.

Accounting for the historic effort distribution in relationship to scallop catch rates by area, the projection model predicts a substantial decrease in fishing time and total area swept for the Georges Bank region as well. Nearly 50% of the projected scallop effort is expected to occur in the Great South Channel vicinity (Figure 8), so reductions in fishing effort are likely to effect vulnerable groundfish found more frequently in that area (yellowtail flounder and American plaice).

Region|GB|Fishing year|2004|Alternative|No Action

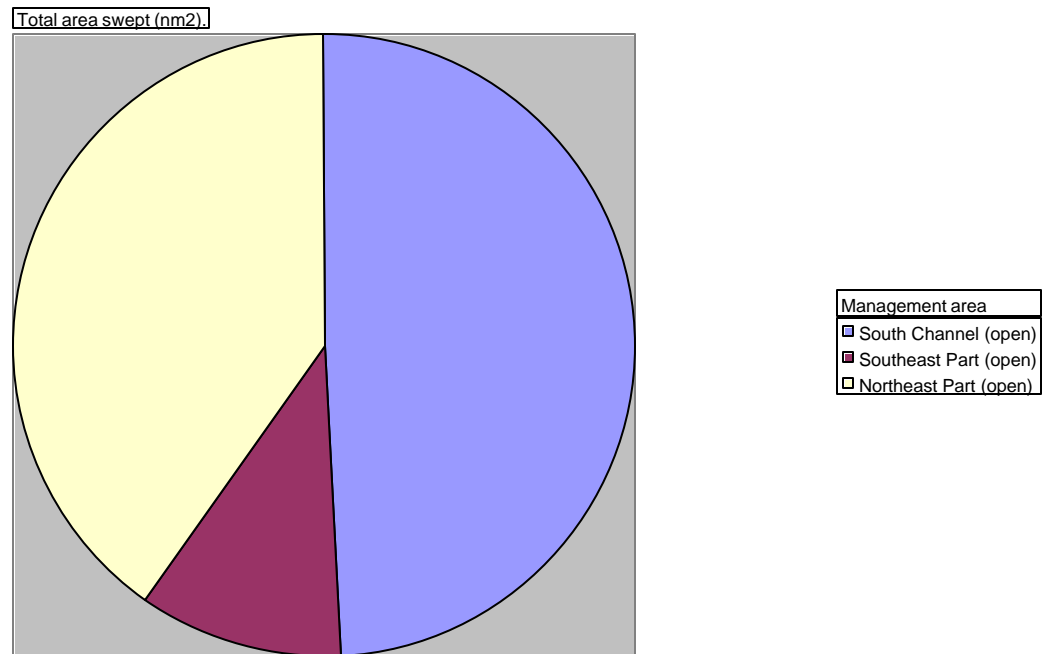


Figure 8. Proportion of 2004 fishing effort by region with no access (“No action” alternative).

According to the projection model for the No Action alternative, total fishing time (area swept) is predicted to decline from 1,750 nm² in 2003 to 900 nm² in 2005, and then varying between 1,000 and 2,000 nm² (Figure 9). In contrast, the projection model predicts a faster decline and more stable low amounts of fishing time in the open areas of the Georges Bank region, declining to 350 nm² by 2005 and then remaining below 1,000 nm² through the ten-year projection. This is 36 and 62 percent less than the No Action alternative in 2004 and 2005, respectively. After that, the total fishing time (area swept) is projected to be 44 to 78 percent less than that with no access (“No Action”). Therefore, a substantial reduction of groundfish bycatch on open area trips is expected from the proposed action.



Figure 9. Difference in projected total area swept (nm²) in the open portions of the Georges Bank region.

Overall, the net change in Georges Bank region total area swept with access is also lower than the No Action alternative (Figure 10). During 2004 and 2005, total area swept is projected to decline from 1,750 nm² in 2003 to less than 700 nm² with access. The total area swept is 15 to 23 percent lower in 2004 and 2005, respectively, with access compared to No Action without access. After 2006, the total area swept in the Georges Bank region is projected to average 50% less with access compared to No Action.

Thus, if groundfish bycatch in the proposed access areas during June 15 to January 31 is equal or less than the groundfish bycatch in the open areas during the entire year when scallop fishing occurs, the proposed access program is expected to minimize bycatch and the net effect on groundfish bycatch is expected to be positive. If the groundfish bycatch is higher than anticipated, the 10% TAC limit for yellowtail flounder would act as a brake on the access program and close the access areas to scallop fishing for the year. This would also limit the catches of other regulated species, because yellowtail flounder are one of the most vulnerable species to capture by scallop dredges. If the yellowtail flounder catches are higher than anticipated, this would reduce the benefits from the area access program and the Council could consider different seasonal or other restrictions to control groundfish bycatch.

Region GB Management area All



Figure 10. Overall change in total area swept projections for the Georges Bank region, including access to the Georges Bank groundfish closed areas with the “FW16 rotation” scenario.

The groundfish closed areas – particularly CAI and CAII – are also intended to protect spawning aggregations of groundfish (see Section 6.2.7.1.2). Groundfish spawning activity occurs through much of the year, though for most stocks the key months are January through June. There are distinct peaks in spawning activity even within this block, depending on species. The proposed action would allow scallop fishing only during June 15 to January 31, however. The access program thus will not interfere with the peak spawning activity that occurs in the closed areas at this time. Compared to the No Action alternative, the access program does not change the impact of the fishery on spawning groundfish. (It should be reiterated that specific evidence that dredge activity interferes with spawning is not available; the assumption of possible interference is based on limited studies of the behavior of spawning fish and their reaction to trawl nets, a far different fishing gear).

The areas that are opened to scallop fishing are only those that are not closed to mobile gear by Amendment 13 to protect EFH. As a result, the program is not expected to have a significant impact on groundfish EFH and the impacts are not any different than under the No Action alternative.

Amendment 13 to the Northeast Multispecies FMP imposes additional effort reductions on groundfish fishing vessels in order to reduce fishing mortality. Scallop catches of groundfish could affect access to the resource by groundfish vessels in several ways. If scallop vessels increased their catch of groundfish to levels that threatened the mortality reductions in Amendment 13, groundfish vessels could be subject to additional effort reductions in the future. Because the only species caught by scallop dredges in any appreciable amount – yellowtail flounder – is restricted by a hard TAC, this is unlikely to occur. Amendment 13 also adopts a hard TAC on GB yellowtail flounder as part of the implementation

of the US/CA Resource Sharing Understanding. Once this TAC is caught, fishing in statistical areas 561 and 562 while on a groundfish DAS and possession of yellowtail flounder throughout the stock area would be prohibited. High catches of yellowtail flounder by scallop vessels could, in theory, result in closing this area. The hard TAC limit, however, makes it unlikely that this will occur before US groundfish vessels have the opportunity to harvest the resource in this area. The proposed access program also allows scallop vessels to land more yellowtail flounder under a 1,000-pound possession limit. It is unlikely that this will have a significant effect on markets. Groundfish fishing trips with trawls in this area typically land 25,000 to 30,000 lbs. per trip, so the additional scallop dredge landings will not have a significant affect on supplies and prices.

To summarize the aggregate impacts:

- The proposed action will not result in a change in groundfish catch by scallop vessels that will threaten the objectives of Amendment 13. It is possible the action will reduce catches of yellowtail flounder by dredge vessels and it may result in reduced discards as well.
- The proposed action will not interfere with groundfish spawning in the closed areas.
- The proposed action will not result in damage to areas closed to mobile fishing gears in order to protect groundfish EFH.
- The proposed action will not affect access to the fishery or markets by groundfish vessels.

6.1.1.3 Skates

The Skate FMP identified and characterized a baseline of management measures in other fisheries that provide additional conservation benefits to skate species. Since this framework action proposes to lessen restrictions as assessed in the skate baseline review, the Skate PDT must evaluate whether this action will have negative impacts on overall mortality of skate species in a formal rebuilding program. Section 7.1.4 evaluates the impact of this action on skate mortality, and concludes that the slight increase in total allocated DAS and access into portions of the groundfish mortality closed areas will not have negative impacts on skate mortality.

This action is not expected to have negative impacts on skates in a formal rebuilding program (thorny and barndoor). In fact, this framework action will have very little, if any, impact on thorny skate mortality because the primary objective of the access program is to concentrate scallop effort in the access areas on Georges Bank, which are on the periphery of thorny skate distribution. As for barndoor skates, the primary justification for inferring that the proposed scallop access program would not substantially increase barndoor skate mortality is that the recovery trend of barndoor has continued, even accelerated, during and after the last access programs. Barndoor biomass has increased steadily since 1998 despite the two scallop access programs (in 1999 and 2000). Therefore, this action is not expected to have negative impacts on barndoor skate rebuilding. While total allocated DAS is expected to slightly increase in 2004 as compared to the level assessed in the skate baseline, allocated DAS will reduce substantially after 2004 under a rotational area management strategy.

6.1.1.4 Other managed species

Other managed species that are affected by the action include monkfish (managed by the NEFMC) and summer flounder (managed by the MAFMC). Monkfish occur in both the proposed access areas and in the open areas of Georges Bank and the Mid-Atlantic regions, and are one of the main components in the scallop fishery catches. Summer flounder occur primarily in the Mid-Atlantic region and along the southern flank of Georges Bank and Southern New England, but usually are a small component of the bycatch for vessels targeting sea scallops.

Monkfish are often caught by scallop dredges when targeting sea scallops in many areas, but have been a significant part of the vessel's revenue at various times over the last 15 years. In fact, when scallop catches and revenue were low, many limited access scallop vessels have a history of targeting monkfish with scallop dredges. Because of this and the low survivability of monkfish after discarding, the Monkfish FMP allocates fairly generous trip limits for vessels on a scallop DAS, 300 lbs. tail-weight per DAS. In addition, some scallop vessels qualify for a limited access monkfish permit that allows them to catch and land more than this limit for 40 DAS to be counted against the limited access scallop DAS allocation.

Monkfish appear to be nearly as abundant within the access areas as they are elsewhere, based on the estimated bycatch in the 2000 access program. No targeting of monkfish was observed and targeting monkfish with a controlled access DAS is very unlikely due to the high catches of more-valuable scallops. With the proposed action and alternative rotation schedule, the daily catch rate is expected to vary between 175 to 332 lbs./day during 2004-2007 (Table 125). These are estimates of annual average catches per DAS, so conditions and catches will vary on individual trips made at various times of the year. Nonetheless, increases in discarding of monkfish are not expected because the catches are not substantially greater than the daily monkfish possession limit that applies on a limited access scallop DAS. Monkfish catches may decline overall, however, due to reductions in total fishing time that are anticipated with access.

Summer flounder, on the other hand, are a very small component of the bycatch in the proposed access areas (see estimates in Table 111 to Table 113). They are more prevalent and a greater component of the bycatch in the Mid-Atlantic region, however. Thus the expected reductions of fishing effort in the Mid-Atlantic region and the open portions of the Georges Bank region are likely to reduce summer flounder catches under the proposed action. This reduction cannot be quantified, however, due to insufficient sea sampling in areas where summer flounder are more available to the fishery.

6.1.2 Summary of Aggregated Habitat Impacts

The EFH final rule requires that changes made to FMPs through Amendments and Framework actions must ensure that the FMP continues to minimize to the extent practicable adverse effects on EFH caused by fishing. This section will demonstrate that the overall habitat impacts of all the measures combined in this action have neutral impacts on habitat, compared to the habitat benefits that will result from implementation of Amendment 10 of the Scallop FMP and Amendment 13 of the Multispecies FMP. Two management measures that will be implemented by this framework action that are likely to have direct habitat impacts are the modification of habitat closed area boundaries that were originally adopted in Amendment 10 to the Scallop FMP and the definition of which areas within the existing Groundfish closed areas will be opened for limited, rotational, access for scallop fishing.

This framework action proposes to modify the habitat closed areas originally proposed for implementation in Amendment 10 to the Scallop FMP to make them consistent with the habitat closed areas proposed in Amendment 13 to the Multispecies FMP. Elimination of the conflicts between the two FMPs will result in the closure of the same areas to gears used in both fisheries, thus providing more effective protection of benthic EFH from the adverse effects of fishing.

Access into portions of the groundfish mortality closed areas has been granted to the scallop fleet in previous frameworks. Continued access was anticipated in the analysis of Amendment 10, therefore granting access through this framework will not increase impacts beyond that which was recognized as part of the Amendment 10 baseline. The specific access areas are slightly different than access areas in

previous frameworks; the access area in the center of Closed Area I has shifted to the south, the access area in the Nantucket Lightship Area has expanded to about one-third of the total closed area (eastern portion only), and the access area in Closed Area II is the same as in previous framework actions. The EFH value of this access option is not significantly different from the EFH value of the other access options. The overall substrate composition of the four access alternatives is also similar; they are all primarily sandy bottom. More recent preliminary substrate data suggest that the southern portion of the Closed Area I proposed access area may be more complex than the area previously opened. Even if the proposed access alternative does open more complex bottom than previous access programs, it is probable that the overall habitat impacts are neutral because there is added habitat protection from the addition of habitat closed areas on Cashes Ledge, Jeffrey's Bank, and the northern part of the Nantucket Lightship Area (over 500 square nautical miles). These areas that were identified as important for habitat conservation represent a variety of substrate bottom that may compensate for the potential "loss" of the southern part of Closed Area I that is proposed for access (about 215 square nautical miles).

The EFH analysis shows that the total EFH area within the proposed access areas is slightly more than the access areas implemented in previous frameworks (Alternative 1). The Council concluded that the potential habitat gain from protecting the southern part of the access area in Closed Area I that has not been part of a previous access program does not outweigh the economic costs of preventing the scallop fleet from accessing this area. About 2/3rds of scallop biomass in the access boundaries for Closed Area I is within the southern part of the access area, therefore preventing access into this area is not practicable (Table 27; compared to Table 23, Table 25, and Table 29).

This framework action also proposes to make the habitat closed areas originally proposed in Amendment 10 to the Sea Scallop FMP consistent with those approved in Amendment 13 to the Multispecies FMP. This will improve the practicability of the habitat closed areas and eliminate conflicts between the two FMPs. Portions of the habitat closed areas proposed in Amendment 13 are outside of the original groundfish mortality closed areas, so will be additional area protected from scallop gear.

The hard TAC for yellowtail bycatch, TAC set aside for research, access season of June 15th - January 31st, and many of the other actions proposed in this framework action will not have direct impacts on EFH. Therefore, based on a comparison of the habitat impacts of the modified habitat closed areas and the preferred access alternative proposed for implementation in this framework action with the habitat management actions adopted in Amendments 10 and 13, the habitat impacts of the proposed action are neutral, and no additional measures are necessary to minimize impacts of the fishery on EFH.

6.1.3 Summary of Aggregated Impacts of Management Measures on Endangered and Other Protected Species

As has been discussed in a number of Council and NMFS documents, sea turtle interactions with the scallop fishery are the focus of discussions relative to protected species. While interactions with the scallop gear could take place between the North Carolina/South Carolina border and Cape Cod, Massachusetts (see Figures 11 to 15 in Amendment 10), they are expected to be more prevalent in the Mid-Atlantic where turtles occur for longer periods of time and at higher concentrations than in New England waters, where Framework 16 proposes access and allocates scallop fishing effort.

To date, highest turtle bycatch rates in the Mid-Atlantic have occurred during the summer season (July-September), while the lowest rates have been observed during the May-June period. Fishing effort peaks in the region during May through August resulting in serious injury or mortality, particularly to loggerheads, as a result of encounters between scallop gear and turtles.

Given that the focus of Framework Adjustment 16/39 is to allow scallop vessels to fish in areas of Georges Bank that would otherwise be closed to scallop dredge gear, the program overall is inherently beneficial to sea turtles as the result of a potential shift in effort. Such a shift from the warmer waters of the Mid-Atlantic during the turtle high use season would benefit all turtle species that occur there on a number of levels. Analysis in Section 6.1.1.2 discusses the expected overall decline of fishing time (measured as area swept) in the Mid-Atlantic region after 2004 as a result of the access program and higher open area scallop biomass in the future. Further, overall scallop effort in open areas by scallop vessels participating in the program would decline as a result of lower DAS allocations, and finally, the periods during which the access areas are proposed to be open to scallop fishing are unlikely to impact sea turtles because of their low numbers in the Georges Bank region.

Potential increases in effort as a result of increased participation by general category vessels, exchanges of controlled access that could result in an increase in effort in the Mid-Atlantic region (only possible if a limited access vessel trades to get Georges Bank region controlled access trips which might be used to fish in open areas if the access areas close when yellowtail flounder catches reach the TAC), and shifts in effort resulting from the timing of the approval the action, or lack thereof, are among the measures that may have unknown or negative consequences to protected species. Other measures such as the TACs, trip limits, bycatch caps, and administrative provisions will have little and likely no impacts on sea turtles.

Due to restrictions in controlled access trip use in this framework adjustment, the impacts are unlikely to be any worse for sea turtles than that anticipated and analyzed in the Amendment 10 FSEIS. Bearing in mind that it is nearly impossible to predict market conditions, the influence of other regulatory programs and a host of other factors that affect fishing behavior, none of the measures described above and included in the action are expected to change the Council's determination that the program should be at least neutral for sea turtles and is more likely to be beneficial as a result of the potential reduction in scallop fishing effort where and when turtles are present.

6.1.4 Summary of Aggregated Economic Impacts

The section provides a cost/benefit analysis of the alternatives proposed by the Council through Framework action 16 to the Sea Scallop FMP. The regulatory guidelines require that the economic impacts of the proposed options be compared relative to the impacts likely to occur if "no action" is taken. No action here refers to no access and scallop fishing in any part of Closed Area I (CAI), Closed Area II (CAII), or the Nantucket Lightship Area (NLSA) for the foreseeable future. The status quo scenario is based on the same assumption, i.e., no access, but with total fleet effort constrained at the current levels by potential Framework action, at about 24,000 DAS, in order to achieve optimum yield from the scallop resource. The economic impacts of access to the Georges Bank groundfish areas (CAI, CAII, and NLSA) are summarized for Amendment 10 (A10) and Alternative mechanical rotation options. The economic impacts with access are compared to the no action and status quo scenarios with no access.

The economic impacts are determined by the level of scallop landings, fishing effort, LPUE, and by the size and price of scallops for each rotation and access alternative. Table 56 shows that the proposed access to the Georges Bank Groundfish Areas will result in lower annual landings, about 3 to 4.4 million lbs. less on average during the 2004-2007 period, compared to the no action scenario for both Amendment 10 and alternative rotation strategies.

- Table 56 shows that in 2004 total landings will be 55.8 million lbs. with access but only 48.6 million with no access. After 2004, however, landings with no access will exceed landings with access, resulting in lower landings per year as an average of the years 2004 to 2007.

This is because, in the absence of access, DAS allocations for the open areas will be higher so that the vessels will fish and land more scallops from open areas.

- These results differ considerably from Amendment 10 landing estimates with and without access. Amendment 10 estimated that scallop landings from the open areas would be about 37 million per year as an average during 2004-2007, if no access was provided to the Georges Bank groundfish areas. Landings with access were estimated at 57 million per year for the same period. Partly because of the large year class in the Mid-Atlantic area and the decline in biomass in the southern portion of Closed Area II, however, the updated biological projections showed that landings without access to the Georges Bank groundfish areas will reach about 59 million per year during 2004-2007, whereas access will produce from about 54.7 million (A10 rotation, access alternative 1) to 56.2 million (Alternative rotation, access alternative 4) in scallop landings.

Table 56. Landings with no access (no action) and with alternative mechanical rotation and access (alternative 2)

Year	Alternatives	Open areas	Access areas	All areas
2004	With access	39.55	16.26	55.80
	With no access	48.56	-	48.56
2005	With access	43.29	11.08	54.36
	With no access	63.70	-	63.70
2006	With access	43.20	9.62	52.82
	With no access	59.02	-	59.02
2007	With access	50.79	12.73	63.52
	With no access	65.39	-	65.39
2004-2007	With access	44.20	12.42	56.63
	With no access	59.12	-	59.12
2008-2013	With access	49.14	7.41	56.55
	With no access	54.83	-	54.83

6.1.4.1 Overview of Economic Impacts

The economic impacts of higher landings with no access compared to access alternatives are shown in Table 57 for 2004 to 2007 and in Table 59 for the long-term impacts. The results are summarized below:

- Overall, access to the Georges Bank groundfish areas will not have a significant impact on the average fleet revenues per year during the 2004-2007 period. Access with A10 strategy will result in slightly lower average revenue per year for the scallop fleet under all access alternatives relative to the no action, no access scenario. Alternative rotation strategy with access, with the exception of access alternative 2, will generate marginally lower revenues per year from scallop fishing compared to no action, no access values. Access alternative 2 will increase fleet revenues compared to no access, although this increase is negligibly small (Table 57).
- The producer benefits will be positive, however, because of lower fishing costs with access as shown in Table 58. Producer surplus is measured by total revenues net of operating expenses, and it includes both vessel profits and crew income. The cumulative present value of the

producer surplus net of no action values is estimated to exceed \$30 million during the 2004-2007 period for all access alternatives.

- Access to the Georges Bank groundfish areas will have positive impacts on gross profits of the scallop fishery. This is due mainly to the decline in the operating expenses by almost 30% with access compared to no access (Table 65). Because LPUE in the Georges Bank groundfish areas will be higher than the LPUE in the open areas, operating expenses per pound of scallop will be lower with access compared to no access. As a result, gross profits are estimated to increase by 17% to 18% in the short-term (2004-2007), and by more than 20% in the long-term due to access to the Georges Bank groundfish areas (Table 66).

During the 2004-2007 period, access to the Georges Bank groundfish areas is estimated to have negative impacts on total benefits because of lower landings with access relative to no action. Total economic benefits, as measured by the sum of the producer and consumer surpluses, will decline by approximately \$12 to \$26 million if access is provided with Amendment 10 rotation. This decline is due mainly to the decline in consumer benefits (by \$43 million to \$56 million) with lower landings and higher prices with access (Table 58). The negative impacts are smaller, however, if alternative mechanical rotation strategy is adopted. With access alternatives 1 and 4, the impacts on total economic benefits will be marginal with a total decline of \$1.4 million for the four years from 2004 to 2007. Access alternative 3 is estimated to produce the largest decline, \$11.9 million for the same period (Table 57). With access alternative 2, total economic benefits will increase marginally by \$2.8 million.

- The long-term economic impacts of access will be positive. Annual average fleet revenues will be positive for all access alternatives relative to no access both for the status quo and no action scenarios. This is because higher landings without access will eventually have negative impacts on scallop biomass and will reduce LPUE and landings in future years. As a result, total economic benefits in the long-term will be positive for all access alternatives with alternative mechanical rotation and for Amendment 10 rotation (Table 59).
- The size of the scallops will be larger with access. Average meat count with access will be around 15 meats per pound during the short-term (2004-2007), whereas, it will be 17.6 meats per pound without access to the Georges Bank groundfish areas (Table 61). Because more U10s will be landed with access, total revenues and economic benefits could be higher than estimated here if the price premium on U10s prevails in the future.
- The economic benefits for access were estimated assuming that the landings from the Georges Bank access areas will reach the scallop TACs for these areas and that there will be no premature closure due to the landings of finfish in excess of the TACs set for these species. The revenues and economic benefits could be lower, however, than estimated here if finfish TACs are met before the scallop TACs are reached.
- Access may reduce the total crew DAS worked and employment in the scallop fishery. The incomes of the crew who continue to be employed are estimated to increase because of access to the highly productive areas of the Georges Bank groundfish areas (Table 67 and Table 68).

Table 57. Short-term (2004-2007) economic impacts net of no action – no access. (Dollar values are expressed in 1996 constant prices.)

Access alternatives	Average revenue per year net of No Action (\$ million)		Total cumulative benefits net of No Action (\$ million)	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	-0.72	-0.06	-16.28	-1.42
Alternative 2	-0.56	0.14	-12.61	2.86
Alternative 3	-1.10	-0.71	-25.35	-11.93
Alternative 4	-0.63	-0.06	-13.80	-1.42

Table 58. Short-term (2004-2007) economic impacts net of no action – no access on producer and consumer benefits. (Dollar values are expressed in 1996 constant prices.)

Access alternatives	Cumulative producer surplus net of No Action (\$ million)		Cumulative consumer surplus Net of No Action (\$ million)	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	31.22	31.19	-47.50	-32.61
Alternative 2	31.34	31.37	-43.95	-28.51
Alternative 3	31.04	30.20	-56.39	-42.13
Alternative 4	31.24	31.19	-45.04	-32.61

Table 59. Long-term (2008-2013) economic impacts on revenue and total economic benefits net of no action – no access. (Dollar values are expressed in 1996 constant prices.)

Access alternatives	Average revenue per year net of No Action (\$ million)		Total cumulative benefits Net of No Action (\$ million)	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	2.80	3.10	52.50	47.18
Alternative 2	2.87	3.22	55.60	50.09
Alternative 3	2.57	2.63	42.24	36.17
Alternative 4	2.83	3.10	54.93	47.18

Table 60. Long-term (2008-2013) impacts on producer and consumer surplus net of no action – no access. (Dollar values are expressed in 1996 constant prices.)

Access alternatives	Cumulative producer surplus net of No Action (\$ million)		Cumulative consumer surplus Net of No Action (\$ million)	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	37.37	38.88	15.13	8.29
Alternative 2	37.23	38.96	18.36	11.13
Alternative 3	38.08	38.52	4.16	-2.36
Alternative 4	37.19	38.88	17.74	8.29

Table 61. LPUE, DAS and meat count with and without access.

	LPUE	DAS	Meat count
2004-2007			
A10 rotation with access	2,486	22,069	15.01
Alternative rotation with access	2,490	22,747	15.02
Status quo (No access and 24000 DAS)	2,188	24,114	16.81
No Action (No access)	1,966	30,268	17.60
2008-2013			
A10 rotation with access	2,673	21,176	13.23
Alternative rotation with access	2,670	21,172	13.25
Status quo (No access and 24000 DAS)	2,327	23,957	15.34
No Action (No access)	1,808	27,724	18.38

6.1.4.2 Discussion of Results

This section provides further discussion of the economic results, which were summarized above, and shows the estimated (absolute) values of the revenues, producer and consumer surplus, and total economic benefits for two scenarios with access and no access. These impacts are shown in Table 62 and Table 63 for A10 rotation with access alternative 1 and for alternative mechanical rotation with preferred access alternative 4. These two access options are selected here for purposes of brevity since the economic impacts of the four access options are analyzed in detail for each rotation alternative in Sections 6.2.2.4 and 6.2.11.4. The numerical results are similar, except that access alternative 3 generates relatively smaller economic benefits.

Despite lower average landings per year with access during the 2004-2007 period, average fleet revenues per year is not expected to change considerably with or without access (except for the status quo scenario) because the prices will be slightly higher with access (Table 62). Status quo scenario results in lower landings and revenues because of lower DAS allocations (24,114 fleet DAS) compared to no action (30,268 fleet DAS).

The change in scallop fleet revenues and total economic benefits does not provide a full explanation of the economic impacts on producer and consumers, however. This is because the management actions affect the producer benefits not only through their impacts on revenues, but also by their impacts on the fishing effort and costs. The economic results show that, even during the short-term, access will have positive impacts on producer benefits because it will result in lower operational costs. Because the productivity, i.e., LPUE, will be lower in the open areas compared to the access areas, the vessels will need to spend more time to fish to same amount of scallops in the open areas (Table 61). As a result, their operational costs without access (no action) will be higher as compared to access options, and the producer surplus, as measured by total fleet revenues net of operational costs, will be greater with access than without access. During the 2004-2007 period, the cumulative discounted value of producer surplus for both rotation alternatives (i.e., A10 and mechanical rotation alternative) will exceed the no action levels by more than \$30 million.

Because consumers gain from lower prices and higher landings, the change in consumer surplus could be positive under certain circumstances even though producer benefits are negative, and vice versa. In this case, consumer surplus without access (no action) will exceed access with A10 rotation by \$47 million, and access with alternative rotation by \$32 million due to the larger landings and relatively lower

prices for the no access scenario. Because of this, the mechanical rotation alternatives with access will result in lower total benefits during the first four years of the program (2004 to 2007) compared to no action (Table 57). The alternative mechanical rotation alternative with access (alternative 4) would result in a marginal decrease in cumulative value of net benefits by about \$1.42 million during the 2004-2007. The total benefits for Amendment 10 rotation with access will be \$15.70 million less compared to no action, no access alternative. In short, in the short-term, the scallop fishing industry will benefit from access to the Georges Bank groundfish areas due to the lower costs of fishing in those more productive areas, whereas the impacts on consumers will be negative because of the lower landings and higher prices with access.

Table 62. Economic impacts of access to groundfish areas (Dollar values are expressed in 1996 constant prices.) 2004-2007.

Period/Alternatives	Annual Averages				Cumulative discounted values		
	Landings Million Lb.	Ex-vessel price \$/lb	Fleet Revenues Million \$	Operating costs Million \$	Producer Surplus Million \$	Consumer Surplus Million \$	Total Benefits Million \$
2004-2007							
A10 rotation with access*	54.74	3.12	170.45	23.55	497.18	371.04	868.22
Alternative rotation with access**	56.26	3.05	171.11	24.38	496.58	385.93	882.51
Status quo (No access and 24000 DAS)	52.71	3.21	168.27	25.99	481.23	346.84	828.08
No Action (No access)	59.17	2.92	171.17	33.76	465.39	418.54	883.93
Change from no action, no access							
A10 rotation with access*	-4.43	0.20	-0.72	-10.21	31.79	-47.50	-15.71
Alternative rotation with access**	-2.91	0.13	-0.06	-9.38	31.19	-32.61	-1.42
Status quo (No access and 24000 DAS)	-6.46	0.29	-2.90	-7.77	15.84	-71.70	-55.85
Change from status quo							
A10 rotation with access*	2.03	-0.09	2.18	-2.44	15.95	24.20	40.14
Alternative rotation with access	3.55	-0.16	2.84	-1.61	15.35	39.09	54.43
No action (no access)	6.46	-0.29	2.90	7.77	-15.84	71.70	55.85

*With boundary alternative 1.

** With boundary alternative 4.

The long-term economic effects of the access options will be positive, however, because of the decline in LPUEs in the open areas without access. Table 61 shows that although with access average LPUE per year is estimated to increase to over 2,600 lbs., without access it will decline to 1,800 lb. during the 2008-2013 period. Furthermore, total fishing effort will be higher with no access (about 27,000 DAS) even though total landings will be less compared to access. As a result, total economic benefits with the alternative mechanical rotation and with access to the Georges Bank groundfish areas (alternative 4) will exceed no action benefits during the 2008-2013 period. This is because lower LPUEs, higher effort and operational costs with no access will reduce the producer surplus by about \$38 million compared to access options (Table 60 and Table 63). Therefore, total benefits from access will be positive in the long-term (2008-2013) and exceed the no access benefits by \$53 million (A10 rotation) to \$47 million (Alternative rotation), despite the decline in the consumer surplus during the same period.

Table 63. Long-term economic impacts of access to groundfish areas (Dollar values are expressed in 1996 constant prices.) 2008-2013.

Period/Alternatives	Annual Averages				Cumulative discounted values		
	Landings Million lb.	Ex-vessel price \$/lb	Fleet Revenues Million \$	Operating costs Million \$	Producer Surplus Million \$	Consumer Surplus Million \$	Total Benefits Million \$
2008-2013							
A10 rotation with access*	56.69	3.05	171.47	22.49	542.23	426.60	968.83
Alternative rotation with access**	56.32	3.06	171.76	22.55	543.16	419.77	962.92
Status quo (No access and 24000 DAS)	55.72	3.08	170.58	25.80	527.72	416.78	944.50
No Action (No access)	54.83	3.11	168.67	30.57	504.27	411.47	915.75
Change from no action, no access							
A10 rotation with access*	1.86	-0.06	2.80	-8.08	37.96	15.13	53.08
Alternative rotation with access**	1.49	-0.06	3.10	-8.02	38.88	8.29	47.18
Status quo (No access and 24000 DAS)	0.89	-0.03	1.91	-4.77	23.45	5.31	28.75
Change from status quo							
A10 rotation with access*	0.97	-0.03	0.89	-3.31	14.51	9.82	24.33
Alternative rotation with access	0.60	-0.02	1.18	-3.25	15.44	2.99	18.42
No action (no access)	-0.89	0.03	-1.91	4.77	-23.45	-5.31	-28.75

* With boundary alternative 1.

** With boundary alternative 4.

Table 64. The impacts of access on annual average scallop fleet revenue

Access alternatives	Average annual percent change from No Action during 2004-2007		Average annual percent change from No Action during 2008-2013	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	-0.42%	-0.03%	1.63%	1.81%
Alternative 2	-0.33%	0.08%	1.68%	1.88%
Alternative 3	-0.64%	-0.42%	1.50%	1.54%
Alternative 4	-0.37%	-0.03%	1.66%	1.81%

Table 65. The impacts of access on total scallop fleet operational costs

Access alternatives	Average annual percent change from No Action during 2004-2007		Average annual percent change from No Action during 2008-2013	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	-29.75%	-27.79%	-32.90%	-33.22%
Alternative 2	-29.39%	-27.35%	-32.60%	-32.93%
Alternative 3	-30.72%	-28.86%	-34.08%	-34.26%
Alternative 4	-29.51%	-27.79%	-32.66%	-33.22%

Table 66. The impacts of access on total scallop fleet gross profits

Access alternatives	Average annual percent change from No Action during 2004-2007		Average annual percent change from No Action during 2008-2013	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	17.90%	18.09%	21.80%	22.63%
Alternative 2	17.99%	18.23%	21.77%	22.71%
Alternative 3	17.74%	17.40%	22.05%	22.30%
Alternative 4	17.92%	18.09%	21.73%	22.63%

6.1.4.3 Impacts of access on employment and crew incomes

Because the DAS allocations per vessel will be higher without access to the Georges Bank groundfish areas compared to access, employment as measured by total crew-days (Crew*DAS) will be higher without access. Conversely, total crew-days are estimated to decline by 23% to 28% from no action-no access levels depending on the rotation and the access boundary alternative (Table 67). This reduction in crew-days does not necessarily translate into a reduction in the number of crew employed in scallop fishery. If, however, lower DAS allocations make some crew available for fishing on different vessels part of the year, there could be some decline in the total number of crew employed, although the extent of this decline could not be estimated.

On the income side the impacts from access will be positive. Access to the Georges Bank groundfish areas will benefit the crewmembers that are employed in the scallop fishery. Because crew income is based on a lay system, which is assumed to be 60/40 in this analysis, crew pays for the trip expenses. Due to the higher scallop abundance and productivity of the access areas, the trip costs will be lower with access per pound of scallops landed. Therefore, crew expenses will be less and income will be higher with access even though revenues may not change significantly, or even decline slightly. As Table 68 shows, crew income is estimated to increase by more than 7% during the 2004-2007 period with access, and more than 8% in the long-term if the same access policies are kept in place.

Table 67. The impacts of access on employment as measured by changes in total crew DAS.

Access alternatives	Average annual percent change from No Action during 2004-2007		Average annual percent change from No Action during 2008-2013	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	-27.09%	-25.26%	-23.62%	-23.93%
Alternative 2	-26.76%	-24.85%	-23.31%	-23.64%
Alternative 3	-27.99%	-26.26%	-24.82%	-24.99%
Alternative 4	-26.87%	-25.26%	-23.38%	-23.93%

Table 68. The impacts of access on total crew income (for the scallop fleet as a whole).

Access alternatives	Average annual percent change from No Action during 2004-2007		Average annual percent change from No Action during 2008-2013	
	A10 Rotation	Alternative Rotation	A10 Rotation	Alternative Rotation
Alternative 1	7.62%	7.57%	8.80%	9.11%
Alternative 2	7.64%	7.60%	8.76%	9.12%
Alternative 3	7.60%	7.37%	8.96%	9.06%
Alternative 4	7.62%	7.57%	8.76%	9.11%

6.1.4.4 Sources of Uncertainty

The economic impacts of the proposed access to the Georges Bank groundfish areas and other measures proposed by this Framework were analyzed using the bio-economic model described in Appendix IV of Amendment 10 FSEIS. The estimated results are based on the available information of yield streams from the biological simulations and data on vessel costs, crew shares, prices, and revenues of the scallop vessels. Therefore, the numerical results of this analysis should be interpreted with caution due to uncertainties about the likely changes in:

- Factors affecting scallop resource abundance and landings
- Fishing behavior
- Fixed costs
- Variable costs including the price of fuel
- Import prices
- Bycatch and revenues from other fisheries
- The share system
- The number of active vessels
- Structural changes in ownership
- The composition of fleet in terms of tonnage, horse power and crew size of the active vessels
- Disposable income and preferences of consumers for scallops
- Price differences and premium on small versus large scallops
- Enforcement costs

In addition, the uncertainties and sensitivity of the economic results to various parameters and biological inputs, to values of the discount rate, and to the future values of the economic variables were discussed in Appendix IV of Amendment 10 FSEIS. These sensitivity analyses and uncertainties are also applicable for the results of the economic analyses provided in Framework 16.

6.1.5 Summary of Aggregated Social Impacts

The social impacts from Framework 16/39 will be positive overall for the scallop industry, in that gaining access to groundfish closed areas (under conditions that follow newly detailed biomass changes as well as changes in the groundfish plan) will enhance revenues to the industry overall, secure access to a reliable source of scallop biomass (with positive ramifications for working conditions and income), and positively enhance perceptions of the viability of inter-fishery agreements. Conversely, the suite of preferred alternatives has the potential for some negative impacts as well, namely from the institutional parameters devised that encourage a derby fishing among certain sectors (e.g. general category vessels) and under certain conditions (e.g. fear of hard TAC for yellowtail flounder), with the accompanying social impacts such as safety risks and negative working conditions.

6.1.5.1 Public health and safety

Effects on public health and safety from rotation area management and other scallop regulations were analyzed in Section 6.1.10 of Amendment 10. These effects are also monitored in the Council's Scallop SAFE Reports (NEFMC 1999 and NEFMC 2000), including a detailed analysis of casualty statistics in the 2000 SAFE Report. In general, the scallop fishery has fewer mishaps than in most other fisheries, but the ones that occur are usually more serious in nature (R. Higgins, USCG, pers. comm.), possibly due to the rugged conditions and heavy gear in use.

Area rotation management, including controlled access trips that have a constant DAS charge, introduces some unique management measures that may impact the health and safety of fishermen on scallop vessels. First, scallop fishing gear must be stowed so that it is not ready for fishing when a vessel transits a closed rotation area, or an access area when the vessel is not on a controlled access DAS. This is a common requirement that exists in many other plans that use closed areas. The stowage requirements have been set at a minimum level to minimize the effects on crew safety, but can be quite dangerous in heavy weather. These dangers however are no worse than the act of fishing under similar conditions.

Second, vessels on a controlled access trip have in the past made decisions to continue fishing or stay in an access area to avoid losing the DAS charge when the vessel's catch was much lower than the scallop possession limit. Before Amendment 10, the customary policy was that applications for controlled access trips that landed no scallops would be favorably considered for a rebate of associated DAS charges. Amendment 10 will change that policy so that any vessel would receive a partial rebate of days for trips that returned to port early, even though the trip landed a significant fraction of the scallop possession limit. This new policy, if Amendment 10 is approved, is expected to have a beneficial effect on the crew's health and safety because captains have less business risk when returning to port due to weather or other concerns that relate to safety. Nothing in the proposed framework action is expected to change this beneficial measure.

The public raised concerns about health and safety of the crew resulting from a restricted season meant to avoid higher groundfish bycatch, arguing that it should be one factor that weighs in favor of a year around season. Hurricanes and nor'easters are infrequent, but not uncommon meteorological events in the Georges Bank region, where the proposed access program would occur. Hurricane occurrences can occur as early as July and as late as October, but are most common during September and early October. Nor'easters generally occur from late September to March, but are most common in October to December. None of these events prevent vessels from fishing during these months, but fishermen must be aware of their pending presence and may need to find shelter or fish at another time.

The proposed access season is June 15 to January 31 (7½ months), but due to delayed implementation will probably be early September 2004 to January 31, 2005 (4 to 5 months) during this fishing year. Another factor is that the yellowtail flounder catches could reach the TACs before January 31, closing the access program early. The Council seriously weighed this factor against alternatives for a longer season, and chose these dates because of the opportunity for vessels to take the allocated trips is sufficient and the new broken trip adjustment procedure will give fishermen an easier choice to seek shelter in port. This choice under the new procedure is only slightly more costly than if the vessel had made the same decision to fish in open areas, where scallop vessels operate year around. At most, the proposed action would allocate 3 trips for limited access vessels to fish in the access areas, and each trip is expected to take about 7 to 8 days. Therefore the total of 21 – 24 days is a small fraction of the time that the areas are expected to be open for fishing and vessels would not be forced to fish, compromising health and safety.

There are also no general public health and safety effects caused by the proposed action. The landed scallop meats are free from PSP toxins and bioaccumulation of other toxins or heavy metals is not known to be a problem.

6.1.5.2 Scientific, historic or cultural resources and ecologically critical areas

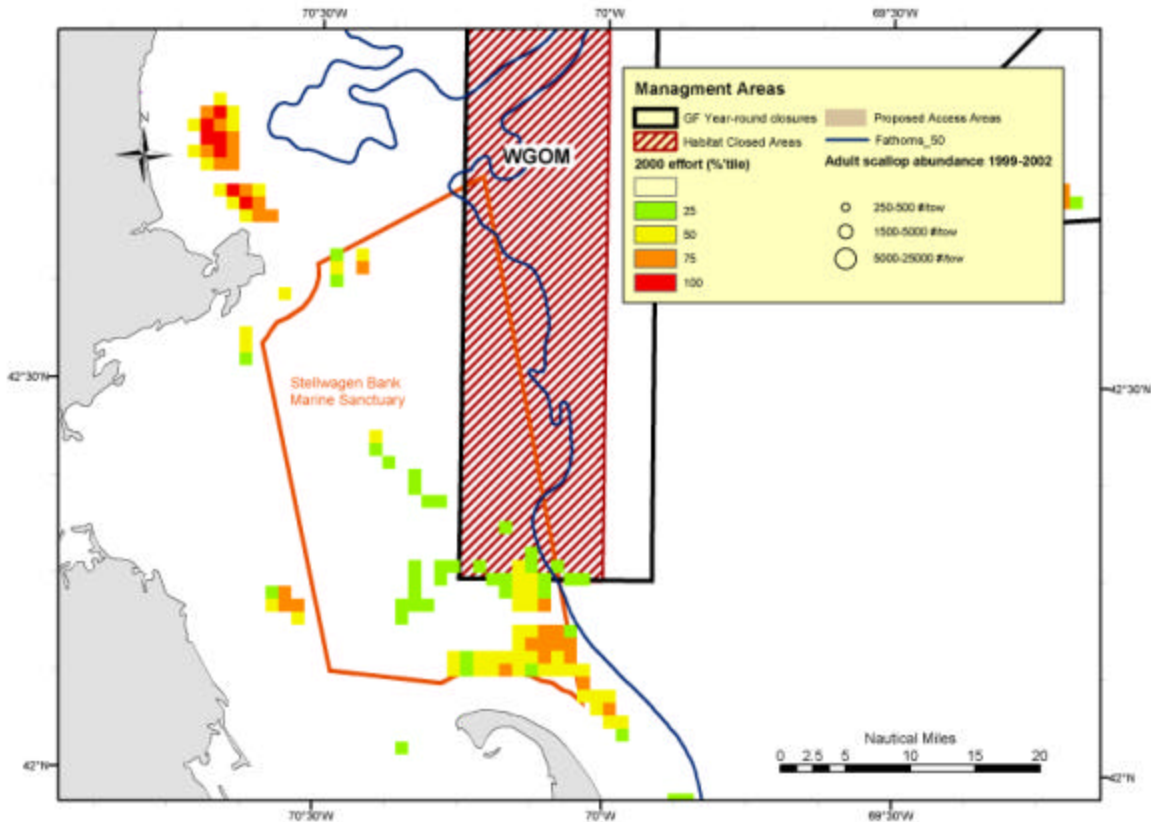
There are two areas with significant scientific, historic, or cultural resources or are considered as ecologically critical areas, overlapping the distribution of the scallop resource and fishing effort. One is the Stellwagen Bank National Marine Sanctuary (SBNMS), designated as a marine sanctuary in November 1992, and the second is the Habitat Area of Particular Concern for Cod, established by the New England Fisheries Management Council in its Multispecies FMP in 1999.

The SBNMS encompasses a 15-fathom bank that rises offshore of Massachusetts Bay, between Cape Cod and Cape Ann, MA (Map 9). A description of the physical environment, the biological environment, and the archeological and cultural resources within the sanctuary are described at <http://www.sanctuaries.nos.noaa.gov/oms/omsstellwagen/omsstellwagennatset.html#Arch>.

Scallop fishing vessels have periodically targeted scallops in this area during limited access DAS trips and under general category rules (for vessels using dredges while not on a scallop DAS). Limited access vessels are required to use VMS, which allows characterization of fishing effort by location, but target scallops periodically either on a scallop DAS or under general category rules. The distribution of this fishing activity in 2000 is shown in the map below. Vessels with general category permits that operate from Chatham, Provincetown, Green Harbor, and Gloucester, MA also fish more regularly in this area, during seasons when the vessels are not pursuing other species, such as groundfish.

The distribution of the VMS fishing effort data in the sanctuary is fairly representative of all scallop fishing effort, and occurs primarily in the SE part of the sanctuary, just outside of the three mile limit, near Cape Cod, MA. Less intense scallop fishing occurs to the NW of this area, toward the center of the sanctuary.

Access to the proposed access areas is not expected to cause limited access scallop fishing effort in the sanctuary to increase, and it may in fact decrease because of a greater degree of access to areas in the region with high scallop biomass. Similarly, vessels that fish for scallops in the sanctuary may fish there less if they are able to take trips in the proposed access areas, which may reduce the amount of scallop fishing within the sanctuary. On the other hand, if the proposed access program encourages more investment in scallop fishing gear by vessels that can obtain an open-access general category scallop permit, then the areas identified in the map below could see higher scallop fishing effort when the proposed access areas are no longer open for scallop fishing. No significant impacts on scientific, historic, or cultural resources within the sanctuary are known, however.

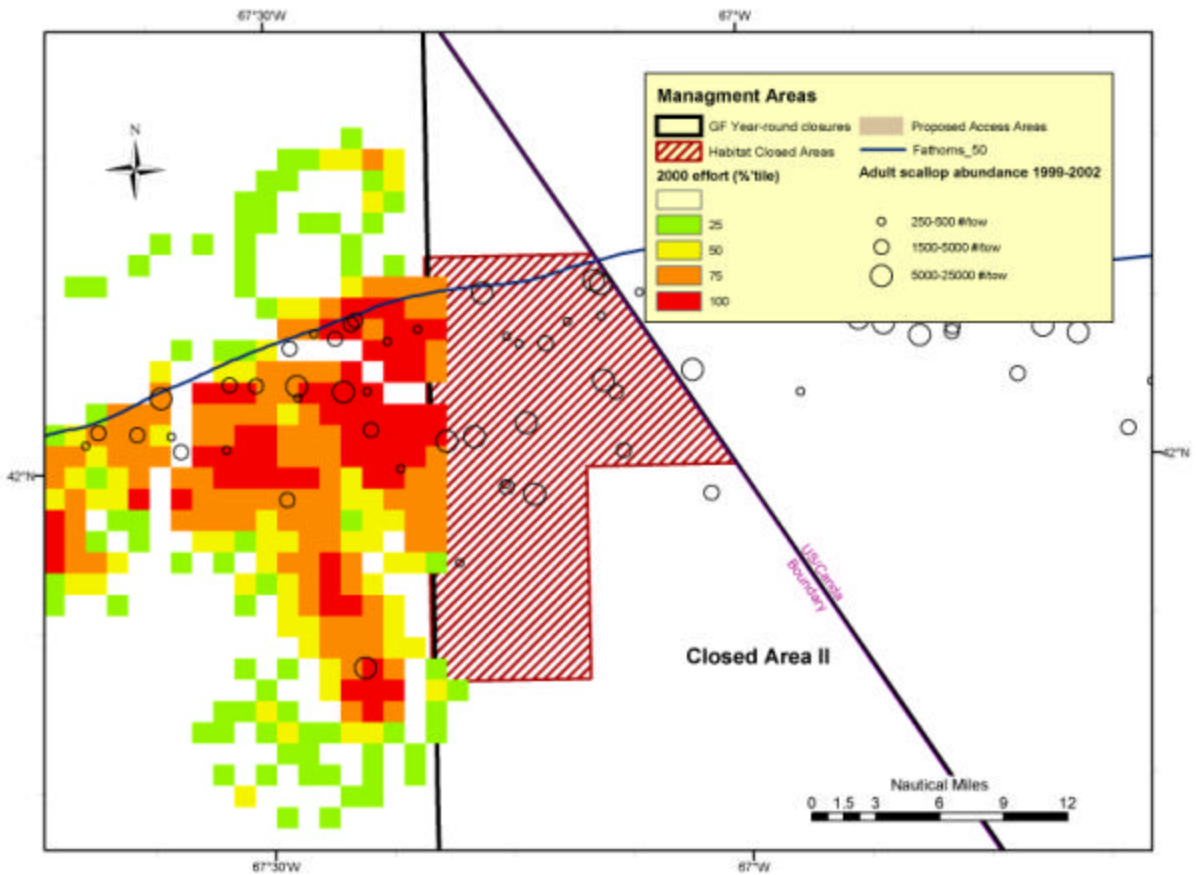


Map 9. Distribution of total fishing effort from VMS data during the 2000 fishing year in and around the Stellwagen Bank National Marine Sanctuary.

The Cod Habitat Area of Particular Concern (HAPC) is located on the northern edge of Georges Bank, along the US/CA boundary (Map 10). This area was designated as an HAPC due to its ecological significance to cod and other groundfish species. Its physical and biological environment are described in Amendment 11 to the Multispecies FMP. Since this area is in Closed Area II, in an area that the Council has not allowed access, no scallop fishing occurs there although there are important scallop resources found within it.

Scallop fishing is prohibited in the HAPC because scallop dredges are capable of catching groundfish and because it has been determined that scallop dredges have a substantial adverse impact on the types of habitat found within the HAPC, areas having cobble and boulder substrates with emergent epifauna. Heavy scallop fishing occurs immediately to the west of the HAPC, in sloughs that run NW to SE. Scallop fishing occurs near the border of the HAPC, not due to any export of scallops from the HAPC to open fishing areas, but because these are naturally-occurring beds that are very favorable for scallop productivity.

Since no scallop fishing occurs within the HAPC, there are no impacts from scallop management in this ecologically critical area. The proposed action furthermore does not allow access to this area, but similar areas to the west of the HAPC may see a reduction of scallop fishing effort as a result of access and lower open area DAS allocations.



Map 10. Location of the Cod HAPC within Closed Area II, along the northern edge of Georges Bank and bordering the US/CA line. Pixels that show the intensity of scallop fishing effort in the 2000 fishing year overlap the HAPC due to 1 nm² grid size, plotted on the center of the data point.

6.2 Analysis of Direct and Indirect Impacts of Alternatives Under Consideration

6.2.1 No access for Scallop Fishing in Closed Area I, Closed Area II, and the Nantucket Lightship Area (No Action; Section 4.2.1)

The No Action alternative (Section 4.2.1) would allow no scallop fishing in any part of the groundfish closed areas until the groundfish stocks were rebuilt sufficiently to allow fishing in the groundfish mortality closures areas that do not overlap EFH closures (see Section 4.2 for further description). This is not likely to occur in the foreseeable future, unless through a special access program (SAP) provision in the Multispecies FMP.

Under this alternative, the DAS allocations would be set to achieve a 0.2 fishing mortality target, regardless of the amount of scallops that are available to the fishery. Amendment 10 allocates open area DAS to achieve this goal, with 62 full-time DAS in 2004, 117 full-time DAS in 2005, and 152 full-time DAS in 2006 and thereafter, unless these annual allocations are adjusted by framework action.