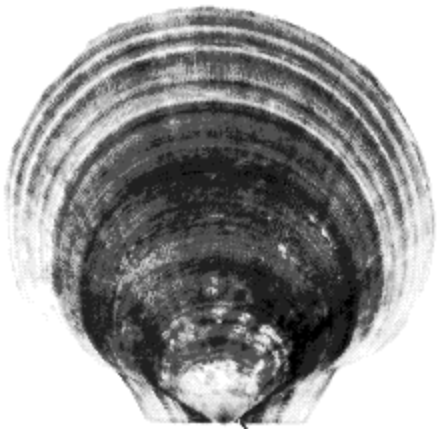
Amendment 7 to the

Atlantic Sea Scallop Fishery Management Plan

Incorporating the
Final Supplemental Environmental Impact Statement
and
the Regulatory Impact Review including the
Regulatory Flexibility Analysis

Volume I



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1.0 Summary

The New England Fishery Management Council is proposing a 10-year rebuilding program for the Atlantic Sea Scallop resource that would eliminate overfishing in compliance with the Sustainable Fisheries Act standards. The program would rely primarily on reductions in scallop days-at-sea (DAS) for the scallop limited access vessels, but would be supplemented by measures to increase the size of scallops caught such as a rotational area strategy as information becomes available.

The proposed action will set the per-vessel allocation of DAS to Amendment 4 final-year target levels. Full-time vessel would be allocated 120 DAS for the 1999 fishing year (March 1, 1999 through February 28, 2000) and implement subsequent DAS reductions designed to rebuild the scallop within 10 years from the original implementation of the proposed action. DAS allocations for part-time and occasional limited access vessels would be reduced proportionally to reductions in DAS for full-time vessels.

The Council chose this particular DAS reduction strategy to:

- allow the scallop industry an additional year to develop a buyback program before further, more severe cuts in DAS would be implemented
- allow the Council more time to develop an area management approach to take advantage of the rapid growth of scallops
- allow the Council to get information from the experimental fishery in groundfish closed areas to supplement available biological information and to develop a policy with respect to scallop fishing in these areas.

In addition to the DAS reduction schedule, the proposed action includes the following measures:

- a new overfishing definition and rebuilding target for Atlantic sea scallops
- a revised specification of optimum yield from the fishery
- continuation of Mid-Atlantic closed areas with a sunset date of March 1, 2001 unless opened earlier as part of an area management program
- a system for closing and opening areas to improve yield per recruit
- an annual monitoring and adjustment system to ensure stock rebuilding
- the addition of the following measures to those that the Council may implement through the framework adjustment process:
    - modifications to the overfishing definition
    - the leasing of DAS (provided that the Council holds a full set of public hearings)
    - scallop size restrictions (except a minimum individual meat size)
    - approval of aquaculture projects in the EEZ
    - modifications to the overfishing definition, modifications to the Mid-Atlantic scallop closed areas
    - the demarcation line for DAS monitoring
    - the ability to implement different DAS allocations according to gear type
    - the use of closed areas to lessen the amount of DAS reductions
    - the use of closed areas to increase the size of scallops caught.

2.0 Need for Management Action

The Sustainable Fisheries Act (SFA), adopted in October 1996, requires the Council to meet stringent new standards for the management of fisheries including Atlantic Sea Scallops. In October 1997, the Secretary of Commerce notified the Council that sea scallops are overfished and that the Council must submit a plan by October 1998 to end overfishing and rebuild the resource. To meet these requirements, the Council must:

- Rebuild, within 10 years, the scallop resource to a level that will produce the maximum sustainable yield (MSY) on a continuing basis
- End overfishing by reducing fishing to a level (referred to as F_{target}) that would not jeopardize the capacity of the resource to produce MSY on a continuing basis
- Achieve optimum yield on a continuing basis. See the Glossary for a definition of optimum yield.

The percentage reduction from current fishing mortality levels (F=0.93 in 1996) to meet the revised target fishing mortality levels (F_{target} = 0.20) is approximately 80%. In other words, fishing must be reduced from a level at which about 58% of the stock is harvested annually to a level at which only 17% of the stock is harvested annually. If the size of scallops caught by the gear were increased so that only scallops larger than 90 mm (about 4 years or older) were caught, the target fishing levels could be increased by about 21% to F=0.25.

If the Council fails to amend the Scallop FMP to Sustainable Fisheries Act requirements, the Secretary of Commerce *"shall prepare a fishery management plan or plan amendment any accompanying regulations to stop overfishing and rebuild affected stocks of fish within 9 months…"*

In addition to rebuilding overfished resources such as scallops, the Sustainable Fisheries Act requires the Council to:

- identify and describe essential fish habitat (EFH) for all managed fisheries including Atlantic sea scallops and make recommendations to preserve EFH. The New England Council is developing a separate amendment to be submitted in October 1998 to designate EFH for sea scallop.
- consider impacts on fishing communities in choosing among management alternatives that meet National Standard 1 requirements to end overfishing
- promote safety-at-sea
- minimize bycatch to the extent practicable and where it cannot be avoided to minimize bycatch mortality. *"The term 'bycatch' means fish* [including target species] *which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic and regulatory discards."*

3.0 Background

3.1. Recent Management Actions

Amendment 4 was implemented in March of 1994 with the goals of increased yield-per-recruit and restored adult stock abundance and age distribution, as expressed in terms of %maximum spawning potential. The amendment included restrictions on days-at-sea (DAS), gear, and crew size, which were phased in over a seven-year rebuilding period. The amendment also created a limited access fleet in the scallop fishery and allowed a possession limit for all others. The seven-year rebuilding period was believed to be a reasonable balance between resource and industry.

In December 1994, approximately 5,000 square miles of Georges Bank and the Great South Channel were closed year-round to all fishing capable of catching groundfish. The prohibition included scallop fishing in this definition. These three areas remain closed and contain high concentrations of scallops that are mostly four years old or older.

Two subsequent amendments created an experimental grow-out area south of Martha's Vineyard and allowed the framework adjustment process to be used for resolving gear conflicts. A third amendment submitted which would have allowed the consolidation of DAS, was considered but not but was not pursued further after public hearings.

On April 3, 1998, two areas, south of Hudson Canyon and off Virginia Beach, were closed to scallop fishing to protect small scallops. These areas cover approximately 1,900 square miles.

3.2. No–action alternative

The no-action alternative is to keep the current fishing mortality reduction program established under Amendment 4 in 1994. (The no-action alternative also is referred to as the Status quo or the Baseline for purposes of evaluating the impacts of the proposed actions.) Under this alternative, the fishing mortality reductions would continue until the Amendment 4 overfishing threshold of F=0.64 (corresponding to F5%MSP) was reached in the 2001-02 fishing year. The fishing mortality reductions would be achieved primarily through DAS reductions and the original DAS allocations would be revised to meet the targets.

During the "third-year review" of the FMP in 1997, however, the Scallop PDT found that the original DAS estimates for 1998 through 2001 must be substantially reduced to achieve the 5%MSP fishing mortality threshold. For example, in the Amendment 4 document, full-time DAS were estimated to be 142 for the fishing 1999-2000 and 120 DAS for fishing years 2000-01 and 2001-02. In order to achieve the F_{target} goals in Amendment 4, the Scallop Plan Development Team has since re-estimated that the DAS corresponding to the target fishing mortality levels would have be 80 DAS for 1999-2000, 79 DAS for 2000-01 and 82 DAS for 2001-02 in the absence of any other new or revised measures.

As a result, and as a basis for comparing the proposed action, the revised (reduced) DAS estimates are used to illustrate the status quo alternative. Regardless of DAS adjustments, however, the no-action alternative will not meet Sustainable Fisheries Act requirements because its goal, the 5%MSP threshold for fishing, is a only a replacement objective that results in scallop stock size only about 1/3 of that needed to produce MSY.

4.0 Description of Proposed Action

4.1. Management Targets

The proposed action includes a new definition overfishing and specifies a stock rebuilding schedule to comply with the Sustainable Fisheries Act. Associated with the objective of rebuilding and maintaining the stock at a level that can achieve maximum sustainable yield on a continuing basis (B), the proposed action defines optimum yield a level that is less than MSY and takes into account the current stock biomass level.

4.1.1. Overfishing definition and rebuilding targets

The target biomass and F_{msy} proxy levels were provided to the Council by its Overfishing Definition Review Panel. The Review Panel which was comprised of fishery scientists from the New England and Mid-Atlantic Council staffs, the National Marine Fisheries Service and universities, was established to provide the Council with overfishing definitions and target fishing mortality rebuilding levels for all stocks it manages. The panel used F_{max} and B_{max} as proxies for F_{MSY} and B_{MSY} because it was not possible to calculate these parameters directly with commonly accepted methods.

Overfishing definition

If stock biomass is equal or greater than B_{max} as measured by the resource survey weight per tow index (currently estimated at 8.16 kg/tow for the Georges Bank resource and 3.90 kg/tow for the Mid-Atlantic resource area), overfishing occurs when fishing mortality exceeds F_{max} currently estimated at 0.24. If stock biomass is below B_{max}, overfishing occurs when fishing mortality exceeds the level that has a 50 percent probability to rebuild stock biomass to B_{max} in 10 years. The stock is in an overfished condition when stock biomass is below $¼B_{max}$ and overfishing occurs when fishing mortality is above zero. These reference points are thresholds and form the basis for the control rule.

Stock biomass for 1997 is estimated to be 1.37 kg/tow (17 percent of B_{max}) for the Georges Bank resource area and o.41 kg/tow (11 percent of B_{max}) for the Mid-Atlantic area. Fishing mortality in 1997 is estimated to be 0.83 and would need to be reduced by about 71 percent to reach the F_{MSY} level of 0.24 and by about 76% to reach the target fishing mortality level of 0.20. Current fishing mortality is, therefore, far above the overfishing threshold considering the current stock biomass. However, these target values depend on the size/age of scallops in the catch. For example, if measures are taken to eliminate age 3 scallops from the catch, the value of the F_{max} would be 0.31 and the long-term, target F would be about 0.25.

Background

The reference points for sea scallops B_{max} , $½B_{max}$, and $¼B_{max}$ were based on the relative biomass that the average survey recruitment index would produce over the long term if the stock was fished at F_{max} (the proxy used for F_{MSY}). For Georges Bank, the median recruit index was 99.9 scallops per survey tow, over the time series 1979-1997. If this index is multiplied by 81.6 grams per recruit (the stock biomass per recruit resulting from F_{max}), the result represents the proxy for B_{MSY} (8.16 kilograms per survey tow of biomass of all sizes greater than the recruit size). For the Mid-Atlantic, the median recruit per tow index is 47.7, multiplied by 81.6 grams per scallop,

results in a B_{MSY} proxy of 3.90 kilograms per tow. The proxy reference points for ½B_{MSY} and ¼B_{MSY} are 50% and 25% of the of the B_{MSY} proxy reference points.

Based on these results, the B_{MSY} proxy for Georges Bank scallops is equivalent to a survey biomass value of 8.16 kg/tow (ranging from 9.15 to 9.99 kg/tow, depending on the vulnerability of age 3 scallops to fishing). The standardized stratified mean weight per tow for 1997 was 1.37 kg/tow, or 17 percent of B_{max}. For the Mid-Atlantic scallops, the proxy for B_{MSY} is estimated as 3.90 kg/tow (ranging from 3.66 to 4.00 kg/tow, depending on the vulnerability of age 3 scallops). The standardized stratified mean survey biomass index was 0.41 kg/tow in the Mid-Atlantic during 1997, or 11 percent of B_{max}.

The approach taken above to associate F_{max} with F_{MSY} can also be applied to estimate rebuilding potential. If constant recruitment is assumed for all levels of stock biomass, it has the undesirable result of overestimating rebuilding potential at very low biomass levels. In fact, the estimate would predict rebuilding within 10 years from zero biomass, allowing for some fishing mortality. In most surplus production estimates of MSY reference points, it is assumed that F is ½ of the intrinsic rate of growth (r). If F_{max} is an acceptable proxy for F_{MSY}, then twice the value of F_{max} can serve as an upper bound on the intrinsic rate of growth (r) and rebuilding potential can be estimated. The value of F_{max} is often sensitive to the exploitation pattern, as is our estimate of the intrinsic rate of growth (r) from surplus production models. Thus the rebuilding potential would be affected by changes in the exploitation pattern. If the age when scallops become vulnerable to fishing were delayed, then higher fishing mortality rates would achieve the same rebuilding objective at a given stock biomass level.

Assuming that the intrinsic rate of population growth (r) is double that at Fmax imposes a density dependent structure to the population dynamics. The actual responses of recruitment, individual growth and mortality would be better approximated based on a size structured projection model that directly accounts for these factors. The approach taken here, however, is satisfactory for developing a general control rule that defines a maximum fishing mortality threshold were stock biomass is less than B_{max}.

The maximum rebuilding potential for an intrinsic rate of population growth (r) is shown in (Figure 4-2). Considering the current exploitation pattern, this methodology estimates that sea scallops can be rebuilt from 20 percent of B_{MSY} to B_{MSY} within five years, provided that F=0 (Figure 4-2). With a 10-year rebuilding objective, the median estimate of a fishing mortality rate that would allow rebuilding from 20 percent of B_{MSY} to B_{MSY} is about 0.18.

Based on the general framework for a control law the following MSY proxy reference points and control law,

Figure 4-3 shows the recommended fishing mortality thresholds at various biomass levels (expressed as a percent of the survey weight per tow that would be expected under MSY conditions) for Atlantic sea scallops.

F_{max} (0.24) should be an upper limit, or a maximum fishing mortality (

Figure 4-3). Similarly, the minimum biomass threshold (B_{limit}) would be at a value of ¼$B_{max.}$ This fishing mortality rate target would be applicable whenever stock biomass is greater than B_{MSY}.

During rebuilding, the recommended management strategy would allow more rapid rebuilding at low biomass levels. Whenever the stock is below ¼ B_{max}, fishing mortality should be reduced as

close to zero as practicable, to promote rapid rebuilding. Biomass levels less than 20 percent of B_{max} could not rebuild in five years, even if there was no fishing.

When stock biomass is between ¼B_{max} and ½B_{max}, the threshold mortality rate should be defined with a five-year rebuilding time period. When stock biomass is between ½B_{max} and B_{max}, the rebuilding time period could be relaxed to a 10-year schedule, but the Council could adopt a five-year rebuilding time period for all rebuilding conditions. This latitude in setting a rebuilding strategy is shown as a hatched region between ½B_{MSY} and B_{MSY} (

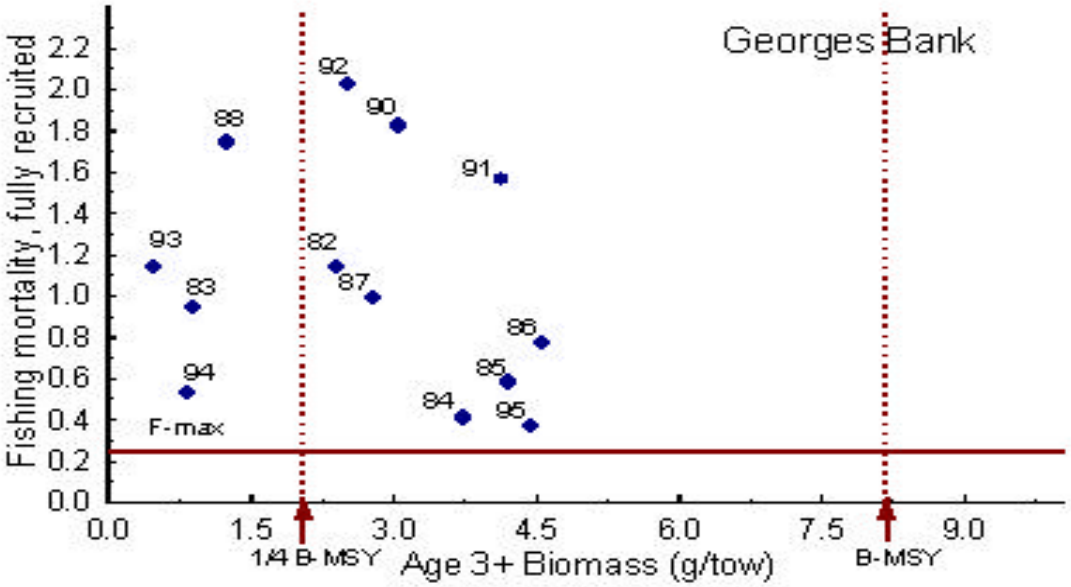
Figure 4-3). Fishing mortality rates that exceed the threshold would indicate overfishing.

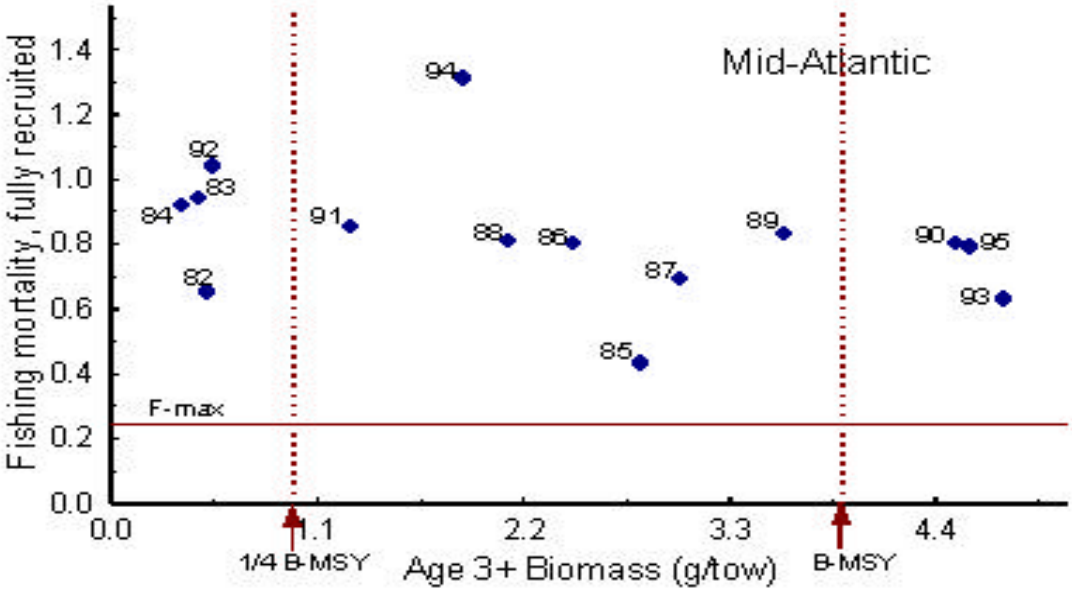
4.1.2. Optimum yield

Optimum yield may be defined both as a long-term level of yield and as an annual yield. For this FMP, the annual optimum yield will be the annual yield that results from 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. The long-term optimum yield is the yield that results from applying the OY control rule when the resource is at the target biomass level.

The optimum yield for a particular year therefore will be the product of the target fishing mortality rate under the selected rebuilding timeframe and the biomass level of the scallop large enough to be caught (recruits). Expressed mathematically, $OY = F_{target} * \text{mean } B_t$.

The final target fishing mortality levels are about 20% lower than F_{max} levels to allow for uncertainty in the estimation of the F_{max} levels. If the precision of the estimated F_{max} improves, the final target fishing mortality rates may be increased to be closer to the F_{max} level.


Georges Bank
Fishing mortality, fully recruited
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
92
90
88
91
93
82
87
83
86
85
94
84
95
F-max
0.0
1.5
3.0
4.5
6.0
7.5
9.0
1/4 B-MSY
Age 3+ Biomass (g/tow)
B-MSY


Mid-Atlantic
Fishing mortality, fully recruited
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
94
92
83
84
91
88
86
89
90
95
87
82
93
85
F-max
0.0
1.1
2.2
3.3
4.4
1/4 B-MSY
Age 3+ Biomass (g/tow)
B-MSY

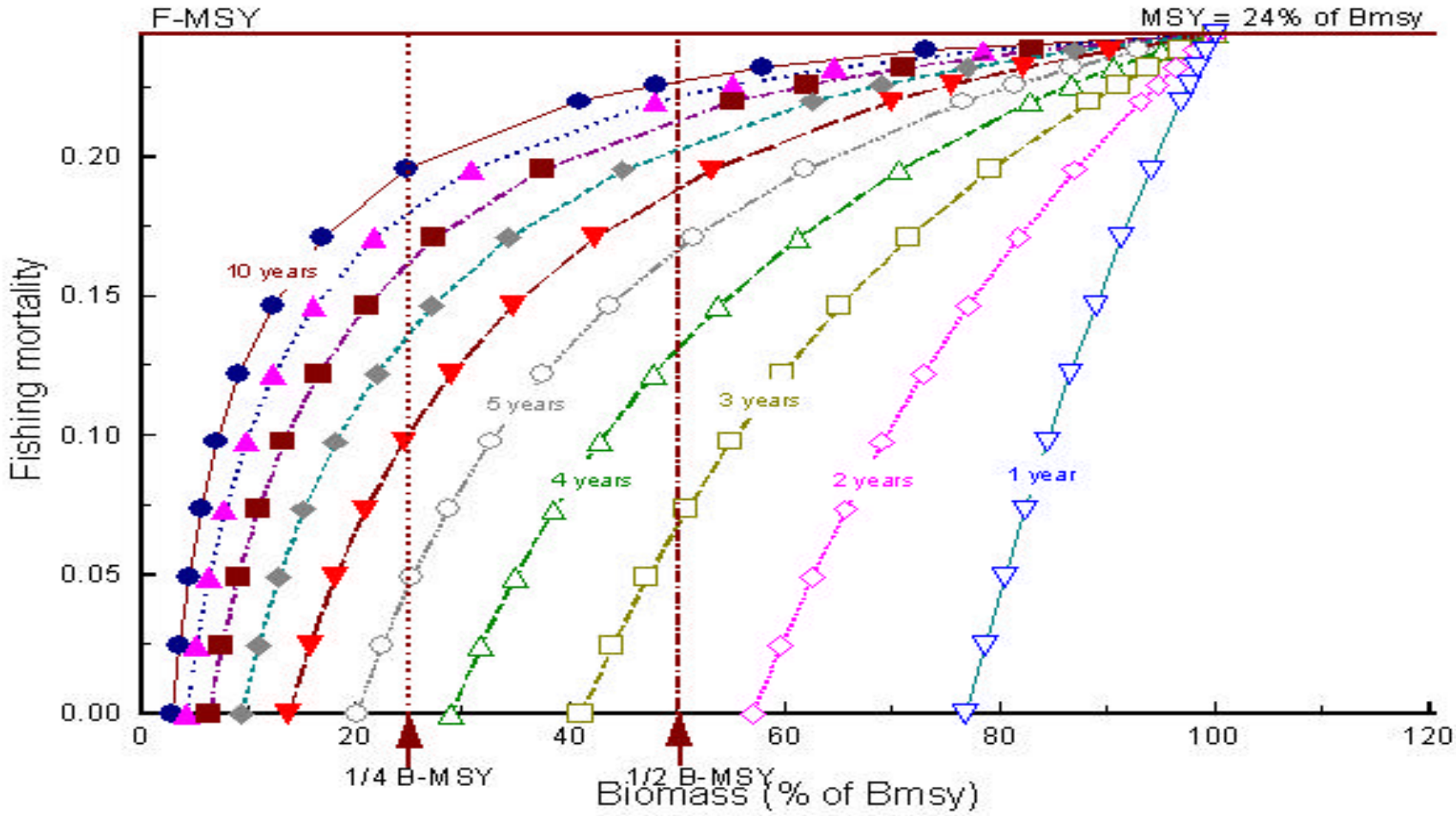


Figure 4-2. Fishing mortality rates that would be required to achieve B_{max} from various biomass levels for Atlantic sea scallops, with rebuilding time periods ranging from one to ten years. The intrinsic rate of growth (r=0.49) is assumed to be twice the vale of F_{max}

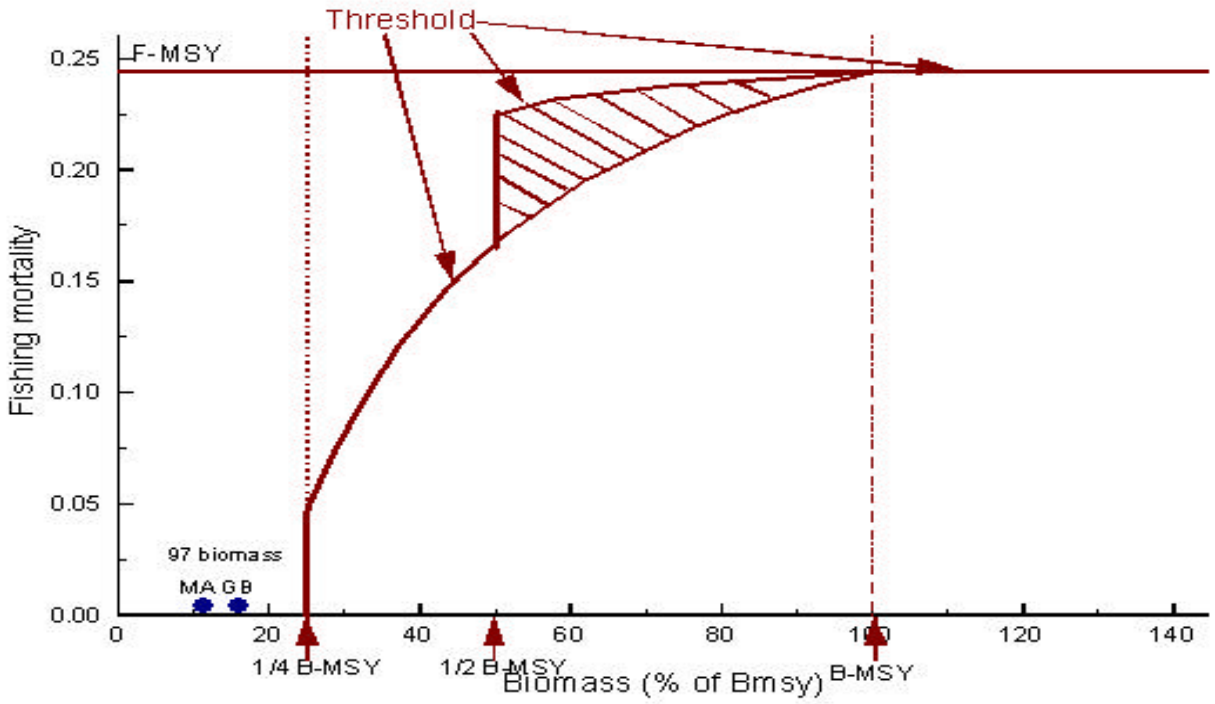


Figure 4-3. Proposed MSY-proxy reference points and control law for Georges Bank and Mid-Atlantic sea scallops. The threshold mortality rates are based on a five and ten-year rebuilding time period and would defined overfishing. The threshold mortality rates are based on an intrinsic rate of population growth (r=0.49), equal to twice the value of F_{max}. The most recent survey values (0.41 kg/tow in the Mid-Atlantic survey strata and 1.37 kg/tow in the Georges Bank strata) are expressed as a percentage of the B_{MSY} proxy values, 3.90 and 8.16 kg/tow, respectively

4.2. Resource Rebuilding Program

4.2.1. Background

After reviewing comments from a series of public hearings, written comments, and recommendations from the Scallop Industry Advisory Panel and its Scallop Committee, the Council adopted the following rebuilding program. The preferred alternative would set the per-vessel allocation of DAS for full-time vessels to 120 DAS for the 1999 fishing year (March 1, 1999 through February 28, 2000) and implement subsequent DAS reductions designed to rebuild the scallop within 10 years from the original implementation of the proposed action. DAS allocations for part-time and occasional limited access vessels would be reduced proportionally to reductions in DAS for full-time vessels.

4.2.2. Fishing Mortality and DAS Reduction Schedules

Table 4.2.1 Fishing mortality reduction schedules

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Status quo	0.76	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Proposed action	*0.83	0.34	0.28	0.24	0.22	0.15	0.15	0.15	0.15	0.20

See notes below

Table 4.2.2 Estimated total DAS –all permit categories

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Status quo	18,060	17,652	18,475	18,982	19,169	19,111	19,080	19,049	19,170	19,054
Proposed action	*26,936	11,389	10,939	10,217	10,079	7,663	7,897	8,534	9,575	13,411

** See notes below*

Table 4.2.3 Estimated total landings (million pounds)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Proposed action	13.6*	6.1	7.6	8.7	10.3	8.7	10.3	11.9	13.4	18.8
Status quo	9.0	10.1	12.1	13.4	14.1	14.7	15.0	14.9	15.0	15.0

Table 4.2.4 Projected biomass indices for annual resource abundance survey (kg. per tow)

	Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Proposed action	Georges Bank	1.5	1.8	2.6	3.5	4.4	5.3	6.5	7.6	*** 8.7**	9.5
	Mid-Atlantic	0.6	0.8	1.1	1.6	2.1	2.6	3.1	3.7	*** 4.2**	4.7
Status Quo	Georges Bank	1.6	1.8	2.2	2.4	2.6	2.6	2.7	2.7	2.7	2.7
	Mid-Atlantic	0.6	0.8	1.0	1.1	1.2	1.3	1.3	1.3	1.3	1.3

* Values shown in bold typeface indicate that stock rebuilding targets will have been met.

Table 4.2.5 Estimated Catch per DAS (pounds of meats)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Proposed action	506	529	684	847	1004	1109	1276	1400	1400	1400
Status quo	500	572	655	708	792	762	780	781	782	785

Table 4.2.6 Estimated total Full-time DAS

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Status quo	16,880	16,669	17,302	17,724	17,935	17,935	17,935	17,935	17,935	17,935
Proposed action	*25,320	10,706	10,283	9,604	9,474	7,204	7,423	8,022	9,001	12,606

** See notes below*

Table 4.2.7 Estimated DAS for full-time vessels assuming a fleet size of 211 full-time vessels

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Status quo	80	79	82	84	85	85	85	85	85	85
Proposed action	*120	51	49	46	45	34	35	38	36	60

**See notes below*

Table 4.2.8 Estimated DAS for part-time vessels

Year Rebuilding Schedule	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Status quo	32	32	33	34	34	34	34	34	34	34
Proposed action	48	20	19	18	18	14	14	15	17	24

Table 4.2.9 Estimated DAS for occasional vessels

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Status quo	7	7	7	7	7	7	7	7	7	7
Proposed action	10	4	4	4	4	3	3	3	4	5

Notes

The total DAS, fishing mortality, and landings for 1999 are estimated assuming that the 211 full-time vessels use all of their 120 DAS to fish for scallops. This is consistent with the methodology used for the following years. It was assumed that because the allocations are so far below the DAS that the full-time vessels historically fished, that the DAS used will equal the number allocated. This may or may not be true for the next year, 1999, depending on several factors.

- The call-in DAS showed, that out of the 231 full-time boats (including 3 full-time, small dredges), 31 did not use any of their allocations during the fishing year 1997. A remaining 21 boats used their DAS partially at an average of 75 DAS. If these trends continue in 1999, total DAS for full-timers might decrease to 23,058 from the assumed 25,320 DAS above, and the total DAS from 26,936 to 24,200. This would reduce the fishing mortality rate slightly to 0.80, and landings to 12.2 million pounds.
- On the other hand, some boats may have some extra DAS because they may carry over up to 10 DAS from 1998 and use them in 1999. In this case, excluding the zero-use and partial-use boats, the remaining 179 boats may be able to use 130 DAS, increasing the total near 25,000 (24,848) and the assumed fishing mortality rate to 0.83 again. In this case, however, the fishing mortality rate for 1998 will be lower than expected since some boats will use less than their full DAS allocation in 1998.
- The opening of the Georges Bank closed areas may increase the number of boats participating in the fishery and the DAS usage. If all 200 vessels used 130 DAS, total full-time DAS would go up to 26,000 and the fishing mortality rate to 0.84. But again, in this case, the fishing mortality rate for 1998 will be lower than expected since boats will use less than their full allocation of DAS.

4.2.3. Rationale for the selection of the rebuilding schedule

The Council chose this rebuilding program for the following reasons:

- to allow the scallop industry an additional year to develop a buyback program before further, more severe cuts in DAS would be implemented
- to allow the Council to get information from the experimental fishery in the groundfish closed areas on Georges Bank to develop a policy with respect to scallop fishing in the groundfish closed areas
- to allow the Council more time to develop a comprehensive area management approach to take advantage of the rapid growth of scallops.

Background and discussion

In developing the proposed action the Council was fully aware of the need to balance its legal responsibilities for eliminating overfishing as recently redefined in National Standard 1 of the Sustainable Fisheries Act, and to the extent practicable, of minimizing adverse economic impacts on fishing communities under National Standard 9. The problem of these competing concerns was made more difficult when the SFA revisions required the Council, which had been managing scallops to eliminate recruitment overfishing, to eliminate growth overfishing. For many fish species, the difference between recruitment and growth overfishing is not as large as it is for scallops. Scallops are thought to produce sufficient recruitment to sustain themselves at a relatively low adult population level, 5% of maximum spawning potential compared to 20% of maximum spawning potential for many finfish, so the difference between the old and the new overfishing definitions for this fishery is very large. About a 2/3 reduction in fishing is required to get from the recruitment overfishing threshold to the growth overfishing threshold. Compounding the difficulty caused by closing this large gap (fishing effort still must be further reduced just to reach the old overfishing threshold) is the problem that scallop vessels currently are not allowed to fish in the groundfish closed areas, which cover an estimated 50% of the Georges Bank scallop grounds. A comparable portion of Mid-Atlantic scallop grounds also have been closed to protect small scallops.

While the closures have enabled the scallop resource to rapidly recover inside the closed areas, scallop fishing has been concentrated on the remaining open areas. As a result, scallops have become even more severely depleted in the open areas despite substantial reductions in scallop fishing since the implementation of Amendment 4 in 1994.

A final problem in developing appropriate action is the difference in perceptions among scientists, fishermen, conservation groups and managers. At the recommendation of its Overfishing Definition Review Panel, the Council adopted a target MSY stock level as measured by the resource abundance index that is greater than any historically observed index value. Scientists supporting the conclusions of the Council's Overfishing Definition Review Panel have explained that, although the target survey abundance values exceed their observed ranges, this situation exists because the resource has been severely growth overfished since the before resource survey began in 1982. They also point to historical landings which show that the estimates of maximum sustainable yield associated with the target abundance levels are within

the historical levels of landings. The Council's Scientific and Statistical Committee has reviewed and supported the overfishing definition and rebuilding targets developed by the Overfishing Definition Review Panel (Appendix 7). It did, however, note that the "surveys in the closed areas, the results of which have not been reviewed, may reflect large quantities of scallops" and that "when survey results become available, a revision of the overfishing reference points may be necessary."

In contrast, fishermen and some scientists have argued that the index values for the biomass levels that will produce maximum sustainable yield are unrealistically high for a number of reasons. First, they are concerned that the survey dredge is not capable of yielding high index values because they suspect it is incapable of catching an adequate amount of large scallops. Second, they believe that the survey cannot precisely measure scallop abundance because they believe the sampling density is too low to adequately sample geographically small, very dense concentrations of scallops. Third, they believe that very high densities of scallops are subject to very high natural mortality which prevents the resource from reaching the projected maximum abundance levels. As result, scallop fishermen have expressed strong concern that the scallops in the closed areas are dying off while they are forced to overfish the remaining open areas.

Conservation groups and other fishermen in other fisheries have expressed concern over potential habitat damage, groundfish bycatch, spawning disruption, enforcement problems and the potential for gear conflict between scallop dredges and lobster gear (which has increased in the areas since the closures) should the groundfish areas be reopened to scallop fishing. Conservation groups also have expressed concern that scallops should be rebuilt as quickly as possible given that resource is less than ¼ of the target level

In developing a proposed action to meet the 10-year rebuilding requirement but which would minimize adverse social and economic impacts on the scallop fleet, the Council has attempted to address some of the above concerns. The proposed action will reduce 1999 DAS to 120 for full-time vessels, a level substantially higher than the 75 DAS in preferred alternative in the public hearing document. To do this however, DAS in the years 2000 through 2002 would have to be reduced substantially. (Maintaining current DAS levels at 142 for full-time vessels in 1999 would not even meet the old Amendment 4 interim fishing mortality targets according to the Scallop PDT.)

The modification to the rebuilding schedule in the proposed action provides the industry, scientists, managers and the public with several opportunities to develop the most successful possible scallop management strategy. First, the industry will have an additional year to organize a vessel buyback plan, either privately or publicly financed (or some combination of both). Buyback programs are very complicated and difficult to organize. The federal buyback of northeast groundfish vessels took several years since its inception even though it was federally financed and did not require an industry majority to agree to it. A scallop industry vessel buyback program probably will not receive the same level of public financial support and must have the support of a two-thirds majority of limited access permit holders to be funded through an industry fee system. Nevertheless, by reducing the number of vessels, it would be possible to allocate more DAS to the remaining vessels. Theoretically there are many possible different sets

of rules for vessel buyback programs with many different outcomes, however, it is clear that a reduced number of vessels could remain economically viable in the years when extreme DAS reductions are required, and more vessels could resume fishing as the stock rebuilt. By modifying its original preferred alternative to avoid more severe reductions in DAS in the first year, the Council has provided some additional time for the industry to organize a buyback to enable as many vessels as possible to survive future effort reductions.

A second reason for delaying the more severe reductions in DAS is to allow the scientists and managers to use the information collected from the experimental fishery in groundfish Closed Area 2 to further evaluate the DAS reduction schedule. As mentioned above, a high level of controversy exists about current and scallop abundance and projected MSY stock levels. The experimental fishery, which began in August 1998, is providing scientists and others with detailed information on scallop concentrations in terms of observed densities, effects on growth and natural mortality and the bycatch of other species. In addition, it is likely to provide information on the relative performance of commercial and survey dredges that may resolve some of the differences in the perception of scientists, fishermen and managers. This resolution is important to developing a more broadly shared understanding about the status of the resource and its rebuilding requirements. Also, the Council supports experiments to obtain information about impacts on habitat and other fisheries.

The third reason for the modifications to the DAS reduction schedule was to allow the Council to develop a strategy that takes advantage of the rapid growth of scallops, such as a rotational area management system or other ways of increasing the size of scallops caught. Fishing mortality targets could be increased by as much as 25% if age 3 scallops were fully protected from commercial catch. While this level of protection might not be entirely feasible, either a successful area rotation system or improvements in the selectivity of fishing might substantially improve yield per recruit and overall yield from the fishery.

4.3. Continuation of Mid-Atlantic closed areas

Background

At the request of the Council, the Secretary of Commerce, on April 3, 1998, closed two areas, one south of Hudson Canyon and another off Virginia Beach, to scallop fishing to protect small scallops. These areas cover about 1,900 square miles.

The Council has included the closed areas in the proposed with the provision that the closure would end on March 1, 2001 (three years later) unless the Council took additional action to keep the areas closed or to open them earlier.

Fishing for sea scallops in, or possession or retention of sea scallops from, the areas known as the Hudson Canyon South or the Virginia Beach Closed Areas is prohibited (see coordinates below and attached chart). Possession of sea scallops in those areas while in transit is prohibited

unless all gear onboard is properly stowed and not available for immediate use in accordance with the transitting and gear stowage provisions of the FMP.

Vessels not fishing under a scallop DAS and fishing for species other than scallops in these areas may not have scallop dredge gear available for immediate use and must stow their dredge gear in accordance with the transitting and gear stowage provisions.

The Hudson Canyon South and Virginia Beach Closed Areas are defined by lines connecting the following points:

Table 4.3.1

Hudson Canyon South Closed Area		
Point	Latitude	Longitude
H1	39 30' N.	73 10' W.
H2	39 30' N.	72 30' W.
H3	38 30' N.	73 30' W.
H4	38 40' N.	73 50' W.

Virginia Beach Closed Area		
Point	Latitude	Longitude
V1	37 00' N.	74 55' W.
V2	37 00' N.	74 35' W.
V3	36 25' N.	74 45' W.
V4	36 25' N.	74 55' W.

Rationale: The measure would continue to protect the resource by protecting high concentrations of juvenile scallops. The current interim may remain in effect for 180 days and, subject to certain conditions, may be extended by publication in the Federal Register for one additional 180-day period.

The Council's purpose in requesting the interim closures was to protect concentrations of small scallops until they reach a larger size. At that time the Council agreed consider opening the areas to shift fishing pressure away from other areas where the average size of scallops is smaller. The biological benefits of this measure will be a more balanced age structure of the scallop stock. Also, significant reductions in fishing mortality and increases in yield-per-recruit are possible from the closures. The need to increase the size of scallops caught in the catch to achieve either current or future spawning stock biomass targets has been identified by the PDT in the third-year review and subsequent analyses for this amendment. The economic benefit will be an increase in the yield-per-recruit when the areas are reopened.

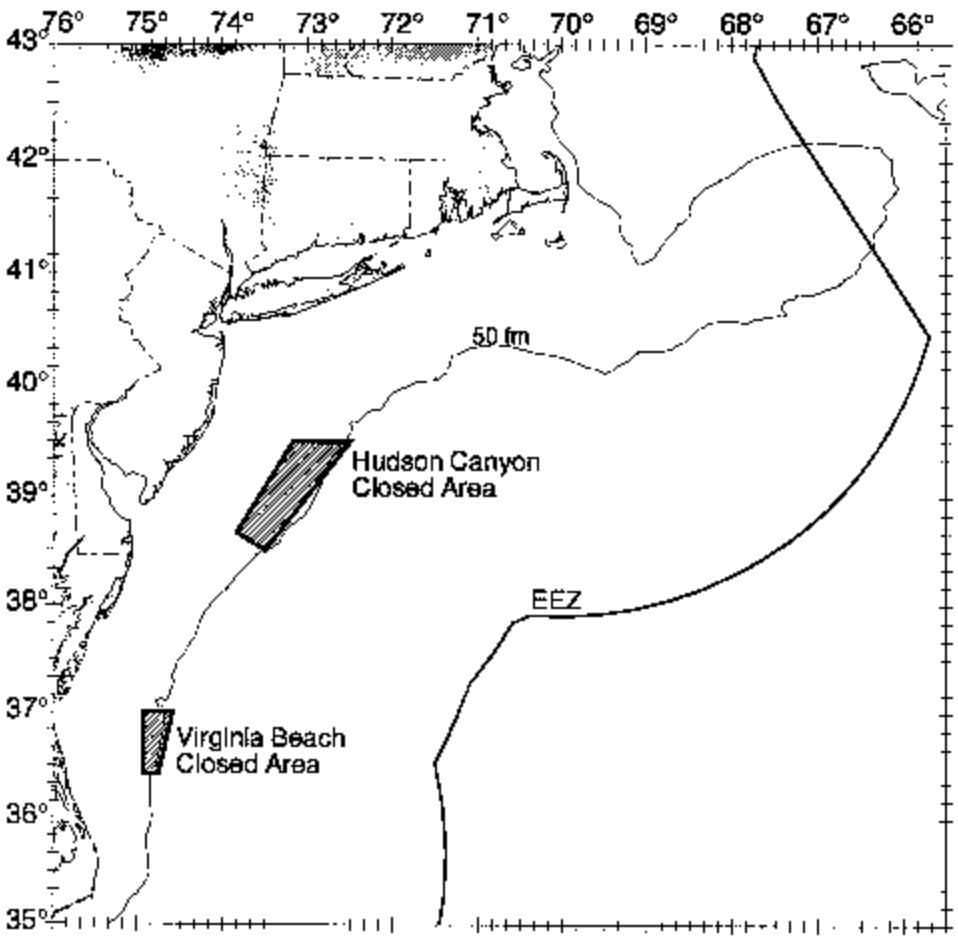


Figure 4-4 Mid-Atlantic Scallop Closed Areas

4.4. Closed areas to increase the size of scallops caught

A system for opening and closing areas to increase the size of scallops caught (improve yield per recruit) could contribute substantially to changes in the size of scallops caught. Such a system could increase substantially the overall catch levels associated with the FMP objectives and increase the level of fishing mortality that maximizes yield per recruit (F_{max}).

The overall objective of this alternative would be to help achieve the stock rebuilding targets by increasing yield per recruit. Other objectives are:

- to improve the age-structure of the scallop resource more quickly to that of a rebuilt stock
- to increase the economic benefits to the scallop harvesting sector.

Definition of areas

Major resource areas would be Georges Bank and the Mid-Atlantic areas comprising the subareas listed below:

Georges Bank	***Mid-Atlantic***
South Channel (including Southern New England)	Virginia Beach (including other area of VA and NC)
Northern Edge of Georges Bank	Hudson Canyon
Middle of the Bank (Georges Bank)	
Southeast Part (Georges Bank)	
Southwest Part (Georges Bank)	

The Nantucket Lightship Closed Area and Closed Area 1 belong to the same scallop resource area (the South Channel).

The Southeast Part should be considered separately from the Northern Edge.

Other elements

The PDT or appropriate monitoring committee would annually review resource abundance survey and other data and information from the fishery to develop a recommendation to the Council about which areas might be opened or closed. This could be done as part of the annual FMP monitoring and adjustment process.

The specific purpose of closing areas would be to conserve strong cohorts until they grow to at least 90 mm to the extent practicable. More specific criteria might decrease the monitoring group's flexibility in responding to unanticipated resource conditions.

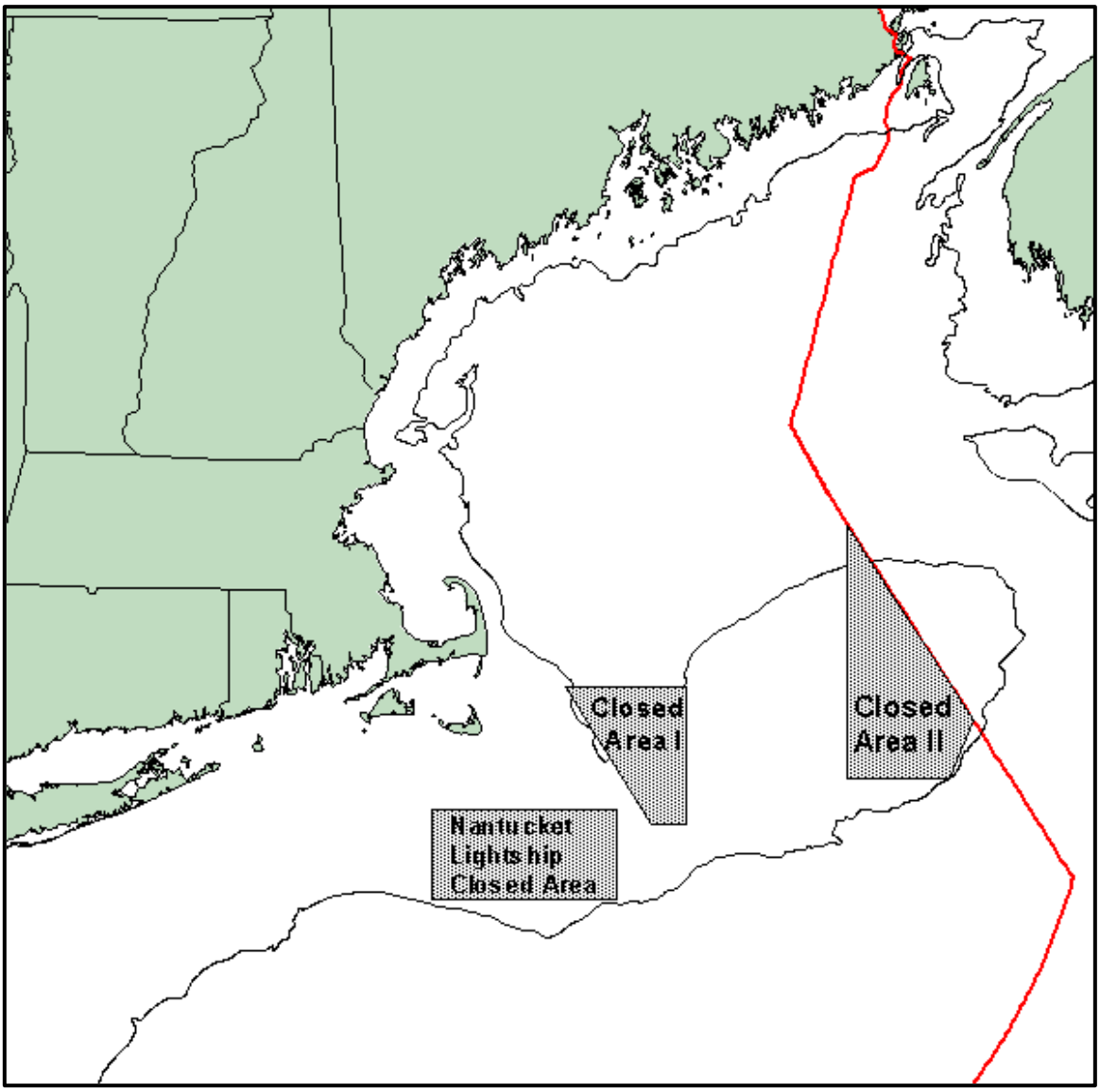


Figure 4-5 Georges Bank Groundfish Closed Areas

For example to protect an area containing a very large abundance of age 2 scallops (50-60 mm. shell height) a closure might last two years. If in the next year, another very large group of age 2 scallops were detected in the same area, the recommendation might be to keep the area closed an additional year.

Reopening
Once enough scallops in a closed area have grown to 90 mm or larger, the area should be re-opened and fished an appropriate target fishing mortality rate.

Some alternatives for controlling fishing mortality in reopened areas are area TACs, trip limits or allocations of DAS with or without a trip limit.

Possible requirements for fishing in groundfish areas if reopened

- Vessel tracking systems aboard vessels fishing in reopened areas
- Vessels with prior closed areas violations may not be allowed to fish in reopened areas
- Gear modifications that would reduce finfish bycatch

4.5. Annual monitoring and adjustment of measures to rebuild resource

The monitoring and adjustment process would mirror the one in the Northeast Multispecies FMP.

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 it 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 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.

4.6. Measures that may be implemented through framework adjustment

In addition to measures implemented under this amendment, the Council the following measures are added to the list of those that may be implemented later under the framework adjustment process currently included in the Scallop FMP.

4.6.1. Modifications to the overfishing definition

Under this measure the Council could modify the overfishing definition for sea scallops using the framework adjustment process. This would allow the overfishing definition to be modified based on new data or scientific information about the scallop resource.

4.6.2. Leasing of scallop DAS (provided that the Council holds a full set of public hearings)

This measure would make it possible for the Council to allow leasing of scallop DAS at a later date through the framework adjustment procedure.

The Council is aware of the controversy surrounding the issue of leasing of DAS or any transfers of fishing rights that might enable a few persons or business entities to control a large share of fishing rights. For this reason, the Council has decided that it would conduct a full set of public hearings, if it were to consider implementing this option through a framework adjustment.

The Council developed the list of policies for consideration with respect to a system for the leasing of DAS:

- only active DAS could be leased
- no re-activation of latent DAS due to this type of framework
- no net increase in the active DAS fished should be allowed from the time of each framework (averaged over some time period)
- any leasing program should allow the fleet the maximum economic flexibility within the constraints of the conservation goals of the Council
- qualification criteria should consistent with the previous goals
- non-participants must not be affected by further reductions in DAS due to a leasing program
- to minimize the impacts of a such a framework adjustment , it should not increase effort in other fisheries
- any leasing program should not irrevocably change the structure of the industry
- the purpose of such a framework is not to establish new directions in the scallop fishery

4.6.3. Scallop size restrictions (except a minimum individual meat size),

These restrictions could include restrictions on the average size of scallops in the catch. They could be based on meat weight, shell height or other type of measure. The Council excluded the possible implementation of a minimum individual meat size as a framework adjustment, however, because of its potentially very high level of controversy.

Rationale: Increasing the size of scallops in the catch can substantially increase overall harvest levels and the fishing mortality rate associated with fishing mortality targets of F_{max} or F_{MSY}. Although, the Council discontinued the average meat count restriction that was in place for many years because of administration and enforcement problems, size restrictions are a potentially valuable tool for managing most fisheries. This is particularly true in the scallop fishery because of the rapid growth of small scallops. In the future, the Council may find a need to implement size limits in a timelier manner than by amending the FMP.

4.6.4. Approval of aquaculture projects in the EEZ

This measure would allow the Council to implement measures through the framework adjustment process to allow aquaculture projects to be conducted in the EEZ consistent with the Council aquaculture policy.

Assigning a new purpose to measures that are part of a framework adjustment process requires adoption of a plan objective that is consistent with the framework action. Consequently, the following objective will be added to scallop FMP:

> *To facilitate the siting of biologically and environmentally sound aquaculture operations in the EEZ, given that some projects cannot occur in federal waters without modification to one or more NEFMC fishery management plans.*

For aquaculture projects in the EEZ, the Council's recommendations on adjustments or additions to management measures must come from one or more of the following categories: minimum fish sizes, gear restrictions, minimum mesh sizes, possession limits, tagging requirements, monitoring requirements, reporting requirements, permit restrictions, area closures, establishment of special management areas or zones and any other management measures currently included in the FMP.

Rationale: The Council proposes the use of the described process to make necessary adjustments to Council FMPs that apply to EEZ-based aquaculture projects. The intent is to make changes to FMPs in a timely manner. During this process, the Council will address issues within its purview, including user group conflicts and fishery habitat-related issues, but will not pre-empt the role of the permitting agencies, the Army Corps of Engineers and the Environmental Protection Agency.

4.6.5. Modifications to the Mid-Atlantic scallop closed areas

This measure would allow the Council to modify the Mid-Atlantic Scallop closed areas through the framework adjustment process.

Rationale: The closure of these areas, which is included in the proposed action, would end on March 1, 2001 unless the Council took additional action to keep the areas closed or to open them earlier. Adding this measure to those that can be adopted through the framework adjustment process allows the Council to fulfill its intent in a more timely manner by not requiring it to amend the FMP to do so. Also it allows the Council to modify the area in response to changing resource conditions.

4.6.6. Modifications to the demarcation line for DAS monitoring

This measure would allow the Council to modify the demarcation line for DAS monitoring through the framework adjustment process.

Rationale: The Council might want to change the DAS demarcation line to prevent possible future closed area management from causing boats to change their homeports with the resulting economic impacts such changes might have on fishing communities. For example, under the current system of DAS restrictions, if one of the Mid-Atlantic closed areas were reopened and contained large concentrations of scallops, New England vessels would have an incentive to shift their base of operations to the Mid-Atlantic region. If, however, their DAS could be adjusted depending on their homeport, they might have an incentive to remain in their traditional homeport.

4.6.7. To make different DAS allocations according to gear type

This measure would allow the Council to implement different DAS allocations for dredge and net gear.

Rationale: The Council may want to adjust DAS allocations by type of gear for differences in catching power and their catch of small scallops. This measure would allow the Council to make DAS allocations among gear sectors more equitable by basing them on catching power.

4.6.8. To implement closed areas to lessen the amount of DAS reductions

This measure would allow the Council to implement closed areas specifically to decrease the amount of DAS reductions required to meet the resource rebuilding targets included in this proposed action.

Rationale: Without this measure, the Council would have to implement closed areas for the purpose of increasing DAS allocations through a full plan amendment. Closed areas are much more effective if they can be implemented in a timely manner to protect small scallops.

4.6.9. To implement closed areas to increase the size of scallops caught.

This measure would allow the Council to implement closed areas specifically to increase the size of scallops caught. Currently the FMP does not allow the Council to do this

Rationale: The Council has been advised of the potential benefits of a rotational area management strategy for managing scallops. One of the main benefits of such a strategy is that it would enable the Council to increase the yield per recruit in the fishery and take advantage of the rapid growth of sea scallops. This is particularly important in the scallop fishery because the gear used in the fishery shows very poor size selectivity and is unlikely to improve in this regard in the foreseeable future.

4.7. Non-selected alternatives

The Council considered two different time frames to rebuild the scallop resource to meet the Sustainable Fisheries Act (SFA) requirements, a 7-year and a 10-year rebuilding schedule:

- Under the 7-year rebuilding, fishing mortality is reduced immediately to F=0.15 which is below the final target level of F=0.20. Reducing F to below the final target level provides more rapid rebuilding.
- Under the 10-year rebuilding, fishing mortality is reduced 25 percent per year until it reaches F=0.15 and increases to the final target level of F=0.20 in the tenth year.

The annual fishing mortality targets, DAS schedule, total DAS, landings, biomass and catch per DAS under these alternatives are shown in Tables 4.7.1 to 4.7.7. The fishing mortality targets, and the estimates for landings, catch rates, and DAS are computed for the stock as a whole because it was not possible to model how the current closed areas will affect these estimates.

Both schedules have the same target fishing mortality rate so eventually there will New England no differences in stock size, landings, and catch rates whichever schedule is adopted. They would both comply with the Sustainable Fisheries Act requirements to rebuild the resource within 10-years. The 7-year would require, however, the largest reductions in fishing in the next several years and has more negative impacts in terms of immediate employment loss, loss of income to vessel owners and crew. For this reason, the Council did not adopt this alternative as the proposed action.

Since the 10-year rebuilding schedule is more gradual and would require less severe reductions in fishing in the same time period, it would minimize number of business failures and negative

social impacts compared to the 7-year rebuilding. For these reasons, the Council initially proposed 10-year rebuilding schedule as the preferred alternative.

After reviewing comments from a series of public hearings, written comments, and recommendations from the Scallop Industry Advisory Panel and its Scallop Committee, however, the Council rejected these alternatives, and adopted instead the proposed action. As explained in Section 4.2.3, the rationale for the choice of the proposed action, the fishing mortality and the DAS reduction schedule under this action would

- allow the scallop industry an additional year to develop a buyback program before further, more severe cuts in DAS would be implemented
- allow the Council more time to develop an area management approach to take advantage of the rapid growth of scallops
- allow the Council to get information from the proposed experimental fishery to develop a policy with respect to scallop fishing in the groundfish closed areas .

Table 4.7.1 Fishing Mortality Reduction Schedule

Year Rebuilding Schedule	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
10-year	0.67	0.52	0.41	0.32	0.24	0.15	0.15	0.15	0.15	0.20
7-year	0.15	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20

Table 4.7.2 Estimated DAS for full-time vessels assuming a fleet size of 211 full-time vessels

Year Rebuilding Schedule	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
10-year	75	70	62	55	46	33	35	36	39	56
7-year	33	30	33	34	35	37	53	56	58	60

Table 4.7.3 Estimated total DAS –all permit categories

Year Rebuilding Schedule	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
10-year	16,805	15,677	14,012	12,292	10,343	7,453	7,828	7,976	8,790	12,571
7-year	7,338	6,664	7,314	7,662	7,898	8,330	11,898	12,571	13,101	13,462

Table 4.7.4 Estimated total Full-time DAS

Year Rebuilding Schedule	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
10-year	15,825	14,770	13,082	11,605	9,706	6,963	7,385	7,596	8,229	11,816
7-year	6,963	6,330	6,963	7,174	7,385	7,807	11,183	11,816	12,238	12,660

Table 4.7.5 Projected biomass indices for annual resource abundance survey (kg. per tow)

Year Rebuilding Schedule		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
10-year	Georges Bank	1.6	1.9	2.5	3.0	3.7	4.6	5.8	6.9	8.0	**8.9**
	Mid-Atlantic	0.6	0.8	1.1	1.4	1.7	2.2	2.8	3.4	**3.9**	4.4
7-year	Georges Bank	1.6	2.5	3.7	5.0	6.3	7.5	**8.4**	8.9	9.3	9.6
	Mid-Atlantic	0.6	1.1	1.7	2.3	3.0	3.6	**4.1**	4.3	4.6	4.7

Note: Values shown in bold typeface and shaded underlined that stock rebuilding targets have been met.

Table 4.7.6 Estimated total landings (million pounds)

Year Rebuilding Schedule	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
10-year	8.4	9.2	9.6	9.7	9.3	7.5	9.5	10.9	12.3	17.6
7-year	3.3	4.2	6.3	8.2	9.9	11.7	16.7	17.6	18.3	18.8

Table 4.7.7 Estimated Catch per DAS (pounds of meats)

Year Rebuilding Schedule	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
10-year	500	585	685	789	903	1006	1203	1373	1400	1400
7-year	453	629	855	1067	1257	1400	1400	1400	1400	1400

4.7.1. Increased mesh size for dredge twine tops

The Council is considering the several options for increasing in the minimum mesh of the twine top for scallop dredges to reduce the by-catch of finfish:

- 8 inches diamond mesh - This mesh configuration would maximize the escapement of flatfish such as yellowtail flounder and summer flounder, which are caught in scallop gear, perhaps to a greater extent than other regulated groundfish species.
- 8 inches square mesh - This mesh configuration would maximize the escapement of round fish such as cod, haddock and possibly other similarly shaped species.

Some experiments using the larger mesh in the twine top have shown promising preliminary results. However, more work is needed to develop information on exactly how the large mesh is rigged as part of the twine top and to develop specifications that might be enforceable as regulations. Without this additional information increasing the twine top mesh size through regulations could cause fishermen to rig their gear improperly and negate any benefits of increasing the twine top mesh size.

5.0 Affected Environment

5.1. Biological Environment

5.1.1. Sea scallop life history, habitat and physical environment

This topic is discussed in the original Sea Scallop FMP document and was substantially augmented in the Amendment 4 document. Additionally, the New England Council is developing a separate amendment to be submitted in October 1998 to designate EFH for sea scallops and which will update and add to information on these topics. For ease of reference, however, the following brief description (from SAW 23)of the resource is provided:

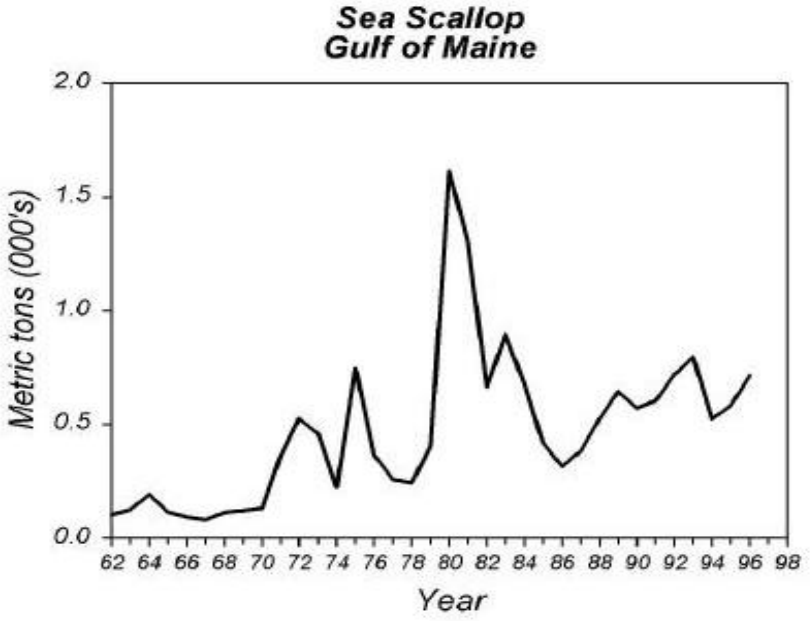
Sea scallops (*Placopecten magellanicus*) are found in the Northwest Atlantic Ocean from North Carolina to Newfoundland along the continental shelf of North America. Most US commercial landings are taken at depths between 40 and 200 m (22 – 110 fm) on Georges Bank and in the Mid-Atlantic (NEFSC 1993). Sea scallops grow rapidly during their first several years of life with a 50-80% increase in shell height and a quadrupling in meat weight between ages 3 and 5. Maximum size is about 23 cm, but scallops larger than 17 cm are rare. Sexual maturity commences at age 2 and as small as 25 mm, but scallops less than 4 years old probably contribute little to total egg production (NEFSC 1993). Spawning generally occurs in the late summer and early autumn, but biannual spawning (twice per year) has been observed in the early spring in the Delmarva Region (DuPaul *et al.* 1989). Mid-winter spawning off Georges Bank may also occur (Almeida *et al.* 1994). Eggs are buoyant, and the larvae remain in the water column for 4-6 weeks before settling. During this period, considerable transport of larvae can occur depending on prevailing current patterns.

5.1.2. Status of the resource

Gulf of Maine

Since 1987, landings have been relatively constant about an average of 600 mt; the 1996 total was 700 mt (meat weight). More than 80% of the 1996 total catch was from state territorial waters indicating continued dependence of the fishery on inshore scallop beds (Figure 5.1).

Figure 5-1 Gulf of Maine Scallop Landings



Georges Bank

Total (U.S. and Canadian) landings from Georges Bank were 5,200 mt (meats) in 1996, well below the 1987-1992 average of 13,000 mt. Of the 1996 total, U.S. landings accounted for 42 percent (2,200 mt) while Canadian landings accounted for 58% (3,000 mt). Landings for the U.S. more than doubled over 1995 levels while Canadian landings increased by 50%. Canadian landings have been significantly higher than U.S. totals since 1993.

Since December 1994, half of the U.S. portion of Georges Bank has been closed to scallop harvesting due to implementation of area closures to protect groundfish stocks. This appears to have contributed to an increase in sea scallop stock biomass. NEFSC sea scallop dredge survey indices for 1996 rebounded to long-term median levels, after declining to the lowest value in the time series in 1993. In the South Channel area of the Bank, the total abundance index in 1996 decreased slightly from 1995 levels. Abundance and biomass indices for recruited sea scallops in 1996 were more than 2 times higher than in 1995 and were the third highest observed in the time series; however, numbers of pre- recruit scallops per tow decreased 50% from 1995 levels. In the Southeast Part, abundance and biomass indices for 1996 were comparable to long-term averages;

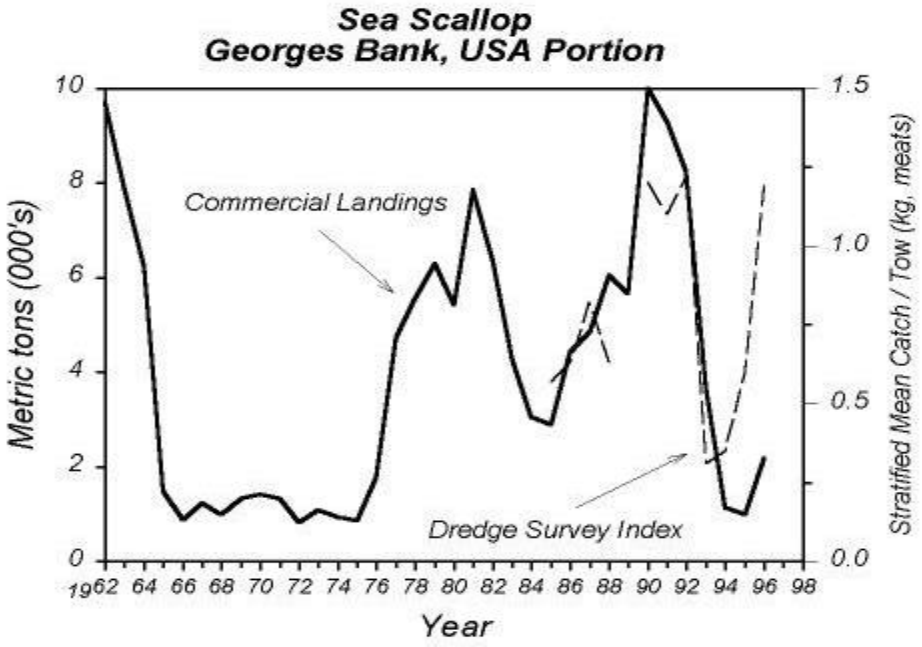


Figure 5-2 Georges Bank Landings and Abundance

and while pre-recruit indices in 1996 increased 49% over 1995, recruits decreased slightly. In the U.S. portion of the Northern Edge and Peak, abundance and biomass indices for total scallops, pre-recruits, and recruits for 1996 increased to the second highest level observed since 1975.

Because of area closures, U.S. landings for 1994 and 1995 were the lowest observed since 1977. Fishing mortality in 1995 was estimated to be 0.41 (32% exploitation rate); the lowest since 1982, and lower than the overfishing definition (F5%=0.71, 49% exploitation rate) provided by New England Fishery Management Council, but is still higher than Fmax (F=0.23, 20% exploitation rate). Stock rebuilding is occurring in the closed areas, but elsewhere on Georges Bank, fishing mortality remains high.

Middle Atlantic

The total nominal catch in 1996 was 4,700 mt, 23% below the 1995 total of 6,100 mt. Abundance indices increased between 1992 and 1995, but decreased substantially from 1995 to 1996. The index in 1996 was 67% lower than in 1995 and was the second lowest since 1985. The pre-recruit abundance index in 1996 decreased 86% from the 1995 level and is the third lowest in the history of the survey. The abundance index for recruits in 1996 was less than half of the 1995 value.

A significant redirection of fishing effort from Georges Bank to the Mid-Atlantic region occurred between 1993 and 1996. This resulted from a number of factors including low abundance on Georges Bank, strong 1990 and 1991 year-classes in the Mid- Atlantic region, and large-scale area closures on Georges Bank. Consequently, effort on Mid-Atlantic sea scallops increased greatly, with virtually all small scallops being harvested once available to the gear. The removal of maximum meat count regulations has resulted in even more effort on sea scallops in

the 50-70 count range. Fishing mortality in this region appears to have increased to a record high in 1994 (F = 1.27, 69% exploitation rate). Although fishing mortality decreased to 0.85 (55% exploitation rate) in 1995, it was still higher than the above overfishing definition.

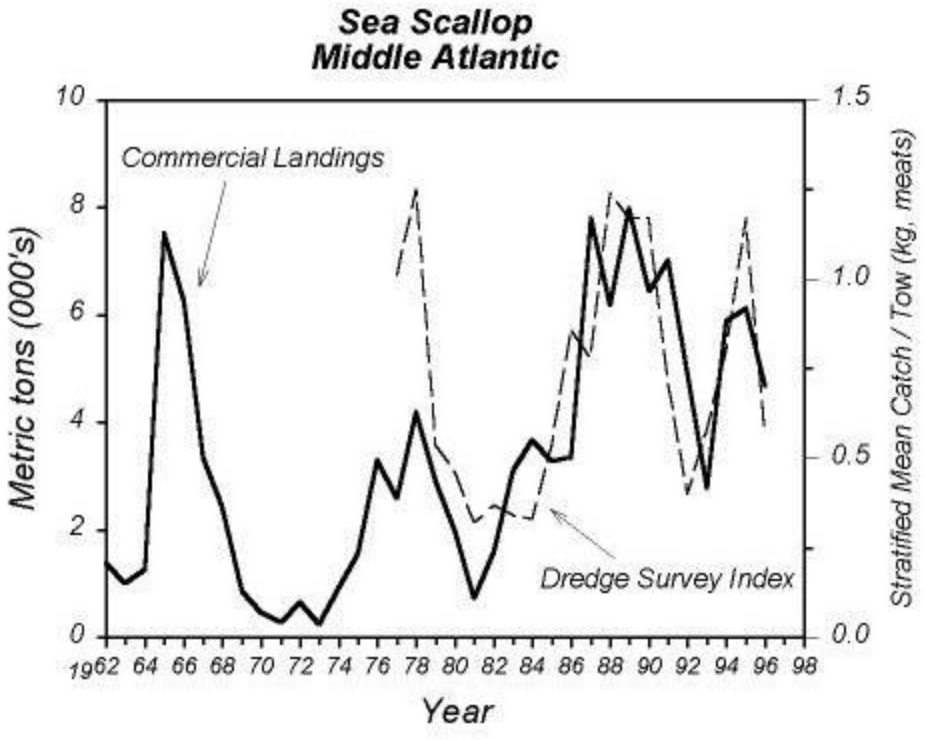


Figure 5-3 Mid-Atlantic Scallop Landings and Abundance

Amendment 4 to the Sea Scallop FMP specifies reductions in days at sea to reduce overall harvest rates and dependence on new recruits. In recent years landings have fluctuated greatly both annually and spatially, with virtually all small scallops being harvested once available to the gear. The removal of maximum meat count regulations has resulted in even more effort on scallops in the 50-70 count range. Amendment 4 specifies an increase of ring size from 3.25 to 3.50 in., which is designed to shift size selectivity toward large-sized scallops. Amendment 4 also restricts the shucking capacity of vessels by limiting crew size to a maximum of seven. However, in the absence of further reductions in fishing effort in the Mid-Atlantic region, all the measures specified in Amendment 4 appear insufficient to reduce fishing mortality below Fmax.

The rapid growth potential of sea scallops and potential implications for management have been demonstrated in the closed areas on Georges Bank. After 20 months of closure, average densities within the closed areas were about three times higher than in open areas. These results indicate that area closures are a viable option for increasing spawning stock biomass. The importance of these area closures as a source of recruitment has yet to be evaluated.

Recent assessments

The most recent Stock Assessment Workshop (SAW) assessment for the sea scallop resource was completed in January 1997. The Scallop Plan Development Team updated estimates of fishing mortality and reference points such as $F_{5\%MSP}$ since that time, however, the SAW provided a description of the status of the resource that still is largely accurate in terms of overall biomass levels.

The SAW scallop advisory report stated that the current spawning stock biomass was at a low level and landings were determined primarily by variations in the number of recruits entering the fishery. On Georges Bank, abundance and fishing mortality were at moderate levels, but this resulted from approximately one-half of the region being closed to fishing via the groundfish closed areas. The stock was rebuilding in these closed areas, but elsewhere on Georges Bank fishing mortality was greater than the current overfishing threshold. (Overfishing for Atlantic sea scallops was defined as the fishing mortality rate greater than the rate that would maintain a SSB, that is 5 percent of the level that occurs without fishing.) The report further stated that scallops in the Mid-Atlantic region are at a low level of abundance, are overexploited, and are declining. The large 1990 and 1991 year classes were overfished and incoming recruitment was among the lowest on record. Based on high fishing mortality rates, low stock size, and lack of significant recruitment, the management advice from the Northeast Stock Assessment Workshop was that fishing effort should be reduced immediately and significantly in the Mid-Atlantic region to preserve SSB and to improve yield per recruit.

Fishing mortality

The Scallop Plan Development Team provided an updated estimates of fishing mortality in May 1997. It estimated that the fishing mortality for 1996 rate was 0.94. (Table 11 in Rago et al, 1997 – Appendix 2). This estimate represents the fully recruited fishing mortality rate given the effect of 5% cut-off point in commercial size frequencies on the estimate of partial recruitment. The estimate of fully recruited F is based on SARC 23-reviewed total F from the DeLury analysis and the estimate of partial recruitment in Rago et al, 1997. The method to estimate PR and fully recruited F has not reviewed by the Stock Assessment Workshop.

The following results were drawn directly from this report (Rago et al, 1997). Results suggested that fishing mortality for the combined resource peaked between 1990 and 1992, regardless of the true underlying rate of partial recruitment. Reductions in F since the 1992 survey year were influenced by the absence of fishing in the closure areas and reallocation of fishing effort from Georges Bank to the Mid-Atlantic region.

Estimates of partial recruitment rate were derived for two cutoff points of 5% and 10%. Both the 5%-ile and 10%-ile of shell height in the landings exhibited a downward trend since 1983. The age corresponding to these percentiles of length demonstrated a similar downward trend. As a result, the predicted duration of exposure of age 3 scallops to fishing has increased from about 0.5 years to 0.9 years. When the exposure period is weighted by the relative number of monthly DAS, the estimated partial recruitment rate tends to drop slightly. The change in partial recruitment rate was due to a number of factors whose individual effects could not be disentangled. Increases in recruitment of smaller scallops, elimination of meat count regulations, and higher rates of fishing effort can all act to make small scallops more common in the landings. The report concluded that there was a high probability that fishing mortality exceeded the threshold levels still exists regardless of the cutoff point used to derive the partial

recruitment rate.

PDT review of management program
The scallop regulations require the Scallop Plan Development Team (PDT) to determine the adequacy of the total allowable DAS reduction schedule to achieve the target fishing mortality rate. The PDT completed its review in May 1997 and concluded that the scheduled DAS for full-time scallop vessels should be reduced from 142 to 108 DAS for the March 1, 1998, through February 28, 1999, fishing year. As part of the development of this proposed action, the PDT developed projections of fishing mortality targets and DAS that would meet the Amendment 4 objectives in order to describe the no-action alternative (Tables 4.2.1 and 4.2.2).

Catches
During 1982-1995, US landings ranged between 6,742 (1985) and 17,174 mt (1990) Landings in 1993 (7,296 mt) were the second lowest of the time period and have remained at this low level through 1995. Landings from Georges Bank increased to a period high of 10,009 mt in 1990 before dropping sharply to 3,655 mt in 1993 and 1,006 mt in 1995, a 90% decline from the 1990 level. During 1994-1995, landings from the Mid-Atlantic region increased 115% from the 1993 level. Mid-Atlantic landings from otter trawls increased to 12% of the total during 1994 and 1995. Discard estimates were available for 1992 - June 1996, but were not incorporated into estimates of stock abundance and fishing mortality. U.S. and Canadian landings are shown in Figure 5.4 below.

Recruitment: The biomass of scallops entering the Georges Bank fishery during 1996 was slightly less than the 1984-1996 average. In the Mid-Atlantic, the biomass of scallops entering the fishery was less than half the 1984-1996 average. The unadjusted survey abundance index in 1996 was at a moderate level on Georges Bank and at the lowest level since 1979 in the Mid-Atlantic.

5.1.3. Status and management of the scallop resource in Canadian EEZ
The Canadian sea scallop fishery on Georges Bank shares the same stock as the U.S. fishing Georges Bank scallop fishery. The average abundance level of sea scallops, measured by the U.S. resource abundance survey in the Canadian EEZ, has been consistently higher than in the U.S. EEZ. Canada has set a very conservative fishing mortality target of $F_{.01}$. This level of fishing mortality corresponds to a fishing mortality rate of F=0.15 or an annual exploitation rate of about 13%. This target is comparable to the lowest fishing mortality targets, which are in years 2004-2007 under the proposed action.

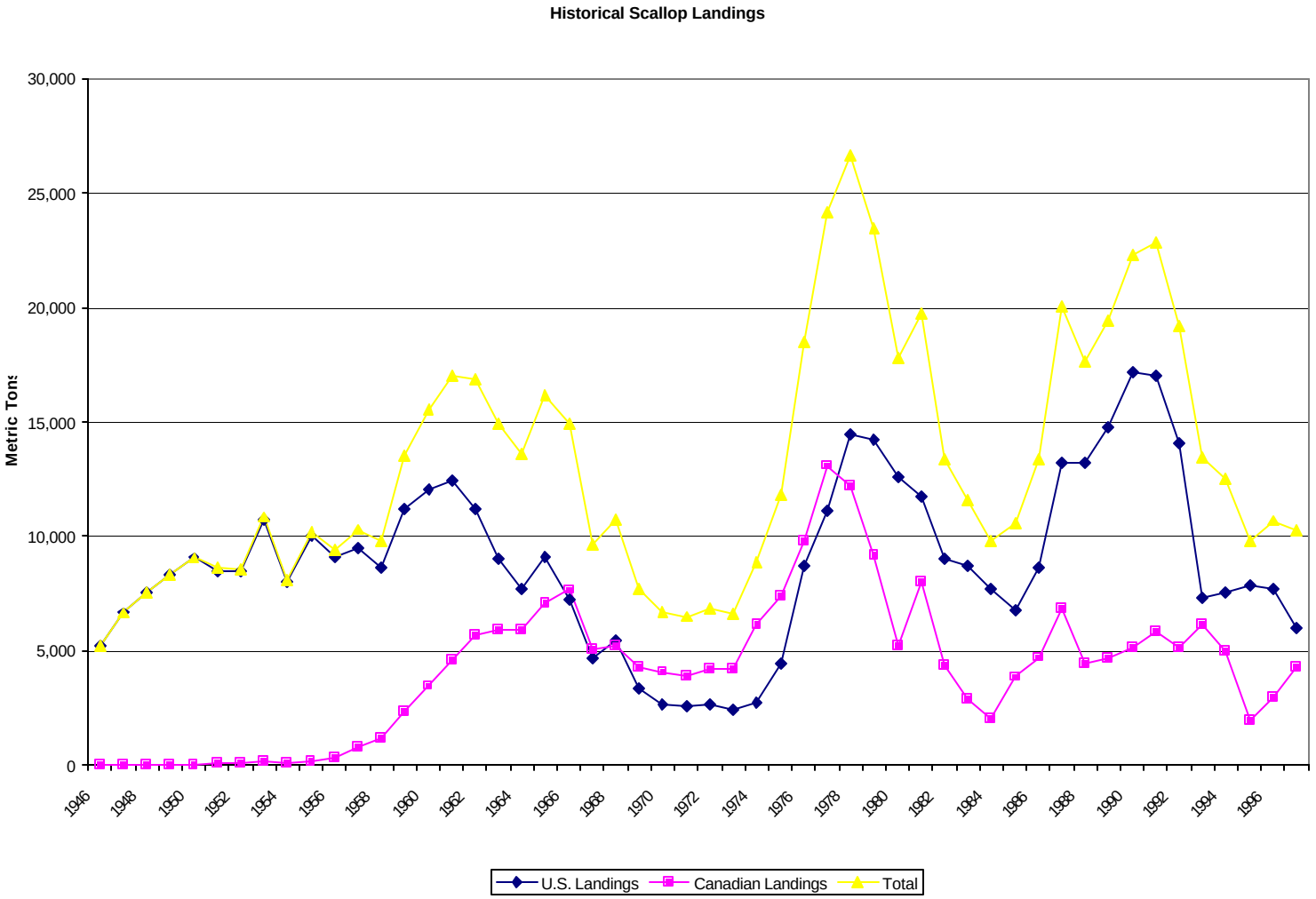


Figure 5-4 U.S. and Canadian Scallop Landings

Table 5.1.1

Scallop Standardized Weight per Tow (kg) from Georges Bank Northern Edge and Peak (Total)			
Year	**U.S. EEZ**	**Canadian EEZ**	**Georges Bank, combined**
1985	0.45	4.78	1.36
1986	0.61	6.81	1.96
1987	0.85	3.63	1.35
1988	0.92	3.13	1.10
1989	N/s	N/s	-
1990	2.05	4.48	1.85
1991	1.16	2.15	1.29
1992	0.68	N/s	-
1993	0.26	3.31	0.87
1994	0.24	3.73	1.56
1995	0.46	5.33	0.57
1996	1.47	3.30	-
Data from 23rd Stock Assessment Workshop		[1] includes South Channel and Southeast Part	

Based on some recent survey abundance data, however, there is reason to believe that concentrations of scallops in the northern part of Groundfish Closed Area 2 are much higher than in the Canadian sector on Georges Bank.

Canada has used quotas to manage its scallop fishery and despite low fishing mortality target levels, Canadian landings from Georges Bank since 1985 have been consistently higher than U.S. landings from this area. Only in 1990 were U.S. and Canadian landings from Georges Bank nearly equal. Recent Canadian landings have remained in the range of 3,000 to 4,000 metric tons (Table 5.1.2).

Table 5.1.2 Scallop Landings from Georges Bank - Northern Edge and Peak

Scallop Landings from Georges Bank - Northern Edge and Peak (Metric tons)			
	U.S.	**Canada**	**Total**
1985	992	3,812	4,804
1986	1,113	4,670	5,783
1987	2,216	6,793	9,009
1988	2,124	4,336	6,460

1989	2,326	4,676	7,002
1990	5,026	5,218	10,244
1991	2,752	5,805	8,557
1992	2,298	6,151	8,449
1993	1,089	6,183	7,272
1994[1]	182	5,003	5,185
1995[1]	407	1,984	2,401
1996[1,2]	70	2,997	3,067
1997	-	4,257	-

Data from 23rd Stock Assessment Workshop; [1] U.S. landings are preliminary and 1996 landings are from Jan-Jun only.

Impacts of Canadian management

The Canadian management system is not expected to have any direct impacts on the management of scallops in the U.S. EEZ because of the sedentary nature of scallops. Although some movement of scallops may take place across the U.S./Canada Boundary Line, it probably is insignificant and the net direction of such movements is unknown. Although there might be a contribution to scallop spawning and settlement of larvae across the boundary line, again the net gain or loss to the U.S. EEZ is unknown. Given that there are large concentrations of scallops in groundfish Closed Area 2, there is probably adequate adult biomass on the U.S. side of the boundary line to supply adequate spawning. Again without information about the direction of larval settlement, however, it is not possible to make any definitive determinations about this issue. Because Canada historically has maintained the resource on its side of boundary line at higher abundance levels than has the U.S., it is very unlikely that Canadian management of scallops has had, or will have any negative impacts on the U.S. fishery.

5.1.4. Endangered and protected species

A description of potentially affected protected species (marine mammals, sea turtles and shortnose sturgeon, including those that are threatened and endangered or proposed to be listed as threatened or endangered)) was provided in Amendment4 to the Atlantic Sea Scallop FMP. The status of these and other marine mammal populations inhabiting the Northwest Atlantic has been more recently discussed in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments. Initial assessments were presented in Blaylock, et al. (1995) and are updated in Waring, et al. (1997). The report presents information on stock definition and geographic range, population size and productivity rates and unknown impacts. The most recent information on sea turtle status is contained in the 1995 and 1997 status reviews of listed turtles prepared jointly by NMFS and the U.S. Fish and Wildlife Service.

5.2. Description of the Fishery (Human Environment)

5.2.1. Scallop landings

Amendment 4 dramatically changed the sea scallop harvesting industry by creating the limited access fleet. Limited access permit categories include full-time, part-time, and occasional participants. All other vessels landing scallops must have general category permits, and may only land less than 400 pounds of shucked meats per trip.

Sea scallop landings began decreasing after 1991, when 37 million pounds of scallop meats were landed. Since implementation of Amendment 4 in March 1994, sea scallop landings, particularly by the limited access fleet, remained steady, but at a low level. This drop in landings coincided with the closure of about one-half of the Georges Bank scallop beds since the beginning of 1995, the implementation of a minimum 3-1/2" dredge ring size and 7-man limit on crew size at the start of 1996, and initiation of DAS reductions. Most scallops are landed with dredge gear.

Table 5.2.1 Atlantic Sea Scallop Landings by Gear

Atlantic Sea Scallop Landings by Gear (Thousand pounds)			
	1995	**1996**	**1997**
Total:	17,640	16,991	13,238
Dredge	15,555	15,447	12,223
Trawl	1,594	1,398	710
Other	491	146	305

Limited access vessels include full-time, part-time, and occasional permits, and adding the landings by general category permits yields the total landings, 17,273 thousand pounds in 1995 for instance. From the Table 5.2.2, it is clear that full-time vessels make up the bulk of the landings (85% of the grand total in 1995 and 1996). Scallop landings in 1994 include two months under the old, voluntary recording system, thus the 971,000 pounds of scallops, recorded as aggregate landings (and catch per trip cannot be calculated). Aggregate landings (in terms of catch per trip) in 1995, 1996, and 1997 are also recorded. Landings by category are consistent across the three years, at nearly 17 million pounds, but drop to 13 million pounds in 1997. Interestingly, DAS per full-time boat was 204 in 1994, 182 in both 1995 and 1996, but dropped to 164 in 1997. Nearly half of Georges Bank scallop grounds, on the other hand, were closed at the end of 1994.

Table 5.2.2 Atlantic sea scallop landings by permit category

Atlantic Sea Scallop Landings by Permit Category *(thousand pounds)				
	1994	**1995**	**1996**	**1997**
Limited Access:	15,200	15,849	15,611	11,454

Full-time	14,388	14,818	14,394	10,724
Part-time	680	892	902	597
Occasional	132	139	315	133
General category:	1,432	1,424	1,376	1,784
Total:	**16,631**	**17,273**	**16,987**	**13,238**
> 400	15,490	16,071	15,980	11,823
< 400	171	204	240	370
Unknown	972	998	767	1,045

The difference between general category and less than 400 pound trips may be about 200 to 400 thousand pounds of scallops landed on trips that just exceeded 400 pounds. From 1996 to 1997, general-category scallop landings increased from 1.4 to 1.8 million pounds. For the under 400 pounds trips, scallop landings increased from 240 to at least 370 thousand pounds, from 1996 to 1997. Meanwhile, overall scallop landings declined from 16.9 to 13.2 million pounds.

5.2.2. Bycatch in the scallop fishery

The largest catch of species other than scallops is monkfish, which appears to be a targeted as well as an incidental species in the dredge fishery. All other species have been a fraction of a percent of the total landings (see percentages, bottom of Table 5.2.3). In terms of absolute weights, the species of concern would be summer flounder and yellowtail flounder. The highest landings of these two species were 732,000 pounds of summer flounder in 1990 and 223,000 pounds of yellowtail flounder in 1991.

Landings, however, are not considered bycatch under National Standard 9. Table 5.2.4, and Figure 5.2.1, shows the aggregated catch by species aboard scallop dredge vessels (NEFSC Sea Sampling Program), during 1991 to 1996. Weights are reported as discard or kept. Minimizing the discard weights is the purpose of National Standard 9. Discards are less than one-third the kept weights. In the last three years, the ratio changes to one to five, discards to kept weight. Skate and Others make up the majority of the discarded weight, but in the last two years bycatch of the two directed species, scallops and monkfish, make up an increasing share of the discards. These are probably juveniles. The bycatch of the regulated species makes up the smallest proportion of the discards (Figure 5-5).

Table 5.2.3 Total landing of live weight (kg) by species for vessels using scallop dredges (from weigh-out data, 1990-1994)

Table 5.2.4 Aggregated catch (kg) by species from hauls watched by observers aboard scallop dredge vessels (NEFSC Sea Sampling Program)

Figure 5-5 Percent of observed catch (live weight) of regulated groundfish species compared with the live weight of kept sea scallops

5.2.3. The scallop fleet

Amendment 7 affects all person who hold a limited access sea scallop permit and/or work aboard or for limited access vessel operations that land sea scallops from the EEZ. The scallop permit year runs from March 1 to the end of February. (To have a full year of data available for analysis, 1997 data will be used rather than 1998.) The 1997 scallop permit data cover the period from March 1997 through February 1998. Landings data, however, are based on the calendar year (January to December).

Table 5.2.5 Recent landings and DAS used by the limited access scallop fleet

Year	Landings in million pounds (for calendar year)	DAS used (for fishing year)
1994	15.2	35,151
1995	15.8	33,466
1996	15.6	33,950
1997	11.5	29,404

Dredges are the most common gear type (Table 5.2.6). This reflects both a trend toward dredges and away from nets for scallop fishing (White 1993, p.12) and recent regulations that attempt to limit any expansion of the use of scallop trawls.

Table 5.2.6 Distribution of gear types on limited access scallop vessels, 1997 permit data

Type of Gear	Number of Vessels	% of Vessels
Dredge	228	74.5
Bottom trawl	76	24.8
Other Trawl	2	0.7
Total	306	100

There were 306 limited access scallop vessels in 1997, and an additional 42 limited access history permits. A history permit is defined as one for which the permit holder no longer has a vessel, but retains the permit with its limited access qualification. This means that the permit holder may acquire a new vessel in the future and use that permit for the new vessel. Since it is unlikely that any holder of a history permit would choose to activate it at this time, given the proposed reductions in DAS, this analysis concentrates on the 306 permits which are for active vessels.

The vast majority of scallop vessels are large, ranging from 61-100 ft. and greater than 101 gross registered tons (Table 5.2.7). This large average size reflects three factors:

1. scallop vessels on average tend to be larger than, for instance, groundfish vessels
2. qualification for limited access required minimum landings of 400 lbs. of scallop meats or 50 U.S. bushels of shellstock on any trip in the qualifying period
3. a number of inshore scallop vessels (which tend to be smaller), especially in Maine, did not apply for limited access permits to avoid federal gear regulations in state waters.

These limited access vessels are, by and large, in the full-time category (Table 5.2.8), that is, vessels that primarily target scallops. As a result, they are very vulnerable to measures heavily restricting scallop DAS or catch.

Table 5.2.7 All limited access scallop vessels by size categories, 1997 permit data

Length Category	*No. Vessels*	*% of total*	*Tonnage Category*	*No. Vessels*	*% of total*
0-45 ft	7	2.3	*0-50 GRT*	8	2.7
46-60 ft	6	2.0	*51-100 GRT*	52	17.0
61-100 ft	282	92.2	*101-150 GRT*	105	34.3
101+ ft	11	3.6	*151+ GRT*	141	46.1
Total	306	100	*Total*	306	100

Table 5.2.8 Number of vessels per scallop limited access category, 1997 permit data

Category	Number of Vessels	% of Vessels
Limited Access Full-time	226	73.8
Limited Access Part-time	46	15.0
Limited Access Occasional	23	7.5
Limited Access Full-time Small Dredge	3	.01
Limited Access Part-time Small Dredge	8	2.6
Total	306	100.0

The number of vessels landing scallops in the different ports is a useful benchmark for general economic activity generated by this fishery. Most vessels, however, land in several ports during the year, so the sum of numbers per port do not equal a total number of vessels. See section 5.2.5 for a discussion of the number of vessels by primary port.

Table 5.2.9 Number of vessels landing scallops during 1996

Port	Full-time	Part-time	Occasional	Total Limited Access
Maine	4	4	7	15
Maryland	2	3	3	8
Other-MA	12	1	3	16
New Bedford	113	3	3	119
Other-NJ	-	-	-	-
Pt. Pleasant	4	3	1	8
Cape May	56	17	6	79
Long Beach	9	-	-	9
New York	-		1	1
Rhode Island	6	-	1	7
Other-VA	-	-	-	-
Hampton	20	13	8	41
Newport News	43	8	2	53
York, VA	22	-	-	22

The full-time, limited access permit vessels are the overwhelming majority of scallop vessels in the major scallop ports of New Bedford, Cape May, and the Norfolk area including Hampton, Newport News and York. These ports are the major ports in terms of landings, as well, as the table below shows.

Table 5.2.10

Landings of Sea Scallops in 1996 by Permit Category and Port (thousand pounds)					
Ports	**Full-time**	**Part-time**	**Occasional**	**Total Limited access**	**Total including non-limited access**
Connecticut	-	-	-		-
Maine	86	35	15	136	1,008
Maryland	1	2	7	10	10
Other-MA	425	75	4	504	574
New Bedford	7,742	83	10	7,835	7,981
New Hampshire	-	-	-		0
Other-NJ	-	-	-		9
Pt. Pleasant	157	49	4	210	227
Cape May	1,123	228	121	1,472	1,599
Long Beach, NJ	527	-	-	527	520
New York	-	-	1	1	4
Rhode Island	20	-	1	21	22
Other-VA	-	-	-		-
Hampton	916	156	137	1,209	1,327
Newport News	2,176	273	16	2,465	2,487
York, VA	1,219	-	-	1,219	1,220

Species landed on scallop trips

The limited-access fleet, which includes both scallop dredges and scallop trawls, lands species other than scallops. This appears to be largely "economic by-catch" which is sought after and sold. Two of the most important, other species for scallop boats are summer flounder (fluke), and monkfish. The following table shows the species distribution on scallop boats.

Table 5.2.11

Species landings on scallop trips, by limited access vessels, 1994-1996
(thousand pounds)

	Scallops	Monkfish	Fluke	Multispecies*	Total
1994:					
Full-time	14,388	12,220	647	554	28,318
Part-time	680	310	197	13	1,241
Occasional	132	51	157	58	465
1995:					
Full-time	14,818	10,355	742	215	26,423
Part-time	892	347	208	29	1,527
Occasional	139	225	286	94	840
1996:					
Full-time	14,394	10,238	405	212	25,489
Part-time	902	352	85	11	1,421
Occasional	315	90	82	112	716

* Multispecies include cod, haddock, pollock, redfish, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and whiting.

Monkfish landings have been about two-thirds of scallop landings for the full-time vessels, and about one-half for the part-time vessels. Relative landings by occasional vessels vary considerably, but are at low absolute levels. Fluke landings are only 3% of scallop landings, but are more important to both part-time and occasional scallop vessels. Multispecies landings are less than one-half of 1994 levels (554,000 pounds). Multispecies Amendments 5 and 7 closed about one-half of the Georges Bank scallop grounds to scallopers and limited the possession of regulated groundfish species to 500 and later on to 300 pounds, and only while a vessel was on a scallop DAS. Also, all landings of haddock have been prohibited since 1995.

The major sources of revenues on scallop trips (other than scallops) are monkfish and fluke landings (see table below), but monkfish revenues declined between 1994 and 1996. Multispecies revenues also decreased because of the increased multispecies restrictions mentioned above.

Table 5.2.12

Species revenues on scallop trips, by limited access vessels, 1994-1996 (thousand dollars)					
	Scallops	**Monkfish**	**Fluke**	**Multispecies**	**Total**
1994:					
Full-time	71,672	6,032	713	658	79,239
Part-time	2,786	135	265	12	3,220
Occasional	611	18	203	68	939
1995:					
Full-time	75,946	5,812	956	220	83,080
Part-time	4,193	162	273	25	4,671
Occasional	803	121	393	125	1,510
1996:					
Full-time	81,145	4,791	481	192	86,773
Part-time	4,575	157	113	9	4,895
Occasional	1,512	40	115	132	1,857

Other fisheries for scallop vessels

To understand the full range of actual and potential fishing activity of these limited access vessels, there are two important factors. One is the type of permits these vessels hold (Table 5.2.13) and the other is the other fisheries in which they participate (Table 5.2.14).

Table 5.2.13 Other 1997 permits held by scallop limited access vessels

Permit Groupings	Northeast Region Permit Status	Number of Vessels	Percentage of Permitted Vessels
By Individual FMP	Multispecies	272	88.9
	Summer flounder	269	87.9
	Lobster	205	67.0
	Squid/Mackerel/Butterfish	208	68.0
	Scup	123	40.2
	Black Sea Bass	113	36.9
By common combinations (10 vessels or more)	All 7 permits	64	21.0
	Scallop, Multispecies, Summer Flounder, Squid/Mackerel/Butterfish, Lobster	60	19.6
	Scallop, Multispecies, Summer Flounder, Lobster	28	9.2
	Scallop, Multispecies, Summer Flounder, Squid/Mackerel/Butterfish, Black Sea Bass, Scup	19	6.2
	Scallop, Multispecies, Summer Flounder	14	4.6
	Scallop, Multispecies, Summer Flounder, Squid/Mackerel/Butterfish	12	3.9
	Scallop and Multispecies	11	3.6
	Scallop and Summer Flounder	11	3.6
	Scallop, Summer Flounder, Lobster	10	3.3

Note - In the Individual Access Vessels section, since some vessels hold more than one permit, total number of permits is higher than total number of vessels.

Table 5.2.14 shows that full-time, part-time, and occasional vessels have very different fishing patterns. Full-time vessels, as might be expected, depend heavily on sea scallops. Scallops constitute 70% of landed pounds for these vessels. Second in importance for full-time vessels are monkfish (23%). For part-time vessels, sea scallops are only 15% by weight of their catch with loligo (26%) and illex (25%) squid being the most common species. Occasional vessels depend on no single species for large portions of their catch. Further, the majority of their landed weight comes from non-traditional species, represented below in the category "Other." The only traditional species which comprises 10% or more of Occasional vessel landings is summer flounder (12%)

Table 5.2.14 Alternative fisheries engaged in by limited access scallop vessels, from 1997 logbook data

	Full-Time		Part-Time		Occasional	
Species	Number of Pounds Landed	Percent of Total Landings	Number of Pounds Landed	Percent of Total Landings	Number of Pounds Landed	Percent of Total Landings
Scallops	12,085,441	**69.6%**	454,659	**15.0%**	130	**0.0%**
Bluefish	14,020	0.1%	2,924	0.1%	7,697	1.3%
Butterfish	3,153	0.0%	281,084	9.2%	24,703	4.3%
Cod	84,314	0.5%	5	0.0%	1,083	0.2%
Haddock	3,070	0.0%	0	0.0%	0	0.0%
Red Hake	23	0.0%	0	0.0%	1,481	0.3%
White Hake	2,562	0.0%	0	0.0%	2	0.0%
Mackerel	142,186	0.8%	183,825	6.0%	19	0.0%
Pollock	1,025	0.0%	0	0.0%	0	0.0%
Scup	12,965	0.1%	132,584	4.4%	112	0.0%
Dogfish	74,500	0.4%	1,650	0.1%	28,983	5.1%
Skates	67,313	0.4%	625	0.0%	12,710	2.2%
Silver Hake	31,627	0.2%	912	0.0%	485	0.1%
Black Whiting	220	0.0%	3,038	0.1%	5	0.0%
Loligo Squid	365,071	2.1%	773,787	**25.5%**	1,910	0.3%
Illex Squid	0	0.0%	750,450	**24.7%**	0	0.0%
Black Sea Bass	4,131	0.0%	7,668	0.3%	1,822	0.3%
Monkfish	3,938,629	**22.7%**	72,451	2.4%	2,643	0.5%
Herring	0	0.0%	1,187	0.0%	0	0.0%
Winter Flounder	61,518	0.4%	822	0.0%	25	0.0%
Summer Flounder	192,904	1.1%	138,203	4.5%	68,639	**12.0%**
Witch Flounder	17,000	.01%	609	0.0%	615	0.1%
Yellowtail Flounder	126,112	0.7%	2,807	0.1%	0	0.0%
American Plaice	27,622	0.2%	0	0.0%	0	0.0%
Weakfish	26	0.0%	34	0.0%	24,629	4.3%
Lobster	25,099	0.1%	2,239	0.1%	22	0.0%
Pandalid Shrimp	5,900	0.0%	2,643	0.1%	0	0.0%
Ocean Pout	0	0.0%	0	0.0%	1	0.0%
Other	85,489	0.5%	225,360	7.4%	394,353	**68.9%**

Total crew size

Crew data in the NMFS permit files primarily indicate of number of berths, and many permit holders do not consistently update their crew information. Data on numbers of crew (Table 5.2.15) are provided only as a general indicator of employment. Disregarding those permits which indicate more than the maximum allowable number of 7 crew members, these data show about one-third of vessels to have 7 crew, with 4 crew members being the next most common.

Georgianna and Cass (1997, p.11) report that in New Bedford, "Scallop vessels reduce crew members from seven to four or five, when targeting monkfish...," therfore,it is probably safe to assume that larger vessels use 7 crew while targeting scallops.

If vessels which listed more than 7 crew members are currently using 7 crew, then total crew employment in the limited access fleet would be 1,777.

Table 5.2.15 Number of crew on scallop limited access vessels (1997 permit data)

Number of Crew	Number Vessels with that Crew Size	% Vessels with that Crew Size
1	0	0.0
2	4	1.6
3	17	5.7
4	40	13.4
5	14	4.7
6	10	3.3
7	98	32.8
8	11	3.7
9	83	27.8
10	13	4.3
> 10	9	3.0

Note - Of the 306 vessels, 7 did not supply a crew figure on their permit applications.

Employment

Employment as used here differs from the total number of crew because it includes the amount of time people are employed as well as the number of jobs. Employment in the scallop fishery can be most accurately estimated by multiplying the number of DAS by the average crew size. These estimates are shown in the table below.

Table 5.2.16 Estimated employment in the sea scallop limited access fleet

	Vessel Category	1996[1]	1997[1]
DAS	Full-time	32338	28096
	Others[2]	2,104	998
	Total DAS	34,442	29,094
Crew*DAS	Full-time	219,898	191,053
	Others	10,521	4,990
	Total	230,419	196,093

Notes:
1. Average crew size for full-time vessels was calculated to be 6.8 in 1996. The average for other vessels was set at 5 based on anecdotal information.
2. Fishing year: March-end of February.
3. The data is obtained from the 1996 and 1997 call-in data.
4. Others represent the DAS-use by part-time, occasional, full-time small dredge and part-time small dredge permit holders.
5. Crew size is obtained from the permit files and the maximum is set at 7 persons.

5.2.4. Principal ports

Geographical distribution of the limited access fleet:

NMFS permit data give the following picture of the distribution of scallop permit holders and of vessel sizes since the implementation of limited entry.

Table 5.2.17 1997 Permit data by state for limited access scallop vessels

	CT	FL	MA	ME	NC	NJ	NY	PA	RI	VA	WV	Other
No. of permits by home port state		9	99	9	34	31	5	14		81	4	8
No. permits by primary port state	5	5	96	11	45	39	0	3	4	82	0	4
Avg. length in feet by primary port	81	77	84	61	76	79		68	88	79		
Avg. GRT by primary port	154	126	164	81	117	142		98	162	142		

Landings of sea scallops were reported in more than 76 ports in every coastal state from Maine to North Carolina in 1997. (Not all points of landings are evident because of the method used to aggregate the data.)

Table 5.2.18 1997 Scallop landings by major port areas (thousand pounds meat weight)

Port area	Landings	Percentage of total landings
New Beford – Fairhaven, MA	6,817	51.5%
Hampton-York-Newport News-Seaford, VA	2,733	20.6%
Cape May and Ocean Counties, NJ	1,962	14.8%
Maine ports (Principally in Hancock and Washington Counties)	896	6.8%
Cape Cod	120	0.9%
North Carolina ports	57	0.4%
Other ports	653	4.9%
Total	13,238	100.0%

The use of these gears by port of landing (from the 1997 NMFS landings database) for the top scallop ports (Table 5.2.19, below), show a similar pattern. Dredges accounted for between 99% and 100% of sea scallop landed value in the ports of Stonington, CT; Southwest Harbor, ME; New Bedford, MA; Point Pleasant, NJ; Long Beach, NJ; and City of Seaford, VA. In Newport News, VA, dredge gear accounted for 91% of landed sea scallop value, with the other 9% coming from sea scallop trawls. Cape May, NJ and Hampton, VA depended the most on scallop trawls, with 36% and 30% of their 1997 scallop landed value coming from trawl gear; nonetheless, even in these ports two-thirds to three-quarters of sea scallop landed value was attributed to dredges.

Based on 1995–1997 landings data the principal sea scallop fishing ports or geographical regions were New Bedford – Fairhaven, MA; Hampton-York-Newport News, VA; Hancock and Washington Counties in Maine. Landings in these regions were about 94 percent of the 1997 total reported landings. Although the ports on Cape Cod and in North Carolina so not have significant scallop landings in 1997, historically these ports have been important and are their landings may sharply increase depending on the local abundance of scallops. Other landings were distributed throughout the coastal area.

Another measure of dependence on the scallop harvest comes from the landings data. In examining the landed value of scallops by port, New Bedford again tops the list, followed by Newport News, Virginia and Cape May, New Jersey. Seaford and Hampton, Virginia also rank high in terms of the value of scallop landings. Both are located near Newport News in the Hampton Roads area. In addition to Cape May, scallops are important to Point Pleasant and Long Beach. Southwest Harbor, Maine also is an important scallop port, despite the low number of federal sea scallop permits in Maine. This probably reflects the active state waters scallop fishery which will not be affected by this proposed action.

Table 5.2.19 Top scallop ports by landed value, 1997 landings data

Port	1997 Value in US Dollars
New Bedford, MA	$40,056,341
Newport News, VA	$7,696,523
Cape May, NJ	$6,891,290
City of Seaford, VA	$3,341,261
Long Beach, NJ	$2,839,557
Stonington, CT	$2,412,744
Hampton, VA	$2,275,315
Southwest Harbor, ME	$2,189,411
Point Pleasant, NJ	$2,129,385

Within each of these ports, we can also examine the importance of sea scallops relative to other species landed in those ports. These figures can be compared with those cited by McCay et al. for 1992 in the port descriptions, to get a sense of changes in the fisheries of these ports over recent years.

In Stonington, Connecticut, sea scallops constituted 37% of landed value in 1997. They were followed by: lobster (19%); monkfish (14%); summer flounder (8%); loligo squid (7%); winter flounder (6%); yellowtail flounder (2%); skates (2%); butterfish, scup, dogfish, and silver hake—all at 1% each; and a variety of species at less than 1% each.

In Southwest Harbor, Maine, sea scallops account for 41% of landed value. Only lobster topped this, with 54% of value. Sea urchins accounted for an additional 4% and Pandalid shrimp for approximately 1%. A few other species were also landed, but constituted well below 1% of total value.

For New Bedford, Massachusetts, sea scallops comprised 47% of landed value in 1997. They were followed by monkfish (12%); winter flounder (11%); cod (5%), yellowtail flounder (4%); American plaice and ocean quahogs at 3% each; scup, swordfish, bluefin tuna and lobster at 2% each; sand dab, haddock, and skates at 1% each; and a variety of other species at less than 1% each.

Point Pleasant, New Jersey relied on sea scallops for 21% of the port's landed value in 1997. They were followed by monkfish (12%); surf clams (10%); loligo squid (9%); lobster and ocean quahogs at 8% each; summer flounder (7%); yellowtail flounder, menhaden, and silver hake at 5% each; dogfish (3%); scup weakfish, and skates at 1% each; and a variety of species at less than 1% each.

In Cape May, New Jersey, sea scallops were 30% of 1997 landed value. Other species and their relative values included Illex squid (8%); Atlantic mackerel (7%); menhaden (6%); lobster and

scup at 5% each; summer flounder (3%); monkfish and croaker at 2% each; conchs and Jonah crab at 1% each; and a large number of other species at below 1% each.

Long Beach, New Jersey, relied on sea scallops for 32% of its 1997 landed value. They were followed by: monkfish (19%); swordfish (10%); big eye tuna (9%); yellowfin tuna (6%); tilefish and dogfish at 4% each; bluefish (3%); weakfish and quahogs at 2% each; bonito, dolphin fish, shad, mako shark, skates, albacore tuna, and large coastal sharks at 1% each; and a some other species at less than 1% each.

For Hampton, Virginia, sea scallops constituted 41% of landed value. Other species included: summer flounder and blue crab at 17% each; quahogs (6%); croaker (5%); monkfish (4%); spot (3%); Atlantic mackerel (2%); conch and Atlantic herring at 1% each; and other species at less than 1% each.

The unincorporated port town known as City of Seaford, Virginia counted on sea scallops for a hefty 96% of landed value. The majority of the remaining 4% was accounted for by monkfish.

Newport News, Virginia, was also heavily dependent on sea scallops, which accounted for 70% of its 1997 landed value. Other species were: summer flounder (7%); blue crab and quahogs and 6% each; monkfish and dogfish at 3% each; whelks (1%); and a variety of other species at less than 1% each.

The largest concentrations of scallop vessels are in Massachusetts (mostly in New Bedford) and Virginia (the Norfolk area), followed by North Carolina and New Jersey (Table 5.2.20).

Table 5.2.20 Distribution of scallop limited access vessels by state, 1997 permit data

	CT	FL	MA	ME	NC	NJ	NY	PA	RI	VA	WV	Other
No. Permits by Home Port State		9	101	10	37	34	5	12		85	4	9
No. Permits by Primary Port State	6	5	101	12	46	43	0	0	4	84	0	5
Avg. Length in Feet by Primary Port State	81	77	84	61	76	79		68	88	79		
Avg. GRT by Primary Port State	154	126	164	81	117	142		98	162	142		

5.2.5. Economic activity in principal port areas

Table 5.2.21 provides a general profile of commercial fishing related to economic activities within communities involved in the sea scallop fishery. Data was collected on a county-wide basis by the U.S. Census Bureau through IRS administrative records for businesses submitting

tax returns for 1995. The data in the above table does not distinguish between scalloping and any other kind of commercial fishing activity in the area, but it is still useful to characterize the general nature of economic and fishing activity and to better understand the dynamics of those communities directly involved in the sea scallop fishery.

The numbers in Table 5.2.21 only reflect persons 16 years and older who served as employees of establishments either directly or indirectly involved with the commercial fishing industry. It is critical to recognize that this table does not include self-employed persons, i.e. the majority of commercial fishermen and their crew. It does, however, provide an estimate of the relative importance of the commercial fishing industry to community businesses and to entities other than those directly involved in the commercial harvesting of fisheries resources.

This type of census data is only available on a county-wide basis and must be interpreted while bearing in mind some qualifiers. First, when trying to capture the significance of the commercial fishing industry to specific communities, it is important to realize the number and size of fishing communities within each county relative to the entire county. Second, most of the fishing related activities can be assumed to occur in or near the fishing communities within each county. For example, Cumberland (Maine) is a medium sized county (almost 250,000 residents in 1995) extending inland from Portland. Of the more than 128,000 employees in Cumberland County, over 1,300 were employed in fishing related businesses. In total, the proportion of fishing related employees to the total number of employees seems insignificant (1.06%). However, most of those fishing related employees probably work in and around Portland (about 63,000 residents in 1995), and fishing related industries in Cumberland County may be significantly more important to the community of Portland than to Cumberland County as a whole.

Third, an understanding of the business categories is extremely helpful to more accurately interpret the data given in Table 5.2.21. Some categories are comprised almost completely of fields specific to commercial fishing, while others are only partially comprised of relevant fields but are included in an attempt to characterize specific sectors of the commercial fishing industry. A few business categories could not be classified with the given census data, and thus, they have not been included in the table. For example, fuel suppliers as well as commercial machinery and equipment suppliers have been omitted because these business categories are too general and include too many fields completely unrelated to commercial fishing. Commercial fishing gear suppliers are also very difficult to pinpoint within the given business categories, so these businesses (except for Cordage and Twine and Misc. Wire Products) have also been excluded from the table. In fact, the business categories listed only begin to characterize the different entities either directly or indirectly involved in the commercial fishing industry. At the same time, however, by including some broader business categories (marinas, for example), the table might include employees in fields unrelated to the commercial fishing industry. The tradeoffs may or may not be equivalent. Below is a list of the business categories and the business fields to which they correspond.

Table 5.2.21 Census data for counties that include major scallop ports

County	Fishing, Hunting, Trapping	Fresh and Frozen Prepared Fish	Canned and Cured Fish	Wholesale Fish and Seafood	Retail Meat and Fish Markets	Animal and Marine Fats and Oils	Ice	Ship + Boat Building and Repairing	Search and Navigation Equipment	Marinas	Cordage and Twine	Misc. Wire Products	Total Fishing Employees	Total Business Employees	Fishing % of Total
Barnstable, MA	53	*60	N/A	119	113	N/A	*10	127	*175	201	N/A	N/A	858	59,987	1.43%
Bristol, MA	*375	341	90	722	215	*60	*60	269	*60	*60	*175	*60	2,487	183,206	1.36%
Cape May, NJ	83	N/A	*375	452	39	N/A	N/A	*60	N/A	137	N/A	N/A	1,146	*17,500	6.55%
Carteret, NC	*10	*10	N/A	67	10	*60	*60	204	N/A	*60	N/A	N/A	481	14,907	3.23%
Cumberland, ME	59	*60	N/A	799	58	N/A	N/A	*175	N/A	149	*60	*10	1,370	128,876	1.06%
Dare, NC	*60	*10	N/A	*375	22	N/A	*10	105	N/A	*60	N/A	N/A	642	9,813	6.54%
Essex, MA	245	965	*10	454	192	N/A	*10	82	*3,750	130	*175	N/A	6,013	251,278	2.40%
Hampton, VA	N/A	*375	N/A	*60	32	N/A	*10	*60	*10	*10	N/A	N/A	557	41,620	1.34%
Hancock, ME	27	*60	*175	*175	48	N/A	N/A	*375	N/A	72	N/A	*10	942	14,338	6.57%
New London, CT	17	N/A	*10	32	69	N/A	N/A	*17,500	*10	*175	*60	*60	17,933	98,665	18.18%
Newport News, VA	N/A	*175	N/A	140	27	N/A	N/A	*17,500	N/A	*10	N/A	N/A	17,852	72,736	24.54%
Norfolk, VA	*60	*60	N/A	*60	*60	N/A	*60	*3,750	*10	79	*10	N/A	4,149	112,562	3.69%
Ocean, NJ	18	*10	N/A	73	87	N/A	N/A	76	*10	291	N/A	N/A	565	96,695	0.58%
Penobscot, ME	N/A	N/A	N/A	14	13	N/A	*60	*60	N/A	*10	N/A	*10	167	52,579	0.32%
Washington, ME	175	95	375	138	*10	*60	N/A	*10	N/A	*10	N/A	*60	933	7,863	11.87%
York, VA	82	N/A	N/A	*60	N/A	N/A	N/A	*10	N/A	*10	N/A	N/A	162	10,924	1.48%

Table 5.2.21 *(continued)* **Census data for counties that include major scallop ports)**

County	Fishing, Hunting, Trapping	Fresh and Frozen Prepared Fish	Canned and Cured Fish	Wholesale Fish and Seafood	Retail Meat and Fish Markets	Animal and Marine Fats and Oils	Ice	Ship + Boat Building and Repairing	Search and Navigation Equipment	Marinas	Cordage and Twine	Misc. Wire Products	Total Fishing Employees	Total Business Employees	Fishing % of Total
Newport News, VA	N/A	*175	N/A	140	27	N/A	N/A	*17,500	N/A	*10	N/A	N/A	17,852	72,736	24.54%
Norfolk, VA	*60	*60	N/A	*60	*60	N/A	*60	*3,750	*10	79	*10	N/A	4,149	112,562	3.69%
Ocean, NJ	18	*10	N/A	73	87	N/A	N/A	76	*10	291	N/A	N/A	565	96,695	0.58%
Penobscot, ME	N/A	N/A	N/A	14	13	N/A	*60	*60	N/A	*10	N/A	*10	167	52,579	0.32%
Washington, ME	175	95	375	138	*10	*60	N/A	*10	N/A	*10	N/A	*60	933	7,863	11.87%
York, VA	82	N/A	N/A	*60	N/A	N/A	N/A	*10	N/A	*10	N/A	N/A	162	10,924	1.48%

Note: Numbers are numbers of employees over 16 years of age. ***This data does not include self employed persons***. Data was compiled based on administrative business records submitted to the IRS. A number with a "*" next to it means that the number is the average of a given range.
Source: U.S. Census Bureau at http://www.census.gov/

Fishing, hunting, and trapping includes establishments engaged primarily in commercial fishing, including finfishing, crabbing, lobstering, clamming, oystering, sponges, and seaweed. It also includes businesses engaged in the operation of fish hatcheries and fish and game preserves. Commercial hunting and trapping, as well as game propagation, are two fields included in this category which may not be related to the commercial fishing industry.

Fresh and frozen prepared fish includes establishments engaged in preparing fresh and raw or cooked frozen fish and other seafood and seafood preparations such as soups, stews, chowders, fishcakes, crabcakes, and shrimp cakes. It also includes entities responsible for processing (removal of heads, fins, scales) product for the purpose of preparing fresh and frozen seafoods.

Canned and cured fish includes establishments engaged in cooking and canning fish, shrimp, oysters, clams, crabs, and other seafoods and seafood soups. It also includes establishments engaged in smoking, salting, drying, pickling, or otherwise curing fish and other seafoods for the trade.

Wholesale fish and seafood includes establishments primarily engaged in the wholesale distribution (but not packaging) of fresh, cured, or frozen fish and seafoods, except canned or packaged frozen (see above categories).

Retail meat and fish markets includes establishments engaged in the retail sale of fresh, frozen, or cured meats, fish, shellfish, and other seafoods, as well as establishments involved with bulk sale of products for freezer storage. Employees in any fields relating only to meat markets and meat freezer provisioners may be misrepresented.

Animal and marine fats and oils includes establishments involved with manufacturing animal oils, including fish and other marine animal oils, and fish and animal meal. This includes fish liver oils, fish oils, whale oils, and establishments involved with rendering inedible stearin, grease, and tallow from animal fat, bones, and meat scraps. Employees working for establishments only engaged in non-marine animal fats and oils may be misrepresented.

Ice includes establishments primarily engaged in manufacturing ice (not dry ice) for sale.

Ship and boat building and repairing is an extremely broad category and includes establishments engaged in building and repairing ships and boats of all kinds, including all types of fishing vessels, cargo vessels, crew boats, dredges, patrol boats, lighthouse tenders, naval ships, skiffs, kayaks, dories, canoes, motorboats, offshore supply boats, radar towers, towboats, tugboats, and others. It is very important to understand the shoreside infrastructure of the county when assessing the extent of fishing related ship and boat activity in the area. A county that has a large amount of ship and boat building and repairing activity within it (New London, CT or Newport News, VA) may contain a large military population, and most of the ship and boat activity may result from a large naval shipyard.

Search and navigation equipment includes establishments primarily engaged in manufacturing search, detection, navigation, guidance, aeronautical, and nautical systems and instruments. Important products of this category are compasses, fathometers, sonar fish finders, sonabuoys, radar systems and equipment, navigational instruments, and other similar equipment. Again, because aeronautical search and navigation equipment is included in this category, some employees may be mis-represented.

Marinas includes any establishments engaged in operating marinas. Marinas rent boat slips, store boats, and perform a range of services to clean and repair boats. They also frequently sell food, fuel, and fishing supplies. It is important to remember that depending on the county in question, the employees working in marinas may be serving more recreational than commercial fishing interests.

Cordage and twine includes establishments primarily engaged in manufacturing rope, cable, cordage, twine, and related products from sisal, hemp, cotton, paper, flax, etc. This also includes manufacturers of binder and baler twine, cargo nets, rope nets, trawl twine, fishing lines, nets, and seines.

Miscellaneous wire products is another very broad category that was included in an attempt to characterize at least part of the fishing gear supply businesses. It includes establishments that manufacture conveyor belts, wire baskets and belts, clips and fasteners, wire delivery cases, wire grates, wire fish traps, sieves, woven wire netting and screening, and trays. Unfortunately, this category also includes manufacturers of paper clips, staples, tire chains, lamp frames, etc. Again, employees in this broad category may be misrepresented, but they may also substitute for underrepresented employees in other gear supply fields.

5.2.6. Fishing communities

Organization of the fishery
Critical social sub-components of the scallop harvest sector noted by White (1993)[1] include:

- geographic divisions: Downeast Maine ports, Chatham, MA, New Bedford, the Mid-Atlantic ports, and the Virginia/Carolinas ports;
- fishing style divisions: year round versus seasonal; day trips versus short (up to 5 day) trips versus long (up to 12 day) trips; dredges versus nets
- ethnic and racial divisions: Yankees, Portuguese, Norwegians, Vietnamese, Rebs, and Blacks.

Geographic divisions (White, 1993)
Maine has a primarily inshore fleet: small (35-50') boats which fish for scallops seasonally rather than full-time. By ethnicity they are Yankees. There are a few offshore Maine scallopers, however. The Massachusetts fleet is more mixed between inshore and offshore. Rhode Island and New York have fleets of scallop boats, mostly fair sized but including a few smaller vessels (70' or less)...Connecticut, Pennsylvania and Maryland have a few scallop boats, but these are larger boats.

New Jersey also has a fleet of smaller draggers, said to be 50-75' shrimper type wood hull boats; it is reported that there are about 25 of them at Point Pleasant, perhaps 20 at Belford, and a few in other ports. These boats make day trips and short trips, compared to the trawlers in Cape May. The majority of New Jersey boats are quite large; the average size vessel is larger than those

[1] For more detailed background on the scallop fishery through 1992, refer both to White, 1993) and to the Amendment 4 FSEIS (1993). (Amendment 4 introduced the current DAS management regime.) The FSEIS only briefly excerpts White?s description of the human environment of the scallop fishery, but does add some additional data not found in White?s report.

from Virginia and North Carolina, though not quite so large as the Massachusetts boats. All of the scallop vessels from Virginia and North Carolina are believed to work offshore. The large Virginia boats are larger than those in Massachusetts. One 161' boat is listed, along with several 130', but none of these landed enough scallops to qualify for a full-time permit. North Carolina has a fair number of big boats, but none over 90' long.

Fishing styles (White, 1993)
Inshore boats in Maine and Massachusetts work-day trips only; a typical trip involves leaving before dawn and working until dark, with frequent tows of the dredge. The smaller draggers, whether form Maine, Massachusetts, or New Jersey, make relatively short trips [no more than five days] to areas a few dozen miles offshore. The biggest scallop boats, from Massachusetts, New Jersey, and Virginia, make much longer trips. Eight days is a short trip for the bigger vessels [with ten to twelve days more common]. There is a great deal of movement in the sea scallop fishery. This is only one aspect of the fishery that makes it difficult to characterize in any simple sense. There are not only boats making routine movements from bases to exploitation areas, but also boats making non-routine moves from one port to another to gain better proximity to exploitation areas. New Bedford attracts a substantial number of boats that are simply stopping over, or coming to unload in between two summer trips to Georges Bank.

The dredge versus net distinction noted by White is losing importance as scallop regulations increasingly require dredge gear.

Ethnic and racial divisions (White, 1993)
Yankees are New Englanders of Northern European descent, and in many Northeastern cities they are a distinct ethnic group in their own right. Nearly all of the Maine scallopers, many inshore Massachusetts scallopers, and a good contingent of the offshore Massachusetts scallopers, are Yankees. Norwegians are a prominent group in the scallop fishery, especially in Fairhaven (directly adjacent to New Bedford). Portuguese people are prominent in several Massachusetts fishing ports, especially Provincetown and New Bedford. Most are groundfish fishermen; some have become scallopers. There are a few Italian scallopers in Gloucester and there may be some Italian scallopers in Portland as well.

Indochinese or Vietnamese people are becoming increasingly visible in the sea scallop fishery. A former Gulf shrimp boat from Mobile, Alabama, was observed in New Bedford with scallop nets and a Vietnamese crew, and several Vietnamese boats (also net fishing for scallops) were seen in Hampton, Virginia. A North Carolina dealer said they were coming into that area in the early 1980s. There are more owner-operators of scallop vessels among the Vietnamese than among Mexican-Americans. Scallopers from North Carolina and Virginia are frequently called Rebs, or Rebels, by people in New Jersey and ports further north. Correspondingly, they tend to identify themselves as Southerners or Southern boys.

A few black crewmen were observed on New Bedford boats; some may be Cape Verdean Portuguese. There are several black mates and there have been at least two black captains in Virginia. Some blacks are employed in seafood processing in North Carolina. There are Hispanic people living on Virginia's Eastern Shore and working in Hampton area seafood businesses. Some who were shrimpers in Mexico are now reportedly working as cutters on Virginia boats. There are a few owner-operators, and many more are captains on fleet boats.

The primary ethnic antagonisms are between the "Rebs" and more Northern groups, and between the Vietnamese and everyone else.

Marketing and processing (White, 1993)
Fishermen are said to be independent if they have no long-term arrangement with a particular dealer. Maine fishermen report that independent sales are very important to them. Similarly, in Virginia, a seafood company fleet manager referred to non-company owned vessels that regularly sold their catches to the company as independents.

The prevalence of different arrangements is unknown, but in addition to the dealers who focus on auction purchases there are also family firms in New Bedford which process and market the catches of their own boats and perhaps a few others. Such firms are rather common in Virginia and North Carolina as well, and they grade into large, vertically integrated firms that own numbers of vessels.

Vessel owners and crews (White, 1993)
In Maine, the majority of scallop vessels are owner-operated, and the small crews are mostly kin or people from the local community (Acheson et al. 1980:31-34). This is likely to be the case with all small inshore scallop boats throughout. In New Bedford, Norwegian and Yankee boat owners frequently hire Portuguese captains and crews, and operate these boats according to capitalist principles, adjusting crew size or taking boats out of service according to profitability (Doeringer, Moss, and Terkla 1986:50). In contrast, Portuguese-owned boats are operated under a kinship employment system, in which boats are kept operating even at low profit levels and crews are maintained according to employment needs of relatives.

The ethnic comparison could be overstated, as it appears to be a matter of proportions rather than absolute contrast; interviews for Doeringer *et al* study suggest that some Norwegian-owned vessels also give priority to kinship, and there are indications that some southern boats also have kin-based crew.

Port profiles
Fishing community profiles conducted by McCay et al. in late 1993 (1993) complement White, though the primary focus was finfish and not shellfish or crustaceans. Recent work by Dyer and Griffith (1996), while targeting groundfish fishermen, also updates some information on scallopers. A limited amount of additional descriptive information on North Carolina is available from Johnson and Orbach (1996), though this study focused on state-licensed fishermen and did not distinguish scallopers or interview any fishermen using dredge gear.

***Maine (*Dyer and Griffith, 1996)**
In Maine, decreased groundfish DAS have pushed some vessels more heavily in shrimping and scalloping. The ports east and north of Ellsworth and Bar Harbor, including Winter Harbor, Jonesport, and Machiasport, specialize in lobster, sea urchins, and winter dragging for scallops; the infrastructure is designed to land these species. Vessels have been outfitted with ironwork triangles to handle winches for hauling lobster traps or for the scallop rigs. Sea urchins, a relatively new fishery, are harvested primarily by divers, and a few gillnetters in each of these communities land flounder and other groundfish during the summer. Their numbers are dwindling. Licensing data becomes dated relatively quickly, even after three or four years; the Maine Marine Patrolman based outside Ellsworth said, "It [the fishery] changes every year." In these areas, winter lobstering may lead to conflicts with scallop draggers. Scalloping season

begins in November and runs through April; lobstering begins in March or so, and runs through to November. Fishers can catch lobster during the winter, but run the risk of having their traps dragged up by scallopers. This prevents lobstering except in areas where scallops will not drag because the substrates would damage their nets. Dealers here reported that those fished for lobster during the winter time placed traps on rocky ledges, where scallopers won't drag.

Many of these inshore scallopers, however, are state water only vessels, having given up their federal permits either because they mistakenly believed that federal regulations would apply in state waters or because they felt the associated paperwork was too burdensome for their small vessels.

***Massachusetts* (Dyer and Griffith, 1996)**

New Bedford/Fairhaven: An informal survey of Massachusetts ports reveals that over the past two years, more than 30 vessels (scallopers and/or draggers) have left the fishery altogether, have moved to a different region/country, are waiting to be scrapped, or are too expensive to re-outfit (Collins 1995). From Fairhaven, across New Bedford Harbor, the city skyline boasts an impressive array of smokestacks that, unfortunately, project skyward from closed and boarded-up factories. Although living reminders of the heritage of fishing and manufacturing abound in New Bedford, signs of working class decline are equally evident. These range from the devastating superfund clean-up site on the northern edge of town to the disconcerting legacy of 52 sunken, sold, burned, dispossessed, and outlawed vessels that have exited groundfishing since 1984, and the 31 scallop vessels similarly cut from the fleetNew Bedford's waterfront looks like an industrial port. A small fleet of recreational craft tie-up at the marina on Pope's Island, between New Bedford and Fairhaven, but along both the New Bedford and Fairhaven waterfronts, 80' to 100' vessels tie up, three deep, at between 15 and 20 locations up and down the harbor. Although a handful of smaller (45' to 70') vessels tie-up among or nearby the larger vessels, New Bedford's fleet is clearly dominated by the larger vessels. Estimates of the fleet's size are as indicated in Table 5.2.22.

These figures are not too different from other recent estimates drawn from direct field observations rather than from licensing data. McCay, et al. (1993: 143), for example, stated that, "There are approximately 300 boats in New Bedford. Thirty to 40 are small draggers in the 45-65 foot range, 120 are large draggers in the 75-85 foot range, and 150 are scallopers in the 75-85 foot range."

Table 5.2.22

New Bedford/ Fairhaven Fleet Characteristics (Source: New Bedford Seafood Coalition)	
Characteristic	**Number**
Vessels Registered	280
Vessels Fishing out of Port Regularly	412
Draggers	190
Scallopers	155
Gillnetters	35
Longliners	16

In New Bedford, scallops are the most important species, along with groundfish. Not only does New Bedford trace its history directly to a fishing past, beginning as a whaling center and evolving into the dynamic industrial scalloping and dragging fisheries of today, as the manufacturing base of New Bedford erodes, the fisheries remain one of the few potentially high-income pursuits available.

Relations among boat owners, captains, and seafood merchants are highly varied and often fraught with suspicion and hostility. Most fishers reported that the 1980s strike signaled the end of a long era of fairly cooperative relations. Within the fleet, divisions exist among vessels, between scallopers and draggers, between fleets based on docking locations, and among different ethnic groups. The Portuguese tend to concentrate on draggers, although this was more the case in the past than today, as some Portuguese have switched from dragging to scalloping. Switching of this nature is possible, but costly. According to one fisher who had made this switch:

> "My first three boats were draggers, and the boat that I now have is a combination dragger/scalloper. We're scalloping right now; we've been scalloping since 1987. I was dragging from '74 to '87. In that period of time, I went scalloping on occasion; I went for a few months on two separate occasions. In '87 I changed to go scalloping. Draggers weren't making any money... I figured I would go back and I've been at it ever since. Now it's like flipping a coin to see who has the best deal, you know, because the draggers and scallopers are both struggling.... I could go dragging, but it's cost-prohibitive to change back and forth. You're talking $30,000 or $35,000 every time you change, so you can't do that if the give you 50 days to drag. It isn't worthwhile."

Cape Cod Ports: In Chatham, typically, fishermen combine winter shellfishing (scalloping or clamming) with summer groundfishing; according to several informants, they complete with many of the part-time and casual commercial fishermen who depend on shellfishing-particularly clamming-to supplement annual earned and unearned incomes.

Provincetown has the most dilapidated fleet of any groundfish port. Most of the vessels observed (13 out of 18) were old eastern rigged otter trawlers. Half of the fleet was of wood construction, while the other half consisted of rusty steel vessels. The fleet is a combination of scallopers and otter trawls ranging from 45 to 68 feet in length. The otter trawlers have from 2-6 crew, while the scallopers have crews up to seven (NMFS regulations prohibit more than seven crew members on scallopers). The isolation of Provincetown insures that all fishing families live in local residences. Some of these families are having difficulties with their mortgages as they struggle to survive in the fishery. As in New Bedford, some of those in economic stress have returned to Portugal.

Another issue which may further impede the viability of fishing is the construction of a sewage outfall pipe from Boston's new sewage treatment plant. The outfall pipe carries fresh water and dumps it onto Stellwagen Bank. Any hopes of rebuilding a fish or scallop stock there will be lost once the pipe is operational. One fisher of 40 years experience was very encouraged by the recent comeback of scallops on the Bank, as well as the recuperation of the local lobster population, which serves as a secondary catch on draggers. His assessment of the outfall pipe:

> *"It will be the end of us." An environmental engineer who worked on aspects of the outfall pipe remarked about its impact on the fishery: "the ecosystem will certainly be*

changed ....they would be dumping millions of gallons of freshwater onto the Stellwagen Bank."

***Rhode Island* (McCay et al., 1993)**

Newport: Newport is a fairly large coastal town known for its colonial history, its yachting and its mansions along famous Bellevue Avenue. The well maintained and restored historic homes which dot its narrow streets exemplifies [sic] the town's obsession with connecting present day Newport to its historic past as an 18th century economic and maritime center. Newport also proudly displays proudly [sic] its association with the America's Cup. The waterfront is occupied primarily by various marinas, hotels, shops, and condominiums.

Within Newport there are three commercial fish packing and distributing businesses. One mainly deals with draggers, gillnetters, and some scallopers, and brings in a great deal of groundfish. Another is a lobster house, but they also handle the trappers. [The third is a trap company.]

Most of the boats that offload at the Newport fish house are not from Newport. They are from other such ports as New Bedford, various Long Island ports, Cape May, and Pt. Judith....

Some people interviewed for this study feel that Newport would not mind seeing the commercial ports close, since Newport is more a yachting and sailing town than a commercial fishing port. A Strong division exists between those who use the water and waterfront for these different activities. The commercial fishing areas of the waterfront and the commercial fishing people seem particularly resilient...

***Connecticut* (McCay et al., 1993)**

Stonington: The cost of living in Stonington Borough is very high; most fishermen live in neighboring towns. The commercial fleet has a long history in the Borough but today its economic importance to the town is very small.

In the past the biggest employer in the area was Electric Boat which provided an alternative source of employment for fishermen. This alternative was eliminated with the decrease in defense contracts. The Foxwood Casino in Ledyard (20 minutes away) is becoming an attractive alternative to younger fishermen. Otherwise, young men can find employment in the local construction business.

Stonington's fleet consists of thirty boats: twelve lobster boats, fifteen draggers, and three scallopers. The three scallopers are all equipped to switch over to fishing. These boats range in size from 50 ft. to 96 ft. All of the vessels in Stonington are owner operated. Family is moderately important in the composition of the fishermen. Most of the people working on the boats are not related.

In the past, fishermen in Stonington were almost totally Portuguese. Today they are still the largest ethnic group.

***New Jersey* (McCay et al., 1993)**

Point Pleasant: Of Belford, Point Pleasant and Barnegat Light, Point Pleasant is the largest of these three ports and the arguable the most diverse. There are 51 core boats at Point Pleasant. They run the gamut from inshore gillnetters to scallop boats, draggers, longliners and lobster potters. Point Pleasant is less dominated by family run businesses. Recently some boats are ties up and for sale. This seems to be the trend for some New Jersey ports. There are seven fish

houses in Point Pleasant, only one of which offloads a scallop boat. One place is the Point Pleasant co-op. For the most all the boats in these three ports are owner operated.

In Point Pleasant, the town's economy is geared toward the summer tourist and recreational economy. However, it is not only a beach town and has other industries. The commercial, charter/party boat, and recreational fishing industries are very important to the local economy, employing many of the local residents and supporting many related industries such as seafood markets, restaurants, marine supply houses, welders and salvage, and many of the tourist oriented industries. Sea scallops constituted about 12% of landed value in Point Pleasant in 1992.

Barnegat Light/Long Beach The community of Barnegat Light is located on Long Beach Island, a barrier island along the New Jersey shore. The island up to and including Barnegat Light is intensely developed with summer and beach/boarding houses, and much of the community is heavily geared toward the summer beach economy. During the winter, Barnegat Light's economy slows significantly, and one of the major forms of employment becomes commercial fishing. It hires 150 people working on the docks and is one of the biggest income generating businesses on the island in the winter.

The larger region, including Barnegat bay ports, had landings worth about $32 million in 1992. Major species, by percent of landed value (excluding surf clams and ocean quahogs), were: sea scallops, hard clams (quahogs), swordfish and tuna, and tilefish. Sea scallops constitutes 28% of landed value.

Dock 1 is an entirely commercial dock that accommodates eight scallopers, eight boats that longline for swordfish, tuna, and tilefish, seven gillnet boats, and three bottom longliners that fish for tilefish year round. The docks handle no transient vessels, partially because of a lack of space and partially because of the difficulty of navigating Barnegat inlet.

The sea scallop dredge accounts for over 11% of the total landed value for the area [including the value of surf clams and ocean quahogs, which constitute 63% of landed value for the region]. In general they are steel hulled, 75-90 foot vessels, equipped with no other gear besides the sea scallop dredge. They are specialists in sea scallops, but they do have marketable bycatch that will be described below.

The scallopers have on average 5-6 crew members who work all on or all off. They are paid by an even distribution of the part of the catch that does not cover expenses (about 40% of the catch). All of the crew is locally hired, and none of the boats consist of family crew.

Some of the scallopers are owner operated at Barnegat Light, and some are not. There are also some boats that are difficult to classify. In some boats the owners come aboard and fish every once in a while, if that means they are owner operated.

The scallopers fish about 12 days in 10-40 fathoms of water. The fishing grounds are from Montauk to Cape May, but occasionally they go as far north as George's [sic] bank, depending on weather or anticipated landings. Some of the scallopers will land in New Bedford, but they often choose to live in Barnegat Light because '...we live here and our family is here.'

The captains of the vessels seem to be between 30 and 50 years old, some with a high school education, perhaps some with more. There are no women in the fishery because '...it does not go over well.'

Monkfish, blackback flounder, yellowtail flounder and cod comprise the largest bycatch, with much of it monkfish (about 7.5% of landed value in 1992). Cod can occasionally be valuable, but is not caught as often as the others.

Sometimes scallopers catch a substantial amount of summer flounder from spring to fall, especially when they go to the deeper part of their fishing grounds (approaching 40 fathoms). The catch can be as much as 2,300 pounds a year and 5% of the volume of a trip's total landings. In 1992, however, it was only 0.35% of the landed value. When caught, it is always marketed because of its high value...

The sea scallop dredge accounts for over 11% of the total landed [sic] value for the area. The major species caught in the general area of Barnegat Light/Long Beach Island on a sea scallop dredge (by percentage of landed value) are sea scallop (92%), angler (7.5%), summer flounder (0.35%, other flounder, black sea bass (0.03%, and cod.

Cape May/Wildwood Cape May is the most southerly town in New Jersey. The town is noted for its tourist and beach economy during the summer. While there are marinas in the town, there is little conflict for space with the commercial fishermen because the commercial docks are separated from the rest of the community....major species include sea scallops, ocean quahog, illex squid, loligo squid, and surf clams.

In addition to local boats, a large number of transient boats from North Carolina, Virginia and some northern states land here...The number of [local] boats has been stable here in the last three years. One possible reason is that Cape May is diversified in the species of fish landed.

In 1992, scallop dredges (which accounted for 28% of all landed value) landed the following combination of species (listed by percent of total dredge value) sea scallop (93%, angler (5.8%), summer flounder (0.8%), other [finfish], including black sea bass (0.01%, loligo (0.01%).

Besides the tourist economy of Cape May, there is work available in the form of selling marine supply and various other facilities related to marine fishing and boats. Also, some of the crew from the vessels can work on party and charter boats, and those contracted from Philadelphia can be contracted to other agricultural areas in New Jersey and Pennsylvania.

***Virginia* (McCay et al., 1993)**

Hampton and Hampton Roads have historically been fishing communities. Currently, the fishing industry is but one of the many industries in the Hampton Roads area. While Hampton itself is not a big tourist spot, the town is trying to emphasize its waterfront area and its tourism potential. Hampton has an Air and Space Museum and a marina for pleasure boats. The military presence in the Hampton Roads area is also a large part of the economy, keeping this area from being totally dependent on tourism and fishing. Other industry in the area includes a large coal port in Newport News. CSX Railroad, which according to one informant is in the top five of the Forbes 500 companies, is also in Hampton Roads. The International Longshoremen's Association is present in Hampton Roads as well, reflecting the area's importance for shipping. The freight industry is also quite important in Hampton Roads. Norfolk also has big business.

Thirty boats are home-ported in the Hampton area in the summer and 75 in the winter. The number of boats in the port depends on where the boat decides to land. Last year Oregon Inlet in North Carolina was bad and more boats came up here. This year Oregon Inlet is a little safer so there are fewer boats.

Many of the draggers in Hampton Roads are going for scallops. Some specialize in scalloping and some target both scallops and flounder at different times of the year...Small draggers sometimes switch from fluking to scalloping but were really not big enough for scalloping so there has been a separation of scalloping and fishing boats. Scallop boats have nine men in a crew [N.B. this was prior to implementation of the 7-man crew rule.] and go deeper in the water. On these boats the crews "shuck 'em as they catch 'em." ... Scalloping has also declined in the past two years. [Nonetheless], an informant described the Hampton boat fleet as 50-60% full-time scalloping, 30-40% part-time scalloping (in the summer) and part-time fishing (flounder in winter), and about 10% fish full-time doing any kind of dragging and catch something all year. Two years ago the scallop fishery was growing and two Vietnamese (Americans) got into it. But informants feel that commercial fishing is 'getting a little leaner here overall.'

McCay et al. (1993) also note that scallops accounted for 63% of landed value in Hampton Roads in 1992, and that 54% of landed value (all species) came from scallop dredges, with another 12% from scallop trawls.

One informant believes that scalloping and fluking do not require much risk or knowledge. During the 1970s when there were a number of incentives for buying fishing boats many doctors and other professionals invested in boats. This informant said that 'if you had the money for a taxi to the docks you could be a captain.' This informant also stated that many of these captains have just scalloped and fluked and really are not skilled at other kinds of fishing.

Family ties are important to some degree in the structure of fishing crews in Hampton Roads. Most of the full-time crew are either family or from the Hampton Roads area. One informant stated that 'crews are a real problem because it is hard to get someone who will stick with you and can deal with the money situation.' Fishing typically is a boom and bust operation and it is hard to get reliable help. This informant also said that in the late 1970s the scallop boats hired anybody. He described these crews as 'pretty questionable.' Generally the smaller, independent boats have crews that will stay with them for many years. Many times it is a father-and-son operation. There is typically a higher turnover of crews on the larger boats. Crews are paid under a share system. On a scalloper, 1.5% goes to book work, 5% goes to electronics, 10% to the captain, and the crew gets 60% of whatever is left and they pay for fuel, ice and bait. There are one or two Vietnamese boats that are paying scallop shuckers by the number of scallops shucked. They also note that at this time scallopers were already anticipating a rule requiring reduced crew sizes.

***Virginia* (Dyer and Griffith, 1996)**

Based on visits to the area and interviews primarily with seafood dealers, there are around 80 to 100 trawlers in the 60' to 100' range that land fish in the Hampton/Newport News area, although not all of these are local vessels. These fish for flounder-known throughout the Northeast as "fluke"-in the winter time and scallop in the summer. An important incidental catch in the scallop fishery in this region is monkfish. Seafood dealers interviewed ranged from the belief that changing regulations would affect no vessels, to believing they would have negative impacts on around half of the fleet, with 25 percent moving into other fisheries and 25 percent, primarily the larger vessels, going out of business.

North Carolina

Wanchese (McCay et al., 1993) Wanchese has traditionally been a fishing community with commercial fishing operations, since the late 1800s. Many of the current residents of Wanchese

are descendants of people who settled here in the late 1600s and early 1700s. Until twenty years ago many informants maintain that all the residents of Wanchese were related in some way. Today, Wanchese is a residential community that is relatively unscathed by the tremendous growth in tourism that has occurred in the beach communities of Dare County in the past twenty years.

Wanchese is also the site of the Wanchese Seafood Industrial Park. However, because of the uncertain nature of Oregon Inlet and the general decline in fisheries since the 1970s, very few businesses actually operate at the industrial park. Wanchese fishermen have been described as 'small, independent operators who generally own their own boats and gear and spend long, hard hours on the water' (Shoenbaum 1982:39). At least one of the Wanchese commercial fishing and packing operations has expanded to other ports such as Hampton, Virginia and New Bedford, Massachusetts.

Informants have estimated that fifty percent of the men in Wanchese are in a marine related career. Other sources of employment are found in various government agencies based in Dare County, in construction, and in the various businesses that have opened in the beach communities to serve tourists.

One informant identified thee different groups of commercial fishermen in Wanchese; small fishermen, ocean gillnetters, and the large trawl fishermen or draggers.

Wanchese (Dyer and Griffith, 1996) Fishers along the Outer Banks and from Wanchese are especially sensitive to the historical importance of their fisheries and related marine lifestyles, beginning with the shore-based whaling fisheries of the early colonial period and going through subsequent periods where fishing families provided life-saving services to hundreds of ships that make up the "Ghost Fleet" of the Outer Banks. Fishers we interviewed here mentioned the importance of this history in terms of the memories of old fishers. One claimed, for example, that there have been periods in local fishers' pasts that they had to migrate to Florida because of declines in local fish stocks, making the argument that regulations need to consider extreme fluctuations in fish stocks as part of the economic hazards of commercial fishing. This same fisher noted the importance of life-time experience in fishing, and of the difference between knowledge gained through direct experience and knowledge gained through scientific methods; the latter, of course, may suffer from sampling biases, while the former may suffer from other kinds of biases (economic, political, religious, etc.), yet combining the two could far better inform the regulatory community than sole reliance on one or the other.

The heavy dependence on Wanchese as a fishing community demands special attention in this section. Seven principal families of seafood dealers ring the seafood industrial park and serve as the central locations of the estimated 200 fishing families who live in Wanchese as well as anchor the southern marketing behaviors of fishers from as far away as New Bedford, Massachusetts and Portland, Maine. The fleets that originate from here, and the fishing activity focused by the seafood dealers and the ports, concentrate around the seafood industrial park and fleets of trawlers organized or encouraged by seafood dealers. The large, >100' vessels, as is occurring elsewhere, have been less active recently, their captains and crews now fishing from smaller crafts.

These arrangements have been replicated in the Newport News/Hampton area. On Virginia's Eastern Shore and the other parts of the Delmarva Peninsula, more independent, owner-operator

fishing operations prevail, with some long-time loyalties between fishers and fish dealers that hinge on the questions of slip space and access. In recent years, fishers in this region have become increasingly concerned that real estate development will entice dealers to sell their space to developers less interested in commercial fishing than in providing marinas and condominiums for recreational boating traffic.

Beaufort: Beaufort has served as home port for a large fishing fleet and as the site of the processing plants for the menhaden trade. In the 1970s, Beaufort became a major summer resort as the town and waterfront were restored.

Morehead City: Morehead City is Carteret County's other sound-side mainland seaport situated on the opposite bank of the Newport River from Beaufort. The city is home to several marine-research facilities such as the Institute of Marine Sciences and the North Carolina Division of Marine Fisheries. One of North Carolina's deep water ports, it also serves and a port of the Second Division of the US Marine Corps at Camp Lejeune.

In recent years, a large charter-fishing fleet has developed. The town has regained its commercial viability as a modern port terminal as well as a being the "sound-side" of the Atlantic Beach resort trade.

Morehead City (Johnson and Orbach, 1996) According to a study of state licensed fishermen, Carteret County (where Beaufort and Morehead city are located) approximately 25% of full-time fishermen have at least some college education. The report also notes the availability of non-fishing work in Morehead City and nearby Cherry Point. Nearly 70% of fishermen in the county, however, rely on fishing for over 50% of their annual income. Most (nearly 95%) of the county's fishermen consider themselves to be 'independents', not tied to any particular dealer. Crew members are usually family or friends.

5.2.7. Processing and marketing

Amendment 4 required all sea scallop dealers to obtain a dealer permit to possess Atlantic Sea Scallops. The table below shows the number of these permits, for 1998, by state and major scallop ports. Vessel landings, in 1997, are added to give a sense of the relative volume among the states and major ports.

Table 5.2.23 Distribution of scallop dealers permits - 1998

State or Port	Number of Dealers	Thousand pounds landed 1997
CT	4	370
DE	1	
FL	3	
LIMITED ACCESS	3	
MA [OTHER]	99	276
NEW BEDFORD/FAIRHAVEN	40	6817
MD	5	1
ME	93	896
NC	26	57
NH	9	1
NJ [OTHER]	13	3
CAPE MAY/ WILDWOOD	6	1146
POINT PLEASANT	3	323
BARNEGAT [LONG BEACH]	2	492
NY	43	10
PA	1	
RI	31	112
VA [OTHER]	7	0
HAMPTON	4	420
NEWPORT NEWS	4	1463
SEAFORD [YORK COUNTY]	4	849

Because regulations require the corporate name and address, some dealers appear to be located in states such as Louisiana, where no sea scallops are landed. These dealers may be expected to operate plants in states with scallop landings. The large number of dealers is due to the requirement for dealers to have a license to possess any scallops, whether landed by limited access vessels or general category permit vessels, and it is impossible to distinguish some imported sea scallops from domestically landed product. Additionally, virtually all scallop processing is done on the vessels at sea, because so much of the available resource is not large enough to meet the minimum shell-height requirement for landing ashore. As a result net vessels that previously shell-stocked scallops now shuck them at sea.

In Maine, dealers are distributed along the coast rather than concentrated in a few areas because landings also are more widely distributed than in other coastal areas.

Another measure of involvement in the scallop fishery comes from the number of dealers (Table 5.2.24) and processors (Table 5.2.25) in a given location. Again New Bedford and Massachusetts top the lists. But highest landings are not always associated with largest number of sea scallop dealers or processors. Boston, New York, Narragansett/Wakefield, Gloucester, and Portland all have more dealers than the Hampton Roads area of Virginia, which was second in landed value. In terms of processors who handle scallops, Massachusetts is the leader, followed by Maryland and Maine. (These data are not available on a port basis.) Most of the processors, however, are dependent on scallop revenues for less than 10% of their income. Even among the few with higher levels of dependence, in at least one case the scallops in question are foreign and not domestic. Total employment for the processing firms is 2,042, with a seasonal high of 2,115.

Table 5.2.24 Number of Permitted Scallop Dealers, 1998

Port	Number of 1998 Permitted Scallop Dealers
New Bedford/Fairhaven, MA	40
Boston, MA	18
New York, NY	18
Narragansett/Wakefield, RI	14
Gloucester, MA	13
Portland, ME	13
Hampton/Newport News, VA	8
Beaufort/Morehead, NC	7
Point Pleasant/Belford/Barnegat Light, NJ	6
Rockland, ME	6
Provincetown, MA	5
Wellfleet, MA	5
Deer Isle, ME	5
Southwest Harbor, ME	5

Product forms

Because the primary form of processing is shucking the scallop meat from the shell at sea, most dealers simply distribute fresh scallops. However, other niche products are developing. A roe-on, frozen product for export developed around 1990. Several forms of frozen-at-sea scallops are also developing, but the most successful are quick, fresh-frozen at sea scallops packaged in 5 and 10 pound plastic bags or containers. Some are now frozen and placed into one-pound plastic bags that can be shipped overnight. There are also the traditional freezing operations onshore, with storage in local warehouses. Sea scallop processors also supplement their supply of domestic scallops with imported sea scallops, particularly from Canada, in either fresh or frozen form. The predominant product form for sea scallops, nevertheless, remains the fresh product.

Table 5.2.25 Processors Handling Sea Scallops, 1997 Processed Product Reports

State	No. Processors
Connecticut	1
Maine	4
Maryland	4
Massachusetts	7
New Hampshire	1
New Jersey	1
North Carolina	1
Rhode Island	1
Virginia	1

Prices and imports

There have been considerable changes in the level and composition of scallop imports in the last 20 years during the period 1976-1996. Perhaps the most striking change that took place in the scallop markets since 1983 was the influx of less-expensive (possibly small-sized) scallops from countries other than Canada.[2] Imports from these countries averaged only 5 million pounds annually during the period 1976-1982. However, in 1983, although Canadian imports and domestic landings declined slightly, the imports from other countries jumped to 20 million pounds and stayed well above 15 million pounds during the period 1983-1990. This result could be due to several factors including:

- The meat-count standards in the U.S (1983-1993) restricted the size of domestic scallops, possibly resulting in a higher quality product compared to imported scallops. The same standard may have also opened-up a new market for small-sized imported scallops.
- There was an increase in the consumer preference for scallops in general as indicated by the simultaneous rise in the supply and price of scallops, especially in year 1983.

Figure 5.2.2 shows that the ex-vessel and import prices were very close in value until 1983 and moved in a parallel way. In 1983, however, both the domestic and the import price of scallops increased considerably, domestic prices from $5.00 per pound in 1982 to $7.25 in 1983, and the import prices from about $4.80 in 1982 to $6.00 in 1983 in real terms (1990 constant prices). Although the changes in these prices followed a similar trend after 1983, ex-vessel prices in general exceeded the import prices by a greater margin during the period 1983-1996. Again, this is due to the structural changes in the import market, which was dominated by Canada until 1983, but later

[2] Although information is not available about the size of imported scallops on an annual basis, some idea might be obtained from the daily frozen scallop price and meat-counts in the New York Market News Report published by NMFS. For example, in the May 14, 1993 issue, it is shown that imports from Peru with a meat-count of 40/60 and 60/80 per 5 pound bags had a price of $3.85 and $ 3.35 respectively. Imports from China with a meat-count of 40-60 had a price of $3.50. On the other hand, the specified meat-count for domestic sea scallops ranged from 10/20 to 30/40 count per 5-pound bag with corresponding prices of $5.50 and $5.15 per pound.

included many countries such as Peru and China. Canadian sea scallops are similar in quality to the domestic scallops and therefore have a higher price than scallops from other countries.

Figure 5.2.2 shows that the total supply of scallops, the sum of annual imports and domestic landings, increased especially after 1982, from 50 million pounds in the late seventies to 70 million pounds in the late eighties.[3] Although the annual supply of scallops remained at 70 million pounds on the average during the period 1989-1996, its origins have changed considerably (Table 5.2.26). As average domestic landings declined from 35 million pounds in 1989-1992 to 17 million pounds in 1993-1996, the annual imports increased from an average of 37 million to 54 million to fill up the gap between total demand and domestic landings.

Table 5.2.26: Domestic Landings and Imports of Scallops (Annual Average)

	Domestic Landings (Million Pounds)	Imports (Million Pounds)	Total Supply (Million Pounds)
1976-1982	25	25	51
1983-1988	22	37	59
1989-1992	35	37	72
1993-1996	17	54	71

[3] As indicated by Dr. Steve Edwards, the domestic landings numbers did not include Virginia's landings until 1982. Thus, landings were slightly underestimated in period 1976-1981, and a small part of the increase in total supply of scallops (about 2 million pounds in 1980's) was due to this change in data coverage.

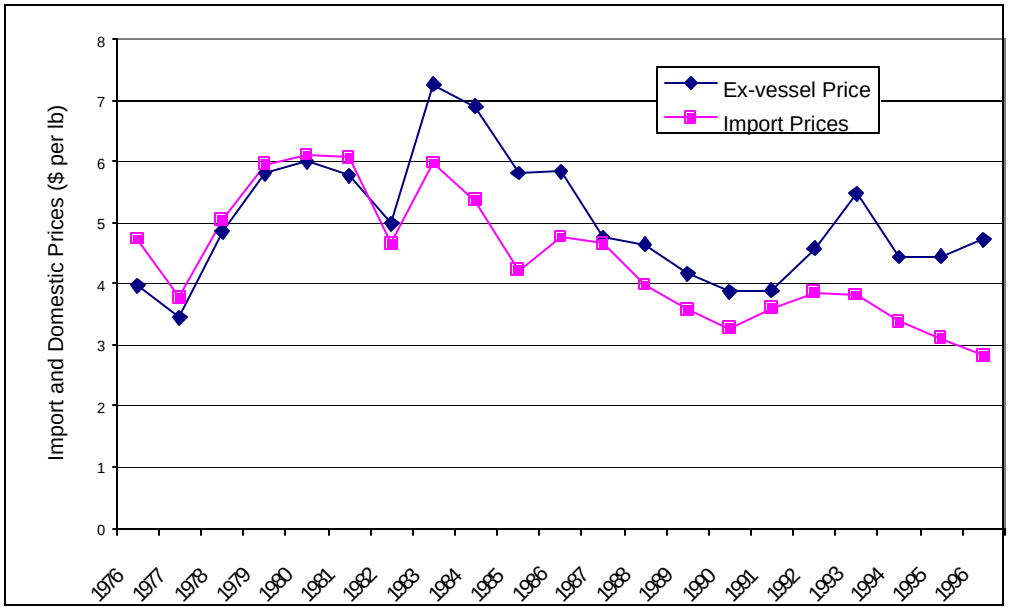


Figure 5.2.2 Domestic Ex-vessel and Import Prices of Scallops (Dollars Per Pound)

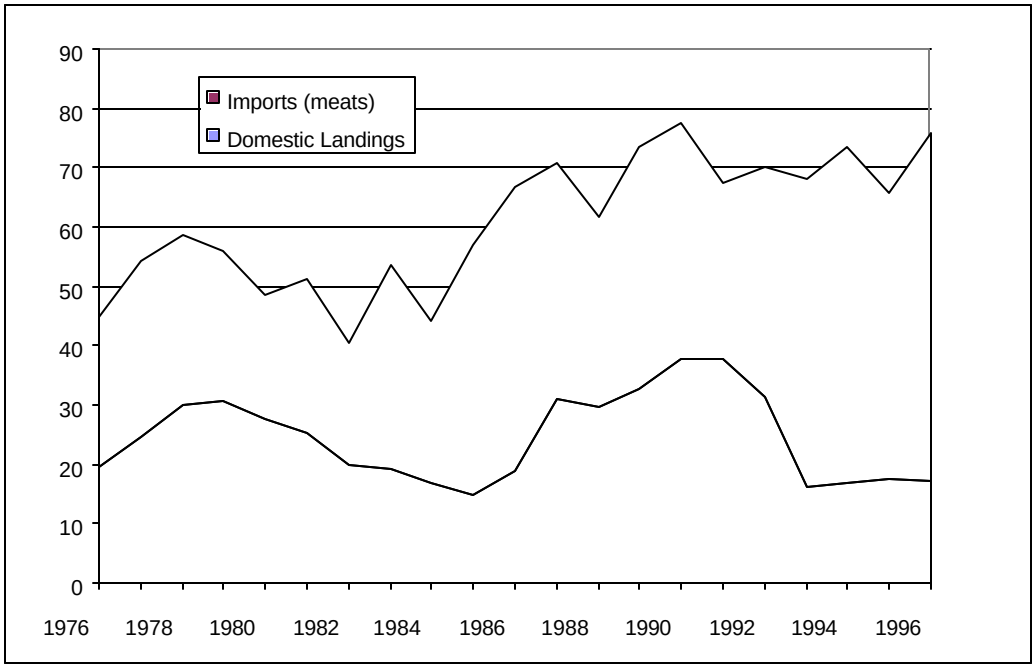


Figure 5.2.3 Domestic Landings and Imports of Sea Scallops (Million Pounds)

6.0 Analysis of Impacts

6.1. Impacts of Resource Rebuilding Program

6.1.1. Impacts on the scallop resource

The proposed action will substantially reduce the level of fishing for Atlantic sea scallops. The total number of scallop days-at-sea would be reduced to less than one-half the current level and by about 30% compared to the no-action alternative (the Amendment 4 DAS reduction program). As a result the proposed action is not expected to have any harmful impacts on the environment or cumulative environmental impacts.

The scallop resource will be rebuilt to a level that will produce maximum sustainable yield on a continuing basis. Based on abundance indices the resulting stock size levels will be approximately four times greater than current levels.

The impacts of alternatives for area management strategies will be analyzed when those adjustments are implemented.

A rebuilt scallop stock, fished at the fishing mortality target levels, will provide the highest possible long-term landings (18.8 million pounds) and catch rates. It also will ensure a healthy scallop stock - one with a balanced age structure, high spawning potential and lower year-to-year variability in stock size and landings.

The proposed action will meet the Magnuson-Stevens Act requirements for ending overfishing and rebuilding , within 10 years, the stock to levels capable of producing maximum sustainable yield on a continuing basis.

Under the status quo (the management program currently in place) the target fishing mortality level is 0.64 (equivalent to an annual exploitation rate of about 45%). As mentioned in the discussion of the proposed action, the long-term term stock size under the current management program would be about 1/3 of those under the proposed rebuilding program (Table 4.2.4). Projected long-term landings would not differ much, 15 million pounds compared to 18.8 million pounds in 2008 under the proposed action (Table 4.2.3), but under the status quo, annual landings would change much more with variations in recruitment.

6.1.2. Other impacts on the physical environment

The reduction in the level of fishing under the proposed action will decrease possible adverse impacts, if any, of both scallop trawl and dredge gear on the physical environment. Cumulative environmental impacts will be analyzed in an amendment, currently under development and to be submitted concurrently with this amendment, that will define and make recommendations to protect essential fish habitat for sea scallops. The amendment also will a comprehensive analysis of currently available information about impacts to such habitat from scallop fishing gear.

6.1.3. Impacts on endangered and protected species

The resource rebuilding program will decrease fishing effort in the scallop fishery. Current measures already preclude any expansion of the scallop trawl fishery in the Mid-Atlantic - an area where interactions with sea turtles are possible. These combined factors, coupled with the classification of the

sea scallop fishery as Category III (with no documented marine mammal interactions) in the NMFS 1998 Final List of Fisheries *(Federal Register/Vol. 63. No. 23/Wednesday, February 4, 1998*) published pursuant to Section 118 of the MMPA, leads to the conclusion that should interactions with endangered or protected species occur, there is only a remote likelihood that they would result in adverse effects.

6.1.4. Economic impacts

The rebuilding alternatives proposed by this amendment will have considerable impacts on the economic viability of the scallop vessels and on the net national economic benefits derived from this fishery. This analysis provides an assessment of the impacts both on individual vessel operations, and on the economic costs and benefits to the nation.

6.1.4.1. Summary

- Under the projected resource conditions, the full-time scallop vessels will not be able maintain their economic viability under any of the alternatives proposed by this amendment during the first six to nine years of the program.
- Full-time vessels earn over 90% of their revenues from scallop fishing (Table 6.1.1) and, therefore it is not apparent in what alternative fisheries they may succeed. Under the proposed Monkfish FMP, they will not be able to land monkfish except on their limited number of scallop DAS and they will lose the additional revenues they earned in the directed monkfish fishery.

Table 6.1.1

Comparison of Revenues of Limited Access Vessels from Scallop Fishery and Other Fisheries - 1996

(thousand dollars)

Permit Category	Full-time		Part-time		Occasional	
Total revenue from scallop fishing trips	$86,773	91%	$4,895	39%	$1,857	16%
Total revenue when there are no scallop fishing trips	$8,408	9%	$7,744	61%	$9.544	84%
Total	$95,181	100%	$12,639	100%	$11,401	100%

- For all options, the DAS requirement for vessels to break-even exceeds the number of DAS to be allocated at least during the first six years of the program indicating that full-time vessels will not be able to cover their fixed and variable costs. The difference between the DAS allocation (120) and the average break-even DAS (127) is relatively small for the proposed action in 1999, the first year of the program. Starting in 2000, however, the average break-even DAS requirements far exceed the full-time DAS allocation.
- Under these conditions, it is unlikely for many vessels to remain in the fishery since not only would they not earn any profits from their operations but also they would not pay for their expenses for many years. Therefore, the proposed action will not allow the current number of vessels to remain financially viable.

- It will be almost impossible for the majority of the scallop vessels to realize a profit (earn revenues greater than fixed and variable costs) at the given DAS schedules almost until year 10 of the program.
- After the first six to nine years, however, as the scallop resource is rebuilt and the landings increase, vessel revenues will increase. Since, at the same time, the operating costs will decrease with the reduced DAS, the excess of revenues over costs will gradually widen making it possible for vessels to fully cover their fixed and variable costs.
- During the first year of the proposed action, 1999, the number of vessels that the fishery can sustain at an annual profit of $50,000 is 151. Over the next five years starting year 2000, however, the total revenues from the fishery can sustain about one third to one half of the scallop fleet, between 80 to 135 vessels, at an annual profit of $50,000.
- The impact of the proposed action, and other management options, on net national benefits will be negative during the first 10 years of the program. The impacts will even be more severe if scallop landings fall short of the projected levels.
- The proposed action is expected, however, to produce a discounted net benefit of $53 million benefit over the next twenty years.
- Under the proposed action the employment measured by total crew DAS will improve in 1999 compared to the baseline scenario which assumes that the full-time allocation would have been adjusted down to 80 DAS under status quo to meet the fishing mortality objectives of Amendment 4. On the other hand, if no such adjustment were made and the allocations were remained at 142 DAS in 1999 for full-time boats, the employment under the proposed action of 120 DAS would fall by 15 percent.
- The decline in employment is estimated to be about 28 percent at the end of the rebuilding period.

6.1.4.2. Impacts on the economic viability of the fleet

The economic viability of the scallop fleet is examined by using a break-even analysis, which estimates the number of DAS necessary to cover total variable and fixed costs of a vessel. The results indicate that under the projected resource conditions, the full-time scallop vessels will not be able to maintain their economic viability under any of the alternatives proposed by this Amendment during the first six to nine years of the program.

The break-even DAS is analyzed for an average full-time, fully active scallop vessel by assuming that its revenues are derived mainly from the scallop fishery. Table 6.1.7 shows that the majority of the active full-time scallop vessels depend heavily on scallop fishing. In 1996, 167 of 202 full-time scallop vessels used more than 120 DAS to fish for scallops and obtained, on the average, more than 90 percent of their income from scallop revenues. These vessels also derive some revenues from monkfish as a bycatch, and these revenues are included in the gross stock estimates in the following analyses. Scallop revenues are calculated by multiplying the projected landings under each option with the estimated ex-vessel prices shown in Table 6.1.6.

Table 6.1.2 compares the projected DAS-use and the break-even DAS for the baseline (status quo alternative) scenario and for three options. The baseline scenario assumes a continuation of

the Amendment 4 fishing mortality reduction schedule with the final fishing mortality level set at 0.64.

For all options, the DAS requirement for break-even exceeds the DAS-use at least during the first six years of the program indicating that the full-time vessels will not be able to cover their fixed and variable costs. The difference between the DAS allocation (120) and the average break-even DAS (127) is relatively small for the proposed action in 1999, the first year of the program. An extended break-even DAS analysis that included 174 full-time vessels showed that only a small percentage of vessels (about 10 percent or 18 out of 174 vessels) may be able to break-even with 120 DAS (Section 6.1.4.4, Variation of Break-even DAS). Starting year 2000, however, average break-even DAS requirements under the proposed option as well as under the 10- and 7-year rebuilding options far exceed the full-time DAS allocations.

Under these conditions, it is unlikely for the majority of the vessels be able to continue fishing since not only they can not earn any profits from their operations but also they can not even pay for their expenses for the first six to seven years. Therefore, the proposed action will have drastic impacts on the financial viability of the scallop fleet.

After the first six to seven years, however, as the scallop resource is rebuilt and the landings increase, the vessel revenues will increase. Since, at the same time, the operating costs will decrease with the reduced DAS, the excess of revenues over costs will gradually widen making it possible for vessels to fully cover their fixed and variable costs. If, for example, the 211 vessels were able to survive financially until year 2008, they would start to break-even and perhaps make some profits. That is an unlikely situation, however, as stated above. The break-even DAS is an indicator of the economic viability of a vessel in the short-term only. Perhaps a vessel can continue its operations for a couple of years with some external source of financing even if it does not break-even. But for a long-term participation in the scallop fishery, it is necessary for a vessel to operate with some profits.

These results are valid for the majority of the full-time vessels, which depend highly on the scallop fishery. A small proportion of full-time vessels will have a lower break-even DAS than shown in Table 6.1.2 because they derive part of their revenues from other fisheries. The break-even DAS for these vessels, however, was not estimated since their future revenues from other fisheries can not be accurately predicted.

It would be possible, however, for a few scallop vessels to operate profitably if a leasing, subsidy and/or a buyback program reduced the number of active vessels participating in the fishery, and the total DAS is distributed among the resulting smaller number of participants. Table 6.1.3 examines such a scenario, and shows the number of vessels the scallop fishery could sustain at an annual average profit of $50,000 for each option.

Table 6.1.3 shows that, during the first year of the program under the proposed action, 151 vessels can fish at profitable levels if the total number of vessels were reduced by 60, and the total DAS distributed among the 151 vessels remaining in the fishery. This number sharply declines however, beginning year 2000 as the DAS allocations are reduced by more than 50 percent compared to 1999. For instance, under the proposed action in year 2001, if the number of boats is reduced from 211 to 100 then each of the 100 vessels could be allocated 103 DAS and therefore, could make a $50,000 profit. On the other hand, under the 10-year rebuilding (7-year

rebuilding), the number of boats should be reduced to 121 vessels (86 vessels) for each to make a $50,000 profit a year in year 2001.

Therefore, the overall results indicate that during the period 2000-2004 under the proposed action, the total revenues from the fishery can sustain approximately one half of the scallop fleet at an annual profit of $50,000. This number is even smaller for the 7-year rebuilding schedule, about 50 to 100 vessels, during the first four years with gradually increasing to about 150 vessels in 2004, the fifth year.

As the scallop resource is rebuilt to the target biomass levels (B_{MSY}), the fishery is expected to sustain more vessels at profitable levels. For example, by the tenth year, 2008, about 225 to 240 vessels are estimated to make $50,000 per year by fishing 56 to 60 DAS under the proposed action.

In summary, the results show that the proposed action will have negative impacts on the economic viability of the vessels and the scallop fleet as a whole during the first five years of the program. These negative impacts are expected to be relatively small during the first year, 1999, under the proposed action. But in the following four years the impacts will be severe, and the vessels will not be able to break-even and/or earn profits unless their numbers are reduced by almost one half of the numbers of currently active vessels. At the end of the rebuilding period, however, the scallop fishery may be able to support about the same number of vessels that currently have full-time permits. It should be pointed out, however, that these vessels would still be operating at part-time levels (about 62 DAS) and making only about $50,000 in profits. For vessels to be able to operate at DAS levels traditionally considered full-time, for example at 200 DAS, the number of participants needs to be reduced to 70 vessels (14,000/200). Clearly, at this level of operation, the scallop industry would be more efficient and profitable, and would generate sufficient revenues for vessel replacement.

6.1.4.3. Net benefits and employment

The net national benefits of the rebuilding alternatives are estimated as the sum of changes in producer and consumer surpluses. The change in producer surplus is measured by the change in revenues and the corresponding change in variable costs under the proposed measures compared to the baseline scenario. Variable costs include operating expenses such as fuel, ice and oil, which will decrease with the reduction in DAS. Labor expenses are generally considered to be a part of the total variable costs and a decrease in labor costs would increase a vessel's profitability. In the fishing industry, however, crews are compensated on the basis of shares of the vessel revenues and if these shares exceed the opportunity cost of labor (income from comparable employment) crew members earn an "economic rent". In this analysis, the reduction in crew shares is counted as a loss (i.e., a reduction in the producer surplus) rather than savings in variable costs.

Consumer surplus, a measure of the consumer benefits, is the extra amount of income seafood consumers would be willing to spend on scallops compared to what they actually spend. In other words, it is a measure of the actual value that consumers place on scallops. It is calculated from the ex-vessel price model and the estimated landings associated with the rebuilding alternatives. With the exception of the first year under the proposed action, the results of this calculation show a negative impact on consumers due to the increase in prices and decline in landings until years 7 to 10 of the proposed and non-preferred management options. These negative impacts, however,

will be reversed after these first 6 to 9 years of the program, depending on the choice of option, and consumer surplus under the rebuilding options will exceed the baseline level by about $4 to $5 million per year (Figure 6-1).

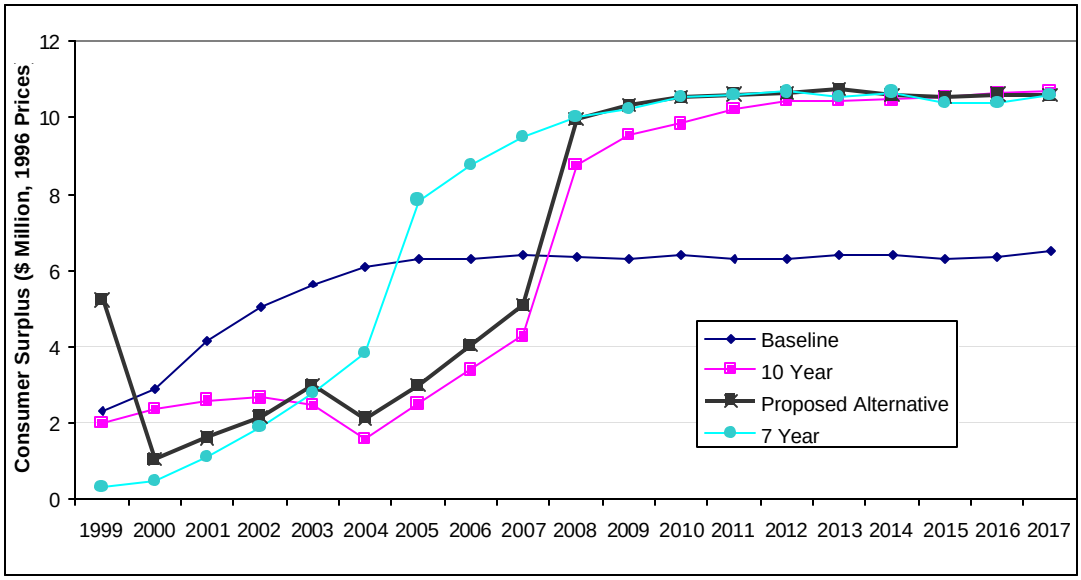
The components of the producer surplus, that is, the ex-vessel revenues and total variable costs are shown in Figure 6-2 and Figure 6-3. Figure 6-2 shows that the estimated fleet (ex-vessel) revenues under the proposed option will exceed the baseline level in the first year, but in the next 8 years starting the year 2000, will be below the baseline revenues. In 1999, the ex-vessel revenues are greater under the proposed option because of a higher number of DAS is allocated to vessels (120 DAS for full-time vessels) compared to the baseline scenario. Baseline DAS levels were estimated assuming that the full-time allocation would have been adjusted down to 80 DAS under status quo to meet the fishing mortality objectives of Amendment 4. On the other hand, if no such adjustment were made and the allocations were remained at 142 DAS in 1999 for full-time boats, revenues under the proposed action of 120 DAS would decrease by about 15 percent.

The decline in revenues under the proposed option compared to the baseline is about $17 million or 38 percent in 2000, and about $10 million or 10 percent in 2008 (Figure 6-2). The overall impacts on regional revenues and incomes, however, will be higher than these estimates because of the indirect and induced multiplier impacts. Indirect impacts include the impacts on sales, income, employment and value-added of industries that supply commercial harvesters, such as the impacts on marine service stations that sell gasoline and oil to scallop vessels. The induced impacts represent the sales, income and employment resulting from expenditures by crew members and employees of the indirect sectors. An input/output analysis conducted by NMFS (1998) estimated that sales, income and employment multipliers for the sea scallop fishery in the Northeast Region. The sales multiplier for the coastal counties in Northeast was estimated to be approximately 1.8 in 1997 for the scallop dredge and trawls. If this multiplier is applied to determine overall impacts, the reduction in overall sales in the Northeast region will be about $30.6 million in 2000, and $18 million in 2008. These estimates should be interpreted with caution, however, since the multipliers were estimated for 1997 including only the backward linkages associated with the harvest of sea scallops. Appendix 6 provides further information on the regional and state level impacts of the sea scallop harvesting sector.

After 2007, however, total fleet revenues will increase and exceed the baseline levels by about $20 to $25 million per year under both the proposed action and 7- or 10-year rebuilding. Again, applying the sales multiplier, the overall sales impacts in the coastal counties of the northeast region are estimated to be $36 to $45 million after the first nine to ten years of the management program.

Under the proposed action, the ex-vessel revenues are estimated to exceed the baseline levels in the 10^{th} year, 2008. The comparison of alternatives indicates that the sharpest decline in revenues in the first four years occurs under the 7-year rebuilding option as expected. Due to the faster pace of rebuilding under this alternative, however, total fleet revenues start increasing in the 7^{th} year of the program exceeding the revenues under other options.

Figure 6-1 Consumer Surplus (Million Dollars)



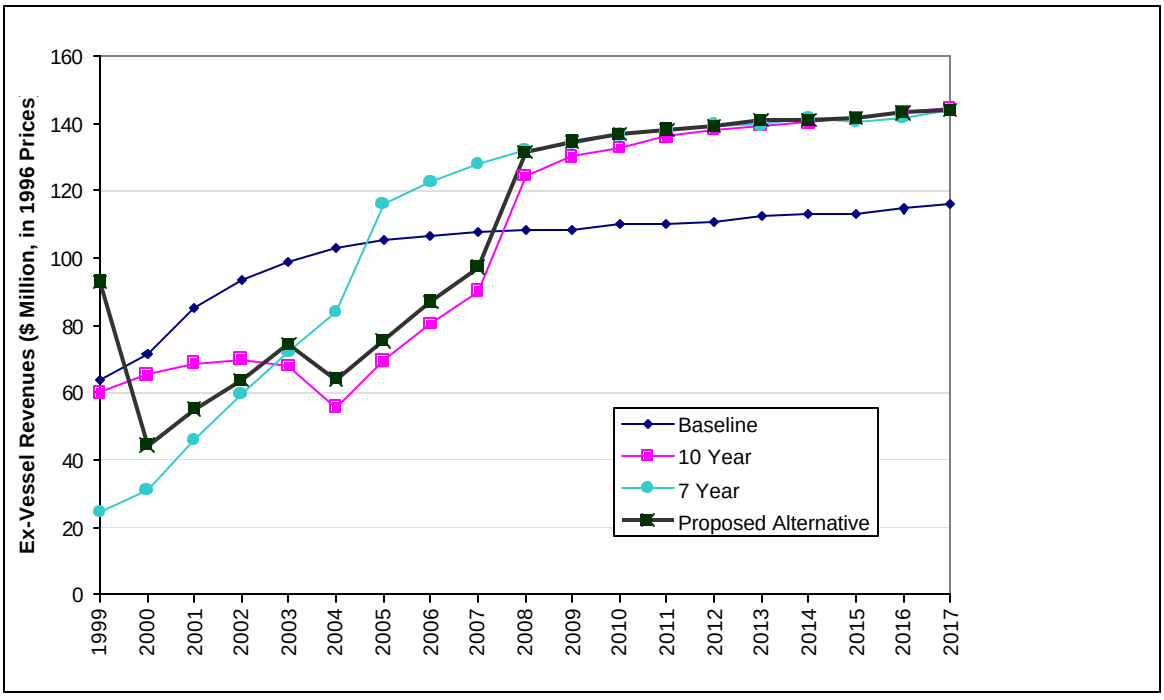


Figure 6-2 Fleet Revenues from Scallops (Million dollars)

The impacts of the rebuilding alternatives on total variable costs of the fleet are shown in Figure 6-3. As explained above, the variable costs do not include crew shares but consist of operating expenses such as fuel, ice and oil. Since these expenses decrease with the reduction in DAS, total costs will be lower under the rebuilding alternatives compared to the baseline scenario, except the first year 1999 under the proposed option since the variable costs are higher with 120 DAS compared to 80 DAS under the baseline scenario. The annual cost savings are defined here as the reduction in costs under the rebuilding alternatives compared to the baseline scenario. The cost savings under the 7-year rebuilding schedule are higher compared to the other options because of the drastic reduction in DAS. Under all alternatives, the magnitude of these savings will be higher during the first 10 years, about $5 to 12 million annually, but will later decline to $5 million with the gradual increase in DAS in the second half of the program.

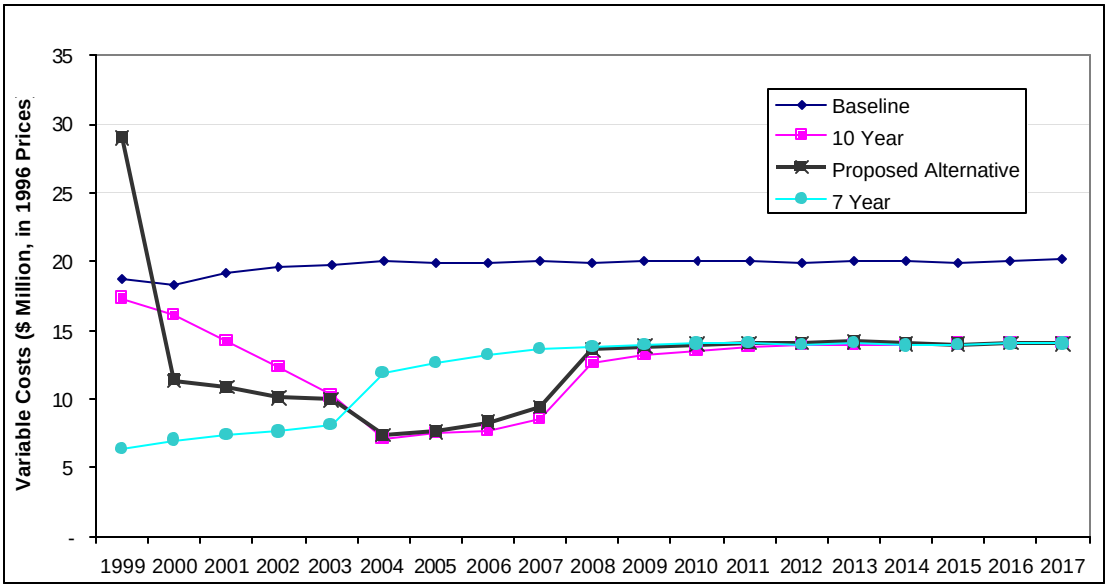


Figure 6-3 Total Variable Costs (Million Dollars)

These savings in costs were combined with expected revenues to estimate the producer surplus under the proposed option and other rebuilding alternatives (Figure 6-4). Figure 6-4 shows that the producer surplus under the proposed option would be above the baseline level in 1999, but will be below it in the next seven years; after the first 8 years, it will increase and exceed the baseline level by about $30 to $35 million per year.

The change in producer surplus is also equivalent to the change in economic rents obtained by vessel owners, the captain and the crew as a result of the rebuilding program. Since the producer surplus under the proposed action is estimated to be less than the baseline levels at least for the first 7 years beginning year 2000, the change in its components, i.e., the change in profits and crew shares, will be negative in the same period. After the first eight years, however, the profits (for the remaining vessels) and crew shares (for the remaining crew) are expected to increase as revenues rise and non-wage variable costs decline. The magnitude of this increase will be equivalent to the estimated increase in the producer surplus, i.e., $30 to $35 million a year after the first 10 years under all options including the proposed action. The distribution of benefits

(from a higher producer surplus) between labor incomes and profits will vary, however, according to the crew shares (the lay system) in the future.

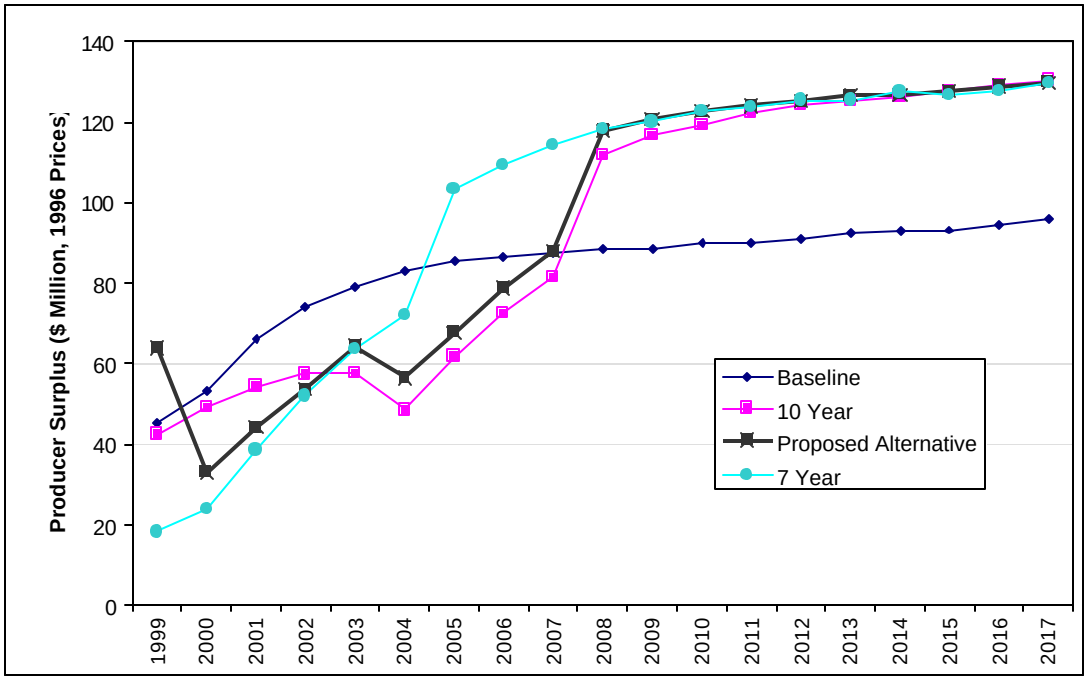


Figure 6-4 Producer Surplus (Million Dollars)

To derive a consistent measure of the total net benefits, however, annual changes in producer and the consumer surplus (compared to the baseline scenario) are converted to present values by applying a discount rate of 7 percent. The sum of these values shows the net benefits of the rebuilding alternatives for the first 10, 15 and 20 years (

Table 6.1.4). The impact of the management options on net national benefits will be negative for the first 10 years of the program mostly because of the sharp decline in scallop revenues during this period. The net loss to the nation is estimated to be $72 million under the proposed action, $93 million under the 10-year and $60 million under the 7-year rebuilding. These negative impacts could be even more severe if a large numbers of vessels are forced to shut down fishing operations. The economic and social costs of such widespread business failures were not taken into account in the net benefit calculations since they could not be quantified with the available methods and data. The change in net benefits, among other things, would depend on the nature of management measures that were adopted. For example, the DAS of the exiting vessels may be allocated among a fewer number of vessels, or a buy-out, leasing or a subsidy program may reduce the number of active vessels allowing each to operate at economically viable DAS levels.

The proposed option is expected, however, to produce a discounted net benefit of $53 million over the next twenty years. The net national benefits are higher under the 7-year rebuilding period compared to the proposed and 10-year rebuilding schedule. This option rebuilds stocks faster and results in higher landings and landings per DAS in a shorter period. However, the

gradual reduction in effort under the proposed option from 142 DAS in 1998 to 120 DAS in 1999, for the full-time boats, was adopted to mitigate a variety of unquantifiable social and economic adjustment costs. Fleet revenues would decline by 61 percent in 1999 if a 7-year rebuilding schedule was adopted (Figure 6-2). Certainly, such a sharp reduction in annual revenues would increase unemployment, and increase the likelihood of vessel bankruptcies. Therefore, the higher economic benefits from an accelerated fishing reduction program would be decreased by these unquantifiable, negative impacts.

Finally, Table 6.1.5 shows the impacts of rebuilding options on the employment change as measured by total fleet CREW*DAS. Under the proposed action the employment measured by total crew DAS will improve in 1999 compared to the baseline scenario which assumes that the full-time allocation would have been adjusted down to 80 DAS under status quo to meet the fishing mortality objectives of Amendment 4. On the other hand, if no such adjustment were made and the allocations were remained at 142 DAS in 1999 for full-time boats, employment under the proposed action of 120 DAS would fall by 15 percent. These numbers should be interpreted with caution, however, since the data on crew are obtained from the permit files which are biased toward higher crew levels than actually used (for more information see Section 5.2, Human Environment).

The sharp reduction in DAS under the 7-year rebuilding alternative also results in a severe decline in employment (CREW*DAS) by almost 60 percent in the first five years compared to a gradual decline under 10-year rebuilding, from 7 percent in year 1999 to 60 percent in 2004.

The number of people employed in the scallop fishery may not decline in the same proportion as the decline in CREW*DAS. The reduction in the number of crew would be higher if some individuals crew the same number of DAS as they would under the baseline, but on more than one vessel. On the other hand, in communities where the kinship-based employment is most common, the reduction in DAS can be absorbed without laying off crew especially if the crew members accept a lower wage to allow the vessel to meet its operating costs. For more discussion on employment see Section 6.1.5, Social Impact Assessment.

The percentage decline in employment is estimated to be almost equivalent, around 28 percent at the end of the rebuilding period under all alternatives. This estimate does not, however, take into account potentially positive impacts of the proposed action on total employment in the region in the later years. An increase in fishing revenues during the second half of the program will create demand for other goods and services in the area. This will subsequently lead to an increase in production and employment in various sectors of the economy, offsetting to some degree the reduction in employment in scallop fishing.

6.1.4.4. Variation in break-even DAS

The break-even DAS estimates reported in Table 6.1.2 were calculated for an hypothetical scallop vessel which has an GRT, HP, and crew size equivalent to the fleet average for the year 1996. The break-even DAS for each individual vessel will be different from this average due to several factors including its GRT, HP, crew, and revenues from other species. The examples given below illustrate this variability.

The first example (Table 6.1.8) shows the range of break-even DAS estimates for the proposed action in 1999 assuming that each vessel fishes 120 DAS. The sample includes full-time vessels that derived 85 percent or more of their revenues from scallops in 1996 by gross tonnage and HP

class. These vessels have a high dependence on scallop fishing for their income and earn a small portion of their revenues from monkfish bycatch.

The group averages for break-even DAS are higher for the vessels in the smaller tonnage and HP classes. The larger vessels catch more monkfish per DAS than the smaller ones, and the inclusion of the monkfish revenues lowers the break-even DAS requirements for larger vessels. This result does not necessarily indicate, however, that the small vessels will be more negatively impacted by the proposed measures for the following reasons:

- The variable and fixed costs for smaller vessels could have been overestimated since these costs were calculated using a regression equation derived from cost-data that mostly included large boats.
- The estimations include interest payments but not the payments on principal. For the vessels still paying mortgage, the payments on principal will be higher for larger than for the smaller boats.

The majority of scallop vessels are not expected to break-even with the reduction in DAS to 120. Out of 174 vessels included in the sample only 18 are estimated to break even. These include both small and large boats (in tonnage and HP) with break-even levels ranging from 112 to 120 DAS.

Table 6.1.9 shows the break-even DAS estimates by vessel size for the proposed option with 51 DAS in year 2000. At this level of DAS, the differences in break-even level gets smaller between the tonnage and HP classes. The break-even DAS is at least 91 DAS, implying that none of the vessels in the sample are expected to cover their fixed and variable costs in full with 51 DAS. Therefore, the results do not indicate a negative bias towards the smaller vessels in the impacts of this option.

The economic model used in break-even DAS analysis estimates the variations in cost structure by the differences in vessel tonnage, horsepower, crew, and DAS used. The variations in the revenue streams are mainly due to the variations in vessel landings, and these are again explained by the differences in vessel sizes, HP, crew size, and DAS used. There could be other variations in both costs and revenues, however, that cannot be totally explained by these factors. For example, the differences in captain's and crews' skill may also affect the revenues and costs of a vessel, and may partially explain the variations in break-even DAS within the same tonnage and HP group (see the standard deviations in Tables 6.1.8 and 6.1.9). The mortgage position of a vessel will also impact its costs and break-even DAS. Although these variations in vessel cost structures cannot be estimated due to a lack of data on mortgages, it is clear that the boats without a mortgage (fully paid-for vessels) will have lower break-even DAS than the others in the same tonnage or HP groups. Similarly, the vessels operated by highly skilled captains and crew will have a better chance to withstand DAS reductions and continue their operations.

6.1.4.5. Assumptions and methodology

The economic impacts are examined using a biological-economic simulation model that combines landings and abundance estimates of the biological model with a vessel production model, and price and cost equations (Appendix 4). The methodology and the assumptions of this model can be summarized as follows:

- Vessel landings, revenues and costs are estimated using averages for GRT, engine horsepower, and crew size. The maximum crew size is restricted at 7 men.

- Landings per DAS under each option is estimated from the production model using the average horsepower, GRT, and crew of the active full-time vessels, DAS-use and the abundance index (weight per tow) calculated from the biological model. The maximum average landings per DAS is set to 1,400 pounds of scallops.
- Total fleet DAS is calculated by dividing total landings obtained from the biological model with average landings per DAS estimated in the last step. The landings estimates from the biological model were calculated for the whole scallop resource because it was not possible to model how the current closed areas will affect landings and catch rates,
- Vessel DAS use under each option is estimated by dividing total full-time fleet DAS among 211 active vessels that participated in the scallop fishery in 1996.
- Scallop revenues are estimated from projected landings and an ex-vessel price model as a function of the following variables:
    - projected domestic landings
    - average import prices for sea scallops
    - a trend variable as a proxy for increase in per-capita income of consumers and/or as a proxy for an increase in the preference for scallops at each price
    - a variable reflecting demand shift for scallops beginning in 1983.
- Sea scallop import prices are assumed to be constant at their 1997 level.
- Trip and variable costs are estimated in 1996 prices as a function of DAS, GRT, engine horsepower and crew. Fixed costs are estimated as a function of GRT and engine horsepower. They include only out-of-pocket expenses such as interest payments, part of repairs and insurance. Payments on mortgage are not included due to lack of data.
- Crew shares, however, are estimated using a 40/60 lay-system according to which crew receives 60% of the gross stock and pays for the trip expenses.
- The results are compared to the baseline (status quo) scenario that assumes a continuation of the Amendment 4 fishing mortality reduction schedule with the final target fishing mortality set at 0.64.

6.1.4.6. Sources of uncertainty in the analysis

The costs and the benefits of the rebuilding alternatives were analyzed based on the available information about the vessel costs and characteristics, crew shares, prices, landings and revenues of the scallop vessels. The numerical results of this analysis should be interpreted with caution due to uncertainties about the likely changes in

- factors affecting scallop resource abundance
- fishing behavior
- fixed costs
- variable costs
- import prices
- bycatch and revenues from other fisheries

- the share system
- change in the number of active vessels
- structural changes in ownership
- changes in the composition of fleet in terms of tonnage, HP and crew size of the active vessels
- disposable income and preferences of consumers for scallops.

The empirical results should be used to compare the alternatives with each other and the with the baseline scenario, since a change in the variables listed above will change the numerical results in the same direction. For example, an increase in import prices would lead to a rise in ex-vessel prices and revenues above the levels estimated here. An increase in the price of oil, on the other hand, would increase the variable costs and reduce the cost savings under all options. While these changes would affect the absolute values of net benefits, break-even DAS and so on, the ranking of the alternatives in terms of their impacts on revenues, costs, and net benefits are not expected to change.

Table 6.1.2 Break-even DAS under Amendment 7 options

Year	Baseline		Proposed Action		10 Year Rebuilding Schedule		7 Year Rebuilding Schedule	
	DAS (*)	Break Even DAS	DAS (*)	Break Even DAS	DAS (*)	Break Even DAS	DAS (*)	Break Even DAS
1999	80	119	120	127	75	117	33	109
2000	79	103	51	101	70	99	30	80
2001	82	91	49	78	62	82	33	61
2002	84	84	46	63	55	70	34	50
2003	85	80	45	53	46	60	35	42
2004	85	77	34	46	33	51	37	39
2008	85	73	60	41	56	40	60	40
2013	85	71	62	39	61	39	61	39
2017	86	69	62	38	62	38	62	38

* Shows DAS allocation to full-time vessels assuming 211 full-time vessels.

Table 6.1.3 Number of full-time vessels that can make $50,000 in annual profits under rebuilding alternatives*

Year	Baseline	Proposed Action	10-year Rebuilding Schedule	7 Year Rebuilding Schedule
1999	108	151	102	48
2000	122	80	113	59
2001	145	100	121	86
2002	160	116	125	110
2003	169	135	124	133
2004	176	117	103	152
2008	186	237	225	238
2013	193	254	251	251
2017	200	259	260	259

*Assuming distribution of DAS with buy-outs and/or leasing/consolidation.

Table 6.1.4 Net Benefits

(million dollars in 1996 prices - cumulative present value at 7% discount rate)

Year	Baseline	Proposed Action	10 Year Rebuilding	7 Year Rebuilding
2008	0	-72	-93	-60
2013	0	6	-21	17
2017	0	53	26	64

Note: The net benefits represent the change in cumulative discounted value of consumer and the producer surpluses from their baseline levels.

Table 6.1.5 Percentage change in employment (measured by total crew*das)

Year	Baseline	Proposed Action	10 Year Rebuilding Schedule	7 Year Rebuilding Schedule
1999	0	49	-7	-59
2000	0	-36	-11	-62
2001	0	-41	-24	-60
2002	0	-46	-35	-59
2003	0	-47	-46	-58
2004	0	-60	-61	-57
2008	0	-29	-34	-29
2013	0	-27	-28	-28
2017	0	-28	-28	-28

Note: Percentage change in employment represents the change in comparison to the baseline employment rather than the change from the previous year.

Table 6.1.6 Projected ex-vessel scallop prices (in 1996 dollars per pound)

Year	Baseline	Proposed Action	10 Year Rebuilding Schedule	7 Year Rebuilding Schedule
1999	7.1	6.8	7.1	7.4
2000	7.1	7.3	7.1	7.4
2001	7.0	7.3	7.2	7.4
2002	7.0	7.3	7.2	7.3
2003	7.0	7.3	7.3	7.2
2004	7.0	7.4	7.4	7.2
2008	7.2	7.0	7.1	7.0
2013	7.5	7.2	7.2	7.2
2017	7.7	7.4	7.4	7.4

Table 6.1.7 Landings and revenues of full-time scallop vessels by days-at-sea use

	DAS Use in 1996				
	1-78	79-108	109-120	121-142	143>
Number of Vessels *	8	20	7	15	152
Percent of Full-time Permits	3.1%	7.7%	2.7%	5.8%	58.7%
Average DAS-use in 1996	42	94	116	133	171
Percent of Revenues from other Gear	56%	14%	27%	3%	2%
Percent of Revenues from Scallops	43%	82%	68%	93%	92%
Total Scallop Landings (Million pounds)	0.1	0.7	0.4	0.9	13.1
GRT (Mean)	135	132	177	141	165
HP (Mean)	691	651	977	780	867

Table 6.1.8 Break-even DAS and revenues for proposed action
(full-time vessels allocation = 120 DAS in 1999)

	Number of vessels	DAS Used in 1996 (mean)	Monkfish Revenues Per DAS In 1996 (mean)	Scallop Revenues Per DAS in 1996 (mean)	Break-even DAS with Full-time Allocation of 120 DAS			
					Mean	Standard Deviation	Minimum	Maximum
Tonnage Class								
50-150 GRT	57	155	$105	$2,470	137	8.7	113	157
>150 GRT	116	163	$211	$3,010	127	6.5	112	141
HP Group								
<400 HP	4	97	$63	$2,390	153	2.7	151	157
400-799 HP	62	161	$78	$3,020	137	6.7	121	160
800-1199 HP	85	162	$217	$3,021	126	5.8	112	138
>=1200	23	159	$284	$3,360	126	5.4	113	134
Break-even Group								
Vessels that break-even	18	161	$504	$2,827	116	2.4	103	119
Vessels that don't break-even	156	160	$137	$2,821	132	7.7	121	161
All Vessels	174	159	$175	$2,822	130	8.8	112	160

Table 6.1.9 Break-even DAS and revenues for proposed action
(Full-time vessel allocation = 51 DAS in 2000)

	Number of vessels	DAS Used in 1996 (mean)	Monkfish Revenues Per DAS In 1996 (mean)	Scallop Revenues Per DAS in 1996 (mean)	Break-even DAS with Full-time Allocation of 51 DAS			
					Mean	Standard Deviation	Minimum	Maximum
Tonnage Class								
50-150 GRT	57	155	$105	$2,470	106	4.1	94	115
>150 GRT	116	163	$211	$3,010	102	3.8	91	108
HP Group								
<400 HP	4	97	$63	$2,390	113	1.9	96	121
400-799 HP	62	161	$78	$3,020	105	3.7	96	121
800-1199 HP	85	162	$217	$3,021	101	3.8	91	109
>=1200	23	159	$284	$3,360	103	3.9	93	108
Break-even Group								
Vessels that break-even	None							
Vessels that don't break-even	174	159	$175	$2,822	103	4.6	91	121

6.1.5. Social impacts

This section describes the socio-cultural impacts of Amendment 7, as well as some of the distributive aspects of the economic impacts.

In the first year of the proposed reduction schedule, full-time vessels will have 120 DAS (exclusive of any carryover of up to 10 unused DAS from the previous year). There are two possible ways of measuring impacts. One is to include all permit holders; the other is to include only permit holders with vessels that actually fished under the DAS program. In 1997, 229 of the 306 limited access vessels with current (not history) permits used DAS. Of these, 200 were full-time vessels. Table 6.1.10 includes both permit holders and vessels that used DAS in 1997.

In terms of permit holders, 77% of full-time permit holders will be impacted in the first year by the new DAS reduction schedule. In terms of vessels that used DAS in 1997, 89% (177 of 200) full-time vessels will be impacted in the first year.

Table 6.1.10 DAS Usage by Full-time Limited Access Scallop Vessels (N=229)

Number of DAS Used	Number of Vessels Using that DAS Level	Percent of Vessels Using that DAS Level
0-10	4	2%
11-20	0	
21-30	1	0.5%
31-40	0	
41-50	1	0.5%
51-60	1	0.5%
61-70	0	
71-80	0	
81-90	2	1%
91-100	5	2.5%
101-110	4	2%
111-120	5	2.5%
Sub-total	*23*	*11.5%*
121-130	11	5%
131-140	16	8%
141-150	27	13.5%
151-160	51	25.5%
161-170	62	31%
171-180	10	10%
181+	0	
Sub-total	*177*	*88.5%*

In the first year of the proposed reduction schedule, part-time vessels will have 48 DAS. This action will affect 28% of the part-time permit holders (24 of 54) but 69% of the vessels that fished in the DAS program in 1997 (15 of 24 vessels). These 15 vessels used more than 48 DAS in 1997.

Table 6.1.11 DAS usage by part-time limited access scallop vessels (N=24)

Number of DAS Used	Number of Vessels Using that DAS Level	Percent of Vessels Using that DAS Level
0-10	1	4.2%
11-20	1	4.2%
21-30	1	4.2%
31-40	2	8.3%
41-48	4	16.7%
Sub-total	*9*	*37.5%*
49-60	3	12.5%
61-70	5	20.8%
71-80	6	25%
81-90	1	4.2%
91+	0	
Sub-total	*15*	*62.5%*

Under the proposed reduction schedule, occasional vessels will have 10 DAS in the first year. In 1997, only two of the 23 occasional vessels fished DAS. Because both used 10 or fewer DAS (Table 6.1.12). no occasional vessels are expected to be affected by the proposed action..

Table 6.1.12 DAS Usage by occasional limited access scallop vessels (N=2)

Number of DAS Used	Number of Vessels Using that DAS Level	Percent of Vessels Using that DAS Level
0-10	2	100%
11+	0	

One measure of the relative ability of these vessel to engage in other fisheries is the other federal fishing permits they hold (Tables 6.1.13 and 6.1.14). The majority of these vessels hold multispecies, summer flounder, lobster and/or squid-mackerel-butterfish permits, and a large number hold scup and/or black sea bass permits. However, almost all of these fisheries are managed under increasingly restrictive regulations, and therefore provide only limited alternatives for displaced scallop vessels.

For full-time vessels affected by the first year DAS reductions, the most common alternate permits are multispecies, summer flounder, lobster, and squid-mackerel-butterfish. Scup and black sea bass permits are held by less than a third of these vessels. Part-time vessels, on the other hand, are more likely to hold scup and black sea bass permits than lobster permits, although multispecies and summer flounder are still the most commonly held. These patterns coincide with those shown for landings in Table 6.1.15.

Table 6.1.13 Other 1997 permits held by full-time scallop limited access vessels

Permit Grouping	Northeast Region Permit Status	Number of Vessels	Percentage of Permitted Vessles
By Individual FMP:	Multispecies	155	87.6
	Summer Flounder	160	90.4
	Lobster	126	71.2
	Squid-Mackerel-Butterfish	115	65.0
	Scup	51	28.8
	Black Sea Bass	50	28.2
By Common Combinations (10 vessels of more)	All 7 permits	23	13.0
	Scallops, Multispecies, Summer Flounder, Squid-Mackerel-Butterfish, Lobster	46	26.0
	Scallops, Multispecies, Summer Flounder, Lobster	24	13.6

Note - Because some vessels hold more than one permit, total number of permits is higher than total number of vessels

Another measure of alternative fishing opportunities is the number other fisheries in which vessels show 1997 landings (Table F). As might be expected for vessels that are using a larger proportion of their DAS, scallops comprise a large portion of their landed weight (72% and 62% for full-time and part-time, respectively). This is similar to the average full-time vessel described in the Human Environment Chapter (70%), but much higher than the average part-time vessel (15%). In the same pattern, affected full-time vessels show monkfish as their second highest source of landed weight (23%) as do average full-time vessels, but so do affected part-time vessels (11%), unlike the average part-time vessel. In addition, part-time vessels show a 13% dependence by weight on summer flounder, higher than the average part-time vessel (5%). Both monkfish and summer flounder are under increasingly strict regulations, and thus are unlikely targets for increased effort to compensate for lost scallops.

The 192 affected vessels are concentrated in Massachusetts (77) and Virginia (59-63), followed by New Jersey (25-27) and North Carolina (11-16). They are large vessels (all over 100 GRT and 96% over 60 feet --61% over 100 feet). The majority are dredge vessels. In the permit files 89% list “dredge” as their gear, with the others listing “bottom trawl”. In the landings database 85% list some type of dredge: 148 list “scallop dredge”, 15 list “other dredge”, 1 lists “surf clam & ocean quahog dredge”. The other list scallop trawl (9), shrimp trawl (4), other beam trawl (1), and “unknown” (14).

Table 6.1.14 Other 1997 permits held by part-time scallop limited access vessels

Permit Grouping	Northeast Region Permit Status	Number of Vessels	Percentage of Permitted Vessels
By Individual FMP:	Multispecies	14	93.3
	Summer Flounder	14	93.3
	Lobster	9	60.0
	Squid-Mackerel-Butterfish	12	80.0
	Scup	13	86.7
	Black Sea Bass	10	66.7
By Common Combinations (10 vessels of more)	All 7 permits	6	40.0
	Scallops, Multispecies, Summer Flounder, Squid-Mackerel-Butterfish, Lobster	3	20.0
	Scallops, Multispecies, Summer Flounder, Lobster		

Note - Because some vessels hold more than one permit, total number of permits is higher than total number of vessels

In Massachusetts most of the affected vessels are in New Bedford/Fairhaven (56), followed by Boston (14). In Virginia, the majority are in Norfolk (41), followed by Newport News (9) and Hampton (7). Most of the affected New Jersey vessels are in Cape May (16), followed by Barnegat Light (6). The North Carolina vessels are spread in groups of 1-2 vessels per port, 6 of which are in Pamlico County with the others in Carteret County (3), Beaufort County (1) and Hyde County(1).

The 177 affected full-time vessels have a total estimated crew employment of 1,223. Ninety-seven percent of these are in 7-person crews. The 15 affected part-time vessels have an estimated total of 84 crew. Only 47 percent of these are 7-person crews, with the next largest grouping being 4-person crews (27%).

Table 6.1.15 Alternative fisheries engaged in by limited access scallop vessels (1997 logbook data)

	Full-time		Part-time	
Species	Number of Pounds Landed	Percent of Total Landings	Number of Pounds Landed	Percent of Total Landings
Scallops	11474414	**71.6%**	383412	**62.1%**
Bluefish	13985	0.1%	442	0.1%
Butterfish	135	0.0%	1262	0.2%
Cod	9894	0.1%	0	0.0%
Haddock	565	0.0%	0	0.0%
Red Hake	10	0.0%	0	0.0%
White Hake	2562	0.0%	0	0.0%
Mackerel	137745	0.9%	6915	1.1%
Pollock	245	0.0%	0	0.0%
Scup	7823	0.0%	29334	4.7%
Dogfish	74500	0.5%	0	0.0%
Skates	48651	0.3%	625	0.1%
Silver Hake	260	0.0%	0	0.0%
Black Whiting	220	0.0%	2967	0.5%
Loligo Squid	191783	1.2%	8370	1.4%
Illex Squid	0	0.0%	0	0.0%
Black Sea Bass	2850	0.0%	5640	0.9%
Monkfish	3741635	**23.3%**	64654	**10.5%**
Herring	0	0.0%	0	0.0%
Winter Flounder	44452	0.3%	0	0.0%
Summer Flounder	130769	0.8%	80737	**13.1%**
Witch Flounder	12837	0.1%	585	0.1%
Yellowtail Flounder	65322	0.4%	100	0.0%
American Plaice	4421	0.0%	0	0.0%
Weakfish	0	0.0%	25	0.0%
Lobster	11290	0.1%	184	0.0%
Pandalid Shrimp	0	0.0%	2643	0.4%
Ocean Pout	0	0.0%	0	0.0%
Other	53190	0.3%	29898	4.8%

In Massachusetts, most of the affected vessels are in New Bedford/Fairhaven (56) followed by Boston (14). In Virginia, the majority are in Norfolk (41) followed be Newport News (9) and Hampton (7). Most of the affected New Jersey are in Cape May (16), followed by Barnegat Light (6). The North Carolina vessel are spread in groups on 1-2 vessels per port, 6 of which are in Pamlico County with the others in Carteret County (3), Beaufort County (1) and Hyde County (1).

In terms of impacts on employment, the 177 affect full-time vessels have a total estimated crew employment of 1,223, Ninety-seven of ther are in 7-person crews. Th 15 affected part-time vessels employ an estimated 84 crewmembers. Only 47% of these are 7-person crews, with 4-person crews as the next most frequent crew size (27%),

Area management

Worldwide, area management is one of the most common forms of community based fisheries. Closing areas to protect spawning stock and allow rebuilding is a management measure that generally makes sense to fishermen, especially with a stationary species such as scallops. This part of the amendment is unlikely to be controversial in general, therefore.

Specific times and locations of specific future closures may be controversial, however, especially if large areas are closed at the same time. Further, the closure of areas specifically for scallop protection raises the more general question that occurs with all closed areas of whether they are closed to all gears, and if not, which ones have access. Individual frameworks for closures will need to be examined closely and their impacts evaluated in the context of closures in other fisheries.

With the severe cutbacks in DAS, especially after year one, if the current experiment in the Georges Bank closure area proves the area to have large concentrations of scallops it may become politically difficult to keep it closed to scalloping, even if there is some impact on groundfish.

Community impacts

Although this impact assessment can only directly address impacts of this specific amendment, readers should keep in mind the cumulative impacts of cutbacks in scallop DAS combined with continuing cutbacks in allowable landings and DAS in the groundfish fishery and newly approved DAS and catch limits in the monkfish fishery. Georgianna and Cass (1997, p.2) note that in New Bedford monkfish (as bycatch and target) has been a longstanding component of the scallop fishery, but increased targeting by scallopers and others has resulted from the 1994 Amendment 4 to the Sea Scallop Plan and Amendments 5 and 7 of the Northeast Multispecies FMP - implemented in 1994 and 1996, respectively. McCay et al. (1993) described similar findings. Dyer and Griffith (1996, chapter 4) also state with regard to the areas of Hampton Roads/Newport News, VA, and Wanchese, NC: "An important bycatch of the scallop fishery in this region are monkfish".

The top ports in terms of the landed value of sea scallops yields the following impacts on scallop ports. Although New Bedford, MA has by far the highest landed value of sea scallops of any port (between 5 and 6 times greater landed value than its nearest competitor of Newport News, VA), two Virginia ports, Seaford and Newport News, depend much more heavily on sea scallop revenue, as measured by the percentage of total landed value. Seaford depends on sea scallops for 96% of its landed value and Newport News for 70%. This compares with 47% in New Bedford - still highly significant, but not as overwhelming. Point Pleasant, NJ is the least dependent on scallops by this measure at 21%. Nonetheless, in Point Pleasant, as in all the top-value ports except Cape May, Hampton, and Newport News, monkfish was the second or third species in terms of value – and it is now coming under stringent regulations. Thus, these communities have few high value fishing alternatives for sea scallop vessels.

Further, of the top-value scallop ports, Cape May, NJ and Hampton, VA depend the least on dredge gear - but even in those ports dredges account for 63% and 70%, respectively, of seas scallop landed value. There are more alternative species that can be caught with a trawl than with a dredge and, therefore, the availability of switching fisheries may be slightly higher in these two ports.

In a related evaluation, the input-output model described in the economic impacts section shows that while overall state-level impacts (direct, indirect, induced) are highest in MA, followed by Van and the NJ, trawl-related impacts are highest in NJ, followed by VA and then MA.

Shoreside Employment

As mentioned in the Description of the Fishery (Section 5.2), most processors depend on sea scallops for less than 10% of their revenues. These processors should be relatively unaffected by lower domestic landings. Dealers depending on sea scallops for more than 10% of their revenues are located in York County, ME; Bristol County, MA (where New Bedford is located); Carteret County, NC and City of Hampton County, VA. Even those more heavily dependent processors, however, should be able to obtain scallops from elsewhere to supplement local landings - as at least one of these processors is doing already. Processors, therefore, are not expected to be seriously impacted .

Table 6.1.16 Scallop dealer dependence on sea scallop revenues

Percent Dependence	Number of Dealers	Percent of Dealers
0-5%	62	45.6
6-10%	10	7.4
11-15%	2	1.5
16-20%	2	1.5
21-25%	3	2.2
26-30%	0	0
31-35%	1	0.7
36-40%	3	2.2
41-45%	4	2.9
46-50%	5	3.7
51-55%	1	0.7
56-60%	1	0.7
61-65%	2	1.5
66-70%	1	0.7
71-75%	2	1.5
76-80%	1	0.7
81-85%	3	2.2
86-90%	2	1.5
91-95%	7	5.1
96-100%	24	17.6

Note - Only dealers who actually bought scallops in 1997 included

Scallop dealers are more likely to be impacted, given that they buy directly from harvesters and that many other species they are likely to buy are also under landings limits. In 1998, 163 dealers have permits to buy scallops: New Bedford has by far the largest number of scallop dealers (40), followed by Boston and New York (18 each), Narragansett/Wakefield, RI (14), and Gloucester, MA and Portland, ME (13 each). Total employment figures are unavailable, but some layoffs are likely.

In 1997, there were 137 dealers who actually bought scallops: 43 in MA, 1 in MD, 43 in ME, 5 in NC, 3 in NH, 11 in NJ, 9 in NY, 8 in RI and 13 in VA. Overall, 46% of these dealers depended on sea scallops for 5% or less of their fishing-related income - often considerably less than 1%. There were 18% who depended on sea scallops for 95-100% of their fishing-related income, 32% who depended on sea scallops for over 50% of that income, and 41% who depended on sea scallops for over 25% of that income.

Looking at those who depended on sea scallops for 95-100% of their fishing-related income, 11 are in MA, 9 in ME, 1 in NJ and 3 in VA. If we examine dependence ranges by state, we see that in MA 47% of dealers depend on sea scallops for 0-5%, 40% for 50-100% and 26% for 95-100%. In ME 44% are in the 05% category, 30% in the 50-100% range and 21% in the 95-100% group. In NC 40% are in 0-5% and none in 95-100%; in fact, no NC dealer has more than a 45% dependence. In NH 100% of dealers have 0-5% dependence. In NJ the figures are 27%, 36% and 9%. In NY 89% are in the 0-5% range and none in the 95-100% group. In RI 75% are in the 0-5% group and none above the 21-25% group. In VA 8% are in the 0-5% category, 77% in the 50-100% range and 23% in the 95-100% group. In percentage terms Virginia scallop dealers as a group are the most impacted, followed by Massachusetts. However, there are many more Massachusetts dealers than there are Virginia dealers, so the community impacts will likely be greater in Massachusetts.

Expected overall decreases in crew employment are shown in the Economic Impacts section. However, the decreases will not be felt equally across the board. Where kinship-based employment is most common (e.g., Portuguese-owned vessels in New Bedford, Italian-owned vessels in Gloucester and perhaps Portland, Indochinese-owned and some "Southerner"-owned vessels in North Carolina and Virginia, any downeast Maine vessels - keeping in mind that many downeast scallopers are state-waters-only scallopers), some degree of economic downturn can be absorbed without laying off crew. This is because crew-members will accept lower wages to allow the vessel to meet its operating costs. As a family-owned businesses, it is to their advantage to keep the enterprise afloat and keep family members employed. Strong family support networks will also aid those in need. However, the only work to a point. Extreme, widespread and/or prolonged financial stress can overwhelm these systems. In cases where crew are not kin, layoffs can be expected. And minorities will likely be the first to be let go.

All these economic impacts, in turn, have social impacts. Increases can be expected in alcoholism and other drug abuse, in domestic violence and family dysfunction, and in individual psychological disorders. Support networks will be stressed, sometimes to the breaking point. The modified alternative will lessen these impacts by allowing the scallop fleet more time to prepare and by staving off the most severe cuts in DAS until after a potential vessel buyback. A vessel buyback, however, would not decrease negative impacts for crew members who would lose their jobs.

6.1.6. Impacts on other fisheries

Limited access scallop vessels participate in other fisheries, as well as land other species while in the scallop fishery. The following tables shows the other permits held by limited access scallop vessels and the other major fisheries in which they participate.

Table 6.1.17 Other permits held by scallop limited access vessels – 1998

Fishery Permits	Scallop Permit Category			
	Full-time	Part-time	Occasional	All
Sea Scallops	217	47	30	294
Multispecies	33	13	11	57
Lobster	153	27	18	198
Summer Flounder	194	41	23	258
Scup	64	30	19	113
Loligo Squid & Butterfish	39	14	8	61
Illex	10	4	3	17
Black Sea Bass	67	26	18	111
Mackerel	127	20	19	166

Table 6.1.17 Species landed by scallop limited access vessels on trips when scallops are not caught – 1996
(thousand pounds)

Fisheries	Full-time	Part-time	Occasional
Fluke	1,040	990	630
Herring	25,795	-	-
Mackerel	3,692	3,708	915
Monkfish	2,028	929	1,428
Illex Squid	2,084	3,960	2,419
Loligo Squid	1,582	1,386	1,234
Clams	1,324	2,277	2,979
Regulated Multispecies	1,112	2,009	2,954
Scup	367	724	331
Shrimp	-	-	933
Dogfish	581	367	479
Skates	-	-	810
Other Groundfish	519	616	312
Total	48,337	31,198	29,955

Full-time vessels Monkfish is the most important species other than scallops caught on scallop trips, however, the landings shown above do include landings of monkfish on scallop trips. The 2 million pounds shown in the table above are only one-sixth of the total monkfish landings by

full-time scallop vessels, which were 12.3 million pounds in 1996. Fluke landings shown above, 1 million pounds, were about two-thirds of the total fluke landings by full-time scallop vessels (the other one-third was landed when scallops were caught). The species listed in the table were landed mostly when the full-time boats are not landing scallops. Herring, mackerel, illex squid, and sea clams are landed exclusive of scallop trips.

Part-time vessels Monkfish was the only species that reported along with scallops on scallop trips by part-time scallop vessels, but three-fourths of monkfish landings by this group occur exclusive of their scallop trips (929,000 of 1.3 million pounds). All the other species in the table were landed mostly when the part-time boats did not landing any scallops. Scup, menhaden, illex squid, and sea clams were landed exclusive of scallop trips.

Occasional scallop vessels By definition these vessels fish mostly in other fisheries.. Only one-seventh of their fluke landings occurs on trips landing scallops, they might land the rest while targeting fluke. These vessels land illex squid, shrimp and sea exclusive of scallop trips.

The proposed measures would impact other fisheries primarily by potentially displacing fishing effort. Almost all the potential displaced effort would be caused by reductions in DAS, rather than by closed areas. The 7-year rebuilding schedule would cause more fishing effort to be displaced than the 10-year-schedule because it calls for a more rapid reduction in scallop DAS.

It is very difficult to predict how much fishing will be displaced because of the regulations in other fisheries and because of the difficulty in assessing the economic feasibility for scallop vessels to switch fisheries. Fisheries management regulations, either current or proposed, will limit both access and harvest levels to these vessels and will have a limited impact on those fisheries.

- The proposed monkfish regulations will limit scallopers to targeting monkfish only on their scallop DAS. Therefore scallop DAS reductions will have a major impact in reducing monkfish landings by scallop vessels. Reported landings of monkfish on scallop trips were about 10.7 million pounds in 1996. Under the 10-year rebuilding option, if scallop DAS are reduced by about 25% per year over the net six years, there would be a corresponding expected decrease in the monkfish landings while fishing scallop DAS. However, closed areas in place of 25% of the DAS reductions (Option D) would reduce monkfish landings by scallop vessels while on scallop trips to a lesser extent than just DAS reductions (Option A).

  Additionally, in 1996 scallop vessels reported landing 4.4 million pounds of monkfish on fishing trips on which they did not catch scallops. These landings of monkfish will be eliminated by the proposed Monkfish FMP, which restricts scallop vessels to landing monkfish only while fishing scallop DAS.
- Only 33 full-time scallop vessels hold permits to the multispecies fishery and these are limited to their individual multispecies DAS allocations. As a result impacts on the multispecies fishery are expected to be minimal.
- The lobster regulations now closely control the catch of lobster by mobile gear through a trip limit. Therefore, displaced effort from the scallop fishery is not expected to have a major impact on this fishery.

- Scup and summer flounder are now regulated through quota systems that limit their overall catch. This does, however, create the potential for displaced scallop vessels to cause these quotas to be taken more quickly and adversely impact other participants in these fisheries.
- Although many full-time scallop vessels hold mackerel permit, it is unlikely that many can make the transition from a relatively, high-price, low volume species to a low price, high volume species like mackerel. Additionally, the ex-vessel marketing arrangements for species such as mackerel and herring are much more complicated than for scallops; there are relatively few buyers and much of the herring and mackerel product is sold on comparatively, unstable international markets.

6.2. Continuation of Mid-Atlantic Closed Areas

6.2.1. Biological impacts

The following description of impacts is taken from the Environmental Assessment prepared by NMFS.

6.2.1.1. Impacts on the environment

The proposed action will have a positive environmental benefit because the associated reduction in fishing mortality on the scallop stock will allow the resource to rebuild and contribute to a well-balanced, healthy marine ecosystem. The physical and biological environments in which this fishery takes place are fully described in the Supplemental EIS documents for Amendments 4 and 6.

6.2.1.2. Impacts on the scallop resource

The benefits of the interim action will be manifested through a more balanced age structure of the scallop stock. Even these proposed, relatively small closures can result in significant reductions in fishing mortality and increases in yield per recruit. The effort displacement onto other parts of the scallop resource probably will have an insignificant effect because it will be widely dispersed throughout the Mid-Atlantic area.

Closures provide conservation opportunities that would contribute to the stock rebuilding effort. Special management of these areas could serve as a prototype for the entire fishery to augment current and future effort reductions. Closed area management may be used for the following reasons:

- To protect small scallops - This measure would allow the Council to establish closed areas to protect small scallops for a specified period of time to enhance yield per recruit. The SAW has advised the Council that high concentrations of scallops are present in the current groundfish closed areas. These concentrations demonstrate that closed areas can be used to protect small scallops until they reach a desirable size or concentration for harvest;
- Seeding - To establish areas to enhance the scallop resource through the seeding of small scallops; and
- Spawning protection - To protect concentrations of large, relatively productive spawners by leaving them undisturbed for a period of time.

Results of the 1997 survey indicate that indices of relative abundance and biomass in both the Mid-Atlantic and Georges Bank regions decreased from their 1996 levels. Because of the

increase in pre-recruits and the effect of the weak 1993 year-class, the entire Mid-Atlantic scallop population had a high proportion of small scallops in 1997; 59% of the scallops caught were >80-count and 14% were in the 80-40-count category. About 77% of the harvestable biomass in Georges Bank were <30-count (larger-sized scallops). The proportion of harvestable biomass in the 80-40-count category (12% in 1997) has decreased substantially since 1992. The groundfish closed areas probably resulted in the increased biomass and abundance of <30-count scallops in the Georges Bank region.

Due to the relatively low stock condition in the Mid-Atlantic region, reductions in scallop landings and the time needed for the Council to develop measures to address these problems, prompt management action is needed in order to protect small scallops in these areas. The benefits of the interim action will be manifested through a more balanced age structure of the scallop stock. Even these proposed, relatively small closures can result in significant reductions in fishing mortality and increases in yield per recruit.

The proposed action will have a positive environmental benefit because the associated reduction in fishing mortality on the scallop stock will allow the resource to rebuild and contribute to a well-balanced, healthy marine ecosystem. The physical and biological environments in which this fishery takes place are fully described in the FEIS of Amendments 4 and 6.

Biological impacts of the implementation of these regulations are positive. Analyses indicate that the implementation of the action will be a positive step towards stock rebuilding as well as initiating the long-term management of the scallop fishery.

Based on valid vessel trip reports collected in 1995-1997, the fractions in percent of days fished (DF), days absent (DA), and kept landings (Pounds) in open and closed areas are shown in Table 6.2.4. During the 1995-1997 period, the fraction of efforts (DF and DA) and landings for the vessels using scallop dredges increased in the Virginia Beach Closed Area, except that of DF. This trend was coincident with the increasing pre-recruits (Figures 6-6 and 6-7) in the Virginia Beach Closed Area. Although the fraction of DA and DF for the vessels using scallop trawls fluctuated from 1995 to 1997, a sudden increase of effort and landings was observed in the Virginia Beach Closed Area. The SAW also reported increasing fractions of landings from vessels using trawl gear in the Mid-Atlantic region.

Projection of the scallop population in the closed areas

Hudson Canyon and South closure

The 1997 recruitment index was 65 scallops/tow, around the 38 percentile in the survey history.

Under the no fishing scenario (area closed) the biomass will increase at least 64% for low recruitment (0-25 percentile) but 94% for moderate recruitment (25-50 percentile) during mid-1998. If the resources in this area are harvested at F=0.85 (the current fishing mortality rate), the stock will decrease 16% at mid-1998 if low recruitment (0-25 percentile) occurs. With a moderate level of recruitment, the biomass increases upon the assumed level of recruitment, even if F=0.85.

After a one-year closure, the biomass will be at least twice the level as under the status quo fishing mortality rate. These projections are found in Table 6.2.5, which also includes projections at Fmax for illustrative purposes.

Virginia Beach closure

The recruitment index in 1997 was 301 scallops/tow, the highest ever observed in this area.

Under the no fishing scenario (area closed) the biomass will increase at least 78% during mid-1998, even if recruitment in 1998 is assumed to be at a low level (mean of (0-25 percentile)). If, on the other hand, the observed recruitment in 1998 is at the same level as 1997 (assumed to be a mean of (75-100 percentile)), the biomass at mid-1998 will increase 141%.

In contrast, if the area continues to be harvested at the current F (=0.85), the biomass will decrease at mid-1998, even if a moderate high (mean of (50-75 percentile)) is assumed. Comparing the biomass at mid-1998 for the scenarios of no fishing and status quo F, the biomass of the no fishing scenario is more than twice that of status quo F at lower levels of recruitment (means of (0-25 percentile) and (25-50 percentile)). Assuming that 1998 recruitment is at a high level (mean of (75-100 percentile)), the biomass of the no fishing scenario is at least 50% more than F=0.85. In any case, the biomass will at least double in a one-year period if the area is closed, even if recruitment is low (mean of (0-25 percentile)).

It appears then that the resources in this area will not be sustainable with F=0.85 unless there is a high level of recruitment (mean of (75-100 percentile)). (Table 6.2.6)

Table 6.2.1 Number of participants potentially affected by closed areas

Number of entities (#) and percentage of the permit category (%) potentially affected based on fishing locations reported during 1996.

Closed Area	Limited Access Permit Category							
	Full-Time		Part-Time		Occasional		Total	
	#	%	#	%	#	%	#	%
South of Hudson Canyon	121	43.7	11	16.9	3	9.7	135	36.2
Virginia Beach	26	9.4	1	1.5	0	0	27	7.2
Combined Areas (excludes duplication)	125	45.1	12	18.5	3	9.7	140	37.5
Total Limited Access Permits in 1996	277[1]	-	65[2]	-	31[3]	-	373	-

Notes - During the 1996 season, there were 277 full-time permits (including category 5 for part-time small dredge with full-time allocations), 65 part-time permits (including category 6 for occasional small dredge with part-time allocations), and 31 Occasional permits for a total of 373. Permit counts include 39 "history" (sometimes called "latent") permits.

[1]Includes 5 category 5 permits (part-time, small dredge) that received full-time IVEQs and 27 "history" permits associated with sunk or unseaworthy vessels.

[2]Includes 8 category 6 permits (occasional, small dredge) that received part-time IVEQs and 10 "history" permits associated with sunk or unseaworthy vessels.

[3]Includes 2 "history" permits associated with sunk or unseaworthy vessels.

Table 6.2.2 Potential impacts of area closures on gross revenues of participants in the scallop fishery

Number and percentage of small business entities in the limited access sector of the fishery that reported geographic coordinates in and landings from the closed areas (both Hudson Canyon South and Virginia Beach) during 1996				
Percentage of total annual revenues from fishing in the Northeast Region	Sea Scallop		Total Scallop Trips(all species)	
	Number[1]	Percentage	Number[1]	Percentage
<5%	11	8.0	13	9.5
5-25%	51	37.2	56	40.9
26-50%	40	29.2	33	24.1
51-75%	15	10.9	16	11.7
76-100%	20	14.6	19	13.9
5-100%	126	92.0	124	90.5

[1]Three vessels did not appear in the dealer report tables; therefore, the total does not correspond to that in Table 6.2.1.

Figure 6-5

Figure 6-6 Distribution recruits and pre-recruits by area

Figure 6-7 Percentage distribution of recruits and pre-recruits by area

Table 6.2.3 - Contribution of scallop trips in the areas to port revenue in 1996

Contribution of scallop trips in the closed areas to port revenue in 1996. Closed areas were approximated by quarter-degree squares that overlapped the closed area boundaries. Revenue on scallop trips include all species landed (e.g., monkfish as well as scallop). Revenue in million dollars. "%T" is percent of total scallop trip revenue. "%P" is percentage of total port revenue.

Port	Port Revenue		Closed Area									
	Total (all species and gear)	Scallop Trips (all species harvested by scallop dredge and scallop trawl)	Scallop Gear	Hudson Canyon South			Virginia Beach			Closed Areas Combined		
				$	% T	% P	$	%T	%P	$	%T	%P
New Bedford and Cape Cod, Massachusetts	119.3	50.4	Dredge	5.062	10.1	4.2	0	-	-	5.062	10.1	4.2
			Trawl	0	-	-	0	-	-	0	-	-
			Both	5.062	10.1	4.2	0	-	-	5.062	10.1	4.2
Cape May, New Jersey	27.0	8.7	Dredge	1.953	11.0	7.2	0.027	0.1	0.1	1.980	11.1	7.3
			Trawl	1.307	7.4	4.8	0	-	-	1.307	7.4	4.8
			Both	3.260	18.4	12.0	0.027	0.1	0.1	3.287	18.5	12.1
Other New Jersey	38.6	3.0	Dredge	0.949	31.3	2.5	0	-	-	0.949	31.3	2.5
			Trawl	0	-	-	0	-	-	0	-	-
			Both	0.949	31.3	2.5	0	-	-	0.949	31.3	2.5
Hampton, Virginia	7.7	6.6	Dredge	1.916	29.1	24.7	0.156	2.4	2.0	2.070	31.5	26.7
			Trawl	1.039	15.8	13.4	0	-	-	1.039	15.8	13.4
			Both	2.955	44.9	38.1	0.156	2.4	2.0	3.109	47.3	40.1
Other Virginia	14.7	13.7	Dredge	4.321	32.3	29.4	0.632	4.7	4.3	4.953	37.0	33.7
			Trawl	1.180	8.8	8.0	0	-	-	1.180	8.8	8.0
			Both	5.501	41.1	37.4	0.632	4.7	4.3	6.133	45.8	41.7
TOTAL	207.3	82.4	Both	17.7	21.5	8.5	0.8	1.0	0.4	18.5	22.5	8.9

Table 6.2.4 Percent of days fished, days absent, and kept landings (pounds) for scallop dredges and trawls fishing in the Mid-Atlantic region in 1995-1997

	Scallop Dredge			Scallop Trawl		
	1995	**1996**	**1997**	**1995**	**1996**	**1997**
Days Fished	%	%	%	%	%	%
OPEN AREA	78.62	81.05	81.49	82.95	68.35	73.73
CLOSED AREA						
Hudson S.	19.58	10.56	10.97	17.05	31.65	9.32
Virginia Beach	1.8	8.39	7.54	0.00	0.00	16.95
DAYS ABSENT	%	%	%	%	%	%
OPEN AREA	74.16	78.19	80.40	79.95	67.95	71.58
CLOSED AREA						
Hudson S.	22.67	18.53	11.98	20.05	32.05	22.77
Virginia Beach	3.17	3.28	7.62	0.00	0.00	5.65
KEPT POUNDS	%	%	%	%	%	%
OPEN AREA	83.85	76.68	81.90	76.79	69.30	74.92
CLOSED AREA						
Hudson S.	13.76	19.84	10.28	23.21	30.70	20.75
Virginia Beach	2.39	3.48	7.82	0.00	0.00	4.32

Table 6.2.5 A - Hudson Canyon South Closed Area- biomass population projections.

Low recruitment – mean of (0-25 %) = 24.90041337						
	F = 0		F = 0.85 (SQ)		F_{max} = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	830.50		830.50		830.50	
1998.5	1358.82	63.62	700.03	-15.71	1118.29	34.65
1999	1970.92	137.32	620.42	-25.30	1363.03	64.12

Table 6.2.5 B

Moderate recruitment mean of (25-50 %) = 76.49						
	F = 0		F = 0.85 (SQ)		Fmax = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	874.44		874.44		874.44	
1998.5	1652.64	94.02	972.78	16.27	1405.56	65.76
1999	2752.78	219.83	1224.55	45.06	2081.83	143.10

Table 6.2.5 C

High recruitment mean of (50-75 %) = 178.848						
	F = 0		F = 0.85 (SQ)		Fmax = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	961.64		961.64		961.64	
1998.5	2235.68	146.12	1514.01	71.08	1975.60	119.08
1999	4304.24	361.23	2423.34	165.64	3508.17	278.45

Table 6.2.5 D

Very high recruitment mean of (75-100 %) = 406.26						
	F = 0		F = 0.85 (SQ)		Fmax = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	1155.36		1155.36		1155.36	
1998.5	3530.97	233.73	2716.40	163.23	3242.00	208.72
1999	7750.99	598.99	5086.57	368.38	6676.93	506.03

Note: F=0 means no fishing; (SQ)=status quo mortality rate due to fishing; Fmax=fishing rate that maximizes yield per recruit

Table 6.2.6A Virginia Beach Closed Area - biomass population projections

Low recruitment - mean of (0-25%)= 3.86						
	F = 0		F = 0.85 (SQ)		Fmax = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	2225.36		2225.36		2225.36	
1998.5	3952.52	77.61	1762.16	-20.81	3143.79	41.27
1999	5352.43	140.52	1053.83	-52.64	3366.52	51.28

Table 6.2.6B

Moderate recruitment - mean of (25-50 %) = 21.62						
	F = 0		F = 0.85 (SQ)		Fmax = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	2250.18		2250.18		2250.18	
1998.5	4100.76	83.34	1890.44	-14.88	3285.63	47.12
1999	5703.31	154.56	1286.99	-41.70	3673.43	64.35

Table 6.2.6C

High recruitment - mean of (50-75 %) = 66.49						
	F = 0		F = 0.85 (SQ)		Fmax = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	2312.92		2312.92		2312.92	
1998.5	4475.40	97.28	2214.63	-0.46	3644.11	61.34
1999	6590.09	188.71	1876.25	-15.09	4449.09	96.14

Table 6.2.6D

Very high recruitment - mean of (75-100 %) = 223.54						
	F = 0		F = 0.85 (SQ)		Fmax = 0.24	
Year	Biomass	%change	Biomass	%change	Biomass	%change
1998	2532.48		2532.48		2532.48	
1998.5	5786.58	140.62	3349.27	44.38	4898.72	105.56
1999	9693.69	294.90	3938.57	67.65	7163.77	195.00

Note: F=0 means no fishing; (SQ)=status quo mortality rate due to fishing; F_{max} =fishing rate that maximizes yield per recruit

6.2.1.3. Impacts on other species

The proposed action will continue the closure of two areas in the Mid-Atlantic region to fishing by federally permitted scallop vessels. This action is not expected to impact other species currently caught with other types of fishing gear. The Council has received no comments indicating that there were adverse impacts on other species, since the earlier interim action implementing the closures.

6.2.2. Economic Impacts

The Environmental Assessment for the interim closures indicated that they may impose a short-term cost on some vessels, but that the "economic losses from implementation of the interim action are expected to be recuperated in the short-term as discards are reduced and scallops are harvested at larger sizes."

Analyses indicate that these measures may impose a short-term cost on some vessels, but they will be able to harvest scallops from the remaining open areas. Vessels fishing for species other than scallops will not be excluded from the closed areas; therefore, there is no economic impact beyond that on the scallop industry. When these areas are reopened, average revenue per DAS should increase because of increased stock abundance and higher prices paid for the larger scallops.

During 1996, 140 vessels, or 37.5 percent of the limited access sector of the fishery, reported scallop landings from the specified areas (Table 6.2.1). Most activity was in the area south of Hudson Canyon. From a gear perspective, 30.4 percent of the permitted scallop trawl vessels and 46 percent of the permitted scallop dredge vessels harvested scallops from these areas. Only one General Category permit (out of 2003) during 1996 reported fishing in the specified areas.

Gross revenues earned during scallop trips in the specified areas were also investigated (Table 6.2.2). Compared to their total annual revenues throughout the Northeast Region (all fisheries and gear), more than 90 percent of the potentially affected small business entities grossed 5 percent or more scallop revenues and total annual revenues from the specified areas during 1996 (Table 6.2.2).

Although they will be excluded from the closed areas, small entities will be able to harvest scallops from the remaining open areas. This option will ameliorate revenue impacts. In addition, 15 of the small entities reporting scallop landings from the specified areas held either Part-time or Occasional Category Permits (Table 6.2.1), indicating business opportunities in other fisheries or industries during part of the year. Of these, 10 were scallop trawl vessels.

Vessels using gear other than scallop gear will not be excluded from the closed areas; therefore, there is no economic impact beyond that which impacts on the scallop industry.

On the basis of reported fishing activity during 1996, more than 20 percent of the small entities grossed more than 5 percent of annual revenues from the specified areas.

The fishing industry will not be required to purchase new gear or equipment or to undertake new reporting requirements as a result of the closed areas. Fishing related costs may increase or decrease depending on alternative fishing

In contrast to taking no action, continuation of the closures will continue to allow scallops to grow in size and market value within the closed areas. For example, between ages 3+ and 5+ years, sea scallops increase in size from 60/70 meats per pound (MMP) priced at about $4.50 per pound to 10/20 MPP priced at $7. Therefore, delaying harvest up to two years could increase revenue 400 percent when the weight and price differentials are combined, depending on total domestic landings and imports. This gross benefit would be diminished somewhat by natural mortality during the interim and by an increase in premature harvest caused by effort displaced into the remaining open areas.

The ports potentially affected by reduced landings from the closed areas are shown in Table 6.2.3. This information is revenues from scallop trips (all species, e.g., monkfish as well as scallops) during 1996 (most recently available data) that reported geographic coordinates within quarter-degree squares that overlap the specified areas. Non-reporting of coordinates on the vessel logs or difficulty in linking the logs to dealer reports might have underestimated impacts and caused some ports to be omitted. In contrast, activity outside the areas could be included because the quarter-degree squares are larger than the closed areas.

During 1996 (Table 6.2.3), New Bedford obtained 10.1 percent of its scallop trip revenue and 4.2 percent of total port revenue from scallop dredge vessels operating in Hudson Canyon South; no revenue came from Virginia Beach. New Jersey ports other than Cape May also reported scallop landings from Hudson Canyon South but nothing from Virginia Beach. About third of the scallop trip revenues in these ports came from dredge vessels in the specified areas, but this amounted to only 2.5 percent of total port revenue.

The remaining ports listed in Table 3 received scallop trip revenue from both specified areas and from both scallop dredge and scallop trawl gear. Cape May reported 18.4 percent of scallop trip revenue and 12.0 percent of total port revenue coming from the specified areas, mostly Hudson Canyon South. In contrast, ports in Virginia obtained over 45 percent of their scallop trip revenue and over 40 percent of total port revenue from the specified areas, but particularly from Hudson Canyon South. Most revenue was from dredge trips, but scallop trawl trips reported more than $1 million from the specified areas.

6.2.3. Social impacts

These closures are a continuation of closures implemented in April of 1998. They are designed to protect small scallops, and as such have fairly strong support among fishermen. The Virginia beach closure is in statistical area 632. The Hudson Canyon closure is in area 622. As seen in Table 6.2.7, all of area 632 has shown decreasing importance over the last several years, as measured by the percent of total scallop landings taken from that area. Area 622 has been more productive, but also shows a strong decline over the past three years.

Georges Bank Closures

The current groundfish closures include portions of area 561, 562, 526, 521 and 522 [Note these closures pre-date the proposed action]. Area 521 has been of increasing importance for scallopers in recent years (Table 6.2.7). Each of the other areas, however, represents less than 5% of total landings. It should be kept in mind these figures represent landings from the entirety of each statistical area, while the proposed closures affect only portions of these areas.

Table 6.2.7 Percent of landed pounds in areas accounting for 5% of total scallop landings

	1994	1995	1996	1997
514	<5%	<5%	5%	<5%
521	<5%	<5%	12%	20%
525	<5%	<5%	6%	7%
613	<5%	6%	<5%	12%
615	<5%	9%	9%	9%
616	<5%	23%	17%	10%
621	6%	7%	<5%	<5%
622	7%	15%	12%	6%
626	20%	14%	9%	<5%
632	8%	<5%	<5%	<5%
Total No. Trips With Area Reported	1086	1701	1649	1133

(Note: Only trips which identified an area of catch are included.)

All closures

Looking at state-level effects in the statistical areas affected or potentially affected by closures, in 1997: 98% of landings from area 521 were in MA, as were 90% of landings from area 522, 96% of landings from area 526, and 97% of landings from area 562. From area 622, 72% of landings were in VA, 27% in NJ, and 1% each in NC and MA. Virginia also had 94% of landings from area 632.

Among the top areas for scallops not mentioned above, 98% of the landings from area 525 were in MA. Landings from area 613 were more spread out: 37% in MA, 24% in VA, 23% in NJ, 10% in CT and 6% in RI. For area 616, 43% of landings were in VA, 28% in NJ, 22% in MA, 6% in CT and 2% in NC.

6.2.4. Impacts on other fisheries

Vessels fishing for species other than scallops will not be excluded from the closed areas; therefore, there are no fishery or economic impacts beyond those imposed on the scallop industry. Most scallop vessels displaced by the closed areas have a limited number of scallop DAS and are likely to use those to fish for scallops in other areas. The impact of this activity on other fisheries will be insignificant because the amount of displaced scallop effort is small compared to the scallop effort for the entire Mid-Atlantic region and the displaced effort will be dispersed over a much larger area than the closure areas.

6.2.5. Impacts on endangered and protected species

These impacts were described in the Environmental Assessment associated with the NMFS Interim Action to Implement Sea Scallop Protection Measures in the Atlantic Sea Scallop Fishery (February 1998). According to the Environmental Assessment, the proposed action of closing the areas would have no adverse impacts on protected species within the sea scallop management unit.

7.0 Compliance with Magnuson-Stevens Act National Standards

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

This amendment includes all elements of optimum yield as defined by the Sustainable Fisheries Act and the final guidelines published On May 1, 1998. Optimum yield , an overfishing definition, and a rebuilding schedule are described in Section 4.1.

Optimum yield (Section 4.1.2) is defined as the yield produced by the target fishing mortality rate when the stock is at a target level. The long-term target fishing mortality rate is F_{max} (the F_{MSY} proxy) as adjusted to reduce the likelihood of exceeding this threshold level. The target biomass level is a proxy value for the stock level that will produce MSY on a continuing basis. Optimum yield, therefore, is measurable, given some assumptions about the relationship among scallop survey biomass indices, fishing mortality, commercial catch and fishing effort.

The overfishing definition includes the four types of reference points recommended in the National Standard 1 guidelines (50 CFR, 600.310). These reference points are a fishing mortality threshold consistent with F_{MSY}, a minimum biomass threshold, a biomass target consistent with B_{MSY} and a long-term, risk-adverse fishing mortality target.

The rebuilding schedule for scallops is 10 years. This period provides the maximum opportunity for fishing communities to survive the transition to MSY-based management consistent with the SFA.

(2) Conservation and management measures shall be based upon the best scientific information available.

The amendment is based on the most recent information from the fishery as evaluated by the Council's Overfishing Definition Review Panel and the Scallop Plan Development Team. An experimental fishery currently is underway in the groundfish closed areas to gather new and additional data about scallop abundance, the relationship between commercial and survey catch rates, and finfish bycatch. These, data however, are not available at this time.

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Atlantic Sea Scallops are managed as a single unit. There are no differences in EEZ regulations throughout the range of the scallop resource. The proposed action does not alter the management unit.

(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried

out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

This amendment does not: 1) make any allocations of fishing privileges based on state residency; 2) change the way DAS allocations or other fishing privileges are allocated among limited access scallop permit holders or 3) encourage particular individuals, corporations, or other entities to acquire an excessive share of such privileges.

(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

This amendment promotes overall efficiency in the fishery by reducing the long-term level of fishing effort to that which will produce the maximum sustainable yield. This amendment eventually will increase catch rates in the fishery (Section 6.2.2)

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Fishing mortality targets also are specified in terms of the size of scallops caught. If the size increases through a future rotational area management strategy or continues to increase through a current measures such as crew limits or minimum ring size in scallop dredges, then the fishing mortality targets would be changed. The amendment establishes an annual monitoring and adjustment process to make these and other changes needed to rebuild the resource.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The proposed action adjusts already existing measures and does not include any additional types of measures to be implemented at this time. Additional, measures, such as those that may be implemented under the framework adjustment process will be evaluated under this standard at that time.

(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The proposed action meets the requirements of this national standard by allowing the scallop fishing industry the maximum allowable time (10 years) to adjust to a MSY-based management approach required under National Standard 1. If the Council did not consider community impacts, and based its decision solely on maximizing biological benefits and net national economic benefits, it would have chosen the 7-year or a shorter rebuilding option. One of the major reasons it chose the proposed action, was to allow scallop fishermen to adjust to DAS reductions through a vessel buyback program as well as through some other possible options, before it might further cutback fishing.

(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

The proposed action will substantially reduce bycatch by substantially reducing the allowable DAS for limited access scallop permit holders. Long-term DAS levels for limited access permit holders are estimated to be about 13,400 days compared to about 19,000 under the status quo management system. This represents a 29% reduction in fishing levels and an expected, corresponding reduction in bycatch of other species. Additionally reduced fishing effort will increase the yield per recruit and vessels will be able to reduce their dependence on scallop grounds containing large concentrations of small, recruiting scallops. Instead they will be able to direct their effort to areas with predominantly large scallops.

At present there is not enough reliable data to estimate the bycatch in the scallop fishery; either the bycatch of scallops not landed or the bycatch of other species. Although scallop permit holders must submit vessel trip reports on which they are required to estimate bycatch levels, the Council does not feel that this is a reliable method for gathering information about bycatch. There has been sea sampling of several scallop trips but not enough to provide a reliable estimate of the bycatch for the whole fishery.

The Council hopes to address these shortcomings through its participation in the Atlantic Coastal Cooperative Statistics Program.

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The proposed action does not change the type of measures already implemented under the current FMP. By rebuilding scallop stocks to higher levels, the proposed action will reduce the current need for vessels to travel to distant grounds to make up for the scarcity of scallops closer to their home ports. This would decrease the exposure of scallop fishermen and vessels to bad weather and other risk factors.

8.0 Compliance with Other Applicable Laws

8.1. National Environmental Policy Act (NEPA)

Background

The Environmental Impact Statement (EIS) which is supplemented by this document was included in the Atlantic Sea Scallop FMP submitted in January 1982. The Council submitted a Supplemental EIS for Amendment 4 in August 1993 because the amendment substantially changed the management system for sea scallops.

The required sections of the Final Supplemental Environmental Impact Statement are included in Sections 1 through 7 and Section 9 of this document except for those sections specifically listed below. These sections contain a description of the proposed action and alternatives, and analyses of their physical, economic, social impacts, including cumulative environmental impacts, impacts on endangered and protected species, other fisheries, fishing communities and other fisheries.

8.1.1. Major conclusions

The proposed actions and alternatives will not have an adverse impact on the physical environment for the following reasons:

- The proposed action and alternatives will substantially reduce the level of fishing in the Atlantic sea scallop fishery in the EEZ. The result is that there will a reduction in any level of cumulative impacts of the scallop fishery on the physical environment compared to those from the no-action alternative because of the reductions in fishing effort compared to taking no-action. Substantially less than 100% of the reduction in fishing is expected to transfer to other fisheries. (Section 6.1.6 – Impacts on Other Fisheries)
- The restrictive management regulations in many other managed fisheries such as in the northeast multispecies and the summer flounder fisheries will prevent a large shift in fishing effort from the scallop fishery. Also the scallop vessels will face difficult problems if they try to adjust to higher volume, lower price species such as herring or mackerel, with very limited markets compared to those for sea scallops.

The proposed actions and alternatives will have:

- severe, negative short-term economic and social impacts including impacts on fishing communities including decreased landings, employment, impacts on shoreside industries, etc.
- positive long-term economic impacts including increased landings, catch rates, vessel profits crew earnings, consumer benefits and net national economic benefits
- both positive and negative long-term social impacts including impacts on fishing communities.

8.1.2. EIS circulation list

The following is a list of government agencies and fishing industry organizations, in addition to members of the New England Fishery Management Council , who were sent copies of the Final Environmental Impacts Statement. Other interested parties may obtain a copy from the NEFMC office (see cover)

Government Agencies

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8.1.3. List of preparers

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8.2. Regulatory Impact Review (RIR)

Background

The Regulatory Impact Review (RIR) provides an assessment of the costs and benefits of proposed action and other alternatives in accordance with the guidelines established by Executive Order 12866. The regulatory philosophy of Executive Order 12866 stresses that, in deciding whether and how to regulate, agencies should assess all costs and benefits of all regulatory alternatives and choose those approaches that maximize net benefits to the society.

The RIR also serves as a basis for determining whether any proposed regulations are a "significant regulatory action" under the criteria provided in Executive Order 12866 and whether the proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act of 1980 (RFA).

This RIR summarizes the effects of the proposed management plan and other alternatives considered in this amendment developed to rebuild the scallop resource. The Amendment 7 document contains all the elements of RIR/RFA and the relevant sections are identified by reference to the document. The Initial Regulatory Flexibility Analysis, which evaluates the impacts of management alternatives on small businesses, is provided in section 8.3.

Problem statement
The problem statement is described under the purpose and need for management (statement of the problem) in section 2.0 of the amendment document.

Management objectives
The management objectives are explained in section 4.1 of this document.

Management alternatives
The proposed action is described in section 4.2 of the amendment document. Alternatives to the proposed action are summarized in section 4.7.

analysis of management alternatives
The cost-benefit analysis of the proposed action and non-selected alternatives is provided in Section 6.1.4 of this document. The estimated landings, prices, revenues, producer surplus, consumer surplus, employment and total net benefits to the nation under the management options were contrasted with the estimated trends under baseline.

Enforcement costs
The cost-benefit analysis assumes that there will be no significant change in the costs to administer, monitor and enforce DAS as a result of the proposed measures. The basis for this assumption is that under the proposed action, the costs associated with setting up a monitoring and enforcement system have already been covered under the mandates of the previous amendment, Amendment 4, to the sea scallop plan. Therefore, the measures proposed under Amendment 7 are not expected to change these costs and the compliance costs in any way.

Summary of regulatory impacts

- Under the proposed option, and with the exception of the first year (1999), scallop landings are expected to be below baseline levels for about eight years, then to surpass the projected baseline landings starting the year 2008 by about 4 million pounds a year (Table 8.2.1). In 1999, the first year, the landings are expected to be greater under the proposed option because of a higher number of DAS are allocated to vessels (120 DAS for full-time vessels) compared to the baseline scenario. Baseline DAS levels were estimated assuming that the full-time allocation would have been adjusted down to 80 DAS to meet the fishing mortality objectives of Amendment 4.

- The estimated fleet (ex-vessel) revenues under the proposed option will exceed the baseline level in the first year (1999), but in the next 8 years starting the year 2000, they will be below the baseline revenues. The decline in revenues compared to baseline is about $17 million or 38 percent in 2000, and about $10 million or 10 percent in 2008 (Table 8.2.1). Including the multiplier effects of these reduction, total sales revenues in the coastal communities of the Northeast Region may decline by $30.6 million in year 2000, and by $18 million in year 2008 compared to the baseline levels (see section 6.1.4.3 of the amendment document). In 1999, the first year, the ex-vessel revenues are greater under the proposed option for the reasons explained above, i.e., because a higher number of DAS are allocated to vessels (120 DAS for full-time vessels) compared to the baseline. On the other hand, if no such adjustment were made and the allocations remained at 142 DAS in 1999 for full-time boats, revenues under the proposed action of 120 DAS would decrease by about 15 percent.

- After 2007, however, total fleet revenues will increase and exceed the baseline levels by about $20 to $25 million, or about 25 percent per year under both the proposed action and 7-

or 10-year rebuilding (Tables 8.2.1 and 8.3.2). With the multiplier effects the increase in annual sales revenues in the Northeast region will range between $36 to $45 for the same period.

- Because of the reduction in effort (DAS), the operating costs of the scallop fleet will decline under the proposed and non-preferred alternatives compared to the baseline levels except in 1999, the first year of the program, when the DAS (120) exceed the baseline level (80). The cost savings under the proposed action will range between $6 to $11 million per year during the period 2000-2008. In the next ten years, these savings will stabilize around an annual $6 million (Figure 6.3 in section 6.1.4).
- Under the projected resource conditions, the full-time scallop vessels will not be able to break-even under any of the alternatives proposed by this amendment during the first six to nine years of the program (Table 6.1.2 in section 6.1.4). Under these conditions, it is unlikely that the majority of the vessels will be able to continue fishing since they would not earn any profits from their operations and would not even pay for their expenses for the first six to seven years. Therefore, the proposed action will have severe negative impacts on the financial viability of the scallop fleet.
- After the first six to nine years, however, as the scallop resource rebuilds and landings increase, vessel revenues will increase. Since, at the same time, the operating costs will decrease with the reduced DAS, the excess of revenues over costs will gradually widen making it possible for vessels to fully cover their fixed and variable costs (Table 6.1.2 and section 6.1.4.2).
- The annual benefits of the proposed measure, as estimated by the sum of consumer and producer surplus, will be above the baseline level in 1999, but then fall below baseline benefits starting year 2000 and until year 2008 (Table 8.2.2). The economic benefits would be below baseline levels for the first six years under the 7-year rebuilding schedule, and for 10 years under the 10-year rebuilding. Therefore, the impact of the proposed action and the non-selected alternatives (7- and 10-year rebuilding) on net national benefits will be negative during the first 10 years of the program, although the annual impacts will not generally exceed $40 million (Table 8.2.2 and Table 6.1.4 in Section 6.1.4).
- The proposed action is expected, however, to produce a discounted net benefit of $53 million over the next twenty years. The net national benefits are higher under the 7-year rebuilding period and the proposed action, compared to the 10-year rebuilding schedule. The 7-year option rebuilds stocks faster and results in higher landings and landings per DAS in a shorter period compared to the 10-year rebuilding. However, the gradual reduction in effort under the proposed option from 142 DAS in 1998 to 120 DAS in 1999, for the full-time boats, was adopted to mitigate a variety of unquantifiable social and economic adjustment costs. Fleet revenues would decline by 61 percent in 1999 if a 7-year rebuilding schedule was adopted (Table 8.2.3 in section 8.3). Certainly, such a sharp reduction in annual fleet revenues would increase unemployment and the likelihood of vessel bankruptcies. Therefore, the higher economic benefits from an accelerated fishing reduction program would be decreased by these unquantifiable negative impacts.

Table 8.2.1 Impact of management alternatives on landings and revenues

Year	Landings (Million Pounds)				Revenues ($ Million in 1996 Prices)			
	Baseline	Proposed Alternative	10-year Rebuilding	7-year Rebuilding	Baseline	Proposed Alternative	10-year Rebuilding	7-year Rebuilding
1999	9.0	13.6	3.3	8.4	64.0	93.0	59.9	24.7
2000	10.1	6.1	4.2	9.2	71.4	44.4	65.4	31.1
2001	12.1	7.6	6.3	9.6	85.2	55.1	68.8	46.0
2002	13.4	8.8	8.2	9.7	93.7	63.7	69.9	59.7
2003	14.1	10.3	9.9	9.3	99.1	74.3	68.0	72.0
2004	14.7	8.7	11.7	7.5	103.1	64.0	55.8	84.0
2005	15.0	10.3	16.7	9.4	105.7	75.5	69.5	116.1
2006	14.9	11.9	17.6	10.9	106.3	87.1	80.4	122.7
2007	15.0	13.4	18.3	12.3	107.8	97.3	90.1	128.0
2008	15.0	18.8	18.8	17.6	108.3	131.5	124.5	132.0
2009	14.9	19.1	19.0	18.4	108.6	134.5	130.0	134.1
2010	15.0	19.3	19.3	18.7	110.1	136.7	132.8	136.6
2011	14.9	19.4	19.4	19.0	110.1	138.1	136.0	138.0
2012	14.9	19.4	19.4	19.2	111.0	139.2	138.1	139.4
2013	15.0	19.5	19.3	19.2	112.3	140.9	139.2	139.6
2014	15.0	19.4	19.4	19.2	113.2	140.9	140.3	141.4
2015	14.9	19.3	19.2	19.3	113.2	141.6	141.6	140.7
2016	15.0	19.4	19.2	19.4	114.6	143.1	143.2	141.7
2017	15.2	19.4	19.4	19.5	116.2	143.9	144.5	143.9

- The level of employment in the scallop fishing industry is expected to decline because of the reduction in the fishing time (DAS), and because of the multiplier effects of reduced revenues in the fishing industry for the eight years of the program beginning in year 2000 (see Table 6.1.5 in section 6.1.4 of amendment document). The percentage decline in employment is estimated to be almost equivalent, around 28 percent at the end of the rebuilding period under all alternatives. This estimate does not, however, take into account potentially positive impacts of the proposed action on total employment in the region in the later years. An increase in fishing revenues during the second half of the program will create demand for other goods and services in the area. This will subsequently lead to an increase in production and employment in various sectors of the economy offsetting to some degree the reduction in employment in scallop fishing.
- Under the proposed action, employment measured by total crew DAS will improve in 1999 compared to the baseline scenario (see Table 6.1.5 in section 6.1.4). This assumes that the full-time allocation would have been adjusted down to 80 DAS under the baseline to meet

the fishing mortality objectives of Amendment 4. On the other hand, if no such adjustment were made and the allocations were remained at 142 DAS in 1999 for full-time boats, employment under the proposed action of 120 DAS would fall by 15 percent.

- The distributional impacts of the proposed regulations will be similar for vessels of different tonnage and horsepower (see section 6.1.4.4 of the amendment document and Tables 6.1.8 and 6.1.9).
- Finally, by increasing the scallop catch rates in the long run and reducing operating costs, the proposed action is expected to make the scallop industry more productive.

Table 8.2.2 Annual benefits (consumer and producer surplus) of the management options

(million dollars in 1996 prices)

Year	Baseline	Proposed Alternative	10-year Rebuilding	7-year Rebuilding
1999	48	69	45	19
2000	56	34	52	25
2001	70	46	57	40
2002	79	56	60	54
2003	85	67	60	67
2004	89	59	50	76
2005	92	71	64	111
2006	93	83	76	118
2007	94	93	86	124
2008	95	128	121	128
2009	95	131	126	130
2010	96	133	129	133
2011	96	135	132	134
2012	97	136	135	136
2013	99	138	136	136
2014	100	137	137	138
2015	100	138	138	137
2016	101	140	140	138
2017	103	140	141	140

Determination of significant regulatory action

Executive order 12866 defines a "significant regulatory action" as one that is likely to result in: a) an annual effect on the economy of $100 million or more or one which adversely affects in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; b) a serious inconsistency

or interference with an action taken or planned by another agency; c) a budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; d) novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order.

The preceding analysis shows that Amendment 7 would constitute a "significant regulatory action" since it will, in the short-term, adversely affect in a material way a sector of the economy, i.e., the scallop fishing industry and the jobs in this industry. The proposed regulations will not have, however, an annual impact on the economy of $100 million or more, and will not adversely affect the productivity, environment, public health or safety, or state, local, or tribal governments or communities in the long run. The proposed action also does not interfere with an action planned by another agency, since no other agency regulates the level of scallop harvest. It does not materially alter budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients. It also does not raise any novel legal and policy issues because it extends the type of fishing restrictions already in place.

8.3. Initial Regulatory Flexibility Analysis

Background

The purpose of the RFA is to reduce the impacts of burdensome regulations and recordkeeping requirements on small businesses. To achieve this goal, the RFA requires government agencies to describe and analyze the effects of regulations and possible alternatives on small business entities. On the basis of this information, the Regulatory Flexibility Analysis determines whether the proposed action would have a "significant economic impact on a substantial number of small entities."

The main elements of the RFA are fully discussed in several sections of the Amendment 7 document and the relevant sections are identified by reference to this document. The following discussion summarizes the consequences for small businesses of the proposed action and non-preferred management options in the scallop fishery.

Problem statement

The purpose and need for management (statement of the problem) is described in Section 2.0 of the amendment document.

Objectives

The management objectives are enumerated in section 4.1 of this document.

Management alternatives

The proposed action is described in Section 4.2 of the amendment document. Alternatives to the proposed action are summarized in section 4.7.

Determination of significant economic impact on a substantial number of small entities

The RFA recognizes three kinds of small entities: Small business, small organization and small government jurisdictions. It defines a small business in any fish-harvesting or hatchery business as a firm which is independently owned and operated and not dominant in its field of operation with receipts of up to $3 million annually.

The scallop industry directly affected by the proposed action is composed primarily of small business entities. Section 5.2 of Final Amendment 7 document provides a description of the industry (Human Environment) in terms of permit category, port, vessel and gear characteristics,

crew, average size, landings, and days absent at sea absent of the vessels in each subgroup (See Tables 5.2.1 to 5.2.25 in section 5.2, Human Environment). The same section also describes the processing sector.

Table 8.2.3 shows that average gross revenue of full-time limited access vessels by DAS-use categories in 1996. The average annual scallop revenues of these vessels ranged between $78,700 and $482,000, and their revenues from other species ranged between $28,700 and $116,000 according to the DAS-use class they belong. Therefore, majority of the vessels in the Atlantic sea scallop fishery are small entities according to the SBA criteria.

According to the Regulatory Flexibility Act, if more than 20 percent of the small businesses in a particular industry are affected by the regulations, the regulations are considered to have an impact on a "substantial number" of these entities. . Since the proposed action will affect all vessels with a limited access permit, the "substantial number" criterion will be met. The proposed action will have considerable impacts especially on the full-time boats that depend heavily on scallop fishing. Table 8.2.3 shows that the majority of the active full-time scallop vessels earned their incomes mainly from scallop fishing. In 1996, 167 out of 202 full-time scallop vessels used more than 120 DAS to fish for scallops and obtained, on the average, more than 90 percent of their income from scallop revenues.

Economic impacts on small business entities are considered to be "significant" if the proposed regulations are likely to cause any of the following: a) a reduction in annual gross revenues by more than 5 percent; b) an increase in total costs of production by more than 5 percent as a result of an increase in compliance costs; c) an increase in compliance costs as a percent of sales for small entities at least 10 percent higher than compliance costs as a percent of sales for large entities; d) costs of compliance that represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities; or e) a number (two percent as a "rule of thumb") of small businesses being forced to cease business operations.

The proposed action will reduce the overall revenues of the scallop industry by approximately 10 to 38 percent during the eight years of the program starting year 2000 compared to the baseline (Table 8.3.2). If this decline approximates the average reduction in annual gross revenues of a vessel in the fleet, the regulations will have a significant impact on a significant number of vessels.

The impact of the proposed action will be similar for different tonnage and horsepower classes. These effects are discussed in detail in Section 6.1.4 of the Amendment document (See also Tables 6.1.8 and 6.1.9).

The economic impacts of non-selected alternatives, are examined in section 6.1.4 of the amendment document. The negative impacts of these alternatives on industry are expected to be more severe than those of the proposed action, at least in the first year of the program. The full-time annual DAS will be reduced to 75 under the 10-year rebuilding, and to 33 DAS under the 7-year rebuilding schedule, increasing the severity of the declines in vessel revenues and the likelihood of vessel bankruptcies. The gradual reduction in effort under the proposed option from 142 DAS in 1998 to 120 DAS in 1999, for the full-time boats, is expected to reduce economic adjustment costs in the first year of the program. It will also provide an opportunity to the industry and the Council to develop other measures, such as vessel buy-outs, leasing, subsidy

programs and/or opening management areas to mitigate those negative impacts on vessels' economic viability during the first ten years of the proposed action.

Compliance costs
See 8.2.6 of RIR above.

Identification on overlapping regulations
The proposed action does not create overlapping regulations with any state regulations or other federal laws.

Conclusion
The preceding Regulatory Flexibility Analysis and the relevant sections of RIR indicate that the regulations proposed in Amendment 7 will have "significant impacts" on a substantial number of small businesses.

Table 8.3.1 Revenues of full-time scallop vessels by DAS-use

	DAS Use in 1996				
	1-78	79-108	109-120	121-142	143>
Number of Vessels *	8	20	7	15	152
Percent of Full-time Permits	3.1%	7.7%	2.7%	5.8%	58.7%
Percent of Revenues from Scallops	43%	82%	68%	93%	92%
Total Scallop Revenues Per Vessel (mean)	78,698	204,896	287,448	358,563	481,842
Other Revenues Per Vessel (mean)	91,874	44,644	115,577	28,686	42,454
GRT (Mean)	135	132	177	141	165
HP (Mean)	691	651	977	780	867

* There were overall 259 full-time permit holders in 1996. The remaining 57 full-time permit holders (not shown in the Table) were either history permit holders, or zero-use vessels, or did not have a separate record in the dealers data because their activity were summed up with the activity of a group of vessels.

Table 8.3.2 Percentage change in revenues compared to baseline (million dollars in 1996 prices)

Year	Proposed Alternative	10-year	7-year
1999	45%	-6%	-61%
2000	-38%	-8%	-56%
2001	-35%	-19%	-46%
2002	-32%	-25%	-36%
2003	-25%	-31%	-27%
2004	-38%	-46%	-18%
2005	-29%	-34%	10%
2006	-18%	-24%	15%
2007	-10%	-16%	19%
2008	21%	15%	22%
2009	24%	20%	23%
2010	24%	21%	24%
2011	25%	24%	25%
2012	25%	24%	26%
2013	25%	24%	24%
2014	24%	24%	25%
2015	25%	25%	24%
2016	25%	25%	24%
2017	24%	24%	24%

8.4. Endangered Species Act (ESA)

The New England Fishery Management Council does not believe that this management program will have any adverse effect on any threatened or endangered species that occur within the range of species in the management units of the applicable fishery management plans. Commercial fishing operations and vessels which have valid fishing permits issued in accordance with Section 204(b) of the Magnuson-Stevens Fishery Conservation and Management Act are subject to the provisions of the ESA. See Section 5.1.4 of this document for a discussion of impacts on populations of endangered species.

8.5. Marine Mammal Protection Act (MMPA)

The New England Fishery Management Council does not believe that this management program will have any adverse effect on marine mammals that occur within the range of species in the management units of the applicable Fishery Management Plans. Commercial fishing operations and vessels which have valid fishing permits issued in accordance with Section 204(b) of the Magnuson-Stevens Fishery Conservation and Management Act are subject to the provisions of the MMPA and specifically Section 114 which governs the incidental take of marine mammals. See Section 5.1.4 of this document for a discussion of impacts on marine mammal populations.

8.6. Coastal Zone Management Act (CZMA)

The Council has determined the proposed action falls within the scope of previous actions already determined to be consistent with the coastal zone management plans of the following states: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina.

The FMP document and letters of determination have been mailed to all of the affected states. No state letters of concurrence with the Council's determination have been received at the time of the submittal of the FMP.

8.7. Paperwork Reduction Act (PRA)

This action includes no new collection of information and further analysis is not required. The proposed action would require no additional reporting burdens by scallop permit holders, dealers or other entities in the Atlantic sea scallop industry. The DAS reductions would be monitored through existing systems.

9.0 Measures to Mitigate Adverse Impacts

Impacts on the physical environmental
The proposed action is not expected to have any adverse impacts on the physical environment. See the discussion in Sections 6.1.1 – 6.1.3.

Social and economic impacts
Two types of mitigation measures were available to the Council: 1) to modify the DAS reduction schedule; and 2) to allow the transferability of DAS. The Council could have allowed the transfer of DAS either permanently or temporarily through leasing arrangements. However, because most of the scallop fishing industry, the very group the transferability options theoretically would benefit, vehemently opposed them, the Council retained only the ability to implement leasing through the framework adjustment process should it decide to do so in the future. This left the Council with the sole mitigation option of modifying the DAS reduction schedule, and the possible modification were severely limited by the constraints of rebuilding the resource within 10-years.

See section 4.2 for discussion of the rationale for modifying the DAS reduction schedule to mitigate adverse social and economic impacts.

10.0 Public Comments and Responses

The following is a list of the major comments received in terms of the scope of issues they address or the frequency with which they were made, and the rationale for the choice of the proposed action in light of the issues raised.

1. *Many comments suggested that the Council should not change the current days-at-sea (DAS) reduction schedule that was implemented under Amendment 4 to the Scallop FMP.*

The Sustainable Fisheries Act requires the Council to rebuild, within ten years, the scallop resource to a level that will produce maximum sustainable yield on a continuing basis. The DAS reductions implemented under Amendment 4 are not sufficient to achieve this level of stock rebuilding. Amendment 4 measures were designed to maintain the stock at long run average levels and not to produce maximum sustainable yield.

2. *The proposed actions [included in the public hearing document and the Draft Supplemental Environmental Impact Statement (DSEIS)] will put the scallop fleet out of business.*

In response to economic and social concerns, the Council modified the preferred DAS alternative to allow 120 DAS for full-time scallop vessels, 48 DAS for part-time scallop vessels and 10 DAS for occasional scallop vessels in 1999. The reasons for this change were:

- to allow the scallop industry an additional year to develop a buyback program before further, more severe cuts in DAS would be implemented
- to allow the Council more time to develop an area management approach to take advantage of the rapid growth of scallops
- to allow the Council to get information from the proposed experimental fishery to develop a policy with respect to scallop fishing in the groundfish closed areas.

3. The scallop resource should be rebuilt over fifteen years.

The final SFA guidelines clearly indicate that stock rebuilding must be achieved within ten years unless international agreements prevent it or the biological characteristics of the species make rebuilding within 10 years impossible.

4. The approach to managing scallops is too conservative in terms of conserving scallops and does not conserve the fishing industry.

The Council proposes to rebuild the resource over the maximum allowable time period (10-years) to minimize adverse social and economic impacts on current participants in the fishery. In developing the rebuilding it made use of the best available scientific information. It plans to evaluate any new scientific information from the experimental fishery and other sources within the first year of plan implementation.

5. Leasing of DAS should not be included in the measures that the Council may implement through a framework adjustment

The framework adjustment process allows the Council to implement actions more quickly but does not change the Administrative Procedure Act requirements for the Council's to solicit public comment. In other words, the framework adjustment process obligate the Council to address public concerns to a lesser extent than does the amendment process Nevertheless, the Council has stated in the plan that it would not implement leasing of DAS without a full set of public hearings.

Although there was widespread opposition to both the amendment that the Council proposed in the fall of 1997 to allow the transfer of DAS as well as to allowing to the leasing of DAS, the Council weighed the grave economic situation facing the scallop industry with public opposition, and determined that leasing of DAS may be necessary to maintain some part of the scallop fleet until the scallop rebuilding targets are reached.

6. If the proposed DAS reductions make the scallop fleet uneconomic, then the Council should simply shut down the fishery for 2 or 3 years.

Shutting down the entire scallop fishery for several years would lessen the chance that all but a very few permit holders would be able to retain their scallop vessels and permits. There are few alternative fisheries for these vessels because of management restrictions in most commercial fisheries and, therefore, the vessels have very little productive use except in the scallop fishery. As a result, more vessels owners would suffer financial failure than if the rebuilding targets were achieved more gradually. Similarly, more crew members will have the opportunity to earn some income from scallops if the fishery remains open than if it were completely closed. There also would be a loss of some valuable skills and knowledge if a very high percentage of scallop fishermen changed jobs entirely.

7. Scallop vessels should be allowed access to groundfish closed areas on Georges Bank.

The Council and members of the public have identified many concerns that include the potential bycatch of groundfish, disruption to groundfish spawning, impacts on habitat, enforcement and increased gear conflicts as reasons why the these areas cannot be opened without careful

planning. Additionally, the Council must develop a plan that manages the harvest of scallop within these areas in a way that does not increase fishing mortality or jeopardize the resource rebuilding program. The Council expects that the experimental fishery in Closed Area 2 will provide information that will help it resolve many of these questions as soon as possible.

8. The Council should reduce fishing mortality to as close to zero as possible, and achieve rebuilding in five years.

The proposed action meets the requirements of the SFA by rebuilding the resource within a 10-year timeframe. However, National Standards concerning optimum yield, best scientific information, efficiency, accounting for variations and contingencies in fisheries, minimizing costs, and community impacts would be severely compromised under the five-year plan. Higher net economic benefits projected with shorter rebuilding periods do not include the unquantifiable adjustments costs associated with wide spread financial failure in the scallop fishing industry. The SIA shows that the community impacts will be severely negative, even with the ten-year plan.

11.0 Glossary

Amendment - a change to a fishery management plan (see FMP). The Council prepares amendments and submits them to the Secretary of Commerce for review and approval. The Council also may make limited changes to FMPs through a "framework adjustment procedure" (see below).

Days absent – an estimate by port agents of trip length. This data was collected as part of the NMFS weigh-out system prior to May 1, 1994.

Days-at-sea (DAS) - the total days, including steaming time that a boat spends at sea to fish.

DAS Permit - Vessels qualified to be in the limited access sea scallop fishery are required to apply for a DAS permit each year to use their annual DAS allocation**.**

Full-Use - Refers to a vessel with a limited access permit and which used all of its DAS, not counting the 10 DAS that it may carry-over into the next fishing year.

Zero-Use - Refers to a vessel with a limited access permit which did not report using any DAS.

Partial-Use - reported using fewer than 10 DAS less than its annual allocation. For example, a vessel which had 165 DAS in the 1997-98 fishing year but used less than 155 DAS is referred to as a partial use vessel.

History Permit - A history permit is issued to qualified fishermen who apply in writing to retain their eligibility for the limited access fishery in the future. history permits are associated with vessels that sank, were destroyed, or were sold. They may be converted into a DAS permit any time during a fishing year. (this definition is repeated below).

Environmental Impact Statement (EIS) - an analysis of the expected impacts of a fisheries management plan (or some other proposed action) on the environment and on people, initially prepared as a "Draft" (DSEIS) for public comment. After an initial EIS is prepared for a plan, subsequent analyses are called "Supplemental".

Exempt fisheries - Any fishery determined by the NMFS Regional Administrator to have less than 5 percent regulated multispecies as a bycatch, by weight, of total catch according to 50 CFR ? 648.80(a)(7).

Exploitation rate - the percentage of catchable fish killed by fishing every year. If a fish stock has 1,000,000 fish groundfish large enough to be caught by fishing gear and 550,000 are killed by fishing during the year, the annual exploitation rate is 55%.

Fishermen - the term traditionally used in New England to refer to fishers of both genders.

Fishing effort - the amount of time and fishing power used to harvest fish. Fishing power includes gear size, boat size and horsepower.

Fishing mortality (F) - (also see *exploitation rate*) a measurement of the rate of removal of fish from a population by fishing. Fishing mortality (F) is the rate at which fish are harvested at any given point in time. ("Exploitation rate" is an annual rate of removal, "F" is an instantaneous rate).

FMP - Fishery management plan. Documents describing a fishery and the rules that govern it. These documents form the basis for federal regulations for fisheries under management authority of the regional management councils. These councils are authorized to manage fisheries and are required to prepare fishery management plans by the Magnuson-Stevens Fishery Conservation and Management Act. The New England Fishery Management Council prepares FMPs and submits them to the Secretary of Commerce for approval and implementation.

Framework adjustments - adjustments within a range of measures previously specified in a fishery management plan (FMP). A change usually can be made more quickly and easily by a framework adjustment than through an amendment. For plans developed by the New England Council, the procedure requires at least two Council meetings including at least one public hearing and an evaluation of environmental impacts not already analyzed as part of the FMP.

Limited-access permits - permits issued to vessels that met certain qualification criteria by a specified date.

$\mathbf{F_{0.1}}$ - a conservative target fishing mortality rate used to determine allowable fishing levels.

History permit - A History Permit is issued to qualified fishermen who apply in writing to retain their eligibility for the limited access fishery in the future. History Permits are associated with vessels that sank, were destroyed, or were sold. They may be converted into a DAS permit any time during a fishing year**.**

Natural mortality - a measurement of the rate of fish deaths from all causes other than fishing such as predation, disease, starvation and pollution. The rate of natural mortality may vary from species to species.

Minimum spawning stock threshold - the minimum spawning stock size (or biomass) below which there is a significantly lower chance that the stock will produce enough new fish to sustain itself over the long term.

Multispecies - the group of species managed under the Northeast Multispecies Fishery Management Plan. This group includes whiting, red hake and ocean pout plus the regulated species (cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish).

Open access - describes a fishery or permit for which there is no qualification criteria to participate. Open-access permits may be issued with restrictions on fishing (for example, the type of gear that may be used or the amount of fish that may be caught).

Overfished - A measure of stock biomass that is below a threshold level that would provide adequate spawning activity, ie. the stock's productive capacity.

Overfishing - A level or rate of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis.

Possession-limit-only permit - an open-access permit (see above) that restricts the amount of multispecies a vessel may retain (currently 500 pounds of "regulated species").

Proposed rule - a federal regulation is usually published in the *Federal Register* as a proposed rule with a time period for public comment. After the comment period closes, the proposed regulation may be changed or withdrawn before it is published as a final rule, along with its date of implementation and response to comments.

Recruitment - the amount of fish added to the fishery each year due to growth and/or migration into the fishing area. For example, the number of fish that grow to become vulnerable to fishing gear in one year would be the recruitment to the fishery.

Regulated groundfish species - cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish. (These species are usually caught with large-mesh net gear.)

Secretarial review process - a process which normally takes 140 days from the time the Council submits a plan or amendment to the Secretary of Commerce until its implementation. The Secretary of Commerce reviews and possibly approves the plan or amendment, which must meet the National Standards, of the Magnuson Fishery Management and Conservation Act and other federal laws. The other laws include the National Environmental Policy Act, the Marine Mammal Protection Act, the Endangered Species Act, the Regulatory Flexibility Act, etc.

Spawning stock biomass (SSB) - the total weight of fish in a stock that are old enough to reproduce.

Stock - a grouping of fish usually based on genetic relationship, geographic distribution and movement patterns. A region may have more than one stock of a species (for example, Gulf of Maine cod and Georges Bank cod).

TAC - Total allowable catch including all sources of fishing mortality such as discards, bycatch of the species in question in other fisheries and recreational landings.

VTS - an electronic vessel tracking system, often used to record the time a vessel is a at sea on a fishing trip or to enforce closed areas.

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