6.0 MANAGEMENT OPTIONS

6.1 Objective of Annual Framework Adjustment

There is considerable disagreement among the PDT about the objectives for management measures in Framework 14, the annual adjustment for 2001. The objectives for Framework 14 are furthermore clouded by the unclear Council policy concerning the relationship between this year's annual adjustment and Amendment 10, an issue that has seesawed back and forth during the past year and whose distinction is blurred by the possible requirement to prepare an Environmental Impact Statement (EIS) for Framework Adjustment 14. For this reason, the SAFE report contains few formal recommendations for the annual adjustment, only estimates and discussion of some potential management options.

6.1.1 A framework adjustment to achieve rebuilding and fishing mortality objectives

Some PDT members think that the objective of the annual framework adjustment is to prevent the fishing mortality rate in 2001 from exceeding the annual target, achieving optimum yield (OY), while not jeopardizing the rebuilding plan to meet biomass targets in 2008, both specified in Amendment 7 (NEFMC 1998). The purpose of the annual adjustment, from this point of view, is to set the annual specification for the day-at-sea allocations to achieve these objectives and develop an area access program for the Hudson Canyon and VA/NC closed areas[67] to optimize yield by promoting fishing on larger scallops in the closed areas, thereby reducing fishing effort on small scallops elsewhere. The intent of the area access program is also to prevent the development of a derby-style fishery in the closed areas that would deplete the biomass before scallops in other areas had chance to recover.

According to Amendment 7, the fishing mortality target in 2001 is F = 0.28 and the expected biomass in 2002 is 3.5 kg/tow for Georges Bank scallops and 1.6 kg/tow for Mid-Atlantic scallops. Section 4.1.2 of Amendment 7 defines the annual OY as *"the annual yield that results form the annual target fishing mortality rate that achieves the FMP's rebuilding (stock biomass) and maximum sustainable yield objectives taking into account economic, social and ecological factors."* To keep the plan on-target and achieve the rebuilding objectives, Section 4.5 of Amendment 7 included an annual framework adjustment process described as follows:

1. *"The Scallop Plan Development Team would annually provide the Council a report review on whether the FMP is meeting the rebuilding objectives and, if not, management options that would enable the FMP to meet its stock-rebuilding objectives.*

2. *The range of options developed by the PDT may include any of the type of management measures in the FMP applicable to rebuilding the scallop stock.*

3. *After receiving the report, the Council would submit to the NMFS Regional Administrator a framework adjustment or amendment which would enable the FMP to meet its objectives.*

4. *If the NEFMC fails to submit a recommendation to the Regional Administrator by the December 1 that meets the FMP goals and objectives, the Regional Administrator may*

[67] Without action, the Hudson Canyon and VA/NC closed areas would automatically re-open for scallop fishing on March 1, 2001.

publish as a proposed rule one of the options reviewed and not rejected by the NEFMC, provided that the option meets the FMP objective and is consistent with other applicable law."

While the Hudson Canyon and VA/NC closed areas would automatically re-open on March 1, 2001, Section 4.6.5 in Amendment 7 specifically describes an additional framework adjustments a provision to modify the Mid-Atlantic scallop closed areas. This framework adjustment was intended to "allow the Council to modify the area in response to changing resource conditions." Provisions that would modify how these areas could re-open (including trip allocations, possession limits, day-at-sea tradeoffs, etc.) are interpreted as a modification to extend a partial closure and regulate the harvest from these areas in response to resource conditions within and outside of these special management areas.

The biomass targets in 2008, as revised by the SAW 29 report (NEFSC 1999), are 8.16 and 3.90 kg/tow, respectively. Amendment 7 also estimated that the annual day-at-sea allocations for 2001 would total 10,283 days (49 for each full-time limited access scallop vessel) and the average landings per day-at-sea would be 684 pounds. Amendment 7 also extended the closure of the Hudson Canyon and VA/NC areas[68] until March 1, 2001 when they would automatically re-open on March 1, 2001 with the restrictions that applied to the entire resource area. Amendment 7 did not anticipate or address the rebuilding of scallop biomass and abundance in the groundfish closed areas that resulted from prohibiting scallop fishing there to reduce bycatch and prevent disruption of groundfish spawning. The estimates in Amendment 7 were therefore made with the assumption that all scallop resource areas would be open to fishing after the 2000 fishing year.

6.1.2 A framework adjustment to respond to the current status of closed areas and improve long-term yield

Other PDT members view Framework Adjustment 14 as a precursor or transition to an area rotation system, planned for implementation via Amendment 10[69]. This viewpoint requires that Framework Adjustment 14 implement new mortality targets, different area access strategies, and possibly new area closures. This approach would take advantage of recent above-average recruitment, the rebuilding in the areas that have been closed by the Multispecies FMP and by Amendment 7 to the Scallop FMP, and further reduce fishing in areas that have relatively more small scallops.

Following this strategy would enable the Council to achieve the rebuilding targets much sooner than anticipated by Amendment 7 while stabilizing the landings so that they are not expected to decline unless recruitment is low for an extended period of time. The strategy would reduce fishing mortality well below the 2001 target in Amendment 7 and postpone catch to 2002-2004 until scallops in other areas have an opportunity to grow. This strategy is similar to that envisioned for Amendment 10, but not as a formal strategy, analyzed in an EIS.

Amendment 7 contemplated implementation of such a strategy in Sections 4.6.8 and 4.6.9. The first of these two framework measures would allow the Council to implement closed areas as an alternative conservation measure to lessen the amount of day-at-sea reductions while achieving the

[68] The Secretary of Commerce closed the Hudson Canyon and VA/NC areas by Emergency Action on April 3, 1998.
[69] Amendment 10 is currently under development and includes management options to allow annual or more frequent decisions to close areas and re-open others to promote fishing for large scallops, thereby enhancing yield. Due to complications encountered in the details of various area rotation systems and the resources needed to develop Framework Adjustment 14, the Council currently plans to implement an area rotation system at the start of the 2001 fishing year.

rebuilding goals of the FMP. The second framework measure was intended to improve OY by closing areas to increase the size of landed scallops, increasing yield-per-recruit.

These two framework measures were not formally analyzed in Amendment 7 because their effectiveness and necessity would depend on when they were applied and the resource conditions inside and outside of the proposed closed areas. As such, management measures that are proposed under these frameworks are permissible under Amendment 7, but may need to by analyzed by an SEIS[70] depending on the significance of their impacts relative to the impacts that were analyzed by the SEIS for Amendment 7. Complying with the National Environmental Policy Act, NMFS has defined significance in terms of the amount of economic impact and controversy, among other factors. On the other hand, the degree to which a change in management results in a significant policy shift and change in the primary management measures that control fishing mortality, the Council may decide to pursue management changes via a plan amendment, rather than a framework adjustment.

6.2 Projections and management options

The disagreement among the PDT stems from where these administrative boundaries are drawn and how comprehensive the required analyses can be, especially without clear guidance on long-term management policies. One analytic approach is to assume status quo management policies that contemplate all areas being open to fishing and day-at-sea allocations for limited access vessels that control fishing mortality, thus ignoring the potential (but not yet demonstrated) benefits of area rotation compared to fishing the entire resource at a level consistent with the current F_{max}. Another approach is to assume that area rotation would become the norm in the near future, partially replacing or augmenting the present management strategy under Amendment 7.

As a result, the PDT could not perform long-term projections beyond 2004 and it was unable to make specific recommendations for 2001 and for the short-term. The PDT, however, performed short-term projections for various management options and compare the results with the targets established by Amendment 7 and the relative net benefits of these options.

The revised projections of fishing mortality, catch, and stock biomass were performed, comparing the status quo (defined as 11,350 days used, no access to the three groundfish closed areas on Georges Bank, and unrestricted access to the Hudson Canyon and VA/NC areas) to an expected number of days-at-sea used by the fleet totaling 25,000 days (equivalent to 120 days-at-sea for full-time vessels). These scenarios are described in the table below.

Table 196. Projection scenarios evaluated.

Scenario	Description of management options in 2001-2003
Amendment 7 (DAS; No Action)	Day-at-sea allocations as specified for 2001-2003 in the Amendment 7 document, i.e. 49 day-at-sea for full-time vessels in 2001, Georges Bank closed areas @ F=0, Mid-Atlantic closed areas fished without additional restrictions.
Low F	120/48/10 day-at-sea allocations, Georges Bank closed areas @ F=0, Mid-Atlantic closed areas @ F=0.2, remaining open areas fished at 25,000 days-at-sea after accounting for proportional tradeoff of 1,400 lbs./day-at-sea in Mid-Atlantic closed areas.
High F	Same as Low F scenario, except the Mid-Atlantic closed areas @ F=0.3.

[70] SEIS is an acronym for a Supplemental Environmental Impact Statement that would analyze significant changes in management under an FMP.

New closures	Same as Low F scenario, except with no fishing in the four areas recommended for closure by the PDT at the 8/4/00 committee meeting.
Amendment 7 F-target	Georges Bank closed areas @ F=0, remaining areas (including the Mid-Atlantic closed areas) fished at the F targets for 2001-2003 in the Amendment 7 document.

Three closed area management options were considered with a full-time 120 day-at-sea allocation. One scenario ("Low F") applied a total fishing mortality rate of 0.2 (F = 0.2) in the Hudson Canyon and VA/NC closed areas. This fishing mortality rate is approximately equal to F_{max} for the entire stock, a proxy for F_{MSY} and the maximum fishing mortality threshold according to Amendment 7. A second scenario where F = 0.3 was also evaluated to promote fishing in the Hudson Canyon and VA/NC closed areas where scallops are larger and decrease mortality in the remaining areas where scallops are smaller. A third scenario considers the biological and economic impacts of a management option that would include additional area closures to conserve small scallops. These area closures are consistent with the four areas that the PDT recommended for consideration for Interim Action, two areas in the Mid-Atlantic and two areas on Georges Bank.

All three options with Hudson Canyon and VA/NC closed area access included a day-at-sea tradeoff equivalent to the ratio of the expected landings per day-at-sea (LPUE) to 1,400 pounds, which is approximately the same as the estimated LPUE in the remaining open areas[71]. If the LPUE in the closed area is expected to be 2,100 lbs., the day-at-sea tradeoff for a six-day trip would be nine days while a 10-day trip would count for 15 days. These projections are therefore somewhat different than the strategy in Framework Adjustments 11 and 13, which employed a fixed day-at-sea tradeoff that do not depend on actual trip length. Other types of day-at-sea tradeoffs are evaluated in more detail in Section 5.2.

These projections were based on the 1999 survey data and therefore contain uncertainties. These uncertainties include recruitment in 1999 and 2000 that were not observable in the 1999 survey, interannual differences in growth and natural mortality, and unreported sources of mortality[72]. Another important source of uncertainty includes survey dredge efficiency. A 40-percent dredge efficiency was assumed for these projections, consistent with results in the 1998 and 1999 experimental fisheries within the Georges Bank closed areas. Actual dredge efficiency that is higher than this estimate would yield lower estimates of stock biomass and higher estimates of fishing mortality, and vice versa.

In summary, the projections give the results shown the table below. More details for the projections and projections of catch and biomass through 2004 are presented by stock and area in Section 5.1.3. The detailed results include the distribution of fishing effort, the number of scallops landed for each scenario, average landed meat weight, LPUE, egg production, and exploitable biomass.

[71] It is difficult to obtain an exact estimate of open area LPUE, since the result is dependent on the amount of fishing mortality that applies to these areas and is itself dependent on the day-at-sea tradeoff within the Hudson Canyon and VA/NC closed areas.

[72] The projections assumed that total fishing mortality was 25 percent higher than the mortality explained by landings alone. These sources of mortality include unreported landings, and non-catch mortality caused by the gear on the bottom. Discard mortality was accounted for through a different procedure and natural mortality was assumed to equal 0.1 in all projections.

Table 197. Summary of projection results for Georges Bank scallops. The Amendment 7 rebuilding target is 8.16 kg/tow.

Year/scenario	Estimated landings (mt)	Fishing mortality (F)	End of year biomass (kg/tow)	Amendment 7 F_{target}	Amendment 7 B_{target} (kg/tow)	Biomass in 2004 (kg/tow)
1999	6,402	0.16	3.7	0.83	1.5	
2000	9,734	0.20	4.2	0.34	1.8	
2001						
Amendment 7 (DAS; No Action)	0	0.00	5.6	0.28	2.6	8.2
Low F	5,028	0.09	5.1	0.28	2.6	6.7
High F	4,103	0.08	5.2	0.28	2.6	6.9
New closures	5,988	0.10	5.2	0.28	2.6	6.8

Table 198. Summary of projection results for Mid-Atlantic scallops. The Amendment 7 rebuilding target is 3.9 kg/tow and expected to be achieved in 2001 from above average recruitment throughout the resource and high survival in the Hudson Canyon and VA/NC closed areas.

Year/scenario	Estimated landings (mt)	Fishing mortality (F)	End of year biomass[73] (kg/tow)	Amendment 7 F_{target}	Amendment 7 B_{target} (kg/tow)	Biomass in 2004 (kg/tow)
1999	5782	0.16	3.6	0.83	0.6	
2000	5767	0.10	4.7	0.34	0.8	
2001						
Amendment 7 (DAS; No Action)	12,850	0.19	5.2	0.28	1.1	6.0
Low F	15,284	0.23	5.0	0.28	1.1	4.8
High F	18,070	0.28	4.8	0.28	1.1	4.2
New closures	11,662	0.15	5.7	0.28	1.1	6.4

6.2.1 Day-at-sea Options

Short-term projections using the 1999 research survey (Section 5.1) indicate that an allocation of 120 full-time days-at-sea in 2001 (equivalent to about 25,000 days used; Section 4.1.5) will ensure mortality will remain below the Amendment 7 target (F=0.28) and will not jeopardize the FMP's rebuilding objectives, provided that the TACs and day-at-sea tradeoff in the Hudson Canyon and VA/NC closed areas remain within the bounds of the assumptions within the projections (Section 5.1.2). This status is also projected to hold true if the management measures for these scenarios continue in 2002-2003 (Section 5.1.3).

The PDT therefore recommends that the annual framework adjustment consider a two-year adjustment of the day-at-sea allocation, rather than only for the 2001 fishing year. This adjustment could

[73] The biomass shown for 1999, for example, is the expected biomass after the catch is taken during the 1999 fishing year, corresponding to the projected survey weight per tow in 2000. Likewise, the end of year biomass for 2001 is the projected biomass in the 2002 survey, after the effects of the 2001 fishing year apply.

enable the Council to devote more resources to developing Amendment 10 in 2001 rather than spending considerable resources on next year's annual framework adjustment.

For the three scenarios that the PDT analyzed, fishing mortality is expected to be between 0.08 and 0.10 for Georges Bank scallops (Figure 31) and between 0.15 to 0.28 for Mid-Atlantic scallops (Figure 30). At the same time, above average recruitment and biomass increases in the closed areas has allowed the resource to rebuild quicker than anticipated by Amendment 7. Total biomass for Georges Bank scallops is expected to increase from 3.7 kg/tow in the 2000 survey to 4.2 kg/tow in 2001 (51 percent of B_{target})[74]. Depending on the chosen scenario, further biomass increases are expected and range from 5.1 to 5.2 kg/tow (about 63 percent of B_{target}) in the 2002 survey (Figure 34) after the effects of management in 2001 are taken into account. Similarly, total biomass of Mid-Atlantic scallops are projected to increase from 3.6 kg/tow (92 percent of B_{target}) in the 2000 survey to 4.7 kg/tow (21 percent above B_{target}) in 2001. Even with the high proportion of effort expected in the Mid-Atlantic in 2001 and access to the Hudson Canyon and VA/NC closed areas, biomass is projected to continue increasing to between 4.8 and 5.7 kg/tow (23 to 46 percent above $B_{target;}$ Figure 37).

The results are sensitive however to several assumptions. The first is that the assumed catch in the 2000 fishing year is accurate. These projections assume that the entire TAC is taken from the Georges Bank closed areas in 2000 and the effort distribution is balanced accordingly. If this does not occur, then the projections will be overly optimistic for the remaining open areas on Georges Bank and the Mid-Atlantic. A second important assumption is that the 1999 survey gives an accurate estimate of biomass in future years, after applying the expected grown, natural mortality, and recruitment. This assumption appears to be reasonable for 2000 and 2001. In 2002 and 2003, however, the actual biomass will depend on the observed recruitment in 2000. In the Mid-Atlantic, preliminary observations of the survey catch indicates average recruitment for most portions of the Mid-Atlantic. Preliminary 2000 Albatross survey data, however, suggest that recruitment is very high, so the projections for the Georges Bank stock could be conservative.

Another important assumption is the survey dredge efficiency, a parameter that the projection uses to estimate total stock biomass from the survey weight per tow estimates. These projections apply a 40 percent dredge efficiency, which appears to be reasonable for parts of Georges Bank, to the entire resource. A higher actual dredge efficiency in the Mid-Atlantic would make the projections overestimate the true total biomass and underestimate the expected fishing mortality rates, and vice versa. Lastly, the projection results are also sensitive to annual variation in the availability of scallops to the survey. While the survey gives relatively accurate estimates of stock abundance and biomass for the resource as a whole, it may under or overestimate biomass for specific resource areas. This is especially sensitive for the Hudson Canyon and VA/NC closed areas where most of the effort and management options would apply in 2001. The 2000 research survey and final experimental fishery data should be used when the impacts of the management choices are analyzed in the annual adjustment framework document.

6.2.2 Management options for access to the Hudson Canyon and VA/NC closed areas

Preliminary estimates of potential total allowable catch for the Hudson Canyon and VA/NC closed areas indicate that between 15.2 and 21.7million lbs. may be taken from these areas during 2001. These TACs were derived by applying fishing mortality equal to 0.2 to 0.3 to the projected biomass in the

[74] The 2001 survey biomass projections assume the expected catches in Framework 13 are taken from the groundfish closed areas on Georges Bank during the 2000 fishing year.

areas at the time of the 2001 survey, respectively equivalent to the "Low F" and "High F" scenarios. In the first case, the fishing mortality approximates a sustainable rate of removals for the stock at equilibrium at B_{target}. Due to the stock structure that is present, the stock biomass may increase (e.g. in the Hudson Canyon area) or decrease (as in the VA/NC area).

In the second case, the Council might consider a higher fishing mortality in the closed areas because scallops tend to be larger there than in the remaining open areas. In the VA/NC area, the scallops are the largest and higher harvest rates would improve yield-per-recruit at this point in time. Lower catches here would mean that yield-per-recruit would decline from the slow biomass increase due to growth compared to natural mortality (M). Conversely, good recruitment again occurred in the Hudson Canyon area during 1999. This followed the good recruitment that was observed in 1998, causing the Council to close the area to fishing. As a result, the average size of the scallops will be a little below the optimum size in 2001 and the lower fishing mortality option may be more appropriate. Continuing the Hudson Canyon closure for another year to allow more increases in biomass is less beneficial because the effort shift and day-at-sea tradeoffs would reduce mortality in the remaining areas where recruitment has also been good and growth potential is high. This choice has implications for how the potential TACs in 2002 and 2003 or how long they may be fished at a higher rate before the LPUE and biomass falls to levels that also occur in the areas outside of the Hudson Canyon and VA/NC closed areas. These impacts are described in more detail in Sections 5.1.3 and 5.3.3.

There are two general options that the Council may consider for controlling the harvest rate and allocating the catch from fishing in these areas. One option is to set a possession limit and allocate trips as if all vessels catch the possession limit on trips into these areas. This is the strategy the Council used to regulate the harvest from the Georges Bank closed areas in 1999 and 2000. Another option is to allocate fractional shares of the TAC to vessels that are eligible to fish, without a possession limit. Similar to the trip allocation option, vessels that fish in the closed areas could be assessed a day-at-sea tradeoff to meet overall mortality goals by reducing the fishing effort in the remaining areas.

Both options were discussed by the PDT and there are pros and cons to each. For the trip allocation option, it would allow monitoring of the fishery with existing regulations, technology, and administrative systems. It also promotes safety and product quality by reducing the incentive to fish as quickly as possible. Another byproduct of this strategy is that vessels can afford to fish in less productive areas for scallops and possibly avoid bycatch, especially if there is an incentive to do so (for example, the fishery would remain open longer when bycatch is less). On the other hand, this option might be less efficient than other management options because it requires the vessels to make more trips than might otherwise be needed to land the TAC.

The TAC share allocation option could allow the vessels to use their capital more efficiently by reducing the number of trips that vessels take to harvest the TAC. It would however require new systems to monitor the fishery and enforce the regulations, something that would be impossible in the approval period for a framework adjustment. Also, any landings on a trip that entered one or more of the Mid-Atlantic closed areas would have to be attributed to that area or it might create a loophole. The day-at-sea tradeoff, in this case, would depend on the amount of scallops landed rather than the fact that a vessel takes a trip of 10 days or less in the closed areas. This would increase the incentive to mis-report. Product quality could also suffer because trips would tend to be longer under this option. Another disadvantage (or at least complication) is that it may be difficult to re-adjust the allocations in-season due to the actual participation by limited access vessels. Yet another complication is the decision to allocate a fractional TAC to Confirmation of Permit Histories (CPH). If the Council chooses not to allocate a fractional TAC to these permits, what happens when a CPH is converted to an active permit on an eligible scallop vessel?

If the Council chooses the first option (allocating trips to eligible vessels), the number of trips will be between 3 and 7 for the "Low F" option (Table 199), depending on the choice of scallop possession limit. Due to its small size and total biomass, the Council could allow only one trip per vessel in the VA/NC area for this option. For the "High F" option (Table 201), the number of allowable trips would be between 4 and 10, depending on the scallop possession limit. The Council could allow up to two trips in the VA/NC area for this option.

Table 199. Preliminary total allowable catch estimates and associated trips allocations for the "Low F" scenario (F = 0.2) applied to the projected 2001 scallop biomass in the Mid-Atlantic closed areas. The TACs exclude a two-percent set-aside for funding observers and research and 30 percent of the estimated catch to account for sources of unobserved fishing mortality.

	Mid-Atlantic Closed Areas		
	Hudson Canyon	***VA /NC***	***Total***
TAC (million lbs.)	13.46	1.10	14.56
TAC (lbs.) per eligible vessel	48,782	7,957	56,739
	Maximum trip allocations		
Scallop possession limit (lbs.)	***Total trips***	***Trips per vessel***	***Trips in VA Beach/NC area[75]***
8000	1,784	6	0
10000	1,427	5	0
12000	1,189	4	0
15000	951	3	0
18000	793	3	0

Table 201. Preliminary total allowable catch estimates and associated trips allocations for the "High F" scenario (F = 0.3) applied to the projected 2001 scallop biomass in the Mid-Atlantic closed areas. The TACs exclude a two-percent set-aside for funding observers and research and 30 percent of the estimated catch to account for sources of unobserved fishing mortality.

	Mid-Atlantic Closed Areas		
	Hudson Canyon	***VA /NC***	***Total***
TAC (million lbs.)	19.22	1.57	20.79
TAC (lbs.) per eligible vessel	69,648	11,367	81,014
	Maximum trip allocations		
Scallop possession limit (lbs.)	***Total trips***	***Trips per vessel***	***Trips in VA Beach/NC area[76]***
8000	2,547	9	1
10000	2,038	7	1
12000	1,698	6	0
15000	1,358	5	0
18000	1,132	4	0

[75] Assuming 50% participation by vessels with existing limited access scallop permits.
[76] Assuming 50% participation by vessels with existing limited access scallop permits.

Due to its distance from New Bedford and other scallop ports, it is uncertain how many eligible vessels would fish in the VA/NC Area. Under a trip allocation system, one possible change in strategy is to allocate the trips for fishing in either area and let the TAC be the primary mechanism to limit harvests in the VA/NC Area. If more vessels than anticipated fish in this area (if vessels, for example, take all seven trips there), it would be appropriate because this is where the largest scallops are found anyway. It might however set up a situation where vessels take their initial trips to the VA/NC area, knowing that that area would close from exceeding the TAC rather than a limit on the number of trips per vessel.

For the second option (allocation of a fractional TAC), the Council could allot between 56,249 and 80,312 pounds per vessel in the Hudson Canyon Area and between 6,137 and 8,768 pounds per vessel for the VA/NC Area (Table 199 and Table 201). The amounts would be less if the Council allocated the fractional TACs to CPH permits.

6.2.3 Area closures

Four area closures were proposed for consideration by the Council, either as part of an Interim Action to take effect during the 2000 fishing year or as part of the annual framework adjustment to take effect during the 2001 fishing year. All four areas overlap survey strata that had the smallest average scallop size in the 1999 survey or had high recruitment in the partially-completed 2000 research survey and therefore the greatest potential for biomass increase if closed to fishing. Section 5.4 describes these areas and estimates the potential increase in biomass for one and three-year periods.

The "New Closure" scenario, summarized in Table 196, extends this analysis to include the effects of the predictable effort shifts to other areas, a 120 day-at-sea allocation for full-time vessels, and an area access program for the Hudson Canyon and VA/NC closed areas in 2001 to 2003. Predictably, the additional closures would cut estimated landings by 24 percent to 11,662 mt in the Mid-Atlantic and due to effort shifts from the New York Bight and Delmarva resource areas the Georges Bank landings would increase by 20 percent to 5,998 mt[77]. Biomass conversely would increase more quickly in the Mid-Atlantic to 5.7 kg/tow in 2002 and 6.4 kg/tow in 2004. Slight increases in biomass for Georges Bank scallops would occur, resulting from the growth of small scallops from the additional closed areas in the Southeast Part and the South Channel. Net economic benefits over the 2001 to 2003 period would be $97 million less for this management option compared to the "Low F" option that does not have these area closures included.

While the benefits appear to be positive and increase biomass relative to the other options, these four closures are of a type that are being contemplated by Amendment 10 as part of an overall area rotation strategy. This Amendment 10 strategy would augment or replace the existing day-at-sea measures as the primary management measure in the plan. Although Section 4.6.9 of Amendment 7 allows the Council to close areas to protect small scallops, it does not contemplate or analyze a formal area rotation system. The extensiveness of the proposed closed areas could be interpreted as the initial implementation of such a system and have significant impacts, requiring the preparation of an SEIS. National Standards 7 and 8 requires that these administrative costs (including potential implementation

[77] The closest scenario for comparison is the "Low F" scenario, described in Table 1???. The "New Closures" and "Low F" scenarios project catch and biomass for conditions approximately representing an allocation of 120 full-time days-at-sea and a Hudson Canyon and VA/NC closed area TAC equivalent to F = 0.2. Direct comparisons may be imprecise however, because the "New Closure" scenario includes preliminary data from the 2000 research survey in the Mid-Atlantic while then "Low F" scenario does not. On a stock-wide basis, the differences are small but the differences between the 1999 projections in 2000 and the 2000 survey within resource areas show some meaningful differences.

delays) and community impacts should be weighed carefully against the overall benefits that might accrue from the proposed closures.

6.2.4 Shell-stocking

Data to evaluate the effect of shell-stocking on the FMP objectives is sparse. During the spring of 2000, there were reports of about 20 vessels who shucked a significant portion of their scallop catch inshore of the day-at-sea monitoring line, usually corresponding to the COLREGS line for navigation. Nearly all of this activity occurred near New Bedford, MA while catches were high in parts of Georges Bank. Without a rigorous examination of the VMS data and observations of what proportion of the catches were shucked off the clock, it is difficult to estimate the increase of effective fishing effort per day-at-sea used for the fleet.

This activity is an important development however, one that was anticipated in Framework Adjustment 1 that lowered the crew limit from 9 to 7. The purpose of the crew limit is to establish a production constraint per day-at-sea as a way to effectively prevent behavioral changes that increase fishing power. The shucking capacity of a vessel increases with larger scallops and therefore also acts as a deterrent for vessels to target small scallops, the major justification for reducing crew limits during periods of above average recruitment. Although the prevalence of this activity appears to be minor at this time, it represents a significant loophole in the FMP regulations, with the day-at-sea and crew limits as primary management measures controlling fishing mortality.

As catch rates increase when biomass increases, the catch will begin to exceed the shucking capacity of a seven man crew per day-at-sea. This effect will lessen the burden on days-at-sea to control fishing mortality when the biomass approaches or exceeds B_{target}. Three potential responses to this outcome are possible: increase the day-at-sea allocations per vessel while holding the crew limit at seven, increase the crew limit without increasing the day-at-sea allocations, or maintain the status quo. The first two responses are in the long-term desirable events to more efficiently use fleet capital to catch sea scallops, but both require that the Council place a restrictive limit on shell stocking by limited access vessels on a day-at-sea.

Maintaining the status quo may have some negative consequences including preventing more efficient use of fleet capital, increasing discard mortality and decreasing product quality from scallops remaining on deck for longer periods, and causing inshore pollution effects from the discarding of scallop shells and viscera within inshore waters. Although not quantified in this report, a few "what-if" scenarios, using existing shucking capacity estimates and a non-linear regression between survey biomass and commercial catch per day, could estimate the quantitative economic impacts of these management options.

6.2.5 Timing of the annual adjustment

Preparation and analysis of data for this SAFE Report began in June 2000. Although this preceded much of the resource surveys in 2000, the PDT attempted to include as much data and information as possible about the status of the fishery into the report. The annual Albatross survey and the experimental fisheries in the Hudson Canyon and VA/NC closed areas were still active when the PDT attempted to do projections and estimate TACs. Due to this poor timing, the projections and TAC estimates are based mainly on the 1999 resource data with some modifications where possible to make the results more consistent with the partial 2000 data gathered during the preparation of this document.

Significant benefits would arise by postponing the framework adjustment process for several months to allow the incorporation of current year data into the SAFE document. Since most of the resource data and research is conducted during April to September, it is difficult to incorporate recent information into a document that is prepared in July and published at the end of August. Sometimes preliminary information can be incorporated via ad hoc adjustments (as was done for the LPUE estimates in the Hudson Canyon and VA/NC closed areas), but inclusion of partial or preliminary data is fraught with potential errors and subject to revision at a later date. Much of the information and data becomes available in September or early October which requires the PDT to re-run all the analyses and revise the results during the very short time available to assess the impacts of management measures developed during or after the initial framework meeting. It makes the procedure very time-consuming and costly.

6.2.6 Data

The primary sources of information for this report were fishery data for the 1999 fishing year ending on February 29, 2000; the 1999 Albatross survey; the 2000 Albatross survey data for portions of the Mid-Atlantic; and preliminary biomass estimates from the 2000 experimental fishery in the Hudson Canyon Area. Assumptions about catch and effort in the 2000 fishing year were made on the basis of estimates in Framework Adjustments 12 and 13, although at the time of the final draft of this report the landings from Closed Area II appear to be well below its TAC and there is no mechanism to allocate more trips for this area during the 2000 fishing year.

In the next month or two, important data will become available that allow for revisions to the assessments in this document. The 2000 Albatross survey data will become available, despite mechanical difficulties that extended the duration of the survey. Also during September, it is likely that the experimental fishery in the VA/NC Area can be conducted. This will provide better data to estimate biomass and TACs for 2001. The Albatross survey data within this area is currently available, but may be influenced by a single large tow. In any case, the estimates in this report are preliminary and subject to revision from new sources of information and data that will soon be available.

7.0 ENFORCEMENT AND SAFETY

7.1 Enforcement

Enforcement information and reports are regularly distributed at the Council's regular meetings. No effort has therefore been made to re-summarize this information only for the scallop fishery. In general, law enforcement has been diligent about closed area and day-at-sea violations, since these two management measures are the primary conservation factors in the fishery management plan.

7.2 Safety

(R. Higgins)

The First Coast Guard District commercial fishing vessel safety program managers have collected commercial fishing industry casualty data since 1993 in an effort to monitor any casualty trends since the inception of the Fishing Vessel Safety Act of 1991. The data is the best information

available. It is gleaned from morning message traffic, oral reports and news clippings. We are sure that there are many other minor casualties that go unreported but we are confident that we have captured virtually all the death and sinking incidents in the Northeast.

The existing data can be sorted by fishery. This was done for the offshore federally documented scallop vessels at the request of the Scallop Planning and Development Team (PDT). We were asked to give a presentation on the safety record of this fishery since they had to reduce their crew size to seven people. The data presented did not indicate any casualty increases of any type affected by regulation changes. The information presented was based on the larger "offshore fleet" so as not to be confused with the inshore state registered scallop vessels that were not affected by the manning reduction.

The data does not indicate any real measured increase in casualties since the implementation of the restriction to a seven man crew in 1994. We did not take an official position on the issue to revoke the manning reductions but did express the Coast Guard concern for reducing crew size on any commercial fishing operation as a potential safety issue.

The PDT is looking for a position statement on this issue as it pertains to National Standard 10 (Safety Assessment) to the Magnuson Act to be added to the annual Safe Report for the New England Fisheries Management Council. The data suggests that the manning reduction has not affected the safety of the fishery in terms of numbers. Other human factors may have come into play such as fatigue, stress and quality of life. These issues do not manifest themselves in our statistics. Our position would be that Coast Guard statistics do not show an increase in casualty statistics for the offshore scallop fleet. We do not have the resources to assess the human factors that may have been affected by the crew reduction change. If the manning reductions have not been effective in conservation measures we would support any initiative that allows a full crew complement on the vessel to allow maximum crew safety.