

4.1.3 Cod minimum size increase

This proposal is part of GOM Option 3 that the Council rejected. The Council initially considered increasing the cod minimum size in Framework 30 but did not propose doing so in the final framework document. The following discussion is copied from the draft Framework 30 document.

In 1997, the mean length of age-2 fish in U.S. commercial landings was 21 inches. While U.S. vessels did not land significant numbers of age-1 fish, age-2 fish accounted for 9.0 percent of the total catch in weight and 18.7 of the total catch in numbers. About 44 percent of age-2 fish are sexually mature. In terms of market categories, scrod cod accounted for 18 percent by weight and 36 percent by number of U.S. cod landings.

A compilation of cod mesh selectivity studies by J. DeAlteris and C.Grogan at the University of Rhode Island indicates a range of L_{50} for 6-inch diamond between 18.13 and 23.86 inches. The median value is approximately 19.6 inches. Based on these data, increasing the minimum size from 19 to 21 inches would raise the minimum size of above the L_{50} for that portion of the stock that is caught by 6-inch diamond mesh. Selectivity studies for hook and gillnet gear are not available.

Without commensurate gear selectivity changes, increasing the minimum size will cause discarding to increase. Vessels that cannot land 19-21 inch fish may try to avoid concentrations of small fish, both in time and area, as there is a cost to the vessel that may not be offset by the catches of legal sized fish in the mix. Secondly, according to industry comments, a significant portion of the scrod are targeted and landed by hook vessels, especially to serve the live fish market in recent years. Hook fishermen have stated that they can fish in ways to reduce the catch of small fish (larger hooks and baits, for example) and that they can discard fish in a manner to improve survival rates. Since hook fishermen proposed this size increase, in large part to forestall a stock decline and further management restrictions in the future as several years of low recruitment enter the fishery, the Council expects that they will voluntarily operate in ways that minimize discard mortality.

The impact of discarding on fishing mortality rates and yield depends on the survivability of the discards. If survival is high, fishing mortality rates will decline, although since fish in this size range are not fully recruited to the fishery (that is, a significant portion of fish in this size range escape the gear), there would be no impact on fully recruited F. Biomass-based F rates, however, would decline. Yields would increase, depending on the proportion of discards that survive and are caught at a larger size (before dying of natural causes). The survival rates of discarded cod under the diversity of gears and circumstances in the commercial fishery cannot be ascertained, however, the Council expects that, as it is in the industry's best interest to minimize discard mortality, fishermen will take all reasonable steps to do so.

4.1.4 Haddock trip limit adjustments

The two options considered by the Council for haddock trip limits are very similar and are not distinguishable in a conventional trip limit analysis. The proposed action combines elements of both. Since the lower initial limit in Option 1 has not appeared to constrain catches nor allow excessive catches over the past year, it is unlikely that the higher limit in Option 2 will necessarily cause any significant change in total haddock catches during the period when it is in effect. The primary difference between the two options is the timing of the trip limit increase (two weeks difference) and the mechanism by which it would take effect (Regional Administrator decision or automatic). Neither of these two components will have an impact on the fishing mortality rate.

The MSMC did not evaluate the effectiveness of the haddock trip limit liberalization in 1998 and 1999. However, landings doubled in 1998 from 1997 while the fishing mortality remained about the same, and below the Amendment 7 target. The MSMC considered that the status of haddock relative to the new overfishing definitions will require a significant reduction in fishing mortality, and recommended against any measure that will allow fishing mortality to increase from the 1998 level. Therefore, the MSMC recommended against any increase in the trip limit for 2000.

The haddock trip limit during calendar year 1999 was 3,000 pounds per day/30,000 pounds maximum from January through April, and 2,000 pounds per day/20,000 pounds maximum until November 5, when the Regional Administrator increased the limit to 5,000 pounds per day/50,000 pounds maximum. During 1998, the trip limit was 1,000 pounds per day/10,000 pounds maximum from January through August, and 3,000 pounds per day/30,000 pounds maximum for the rest of the year. Landings of haddock for January-October, 1999 increased nine percent over the same period in 1998 (2,605 metric tons compared to 2,367 metric tons). These figures suggest that the increased trip limit has allowed landings to increase proportional to the biomass increase and not produced an increase in the exploitation rate. With Georges Bank haddock SSB projected to increase 23 percent from 1999 to 2000 (44,700 metric tons to 55,000 metric tons), the increased trip limit is not likely to cause the exploitation rate to increase significantly.

4.1.5 Adjustment of Large Mesh permit category program

The analysis of the impact of the proposed reduction in minimum mesh size for vessels participating in the program is constrained by two main factors: the limited number of vessels fishing under this permit, and the lack of selectivity data for 7-inch and 8-inch trawl net codends. Furthermore, the PDT cannot predict the level of participation in the permit category if the minimum mesh size were reduced from 8 inches to 7 inches. However, the purpose of this proposal is to provide an incentive for more vessels to fish with the larger mesh, thereby increasing SSB per recruit and yield per recruit, and providing an opportunity to collect the needed information about catch characteristics with the larger mesh size.

In the multispecies call-in system, vessels with F category permits (Large Mesh Individual DAS) were not found for FY98 and FY99, to date. As a result, no data and analyses are

reported for the F permit category. The following summary is for the Multispecies G (Large Mesh Fleet DAS) permit category.

There were fourteen (14) G category vessels (unique counts) for FY 98 and 12 G category vessels for FY99 to date. Total DAS allocation were 2295 DAS and 2332 DAS for FY98 and FY99, respectively. The larger DAS allocation for smaller number of vessels is possibly due to carryover DAS. DAS utilization for the period from May through November is higher for FY98 than FY99 (23.22% versus 16.75%). Generally, monthly DAS utilization percents are higher for FY98 than FY99 except June and July. (See Table 55)

In FY98, vessels in the G permit category reported landing 497,372 pounds of regulated species, with cod as the predominate species at 262,712 (53% of the total) and July as the highest retention month at 74,969 pounds (15% of the total). (See Table 56) For a comparison between FY98 and FY99, landings data for May through August were used. Total multispecies landings during the period shows a slight increase from 192,944 pounds for FY98 to 219,362 pounds for FY99. (See Table 57) A substantial increase is shown in July from 27,995 pounds in July FY98 to 71,331 pounds in July FY99. On a species basis, five species (cod, haddock, pollock, white hake and witch flounder) reported a higher kept in FY99 than FY98. For example, during the May-April period, the amount of cod kept was 139,804 pounds in FY99 versus 111,745 pounds in FY98. It should be noted, also, that in terms of the percentage increase, haddock landings are the highest, a 324% increase from 2,784 pounds in FY98 to 11,793 pounds in FY99. Each of the other five species (yellowtail, redfish, American plaice, winter flounder, and windowpane) decreased in the amount of species kept for the period from FY98 to FY99.

These statistics indicate that the level of participation in the large mesh program is insignificant, despite the 36 percent increase in allocated DAS. If additional vessels enrolled in the program, total DAS allocations would increase over current levels. The impact of the additional DAS would be offset by the impact of the larger mesh used by these vessels. However, the net impact on fishing mortality cannot be determined at this time.

Month	Number of Permits *		DAS Used		Monthly DAS % Used		Cumulative DAS % Used	
	FY 98	FY 99	FY 98	FY 99	FY 98 (2295 DAS ¹)	FY 99 (2332 DAS ²)	FY 98 (2295 DAS ¹)	FY 99 (2332 DAS ²)
May	9	6	62.49	54.59	2.72%	2.34%	2.72%	2.34%
June	11	8	82.48	66.29	3.59%	2.84%	6.32%	5.18%
July	8	8	64.75	106.95	2.82%	4.59%	9.14%	9.77%
August	9	7	89.84	45.22	3.91%	1.94%	13.05%	11.71%
September	8	6	85.22	57.39	3.71%	2.46%	16.77%	14.17%
October	9	5	97.2	47.29	4.24%	2.03%	21.00%	16.20%
November	9	5	51.02	12.84	2.22%	0.55%	23.22%	16.75%
December	8		54.59		2.38%		25.60%	
January	7		58.47		2.55%		28.15%	
February	6		33.34		1.45%		29.60%	
March	3		14.05		0.61%		30.22%	
April	5		44.13		1.92%		32.14%	

Source: NMFS Enforcement DAS Call-in Database

* Unique count of all Category G permits are: 14 Vessels for the 98/99 fishing year, and, 12 vessels for the 99/00 fishing year.

¹ Number of Allocated days of the 14 vessels for the 98/99 fishing year = 2295

² Number of Allocated days of the 12 vessels for the 99/00 fishing year = 2332

Table 55 Monthly DAS usage for Multispecies DAS Category G Permit vessels for the 1998-1999 fishing year and May 1999 through November 1999

Month/Year	COD	HADDOCK	YELLOWTAIL FLOUNDER	POLLOCK	REDFISH	WHITE HAKE	AMERICAN PLAICE	WINTER FLOUNDER	WITCH FLOUNDER	WINDOWPANE FLOUNDER	Total
May-98	38,467	850	10,115	680	21	375	11,351	5,440	692	0	67,991
Jun-98	39,537	997	9,604	10,048	373	3,359	4,452	5,112	1,487	0	74,969
Jul-98	20,131	375	154	5,016	72	415	1,095	280	455	2	27,995
Aug-98	13,610	562	24	5,622	21	1,419	361	177	173	20	21,989
Sep-98	29,364	575	54	9,357	845	2,765	128	1,701	41	0	44,830
Oct-98	31,278	1,754	185	11,322	94	1,473	86	3,606	58	0	49,856
Nov-98	11,556	201	34	1,772	4	144	15	625	7	0	14,358
Dec-98	20,605	1,628	661	16,137	1	250	50	262	3	0	39,597
Jan-99	18,890	997	32,082	12,010	0	65	129	100	0	0	64,273
Feb-99	16,415	1,935	1	34,563	12	138	25	15	8	0	53,112
Mar-99	16,175	86	0	9,150	0	0	12	0	0	0	25,423
Apr-99	6,693	3,005	158	102	0	20	40	2,961	0	0	12,979
Total	262,721	12,965	53,072	115,779	1,443	10,423	17,744	20,279	2,924	22	497,372

Source: NMFS VTR and DAS call-in Databases

Table 56 Monthly landings of groundfish for Category G vessels for the 1998-1999 fishing year (pounds, live weight)

Month	COD		HADDOCK		YELLOWTAIL FLOUNDER		POLLOCK		REDFISH	
	FY 98	FY 99	FY 98	FY 99	FY 98	FY 99	FY 98	FY 99	FY 98	FY 99
May	38,467	42,391	850	6,780	10,115	9,507	680	639	21	0
June	39,537	44,381	997	3,014	9,604	5,677	10,048	7,165	373	75
July	20,131	46,220	375	1,519	154	1,809	5,016	11,722	72	140
August	13,610	6,812	562	480	24	149	5,622	2,825	21	150
Total	111,745	139,804	2,784	11,793	19,897	17,142	21,366	22,351	487	365

Month	WHITE HAKE		AMERICAN PLAICE		WINTER FLOUNDER		WITCH FLOUNDER		WINDOWPANE FLOUNDER		Total	
	FY 98	FY 99	FY 98	FY 99	FY 98	FY 99	FY 98	FY 99	FY 98	FY 99	FY 98	FY 99
May	375	75	11,351	2,389	5,440	5,945	692	1,156	0	0	67,991	68,882
June	3,359	556	4,452	1,432	5,112	1,948	1,487	1,796	0	0	74,969	66,044
July	415	6,855	1,095	492	280	1,104	455	1,470	2	0	27,995	71,331
August	1,419	1,480	361	133	177	142	173	934	20	0	21,989	13,105
Total	5,568	8,966	17,259	4,446	11,009	9,139	2,807	5,356	22	0	192,944	219,362

Source: NMFS VTR and DAS call-in Databases

Table 57 Monthly landings of groundfish for Category G vessels for the period May – August 1998 and 1999 (pounds, live weight)

4.1.6 Impacts on other regulated species

The impact of proposed measures on other stocks managed under this FMP depends on the direct and indirect shifts in effort that result from the area closures and fishermen’s responses to the restrictive trip limits and other management restrictions. Since this framework does not contain an overall DAS reduction proposal, there is no way to accurately predict the indirect impact of measures designed to reduce catches of other individual stocks. Consequently, a quantitative analysis of the overall impacts of all of the alternatives on the range of species cannot be done.

Furthermore, for the four GOM cod options, a comparative analysis of the options’ relative impacts on other regulated species cannot be conducted for the same reasons that the analysis of impacts on cod had to be done separately. Options 3 and 4 area closures are designed to increase the opportunity for fishermen to target other species, including other regulated species by reducing the size of the areas closed. While those other stocks do not have specified management targets under the current plan, many of them, especially American plaice and white hake, require significant rebuilding programs to achieve SFA-mandated levels. Any increased fishing effort on those other stocks, will delay their rebuilding, and potentially increase the severity of measures needed to achieve rebuilding under Amendment 13.

The five Georges Bank cod area closure proposals can be analyzed using the same two-bin model, however, this analysis only shows the expected change in landings if the effort displaced by the closures catches all of the other species at the average catch per unit effort on those species in the open areas. This analysis, therefore, provides a relative estimate of the potential impact of the five options, but should not be used to estimate absolute catches.

	Option1	Option2	Option 3	Option 4	Option 5
Species					
Haddock	5.6%	-3.2%	12.3%	8.0%	5.6%
Yellowtail	10.8%	14.4%	21.9%	7.5%	4.4%
Pollock	4.3%	5.4%	24.6%	2.9%	2.3%
Monkfish	6.8%	9.0%	9.7%	4.0%	2.2%
Dogfish	-10.7%	-21.3%	-19.2%	-2.4%	-9.5%
Other Groundfish	-5.5%	-11.4%	1.9%	-1.3%	0.6%

Table 58 Change in catch for six species calculated using the two-bin effort displacement model for five GB cod area closure options. Option 5 is the proposed action.

4.1.7 Impacts on other species

The following discussion is extracted from Framework 27 because it covers the range of impacts that are likely to occur under the proposed action.

Other major fisheries that are potentially affected by actions in this FMP because of geographical co-occurrence or use of similar fishing gear include sea scallops, monkfish, dogfish, herring, shrimp, lobsters, and pelagic hook (primarily tuna), and summer flounder fisheries. Since the fisheries for herring, shrimp, lobsters and tuna are conducted under a gear exemption that would not restrict them from fishing in closed areas, they would not be restricted by the proposed action. Therefore, there would be no direct biological impact. Effort increases in these fisheries resulting from displaced groundfish effort, particularly lobsters, shrimp and tuna, however, may have a biological impact, although the magnitude and direction of effort shifts cannot be predicted. Nevertheless, the fishery management plans for these species are based on biological reference points and contain provisions to control effort that would otherwise compromise their conservation goals.

The fisheries for sea scallops, monkfish, summer flounder and dogfish are managed under existing or pending FMPs that are designed to control fishing mortality rates at levels that will achieve rebuilding or maximum sustainable yield. It is not possible to predict the full quantitative impact of the measures proposed in this action on all of these fisheries, considering both direct and indirect effect of each option and the changing regulatory environment for those fisheries. Qualitatively, the measures will have both positive and negative impacts depending on:

- the amount of effort that shifts into or out of those fisheries in response to their respective FMPs
- the amount of effort that shifts out of the groundfish fishery in response to these proposed measures
- the limitations on or opportunity for entry to these fisheries for displaced vessels (permit restrictions)
- the protection to those stocks within area closures or increased susceptibility to capture from increase effort outside the closures
- reduction in the amounts of overall bycatch due to DAS reduction, and
- reduction in bycatch resulting from the square-mesh size increase
- individual choices by fishermen about how and where to direct their fishing effort.

4.1.8 Impacts on marine mammals and protected species

See Volume I, FEIS for Amendment 5 to the Northeast Multispecies FMP (Section E.6.3) for a list of threatened, endangered and other marine mammal species that are likely to occur within the waters governed by the FMP, and the National Marine Fisheries Service Biological Opinion issued on November 30, 1993; also see Volume I, FEIS for Amendment 7 to the FMP (Section E.6.3.4), the associated Biological Opinion issued by NMFS on February 16, 1996 and the Biological Opinion issued on December 13, 1996 following an unusual right whale mortality event earlier in that year.

Further information may be found in stock assessment reports prepared by NMFS pursuant to Section 117 of the Marine Mammal Protection Act (MMPA) for all marine mammal species in the U.S. Atlantic Ocean and in the Gulf of Mexico. The initial stock assessments were presented in

Blaylock, *et. al.* (1995) and are updated in Waring, *et. al.* (1999). The reports present information on stock definition and geographic range, population size and productivity rates and known 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 (NMFS and USFWS, 1995 and 1997).

As described more fully in Section 3.0, the actions proposed in Framework 33 are intended to reduce or maintain fishing mortality rates for five critical groundfish stocks below rebuilding targets established by Amendment 7 to the FMP, but focus on Gulf of Maine and Georges Bank cod management. Area closures would affect all gear capable of catching finfish regulated by the FMP.

Although most gear types used in the multispecies fishery have documented interactions with marine mammals, these are relatively infrequent events. The sink gillnet fishery, however, is classified as Category I in the Marine Mammal Protection Act's required *List of Fisheries*, a fishery with frequent incidental mortality and serious injury of marine mammals. A detailed description of the gillnet fishery and gear is provided in Amendments 5 and 7 to the FMP. Sea scallop dredges, which are listed as Category III on the *List of Fisheries* (with no documented takes of marine mammals), are exempt from the closures with the exception of the Western Gulf of Maine closure. The available information indicates their continued presence in these areas should not represent an increased threat to endangered or other protected species, although interactions with turtles have been documented.

With the exception of the area closures, the framework measures proposed should have few direct impacts on protected resources, including listed species, or critical habitat. The trip limits proposed fall within the range of limits that have been considered in previous consultations and the change in conditions for the Large Mesh Permit Category principally involve otter trawl gear, and therefore are not likely to affect protected resources.

Although it is difficult to predict, the area closures proposed could result in effort shifts to other fisheries, including the lobster fishery, which poses entanglement risks for large cetaceans. Small vessels that fish relatively close to shore may forego groundfish fishing during closure periods and engage in alternatives. Others could pursue groundfish offshore or relocate to ports where productive grounds are more convenient and cost-effective. Concentrated groundfish effort along the margins of the closed areas is unlikely because the closure of the most productive cod fishing grounds is fairly comprehensive. Fishing effort could increase, however, before and after the closure period and potentially represent increased risks of marine mammal entanglements.

Provided below is a detailed discussion of the impacts of the Framework 33 area closure alternatives, given that time and area closures have been a primary tool used to reduce marine mammal entanglements in the Gulf of Maine region. Because potential entanglements involve gillnet gear, analyses are limited to that gear type and the species of most concern in New England, harbor porpoise and the northern right whale.

The Protected Species Branch, Northeast Fisheries Science Center for the PDT, reviewed fishery closures proposed as options under this framework for Gulf of Maine and Georges Bank cod in relation to harbor porpoise and northern right whale distributions, and harbor porpoise bycatch, and management measures enacted under the Harbor Porpoise and Large Whale Take Reduction Plans. Gulf of Maine Option II (with a closure of the northern half of Block124) would provide the most protection for these two marine mammal species. Options I, III, and IV would provide successively less protection. Option IV would reduce protection to less than that in the two Take Reduction Plans. All of the Georges Bank options provided some additional protection for harbor porpoise and right whales beyond the current marine mammal closures.

4.1.8.1 Introduction

Over the past decade, interactions between marine mammals and fisheries have resulted in the implementation of a variety of protective measures under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). The 1994 amendments to the MMPA specifically require the NMFS to reduce takes of all marine mammal species to below a sustainable take level referred to as the Potential Biological Removal (PBR). The ESA further requires takes of ESA listed species to be reduced effectively to zero. Measures to achieve these reductions have been promulgated under a combination of Take Reduction Plans (TRP) required under the MMPA and the “reasonable and prudent alternatives” resulting from ESA Section 7 jeopardy opinions. Fishery management actions have, in some cases, also provided protection for marine mammal species (for example, the Western Gulf of Maine or WGOM closure). In some cases, these actions have been explicitly included as part of the suite of measures which could be used to protect marine mammals (for example, the WGOM closure is recognized as a component of the Gulf of Maine-Bay of Fundy harbor porpoise stock’s TRP). When new fishery management measures are proposed, the NMFS is obliged to review the impacts of these actions with respect to the goals of the TRPs, and if appropriate, determine whether these actions would “jeopardize the continued existence” of the species (an ESA Section 7 review).

Options for new fishery closures or removal of existing time/area closures under Framework 33 to the Northeast Multispecies (Groundfish) Fishery Management Plan (FMP) have the potential to impact a variety of marine mammal species. Here we review the potential impacts on two marine mammal stocks: Gulf of Maine-Bay of Fundy harbor porpoise and North Atlantic northern right whales. Potential impacts were identified by comparing the sighting distributions of the stocks and bycatch patterns with the proposed Framework 33 closures (in combination with existing marine mammal closures). A closure encompassing more sighted or bycaught animals was considered to be more effective than one which encompassed fewer animals. Two datasets were analyzed. The first was the locations of harbor porpoise observed taken bycaught New England sink gillnets during 1995-99. These data are maintained by the NEFSC’s Fishery Observer Program, and are also used to prepare the annual assessment of harbor porpoise bycatch. The second data set includes the locations of all harbor porpoise (n = 1,712) and northern right whales (n = 5,185) sighted during surveys conducted in New England waters during 1979-98, and are archived in the University of Rhode Island’s marine mammal database. For each Framework 33 option, the proposed spatial closure was overlaid on the sightings or bycatch in each month/season, and the number of animals potentially effected was tallied.

This analysis has several limitations. First, direct impacts are difficult to predict, because the capture of marine mammals is not the intent of the fishery. Secondly, no attempt was made to consider the level of fishing effort occurring or predicted to occur in an area; all areas were considered to have the potential for being fished at the same intensity.

Thirdly, the analysis was conducted without respect to gear type, although it is recognized that some gear types have a greater potential for interaction with marine mammals than others (for example, sink gillnet fisheries traditionally take far more harbor porpoise than trawl fisheries). This concern is moot in that virtually all gear types with a significant interaction with marine mammals are prohibited from fishing in the closure areas.

Finally, the sightings data are unadjusted for the quantity and spatial/temporal distribution of sighting effort. Thus, there is a potential for bias. Certain seasons (for example, winter) and areas (for example, offshore) have been surveyed less frequently than other areas.

4.1.8.2 Gulf of Maine-Bay of Fundy Harbor Porpoise Stock

4.1.8.2.1 Background

During 1990-98, an average of 1,615 harbor porpoise were taken each year in sink gillnet fisheries between Maine and North Carolina (Rossman and Merrick 1999; Waring et al. 1999). The high level of takes during the period relative to PBR (483 animals per year; Waring et al. 1999) led to the formation in 1996 of Take Reduction Teams (one for the Gulf of Maine and one for the Mid-Atlantic). These teams, with NMFS input, produced a TRP which was implemented on 2 December 1998 (63 FR 66464). The TRP relies upon time-area closures to gillnet gear (see Figure 41 for New England closures), along with required use of pingers in some times and areas in New England and other gear restrictions in the Mid Atlantic.

Closures (whether complete or requiring pinger use) have been established in areas and times with historically high bycatch levels was high. For example, during 1999-98, an average of 1,532 harbor porpoise were estimated to be taken per year in New England waters (Table 59). Most were taken in the coastal waters of the Gulf of Maine (SA 511-515; 1,254 per year). The remaining animals were taken to the east and south of Cape Cod (SA 521-522, 537-539). In most years, the latter takes were confined to the areas directly south of Cape Cod (SA 537-539).

In developing the TRP for New England waters, the Gulf of Maine team and NMFS recognized that fishery closures would also be in effect which could contribute to reducing reduce takes to below PBR. These fishery closures included the year-around closure of the Western Gulf of Maine (WGOM) area and the series of rolling closures established under Framework 25.

In defining closure times and areas, the TRP focused on the historical distribution of bycatch and not on the distribution of harbor porpoise. Areas where both porpoise and gillnet fisheries overlapped was of concern. Most of the sightings of harbor porpoise (Figure 42) during the

winter-spring peak in bycatch have occurred outside of the inshore closure areas where animals have been typically bycaught (Figure 43). If gillnet effort were to shift significantly to offshore areas, then it is highly likely that bycatch of harbor porpoise would greatly increase in these areas.

4.1.8.2.2 Impact of Framework 33 closures for Gulf of Maine Cod Stock

Bycatch - During 1995-99, 96 harbor porpoise were observed taken in the New England multispecies sink gillnet fishery (Figure 43). The harbor porpoise TRP closures (exclusive of Framework 25 and WGOM closures) which became effective in December 1998, closes sink gillnet fishing in times and areas where 71% of this bycatch occurred (Table 60). The remaining 29% of the historical bycatch occurred in areas not currently protected by the TRP closures, and any future bycatch would be expected to occur in these areas. In reviewing the Framework 33 options, it was apparent that a significant part of the future bycatch could be eliminated through closures proposed under one or more of its options.

Option 2 (with the partial closure of area 124) has the greatest potential for further reducing Gulf of Maine harbor porpoise bycatch, as it would protect animals in almost all the areas with historical bycatch which remain unprotected under the TRP (Table 60). Option 3, which incorporates the groundfish closures under Framework 25 and much of the WGOM closure would potentially protection somewhat fewer porpoise. The partial closure of area 124, incorporated in both Option 2 and 3, is of particular importance to porpoise in that it includes a high bycatch area not currently protected under the TRP. Option IV would be the least effective, and would result in a loss of protection from the status quo due to the replacement of the WGOM closure with smaller closures on Jeffreys Ledge and Stellwagen Bank.

Sightings - Around 16% of the harbor porpoise sighted during 1979-98 were seen in areas potentially effected by Framework 33. From these data, Options I and II appear to encompass more sightings than Options III and IV (Table 61) during both winter and summer. Together with the TRP closures, Options I and II would encompass most of the area in which harbor porpoise have been sighted in the Gulf of Maine.

4.1.8.2.3 Impact of Framework 33 closures for Georges Bank Cod Stock

Bycatch analysis - Virtually all of the harbor porpoise bycatch in the Georges Bank cod stock area (Table 59) has occurred in the South Cape area (Figure 43), although a few animals have been taken at the northern edge of statistical area 522. The locations of historical bycatch south of Cape Cod are encompassed by the South Cape TRP closure.

Sightings - Sighting data indicate that harbor porpoise are at low densities during spring throughout Georges Bank (Figure 42), especially in the areas protected by the right whale Great South Channel closure and Closed Area I. During the remainder of the year (June-December), few porpoise are seen in the area. Each of the five closed area options presents potential small improvements over the existing protection under the TRP; none represents a loss of protection (Table 62).

4.1.8.3 Northern Right Whales

4.1.8.3.1 Background

The North Atlantic northern right whale population number around 300 animals, making it part of the most highly endangered marine mammal species. Human activities, notably entanglement in fixed fishing gear, and ship strikes, are a major source of mortality for the. PBR for the stock is currently 0.4 animals per year, and fishing related mortality likely exceeds this number. As with harbor porpoise, a TRP has been implemented to reduce human-induced mortality to below PBR. The TRP incorporates both closures and gear restrictions. In New England there are two major fishery closures to gillnet gear: Cape Cod Bay (January 1- May 15) and the Great South Channel Critical Habitat Area (April 1-June 30).

Right whales overwinter in Cape Cod Bay during December-March with few sightings outside of Cape Cod Bay. Beginning in April, these animals are joined by migrants from the south and animals disperse throughout the Gulf of Maine and Georges Bank. The largest concentrations are found in the Great South Channel and Cape Cod Bay critical habitat areas (Figure 44) with smaller concentrations north of Cape Cod Bay near Stellwagen Bank and Jeffreys Ledge and to the north of Georges Bank. Right whales remain in the Gulf of Maine, particularly near Stellwagen and Jeffreys Ledge throughout the summer and fall. By December most animals have departed New England waters, except for those overwintering in Cape Cod Bay.

The existing right whale winter-spring closures were designed to cover the major foraging grounds, and encompass most of the sightings (Figure 44). Those harbor porpoise closures which allow gear with pingers do little to reduce interactions with right whales. Although, the WGOM and Framework 25 rolling closures were not considered in the development of the Large Whale TRP, the WGOM closure is now considered important for reducing interactions between right whales and gillnet gear.

Little information is available on locations where right whales become entangled in gear. Thus, the analysis here is restricted to locations where right whales have been seen over the past 20 years.

4.1.8.3.2 Impact of Framework 33 closures for Gulf of Maine Cod Stock

Potential impacts were separated into the effects of the rolling closure schemes, and the year round closures (Table 63). All of the rolling closures would have benefits for the protection of right whales. However, the expanded size of the closures under Options 1 and 2 would offer the greatest protection.

Changes in the year-round closed areas would have somewhat different effects. Option 2, which could have the most benefit for right whales, would continue the WGOM closure in combination with a year-round closure of the northern half of Block 124. Right whales using Jeffreys Ledge and its surrounding areas as well as Stellwagen Bank would receive the greatest protection under this option.

Option 4 offers the least benefit to right whales in that it provides reduced annual coverage from the status quo (127 total sightings), and limited protection from the rolling closures. This option is the only alternative providing less protection to right whales than the status quo.

4.1.8.3.3 Impact of Framework 33 closures for Georges Bank Cod Stock

The Great South Channel right whale closure area currently protects the vast majority of right whales observed in the Georges Bank area (674 sightings in the area during 1979-98). While additional groundfish closures beyond the existing closures would benefit right whales to a certain degree, none is strongly preferred based on the sightings data (Table 62).

4.1.8.4 Other protected species

Loggerhead, leatherback and Kemp's ridley turtles are known to inhabit the action area and are susceptible to entanglement in the gears used in the multispecies fishery. Green turtles are considered to be subtropical and tropical in range. Their occurrence north of Virginia is considered unusual at any time of the year. There is no reason to conclude that the fishery or the proposed action represents a major source of human-induced serious injury or mortality for sea turtles.

Although shortnose sturgeon may become entangled in multispecies gear, the possibility is remote given that they are benthic fish that mainly occupy the deep channel sections of large rivers. It is unclear whether previous accounts of takes have been Atlantic or shortnose sturgeon.

4.1.8.5 Conclusions

The management measures proposed in Framework 33 fall within the scope of consultations on previous Multispecies FMP actions. None of the measures are expected to result in the addition of adverse impacts that would change the basis for the determinations in those consultations. Measures may, overall, enhance protection of listed species, or at least maintain current levels of protection. Therefore, the actions proposed in Framework 33 may affect, but are not likely to jeopardize the continued existence of endangered and threatened species. Should activities associated with the Multispecies FMP change significantly or new information become available that alters this determination, the Council will reinitiate consultation.

Year	Gulf of Maine (511-515)	Georges Bank (521-522, 537- 539)	Total (CV)
1998	210	122	332 (46%)
1997	525	257	782 (22%)
1996	713	488	1201 (23%)
1995	819	564	1383 (27%)
1994	1705	365	2070 (19%)
1993	1305	74	1379 (18%)
1992	1127	75	1202 (21%)
1991	1989	na	1989 (32%)
1990	2889	na	2889 (32%)
Average	1254	278	1532

Table 59 Total bycatch (with coefficient of variation) of harbor porpoise in the New England multispecies sink- gillnet fishery during 1990-1998.

Season	TRP	Additional Protection by Option			
		I	II	III	IV
Winter (Jan-May)	50	10	14	13	11
Summer (June-August)	0	0	0	0	0
Fall (Sept- December)	18	3	6	5	0
Total	68	13	20	18	11

Table 60 Observed harbor porpoise take by season during 1995-99 at locations currently protected by the Harbor Porpoise Take Reduction Plan (TRP), and potential additional protection conferred by Framework 33 Gulf of Maine closures.

Season	TRP	Additional Protection by Option			
		I	II	III	IV
Winter (Jan-May)	88	55	55	23	19
Summer (June-August)	45	35	35	20	20
Fall (Sept-December)	51	1	3	0	0
Total	184	91	93	43	39

Table 61 Sightings during 1979-98 of harbor porpoise in areas closed under Framework 33 Gulf of Maine Options I-IV.

Species	Option				
	I	II	III	IV	V
Harbor porpoise	43	24	20	31	17
Right whale	32	44	33	32	28

Table 62 Sightings of harbor porpoise and right whales during 1979-98 in Framework 33 Georges Bank closure options, exclusive of other closures in the same areas.

Option	Type of Closure	January-May	June-August	September-December	Total
I	Rolling	793	0	270	1063
	Year-round	32	96	39	167
	Total				1230
II	Rolling	793	0	270	1063
	Year-round	85	168	91	344
	Total				1407
III	Rolling	313	19	0	332
	Year-round	71	142	61	294
	Total				626
IV	Rolling	313	19	0	332
	Year-round	29	39	59	127
	Total				459

Table 63 Sightings during 1979-98 of northern right whales in proposed closed areas in Framework 33 Gulf of Maine Options I-IV.

4.1.8.6 Literature Cited

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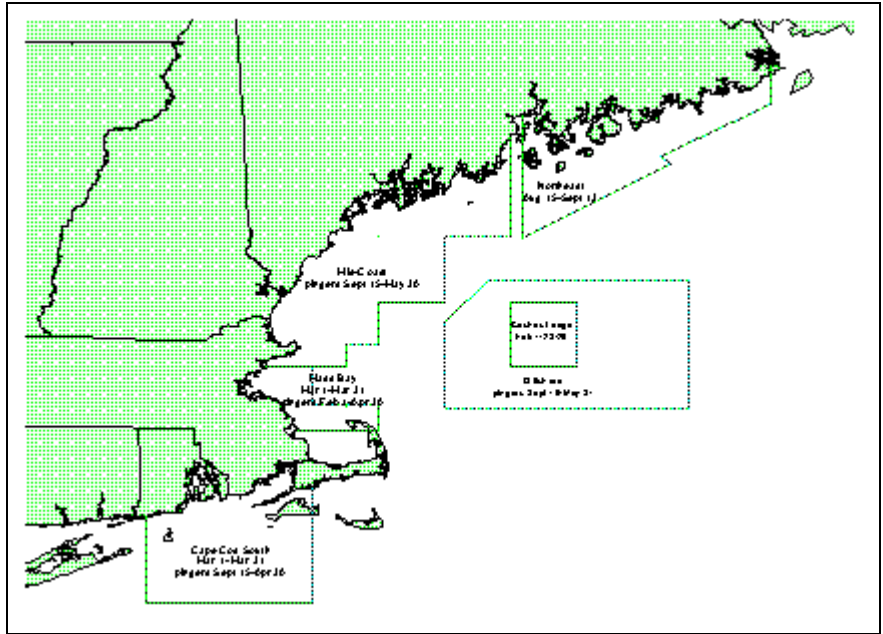


Figure 41 New England harbor porpoise Take Reduction Plan closures

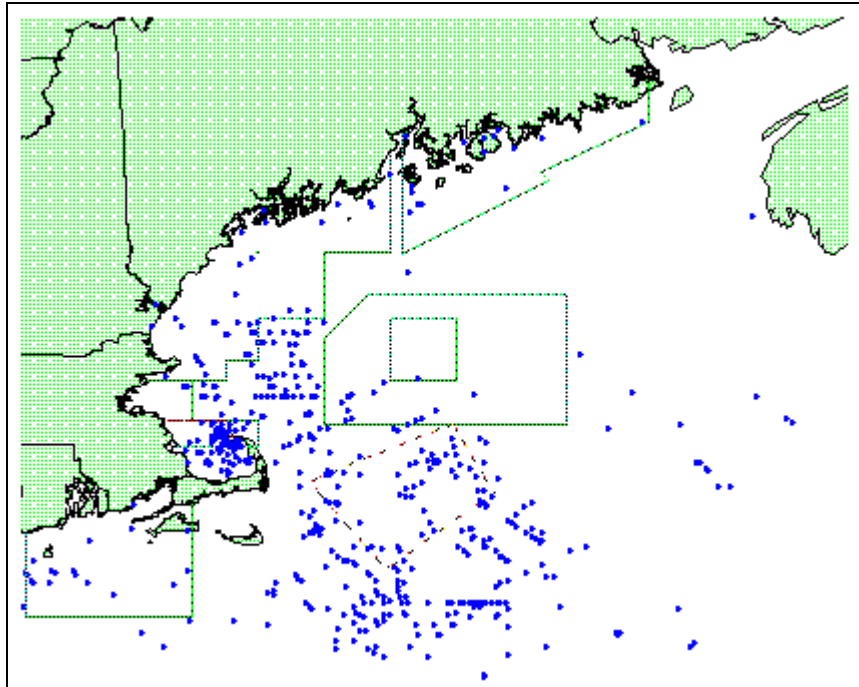


Figure 42 New England harbor porpoise sightings during spring, 1979-1998. Harbor porpoise TRP and right whale closures (dashed line) are overlaid.

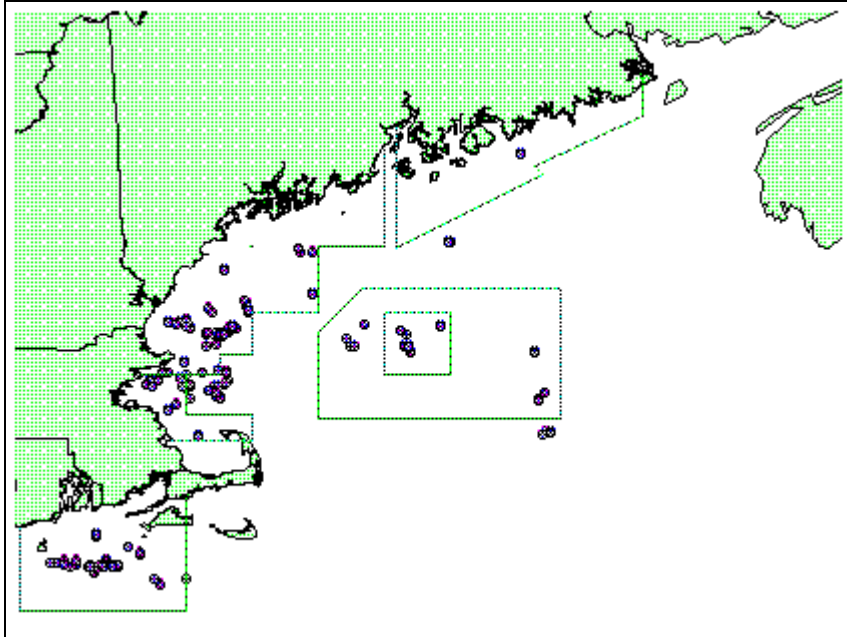


Figure 43 Gulf of Maine harbor porpoise bycatch for 1995-1998. Harbor porpoise TRP closures are overlaid.

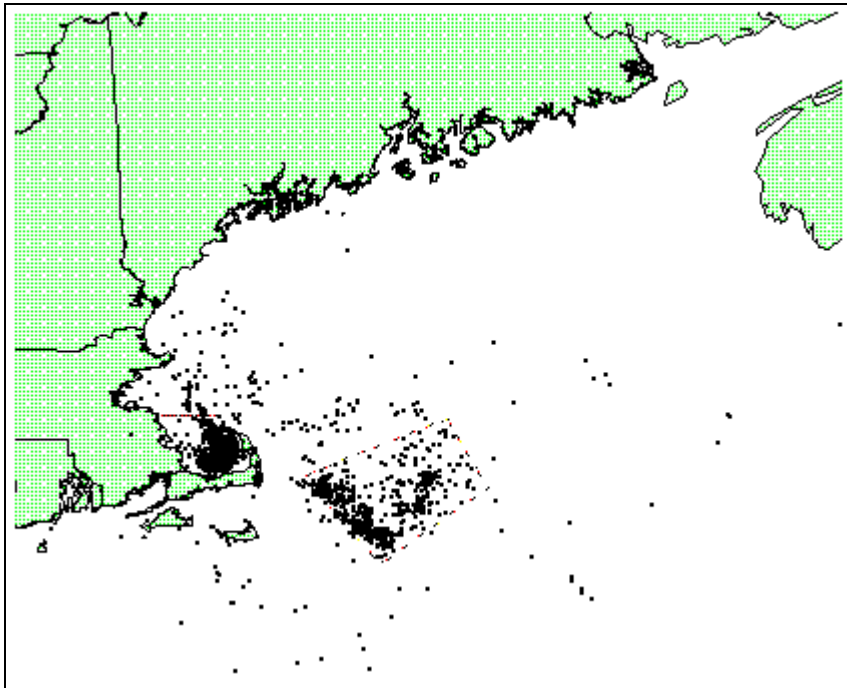


Figure 44 Northern right whale spring sightings overlaid with right whale closure areas.

4.1.9 Impacts on habitat (including the EFH Assessment)

A comprehensive description of the physical environment and assessment of the impacts to habitat resulting from fishing practices is presented in Amendment 11 to the Northeast Multispecies Fishery Management Plan. Some of the alternatives the Council considered for this framework adjustment would have adverse impacts on essential fish habitat (EFH) resulting from some fishing activity. The impact of the proposed action on essential fish habitat is summarized in the EFH Assessment (Section 4.1.9.2).

4.1.9.1 Proposed Actions and Alternatives

The following discussion includes analysis of both the proposed action and the alternatives considered and rejected. Reductions in fishing effort are one mechanism known to minimize the adverse impacts on habitat associated with fishing practices by reducing the frequency and intensity of fishing gear use. Ideally, these reductions will be focused on the sensitive habitats of the Gulf of Maine and Georges Bank that have been designated as EFH by the Council. Some of the proposed measures that could be expected to provide some benefit to the habitat of the region by directly reducing fishing effort are: days-at-sea (DAS) reductions, gear restrictions, temporary (rolling) fishing closures, and year-round fishing closures. Measures that do not directly reduce fishing effort, but rather manage how the effort is distributed among the fishing industry or the size class of fish targeted by the industry, such as permit declarations, mesh size restrictions, or minimum fish size restrictions, would not be expected to have a direct effect on the habitat of the region. Measures that increase the fishing pressure in a specific area, such as through the reopening of a previously closed area, may increase the adverse impacts on EFH above the baseline set with the submission of Amendment 11.

4.1.9.1.1 Gulf of Maine cod measures

GOM Cod Option 1

DAS: This measure would not significantly affect the overall amount of fishing effort in the region, especially that of bottom-tending mobile fishing gear, and should not have any effect on essential fish habitat.

Area closures: This measure would not increase the overall area closed temporarily or year-round to bottom-tending mobile fishing gear and other fishing gear capable of catching groundfish, but would extend the duration of these closures. Maintaining these closures will reduce any adverse impacts associated with these fishing gears within the boundaries of the areas closed to fishing. The short duration of the rolling closures makes it unlikely, however, that this would be enough to allow degraded habitat to recover. The year-round closure should allow for some recovery, but the amount of recovery cannot be quantified without the conclusions of ongoing experimental research to determine habitat recovery rates in the Gulf of Maine.

While surrounding areas may face an increase in fishing activity due to effort displacement, insufficient data prevent a quantitative analysis of the habitat impacts of effort displacement

associated with this measure. If a fraction of the fishing effort within the proposed closed areas is not displaced to other areas or seasons, the proposed closure options may decrease the impacts on habitat, especially that habitat preferred by cod. A more detailed description of the potential impacts on habitat is provided in Section 4.11 of Amendment 11, which specifically discusses the effects of effort displacement. It is also possible that concentrating fishing effort into smaller areas that remain open may have the unintended effect of increasing impacts on EFH for other species.

Trip Limit: This measure proposes to maintain the status quo trip limit as contained in Framework 31. As such, implementation of this measure would not be expected to have any direct effect on the habitat of the region.

Layover Day Requirement: This proposed measure is not expected to have a direct effect on the habitat of the region.

Day Gillnet Vessels: The assessment of the impacts to habitat resulting from fishing practices presented in Section 4.11 of Amendment 11 concludes that although there is some degree of impact to habitat associated with all types of fishing, the use of static gear such as gillnets is thought to introduce relatively minimal adverse impacts to fish habitat. Therefore, restrictions on the use of gillnet gear are unlikely to have any effect on habitat.

GOM cod Option 2

DAS: This measure would not significantly affect the overall amount of fishing effort in the region, and should not have any effect on essential fish habitat.

Area closures: This measure may increase the overall area closed temporarily or year-round to bottom-tending mobile fishing gear and other fishing gear capable of catching groundfish, but would extend the duration of these closures. Maintaining these closures will reduce any adverse impacts associated with these fishing gears within the boundaries of the areas closed to fishing. The short duration of the rolling closures makes it unlikely, however, that this would be enough to allow degraded habitat to recover. The year-round closure should allow for some recovery, but the amount of recovery cannot be quantified without the conclusions of on-going experimental research to determine habitat recovery rates in the Gulf of Maine.

While surrounding areas may face an increase in fishing activity due to effort displacement, insufficient data prevent a quantitative analysis of the habitat impacts of effort displacement associated with this measure. If a fraction of the fishing effort within the proposed closed areas is not displaced to other areas or seasons, the proposed closure options may decrease the impacts on habitat, especially that habitat preferred by cod. A more detailed description of the potential impacts on habitat is provided in Section 4.11 of Amendment 11, which specifically discusses the effects of effort displacement. It is also possible that concentrating fishing effort into smaller areas that remain open may have the unintended effect of increasing impacts on EFH for other species.

Trip Limit: This measure proposes to maintain the status quo trip limit as contained in Framework 31, with some minor modifications regarding overages. As such, implementation of this measure would not be expected to have any direct effect on the habitat of the region.

GOM cod Option 3

DAS: This measure proposes to maintain the status quo DAS allocations. As such, implementation of this measure would not be expected to have any direct effect on the habitat of the region.

Area Closures: This measure proposes to eliminate the current groundfish GOM two-month rolling closures and the Western Gulf of Maine Closed Area, replacing them with a series of one month rolling closures, a smaller year-round closed area over Jeffreys Ledge and a temporary closed area just to the east of Cape Ann, Massachusetts. The Cashes Ledge Closed Area would remain as in the current program.

The relatively small change in the duration of the rolling closures makes it unlikely that this measure would effect any change in the ability of degraded habitat to recover. The reduction in size of the year-round closure may present an adverse impact on the essential fish habitat contained within the reopened area, as the area was closed as part of the baseline set with the submission of Amendment 11. Maintaining this closure would reduce any adverse impacts associated with these fishing gears within the boundaries of the area closed to fishing. The year-round closure should allow for some recovery, but the amount of recovery cannot be quantified without the conclusions of on-going experimental research to determine habitat recovery rates in the Gulf of Maine. Thus, the loss of opportunity for habitat to recover within the area proposed for early reopening can not be quantified, but may be significant.

At the request of the Habitat Committee, several researchers are conducting research within the boundaries of the Western Gulf of Maine Closed Area to study the interactions between habitat and fish production, impacts of fishing gear on habitat, and the recovery rates of various habitat types. The reopening of portions of this area prior to the original sunset date could threaten this important research.

Trip Limit: This measure proposes to maintain the status quo trip limit as contained in Framework 31. As such, implementation of this measure would not be expected to have any direct effect on the habitat of the region.

Running clock and layover day: The options presented in this proposal are not expected to have a direct effect on the habitat of the region.

Increase cod minimum size to 21 inches: This measure proposes to increase the minimum size for cod from 19 inches to 21 inches. Measures such as this that do not directly reduce fishing effort, but rather manage the size class of fish targeted by the industry, are not expected to have a direct effect on the habitat of the region.

GOM Cod Option 4

DAS/Western Gulf of Maine Restricted Fishery Program: These measures propose to maintain the status quo DAS allocations, with modifications restricting the spatial and temporal distribution of DAS usage. As such, implementation of this measure would not be expected to have a direct effect on the habitat of the region.

Area Closures: This measure proposes to eliminate the current groundfish GOM two-month rolling closures and the Western Gulf of Maine Closed Area, replacing them with a series of one month rolling closures, two smaller year-round closed area over Jeffreys Ledge and the north end of Stellwagen Bank and a temporary closed area just to the east of Cape Ann, Massachusetts. The current temporary Cashes Ledge Closed Area would be extended year-round.

The relatively small change in the duration of the rolling closures makes it unlikely that this measure would effect any change in the ability of degraded habitat to recover. Although the year-round closure of two areas currently closed only temporarily would improve the ability of these areas to recover from any adverse impacts due to the excluded fishing gears, the overall reduction in size of the year-round closure may present an adverse impact on the essential fish habitat contained within the reopened area, as the area was closed as part of the baseline set with the submission of Amendment 11. Maintaining this closure would reduce any adverse impacts associated with these fishing gears within the boundaries of the area closed to fishing. The year-round closure should allow for some recovery, but the amount of recovery cannot be quantified without the conclusions of on-going experimental research to determine habitat recovery rates in the Gulf of Maine. Thus, the loss of opportunity for habitat to recover within the area proposed for early reopening cannot be quantified, but may be significant.

At the request of the Habitat Committee, several researchers are conducting research within the boundaries of the Western Gulf of Maine Closed Area to study the interactions between habitat and fish production, impacts of fishing gear on habitat, and the recovery rates of various habitat types. The reopening of portions of this area prior to the original sunset date could threaten this important research.

Trip Limit: This measure proposes to maintain the status quo trip limit as contained in Framework 31. As such, implementation of this measure would not be expected to have any direct effect on the habitat of the region.

Running clock and layover day: The options presented in this proposal are not expected to have a direct effect on the habitat of the region.

Party/charter access to GOM closed areas: The assessment of the impacts to habitat resulting from fishing practices presented in Section 4.11 of Amendment 11 concludes that although there is some degree of impact to habitat associated with all types of fishing, the use of static gear such as hook and line is thought to introduce relatively minimal adverse impacts to fish habitat. Therefore, restrictions on the use of hook and line gear associated with party/charter fishing are unlikely to have any effect on habitat.

Party/charter DAS usage prohibition: This proposed measure is not expected to have a direct effect on the habitat of the region.

Exemption for raised footrope trawl in the Gulf of Maine

These two options propose to either exempt the raised footrope trawl fishery (a seasonal, limited area fishery) from the temporary closures in a portion of the Gulf of Maine (blocks 124 and 125) or move north the southern boundary of these closures so as to avoid conflict with the boundary of the raised footrope trawl fishery. Section 4.5 of Amendment 11 describes the potential habitat impacts associated with a raised footrope trawl, including that the impacts from this gear configuration may be less than traditional otter trawl configurations due to the reduction in contact with the bottom. Neither of these options proposes to allow fishing with the raised footrope trawl in the year-round area closures, but only in the short-duration temporary closures. This proposed measure is not expected to have a direct effect on the habitat of the region.

4.1.9.1.2 GB cod measures

GB cod trip limit

This measure proposes to maintain the status quo trip limit. As such, implementation of this measure would not be expected to have any effect on the habitat of the region.

GB cod area closures

There are five proposed options that utilize a system of temporary and/or year-round fishing area closures to reduce fishing mortality on Georges Bank cod. The increase in areas closed temporarily or year-round to bottom-tending mobile fishing gear and other fishing gear capable of catching groundfish will reduce any adverse impacts associated with these fishing gears within the boundaries of the areas closed to fishing. The short duration of the rolling closures options makes it unlikely, however, that this would be enough to allow degraded habitat to recover. The options that include year-round closures have the potential to allow for some recovery, but the amount of recovery cannot be quantified without experimental research to determine habitat recovery rates on Georges Bank.

While surrounding areas may face an increase in fishing activity due to effort displacement, insufficient data prevent a quantitative analysis of the habitat impacts of effort displacement associated with the actions proposed in these options. If a fraction of the fishing effort within the proposed closed areas is not displaced to other areas or seasons, the proposed closure options may decrease the impacts on habitat, especially that habitat preferred by cod. A more detailed description of the potential impacts on habitat is provided in Section 4.11 of Amendment 11, which specifically discusses the effects of effort displacement. It is also possible that concentrating fishing effort into smaller areas that remain open may have the unintended effect of increasing impacts on EFH for other species.

4.1.9.1.3 Increase cod minimum size

This measure proposes to increase the minimum size for cod from 19 inches to 21 inches throughout the range of cod. Measures such as this that do not directly reduce fishing effort, but rather manage the size class of fish targeted by the industry, are not expected to have a direct effect on the habitat of the region.

4.1.9.1.4 Counting of first DAS of a trip

This measure would not significantly affect the overall amount of fishing effort in the region, especially that of bottom-tending mobile fishing gear, and should not have any effect on essential fish habitat.

4.1.9.1.5 GB haddock trip limit

Option 1

This measure proposes to maintain the status quo trip limit. As such, implementation of this measure would not be expected to have any effect on the habitat of the region.

Option 2

This measure proposes to raise the trip limits for Georges Bank haddock above the status quo. Although implementation of trip limits are generally not expected to have a direct effect on the habitat of the region, a significant increase in trip limits could increase actual fishing effort. The increased trip limit could have an indirect adverse impact on the habitat of Georges Bank by increasing the amount of fishing effort associated with each DAS.

4.1.9.1.6 Large Mesh Permit category

This proposed measure is not expected to have a direct effect on the habitat of the region.

4.1.9.1.7 Midwater trawl exempted fishery

This proposed measure is not expected to have a direct effect on the habitat of the region.

4.1.9.2 EFH Assessment

This essential fish habitat (EFH) assessment is provided pursuant to 50 CFR 600.920 of the EFH Interim Final Rule to initiate EFH consultation with the National Marine Fisheries Service.

- A. Description of the proposed action -- See Section 3.1 for a description of the proposed action. The activity described by this proposed action, fishing for Gulf of Maine and Georges Bank Atlantic cod and Georges Bank haddock as well as other northeast multispecies, occurs throughout the U.S. EEZ. Thus, the range of this activity occurs across the designated EFH of all Council-managed species (see Amendments #11 and 12 to the Northeast Multispecies FMP).
- B. Analysis of the effects of the proposed action -- Although bottom tending mobile fishing gear, such as that used in the groundfish fishery, has been shown to be associated with adverse impacts to some types of bottom habitat (see Section 4.0 of Amendment #11 to the Northeast Multispecies FMP), this action does not propose to increase current levels

of fishing activity in the U.S. EEZ. Other fishing gears that may be affected by the proposed action (gill nets, hook and line, etc.) have minimal, if any, adverse impact on fish habitat.

This action proposes to delay the expiration date of the Western Gulf of Maine Closed Area for an additional year (to April 30, 2002), and continue the current system of rolling closures in the Gulf of Maine (with the provision for some limited additional temporary closures triggered if 50% of the target TAC is landed by the end of July). Extending the duration of the Western Gulf of Maine Closed Area would provide some benefit to habitat by lengthening the time this area has to recover from adverse impacts associated with fishing. This action also proposes to establish temporary closed areas on Georges Bank, but the short duration of the closures make them unlikely to allow degraded habitat to recover from adverse impacts associated with fishing.

The other measures proposed in this action (Gulf of Maine and Georges Bank cod trip limits, Georges Bank haddock trip limit, the party/charter vessel closed area exemption program, and restrictions on party/charter vessel days-at-sea usage) would have no impact on habitat. None of these proposed actions will have any direct adverse impacts on the EFH of any managed species relative to the baseline conditions established under Amendments #11 and 12.

- C. Conclusions -- The actions proposed under this framework have no potential adverse effects on the EFH of any species managed by the New England, Mid-Atlantic or South Atlantic Fishery Management Councils. Because there are no potential adverse impacts associated with this action, an EFH consultation is not required.
- D. Proposed mitigation -- None required.

4.2 Economic impacts

The Council considered four Gulf of Maine options and five Georges Bank options to achieve cod management objectives in these areas. The measures will impact cod landings and revenues, and also indirectly affect the landings and revenues of other species depending on the degree of effort displacement and revenue recovery from other areas and species. The economic impacts of these alternatives compared to the expected levels under the existing system are examined in this section. This section contains discussion of the proposed action as well as alternatives the Council considered and rejected.

4.2.1 Introduction

4.2.1.1 Summary of Impacts

4.2.1.1.1 Gulf of Maine Options

The Council proposes Option 2 of the four options considered.

- Both Option 1 and Option 2 propose the status quo continuation of the closures contained in Frameworks 27 and 31 and also the status quo trip limit of 400 pounds/day. Therefore, no change in revenues and costs are expected with these closures and trip limits from the status quo levels for the fishing year 2000.
- Option 1 and Option 2 also extend the Western GOM Closed area for one additional year, from May 2001 to April 30, 2002. This extension will reduce the fleet revenues by \$1.8 million if there is 75 percent effort displacement or by \$7.4 million if there is no effort displacement in year 2002.
- Options 1 and 2 propose to charge a minimum of 15 to 24 hours to every fishing trip that is three hours or more in length, and thus both will have negative impacts on vessel revenues. The extent of this impact cannot be quantified, however, because some vessels may compensate for DAS-counting restriction by changing their behavior.
- Option 2 includes additional area closures which could reduce total fleet revenues by \$0.1 million (75 percent effort displacement) to \$0.6 million (no effort displacement) million if only Cashes Ledge is closed in November and blocks 124 and 125 are closed in January (the proposed action). The impacts of the closure of the Northern half of Block 124 year round (considered and rejected by the Council) would be more severe, however, ranging from \$1.4 million (75 percent effort displacement) to \$5.4 million (no effort displacement).
- Option 1 does not include any additional area closures. It does, however, contain layover day requirements and restrictions on net tags that will have negative impacts on revenues. Because these impacts, either separately or in combination of other measures, cannot be quantified at this time, it is not possible to know if the impacts of layover day requirements will be larger or smaller than the impacts of additional area closures under Option 2. Therefore, it is not possible to rank Options 1 and 2 in terms of their economic impacts.

- Since Option 3 and Option 4 include smaller area closures compared to Options 1 and 2 and the status quo, the fleet revenues are expected to increase from the status quo levels determined by Frameworks 27 and 31 measures. These options do not meet, however, fishing mortality objectives for Gulf of Maine cod.
- It is not possible to quantify the impacts of the minimum fish size and running clock and 2-day layover day requirement under Option 3. The impacts of the prohibition of party and charter boats under Option 4 from fishing in the GOM closed areas during February through May cannot be quantified either, although this prohibition is expected to have a large negative impact on the revenues of the restricted vessels.
- The longer closures of areas under Option 4 combined with the prohibition of party and charter boats will probably result in larger negative impacts on the fleet compared to Option 3. These negative impacts show only changes compared to the 1997 levels and relative to Option 3 proposals and can not compared to the impacts of Options 1 and 2. In general, the impacts of Option 3 and 4 are expected to be smaller than the impacts of Option 1 and 2, and the status quo measures that would be implemented by Frameworks 27 and 31.

4.2.1.1.2 Georges Bank Measures

The Council proposes area closure Option 5 of the five options it considered.

- The proposed area closures will have negative impacts on fleet revenues and on net economic benefits in the short-run.
- The largest reduction in revenues are estimated to occur with “no effort displacement”, that is, if the vessels are not able to recover some part of their revenues by fishing in open areas. Among the five proposed alternatives, Option 2 is estimated to have the largest negative impacts by a \$38.9 million loss, or 23.7% reduction, in fishing revenues, followed by Option 3 (\$31.9 million) and Option 1 (\$16.2 million). These numbers include the losses of the dredge sector. Option 4 would reduce the fleet revenues by \$9.4 million and Option 5 by \$6.5 million, or by 3.9 percent, including the revenues of the dredge sector.
- The revenue losses will be smaller, \$13.9 million for Option 2, and only \$0.3 million for Option 4, if the vessels were able to shift their effort fully to open areas, generate revenues per DAS at the average rate of vessels that used the same gear in the open areas.
- It is highly unlikely, however, for vessels to recover fully the revenue loss from the closed areas by fishing in the open areas. The size and horse power of some vessels may restrict their ability to fish in distant off-shore areas, so that not all effort can actually shift to open areas. As a result, the actual impacts on revenues will lie somewhere between the range of impacts estimated for the “no effort displacement” and ‘total effort displacement’ scenarios
- The results suggest that the Option 2 has the highest cost in terms of revenues lost per metric ton of cod saved, followed by Options 3 and 5, if the dredges are not allowed to fish in the closed areas. Out of these alternatives, Option 3 has a large economic cost compared to Option 4, despite the amount of cod saved under these options are the same, i.e., 509 metric tons with a trip limit of 2000 pounds/day. Option 4 has also the lowest revenue loss per metric ton of cod saved.

- Option 2 has a high marginal cost compared to Option 1. Cod landings under Option 2 is only 92 metric tons lower than the landings under Option 1, while the revenue loss under Option 2 exceeds the revenue loss for Option 1 by more than \$12 million with total effort displacement.

4.2.1.2 Summary of impacts on economic costs and benefits

- The economic impacts represent only short-term losses from the proposed options and Table 64 provides a qualitative analysis of these short-term impacts on prices, consumer and producer surpluses and net economic benefits.
- As stated in FSEIS of Amendment 7, the rebuilding measures will have negative impacts on revenues, producer and consumer surpluses in the short-term, but will increase fleet profits, crew shares, and consumer benefits over the long-term by increasing the stock size and therefore, landings of the regulated species.

	Impact on prices	Impact on Landings	Impact on Gross Revenues	Impact on Consumer Surplus	Impact on Operating Expenses	Impact on Producer Surplus	Net Benefits
Cod trip limit (Same as status quo)	Increase compared to no trip limit	Decrease compared to no trip limit	Decrease compared to no trip limit	Decrease compared to no trip limit	Increase compared to no trip limit	Negative compared to no trip limit	Short-term Negative (No change from status quo)
Area Closures. Zero or partial Displacement of Effort	Increase	Decrease	Decrease	Decrease	Decrease	Negative	Short-term Negative
Area Closures. Displacement of Effort fully to other areas/months	No or negligible impacts	No or negligible impacts Decrease	No or negligible impacts Decrease	No or negligible impacts Decrease	Increase or negligible	Negative or negligible	Short-term Negative or negligible
Layover day requirement	May increase prices in some periods, stabilize prices	Decrease	Decrease	Decrease	Increase	Negative	Short-term negative
Counting of DAS, restriction on DAS/trips	May increase prices in some periods, stabilize prices	Decrease	Decrease	Decrease	Increase	Negative	Short-term negative
Increase in Haddock trip limit	Decrease	Positive	Positive	Decrease	Neutral	Positive	Short-term Positive (No change if status quo trip limit)
Scallop vessel access	neutral on groundfish but negative on scallops	neutral on groundfish but positive on scallops	neutral on groundfish but increase on scallop vessels	neutral on groundfish but increase for scallop consumers	neutral on groundfish but negative on scallop vessels	neutral on groundfish but positive on scallop vessels	short-term positive

Table 64 Short term economic costs and benefits of Framework 33 alternatives

4.2.1.3 Sources of uncertainty in the analysis

- The results must be interpreted with caution because the estimated revenue impacts under any option does not take into account the price impacts. The decline of landings due to the closed areas, or due to layover day or other measures, may lead to an increase in fish prices, and partly offset the decline in revenues from reduced landings.
- Similarly, the impacts on net revenues, that is, gross revenues minus costs, will be less under each option since the variable costs will decline as effort is reduced due to the closures, layover day requirements, DAS-counting, restrictions on net tags and so on.
- Additionally, the revenue impacts are based on 1997 data for landings and revenues, and no adjustments are made to these numbers for the changes in the fishing mortality of the various species, except in the case of Georges Bank cod.

4.2.2 Impact of Gulf of Maine cod measures

The economic impacts of Options 1 and 2 are analyzed together because they contain some common measures in regard to area closures, trip limits and the counting of DAS.

4.2.2.1 Impact of GOM Options 1 and 2

4.2.2.1.1 Impacts of the common measures

- Both options propose the status quo continuation of the closures contained in Frameworks 27 and 31, and extend the Western GOM Closed area for one additional year, from May 2001 to April 30, 2002.
- The proposed trip limits are also identical, and equal to the status quo trip limit of 400 pounds per day-at-sea.
- As a result, no change in revenues and costs are expected with these closures and trip limits from the status quo levels for the fishing year 2000.
 - The Western GOM closure was scheduled to end on April 30, 2001, however, and the extension of this closure for the 2001 fishing year will reduce the revenues that could be potentially derived from fishing in this area if the scheduled opening went into effect. The revenues from Western GOM area amounted to \$7.4 million in 1997, and would be lost in full if there is no effort displacement to other areas (Table 65). It is more reasonable to expect, however, that vessels will shift their effort, and recover some part of the lost revenues by fishing in other areas. For example, a 50 percent effort displacement would result in \$3.6 million loss, and a 75 percent effort shift in a \$1.8 revenue loss if the Western GOM Closed area were extended for one more year in 2001. It should be emphasized, however, if this area was opened on May 2001, other restrictions on catch and effort would be needed to provide an equivalent cod conservation in order to meet GOM cod fishing mortality objectives.

Closures	Geartype	Effort Displacement			
		0%	25%	50%	75%
Options 1 and 2 Continuation of FW 27 and 31 Closures	Dredge Groundfish gear	No impacts compared to status quo No impacts compared to status quo			
Options 1 and 2 Extension of Western Gulf of Maine CA (FY 2002)	Dredge Groundfish gear Total	-308,304 -7,357,780 -7,666,083	-231,228 -5,518,335 -5,749,563	-154,152 -3,678,890 -3,833,042	-77,076 -1,839,445 -1,916,521
Option 2 only Cashes Ledge CA (Nov) and Blocks 124 & 125 (Jan) If 50 % of TAC is landed by July 31 (proposed action)	Dredge Groundfish gear Total	- 101,578 544,953 646,532	- 76,184 408,715 484,899	- 50,789 272,477 323,266	- 25,395 136,238 161,633
Option 2 only Northern half of Block 124 year-round	Dredge Groundfish gear Total	- 1,453,572 3,906,286 5,359,858	- 1,090,179 2,929,714 4,019,894	- 726,786 1,953,143 2,679,929	- 363,393 976,571 1,339,965

Table 65. Reduction in estimated fleet revenues under Options 1 and 2 (1997 estimates in dollars). The proposed action is shaded.

Options 1 and 2 also propose to charge a minimum of 15 to 24 hours to every fishing trip that is three hours or more in length. The Council did not adopt either of these alternatives. The impacts of charging 24 hours to every fishing trip on the number the trips taken by the groundfish vessels are analyzed in detail for all areas and separately for GOM area in Section 4.1. The results and the possible economic impacts can be summarized as follows:

- The proposal is expected to constrain the fishing activity of the vessels that use a high percentage of DAS and take a large number of short trips. The impacts will be similar to a DAS reduction.
- If the vessel operators respond to this new restriction by decreasing the number of trips taken, 28% of sink gillnets, 15% of bottom longline vessels, and 11% of bottom trawl vessels would loose trips according to the data on all vessels that used groundfish DAS in 1997. In terms of

the DAS category, 14% of fleet DAS Permits, 8% of individual DAS permits, and 2% of hook gear would be impacted.

- The impacts of the DAS counting proposals on the total DAS-used by vessels, and on their landings and revenues cannot be quantified due to the uncertainty regarding the change in fishermen's behavior. Instead of taking fewer trips, the fishermen may shorten the trips longer than 24 hours to stay within the allocated DAS while still taking the same number of trips. A vessel that is now going to be charged a minimum of 24 hours (or 15 hours) for the shorter trips may decide to actually fish the entire 24 hours, rather than sitting at the dock catching nothing. Another way to mitigate the impacts of this proposal is to allow the DAS clock to run when a vessel returns to port on a short trip.
- The impacts on revenues will be negative, however, if the vessels could only compensate partially for DAS-counting restriction by changing their behavior. These measures are also likely to increase the costs to fishermen, by reducing the flexibility in choosing the number and the length of their trips corresponding to levels that would minimize their costs and maximize their economic returns. For example, increasing trip length in response to the increase in hours charged to a trip may result in an increase in variable costs such as crew expenses and fuel, at a risk of exceeding the increase in revenues from extended fishing (see also the discussion below in regard to the layover day requirement). The 15 hours counting option will have less negative impacts, however, compared to a 24 hours counting.

4.2.2.1.2 Impacts of the layover day requirement and restrictions on net tags (Option 1, rejected)

Option 1 differs from Option 2, however, because of its layover day requirements and restrictions on the number of net tags. According to this proposal, during the months May to July, November and December all vessels not enrolled in GOM trip limit exemption program except Day Gillnet vessels, must remain in port for a period of time equivalent to the time of the trip limit, with a minimum of 24 hours. This intent of this measure is to slow pulse-fishing following the re-opening of the rolling closures and disperse effort through a longer time period. The analysis of this measure in section 4.1 and suggested that the landings of the inshore vessels could be reduced by as much as 50 percent in some months during closures (because of the layover requirement). Overall impacts will probably be less than this since the vessels may increase their effort and landings in other months when no layover day requirement is in effect. Although the available data does not allow a quantitative assessment of the net impacts, this measure will probably have some negative impacts on the revenues and costs of vessels:

- The layover day requirement may reduce the level of fishing activity and landings and revenues by reducing the flexibility in the timing of trips, and by extending the time over which the trips can be taken. It may also reduce the ability of a vessel to respond to market conditions, for example, to take more trips when fish prices are higher, and less trips when prices are lower.
- On the positive side, by reducing pulse-fishing and landings during the layover months, this measure may improve price stability. An increase in fish prices during these months might offset at least some of the revenue loss from reduced landings in the same period.

- Additionally, like any measure that restricts the timing, number and length of trips, the layover day requirement may lead to economic inefficiencies. For example, imposition of layover day requirement may extend the time over which insurance must be carried and might also increase crew and docking expenses. On the other hand, if layover day requirements reduce effort, i.e., days-at-sea used by the vessels, variable costs and insurance expenses may decline.

The Day Gillnet vessels would not be subject to layover days, instead during the months from May to July, and November to December they will be limited to fishing with 80 net tags, representing a reduction of 50 percent in allowed nets. It is uncertain, however, if this restriction in the number of net tags would translate into a 50 percent reduction in cod landings, since some boats may already be using 80 tags or fewer. In general, this measure is expected to have a negative impact on revenues of at least some gillnet vessels, although the extent of this impact cannot be assessed quantitatively. In addition, some of these negative impacts will be offset by reduction in price volatility during the pulse period as the landings are spread over a longer period of time due to the restriction on the number of net tags and the concurrent layover days in other fleet sectors.

4.2.2.1.3 Impacts of additional closures (Option 2)

Option 2 differs from Option 1 in that instead of the layover day and 80 gillnet requirement, it contained two additional area closures options:

- under the proposed action, the Cashes Ledge Closed Area in November and Blocks 124 and 125 in January will be closed if 50 percent of the TAC is landed by July 31, or
- it would close the Northern half of Block 124 year round (rejected by the Council).

These closures would have negative economic impacts on vessels by reducing the revenues from all species derived from these areas as shown in Table 65. Specifically, if half of TAC is reached by July 31, the first set of closures would reduce the fleet revenues by \$161,600 (75% effort displacement) to \$646,500 (no effort displacement) depending on the degree of effort displacement to other areas.

The impacts of the closure of the Northern half of Block 124 year round would be more severe, however, ranging from \$1.4 million (75 percent effort displacement) to \$5.4 million (no effort displacement). These impacts were estimated using 1997 landings and revenues. According to the estimates, cod fishing mortality has declined by almost 65 percent since 1997. Therefore area closures will have less impact on revenues than estimated here, since in the absence of the closures, the cod landings and revenues will be less than their 1997 levels. Additionally, no adjustments are made for the changes in the fishing mortality of the other species, therefore, total revenue reductions may differ from the values shown in Table 65.

4.2.2.1.4 Summary of economic impacts for Options 1 and 2

- The economic impacts of the status quo closures (Frameworks 27 and 31) will be identical for both options. There will be no changes in revenues and costs compared to the status quo levels.
- The extension Western GOM Closed area for one additional year (from May 2001 to April 30, 2002) will reduce fleet revenues under both options 1 and 2 compared to the status quo. The decline in total revenues may reach \$1.9 million with a 75 percent effort displacement or \$7.6 million with no effort displacement. The net impact, however, will not be as large because other effort or catch restrictions would be necessary to achieve commensurate conservation in 2001
- Both options propose to charge a minimum of 15 to 24 hours to every fishing trip that is three hours or more in length, and thus both will have negative impacts on some vessels' revenues. The extent of this impact cannot be quantified, however, because some vessels may compensate for DAS-counting restriction by changing their behavior; most vessels, those that do not use all of their DAS allocation, could compensate for this measure by merely increasing their DAS usage rate
- Option 2 includes additional area closures that could reduce total fleet revenues by \$0.1 million (75 percent effort displacement) to \$0.6 million (no effort displacement) if only Cashes Ledge is closed in November and Blocks 124 and 125 are closed in January.
- The impacts of the closure of the Northern half of Block 124 year round (not adopted) would be more severe, however, ranging from \$1.4 million (75 percent effort displacement) to \$5.4 million (no effort displacement).
- Option 1 does not include any additional area closures. It does, however, contain layover day requirements and restrictions on net tags that will have negative impacts on revenues. Because these impacts, either separately or in combination with other measures, cannot be quantified at this time, it is not possible to know if the impacts of layover day requirements will be larger or smaller than the impacts of additional area closures under Option 2. Therefore, it is not possible to rank Options 1 and 2 in terms of their economic impacts.

4.2.2.2 Economic Impacts of GOM Option 3 and Option 4

Since Options 3 and 4 contain similar proposals in regard to area closures and running clock requirement, their economic impacts are analyzed together in this section. The Council rejected these options because they did not meet the biological objectives of the FMP.

4.2.2.2.1 Impacts of area closures and trip limits

The size and configuration of the area closures in Options 3 and 4 prevents an accurate estimation of the economic impacts from these closures. The VTR and observer data is insufficient to determine catch and effort to the level of precision that would allow such an analysis. For these reasons, the discussion of impacts included in this section is mostly qualitative in nature with a few exceptions. The area closures proposed by these options include the following:

- a year round closure of GOM Area I,

- closure of GOM Area II from September 15 to November 15, and
- the implementation of the one-month rolling closures of areas that were in effect in 1998 FY (under Framework 25).
- Whereas Option 3 would close Northern half of 124 in March through August, Option 4 would close GOM Area III, which is equivalent to closing the entire Northern half of 124 year round.
- Option 3 would close Cashes Ledge Closed Area (CA) during the months July to October, whereas Option 4 would close this area year round.

The economic impacts of these closures are expected to be positive as compared to the status quo closures, since the closed areas under Options 3 and 4 are much smaller than the closures scheduled under the Frameworks 27 and 31. In general, the revenues of the fleet from all species will increase from the status quo levels, although the degree of this increase cannot be assessed quantitatively. It should be emphasized, however, that the analysis of the biological impacts in Section 4.1 indicated that these options will not achieve the conservation objectives for Gulf of Maine cod.

Option 4 closures will reduce the fleet revenues compared to the Option 3 closures because it has longer closures of the Cashes Ledge and the Northern half of 124 as Table 66 shows. If there was no effort displacement, the fleet revenues will decline by \$4.5 million (no effort displacement) to 1.1 million (75% effort displacement) under the closures proposed in Option 4 compared to ones proposed in Option 3. It must be emphasized, however, as compared to the status quo levels, there will be no additional reduction in revenues. The size of closures are smaller for Options 3 and 4 compared to both Options 1 and 2 and to status quo closures implemented by Frameworks 27 and 31. Thus the revenue reductions shown in Table 66 cannot be compared to the revenue reduction from Options 1 and 2 shown in Table 65.

Closures	Geartype	Effort Displacement			
		0%	25%	50%	75%
Option 3					
Northern half of 124 (Mar-Aug)	Dredge	-932,624	-699,468	-466,312	-233,156
Cashes Ledge CA (July-Aug)	Groundfish gear	-2,539,240	-1,904,430	-1,269,620	-634,810
	Total	-3,471,864	-2,603,898	-1,735,932	-867,966
Option 4				0	0
Northern half of 124 (year round)	Dredge	-1,500,604	-1,125,453	-750,302	-375,151
Cashes Ledge CA (year round)	Groundfish gear	-6,524,212	-4,893,159	-3,262,106	-1,631,053
	Total	-8,024,816	-6,018,612	-4,012,408	-2,006,204
Difference Option 4 - Option 3				0	0
	Dredge	-567,980	-425,985	-283,990	-141,995
	Groundfish gear	-3,984,972	-2,988,729	-1,992,486	-996,243
	Total	-4,552,952	-3,414,714	-2,276,476	-1,138,238

Table 66: The relative impacts of Option 3 and 4 area closures - Estimated reduction in revenues from 1997 levels only (can not be compared to the impacts of Options 1 and 2)

Since both Options 3 and 4 propose the continuation of the same cod trip limits, 400 pounds per DAS, there will be no change from the status quo levels in landings and revenues.

4.2.2.2.2 The impacts of the additional measures proposed by Option 3 and Option 4

Options 3 and 4 would reinstate the running clock and add a 2-day layover for trips that land an overage, or retain Framework 31 overage requirements. These measures will probably have negative impacts on vessel revenues and increase costs by reducing the flexibility in the timing of trips, and by extending the time over which the trips can be taken. Under Option 4 this requirement would be suspended during February through May. In turn, Option 4 would prohibit party and charter boats from fishing in the GOM closed areas during these months. Such a prohibition would have large negative impacts on the revenues of party and charter boats, however. See Section 4.2.3, Impact of recreational measures.

Option 4 includes a proposal to limit vessels fishing in the Western Gulf of Maine Restricted Fishery Program to 25 DAS or trips (call in/call out cycles), whichever is less, during February through May. The impacts of this measure on total effort in the fishery were analyzed in 4.1. The results indicate that 25 DAS/Trips provision would reduce the cod landings in this area by 3.5 percent. If the landings of the other species declined in the same proportion, this measure would reduce the total fleet revenues by only \$95,295 from the 1997 levels (Table 67).

Geartype	Total revenues during May-February (in dollars)	Reduction in revenues column 1 X 3.5% (\$)
Dredge	58,369	- 2,043
Groundfish Gear	2,664,349	- 93,252
Total	2,722,718	- 95,295

Table 67; Revenue Impacts of Option 4 25 DAS/Trips restriction, February – May, based on 1997 data

Instead of the 25 DAS/trips restriction proposed under Option 4, Option 3 contains an increase in the cod minimum size to 21 inches. This measure may reduce the revenues of the fishing vessels in the very short-term, and increase their costs due to the costs of discarding or due to any changes in gear in order to reduce the catch of smaller fish. The loss of revenues in the short-term could be recovered, however, later in the fishing year as yield per recruit increases due to the growth in 19-21 inch fish not caught (depending on changes in gear selectivity adopted to reduce bycatch).

4.2.2.2.3 Summary of economic impacts for Options 3 and 4

- Since these options include smaller area closures compared to Options 1 and 2 and the status quo, the fleet revenues are expected to increase from the status quo levels determined by Frameworks 27 and 31 measures. These options do not meet, however, fishing mortality objectives for Gulf of Maine cod.
- Since Option 4 proposes to close upper part of Stellwagen Bank and Cashes Ledge CA year round, it will reduce the fleet revenues by \$1.2 million (75 percent effort displacement) to \$4.5 million compared to Option 3 levels. In comparison to status quo, however, Option 4 will still have positive impacts on fleet revenues because of the smaller size of closed areas under this option.
- It is not possible to quantify the impacts of the minimum fish size and running clock and 2-day layover day requirement under Option 3. The impacts under Option 4 of the prohibition on party and charter boats from fishing in the GOM closed areas during February through May also cannot be quantified, although this prohibition is expected to have a large negative impact on the revenues of the restricted vessels. The longer closures of areas combined with this prohibition under Option 4 will probably result in larger negative impacts on the fleet compared to Option 3. Again, both options will increase fleet revenues compared to Options 1 and 2 and status quo, but will fail to meet conservation objectives for Gulf of Maine cod.

4.2.2.3 Requirement for Party/Charter Vessels to Obtain an Exemption Certificate to Fish in the Gulf of Maine Closed Areas

Under the proposed Framework 33 measures, a certification program for all vessels carrying passengers for hire in any or all of the Gulf of Maine closed areas would be implemented. Any vessel enrolling in the proposed certification program would be subject to the recreational no-sale

provision and would be prohibited from using any Multispecies DAS for the duration of the certificate. The Council considered three options for the duration of the certificate: full year, 6-months, or 3-months. The following provides a summary of the recreational party/charter fishery in the Northeast region and evaluates the potential economic impacts for the different certification program alternatives. The Council proposes the three-month certification program.

4.2.2.3.1 Description of Affected Entities

As proposed, the Framework 33 certification requirement would affect any vessel that chooses to take passengers for hire in any one or all of the Gulf of Maine closure areas regardless of species sought or recreational permit held by the vessel for at least the 2000-2001 multispecies fishing year. Thus, this measure would apply to any vessel holding a federal party/charter permit for any species as well as any limited access multispecies vessel that chooses to carry passengers for hire. Based on 1999 year-to-date (YTD) permit data, there are 3,092 vessels that could be affected by the proposed measure. Of these vessels, all but 76 held at least some kind of limited access or open access multispecies commercial permit and/or an open access multispecies party/charter permit.

The economic activity of taking passengers for hire is classified under the Standard Industrial Code (SIC) code 7999 (Miscellaneous Amusement and Recreation Services), while the economic activity of commercial fishing is classified under SIC code 0912. For purposes of size classification under the Regulatory Flexibility Act, the Small Business Administration defines any entity in SIC code 7999 and 0912 as “small” if gross sales do not exceed \$5 and \$3 million respectively. Based on these size standards, all of the potentially affected entities are considered “small.”

Although there are over three thousand vessels that could be required to enroll in the certification program, the proposal would only affect a vessel if recreational passengers are actually taken *and* if the vessel chooses to operate in the Gulf of Maine closed areas. Existing data does not present fine enough resolution to determine patterns of party/charter activity that correspond to the precise coordinates of the Gulf of Maine time and area closures. Nevertheless, the number of vessels that reported at least one party/charter trip within the boundaries of the Gulf of Maine provides a conservative estimate of the number of participating vessels that are most likely to be affected by the certification requirement. Based on 1998 logbook records, a total of 101 vessels took at least one or more party/charter trips in the Gulf of Maine. The economic assessment reported below is based on the potential impact that the certification requirement would have on these 101 vessels. These 101 vessels are herein referred to as “participating vessels.”

4.2.2.3.2 Description of Participating Vessels

Based on permit application year 1998 data, the 101 participating vessels possessed a total of 201 party/charter permits and 160 commercial permits covered by the Multispecies, Lobster, Summer Flounder, Scup, Black Sea Bass, and Squid/Mackerel/Butterfish FMPs (Table 68). Nearly half of the participating vessels held an open access multispecies party/charter permit (50), while the

remaining vessels held either a limited access multispecies permit (29) or some combination of open access multispecies permits (46 hand gear and 8 non-regulated multispecies).

FISHERY MANAGEMENT PLAN	PARTY/CHARTER PERMITS	COMMERCIAL PERMITS
Multispecies	50	
Limited Access		29
Hand Gear Only		46
Non-regulated		8
Lobster	3	15
Summer Flounder	41	4
Squid/Mackerel/Butterfish	54	40
Scup	33	3
Black Sea Bass	20	4
Total Party/Charter Permits = 201		Total Commercial Permits = 160

Table 68 Summary of Federal Permits Held by Participating Gulf of Maine Party/Charter Vessels

In 1998, the majority of participating vessels (54) operated out of primary ports in the state of Massachusetts (Table 69). Many of these vessels were clustered in Gloucester (12), Green Harbor (10), Newburyport (4), Plymouth (3), Salisbury (7), and Scituate (4). There were 20 participating vessels operating out of ports in the state of Maine, but Portland was the only port with three or more participating vessels (Table 70). New Hampshire's party/charter vessels (14) were clustered in the ports of Hampton (6) and Portsmouth (4). The remaining participating vessels in 1998 were broadly distributed across 36 different ports in the Northeast region.

STATE	NUMBER OF VESSELS
Massachusetts	54
Maine	20
New Hampshire	14
New York	5
Other States	8

Table 69 Summary of Participating Gulf of Maine Party/Charter Vessels by Primary Port State

PORT	NUMBER OF VESSELS
Gloucester, MA	12
Green Harbor, MA	10
Hampton, NH	6
Newburyport, MA	4
Plymouth, MA	3
Portland, ME	3
Portsmouth, NH	3
Salisbury, MA	7
Scituate, MA	4
Other Ports ¹	49

¹ Includes 36 ports in the Northeast region.

Table 70 Summary of Primary Port for Participating Gulf of Maine Party/Charter Vessels

The participating vessels in 1998 ranged in size from 20 feet to 78 feet (Table 71). Fifty percent of the vessels were less than 35 feet in overall length, and 75% were less than 47 feet. In terms of gross registered tons (GRT), the vessels ranged from one to 124 GRT. The median vessel in 1998 was 15 GRT, and 95% of the vessels were less than 79 GRT.

PERCENTILE OF DISTRIBUTION	LENGTH (FEET)	GROSS TONS (TONS)
Minimum	20	1
5th	22	2
25th	31	8
Median	35	15
75th	47	29
95th	77	79
Maximum	78	124

Table 71 Summary of Participating Gulf of Maine Party/Charter Vessels by Vessel Size

Based on 1998 reported fishing activity in vessel trip reports and dealer data, the participating vessels operated in the Gulf of Maine as well as areas in Georges Bank and Southern New England. Assuming an average per passenger fee of \$65, the participating vessels earned a total of \$6.5 million in 1998 from combined passenger fees and their commercial fishing activity. These revenues were divided into \$3.9 million for passenger fees on 3,157 trips taken in the Gulf of Maine, \$1.8 million for passenger fees on 1,205 trips taken outside the Gulf of Maine, and \$0.8 million in sales from commercial fishing (Table 72). The total number of fish kept was 243,215 and 169,035 inside and outside the Gulf of Maine respectively. Total discards (in numbers of fish) were estimated at 355,917 and 45,847 inside and outside the Gulf of Maine respectively. Total Gulf of Maine cod kept was 110,775 fish, while 76,537 Gulf of Maine cod were reported to be discarded.

VARIABLE	GULF OF MAINE	NON-GULF OF MAINE
Number of Trips	3,157	1,205
Number of Passengers	60,707	27,056
Passenger Revenue^{1,2}	3,945,955	1,758,640
Total Fish Kept	243,215	169,035
Total Fish Discarded	355,917	45,847
Total Cod Kept	110,775	12,625
Total Cod Discarded	76,537	1,615
Total Other Groundfish Kept	57,685	861
Total Other Groundfish Discarded	143,998	572
Total Non-Groundfish Species Kept	74,755	155,549
Total Non-Groundfish Species Discarded	135,382	43,660
<p><i>1 Assumed average passenger fees of \$65, based on 1994 survey of party/charter anglers.</i></p> <p><i>2 Total revenues from commercial fishing activities were \$820,280.</i></p>		

Table 72 Summary of Participating Gulf of Maine Party/Charter Vessel Activity

The majority of participating vessels earned all of their 1998 income from passenger fees. For 75% of the 101 participating vessels, passenger fees accounted for 98% or more of total revenues (Table 73, Column 1). These vessels are participating in little to no commercial fishing activities. There were 25 vessels whose passenger fees accounted for less than 5% of earnings. The majority of their passenger fee revenues, however, came from trips taken in the Gulf of Maine (Table 73, Column 2). Similarly, for the 76 vessels with 95% or greater earnings from passenger fees, the majority of these revenues came from trips taken in the Gulf of Maine.

	ALL VESSELS	PC REVENUES < 5%	PC REVENUES >= 95%
STATISTICS	PC Revenues/Total Revenues	Gulf of Maine PC Revenues/Total PC Revenues	Gulf of Maine PC Revenues/Total PC Revenues
Mean	0.844	0.882	0.872
Standard Deviation	0.310	0.283	0.291
Minimum	0.002	0.005	0.002
5th Percentile	0.028	0.107	0.003
25th Percentile	0.977	0.948	0.968
Median	1.00	1.00	1.00
75th Percentile	1.00	1.00	1.00
95th Percentile	1.00	1.00	1.00
Maximum	1.00	1.00	1.00
N	101	25	76

Table 73 Summary of Gulf of Maine Party/Charter Vessel Distribution of Party/Charter Revenues

4.2.2.3.3 Economic Impacts of Proposed Certification Alternatives

As previously discussed, existing data do not permit sufficient resolution to model exact times and areas that coincide with Gulf of Maine closures. Further, the proposed certification requirement would apply to any closures that may be implemented either through a subsequent framework adjustment or emergency action. Therefore, the impacts of the certification measure were developed under the assumption that the certificate would be required of any party/charter vessel that fished anywhere in the Gulf of Maine for the duration of the certificate. This assumption is considered a worst-case scenario, so the estimated impacts are likely to overstate the potential economic impacts of the certification program. Nevertheless, the resulting estimates will provide a valid basis for purposes of comparing impacts of alternative certificate duration periods.

The analysis was conducted by compiling monthly commercial activity from dealer data and monthly party/charter activity from vessel logbook data for each of the 101 participating vessels in

1998. The party/charter data was further subdivided into Gulf of Maine and Non-Gulf of Maine activity. An average passenger fee of \$65 was used to calculate passenger income. Since the proposed certification program would only affect party/charter activity in the Gulf of Maine, each participating vessel was assumed to choose between: (1) obtaining the certificate and dropping any commercial activity during the duration of the certificate; and (2) not obtaining the certificate. In the latter case, the vessel would be able to continue to take passengers for hire outside the Gulf of Maine (closed areas) and would be able to engage in commercial fishing activity. The vessel was assumed to choose the alternative that yields highest gross revenues. For example, a vessel earning \$45 thousand from party/charter activity in the Gulf of Maine and \$5 thousand in commercial fishing activity was assumed to obtain the certificate and give up the commercial fishing activity.

Eight different certification duration periods were evaluated. In addition to a one-year duration, two 6-month, and five 3-month duration periods were evaluated. The number of impacted vessels (vessels with 5% or greater loss in gross revenues) ranged from a high of 17 for the one-year certification to one vessel for a April-June certification period (Table 74). The difference in the number of impacted vessels across certification alternatives is due to differences in fishing patterns (fishing location and mix of party/charter *vis à vis* commercial fishing among the participating vessels). These differences affect which vessels choose to fish under a certification program and which vessels choose to exit the party/charter fishery for the duration of the certification time period.

	1998	Annual Certification	April-September Certification	May-October Certification	April-June Certification	May-July Certification	June-August Certification	July-September Certification	August-October Certification
Vessels with 5% or Greater Reduction in Combined Commercial and Party/Charter Revenues	N/A	17	15	13	1	7	9	12	10
Commercial Fishing Revenue (\$)	820,280	780,996	779,339	781,301	812,386	801,664	806,451	811,255	803,017
No. of Gulf of Maine Passengers	60,707	59,184	60,258	60,284	60,616	60,530	60,461	60,338	60,524
Gulf of Maine Passenger Revenue	3,945,955	3,846,960	3,916,770	3,918,460	3,940,040	3,934,450	3,929,965	3,921,970	3,934,060
Gulf of Maine Cod Kept (No. of fish)	110,775	103,763	106,249	107,666	106,967	108,129	110,174	110,178	110,384
Gulf of Maine Cod Discarded (No. of fish)	76,537	74,939	75,942	76,034	76,452	76,342	76,350	76,077	76,212
Gulf of Maine Other Groundfish Kept	57,685	56,073	56,809	56,870	57,430	57,106	57,252	57,103	57,490
Gulf of Maine Other Groundfish Discarded	143,998	143,527	143,806	143,817	143,985	143,948	143,923	143,866	143,881
Gulf of Maine Non-Groundfish Kept	74,755	71,016	71,260	71,262	74,724	71,944	72,010	71,231	73,898
Gulf of Maine Non-Groundfish Discarded	135,382	134,350	134,366	134,362	135,377	135,124	134,593	134,498	135,215

Table 74 Summary of Impacts of Gulf of Maine Party/Charter Certification Alternatives. Shaded cells are proposed three-month programs.

Under a one-year certification program, 17 of the 101 participating vessels in 1998 are estimated to lose 5% or more of their 1998 gross revenues. Of the 84 vessels that would not be impacted by less than 5% revenue loss, 75 would likely choose to fish under the certification program, while 9 would choose to give up party/charter fishing in the Gulf of Maine (Table 75).

Commercial fishing revenues for the 75 vessels that would choose to obtain an exemption accounted for only a small proportion (less than 5%) of annual gross revenues. Passenger fees from Gulf of Maine party/charter trips for the 9 vessels that would give up party/charter fishing accounted for less than 5% of their gross annual revenues. By contrast, the 17 impacted vessels were more diversified in their mix of commercial and party/charter fishing activities and would be required to give up a proportion of their gross revenues. Revenue loss for these vessels ranged from a high of 47% to a low of 6% (Table 75). Fifty-percent of the 17 potentially impacted vessels would give up 29% of their annual gross revenues under the alternative for a one-year certification program.

	Annual Certification	April-September Certification	May-October Certification	April-June Certification	May-July Certification	June-August Certification	July-September Certification	August-October Certification
No. of Impacted Vessels That Obtain Certificate	7	7	7	0	4	4	3	4
Number of Impacted Vessels That do not Obtain Certificate	10	8	6	1	3	5	9	6
Number of non-Impacted Vessels that Obtain Certificate	75	73	73	84	76	70	58	54
Number of non-Impacted Vessels that do not Obtain Certificate	9	13	15	16	18	22	31	37
Maximum Impact	0.47	0.47	0.47	NA	0.41	0.28	0.37	0.35
Median Impact	0.29	0.28	0.27	NA	0.16	0.20	0.18	0.16
Minimum Impact	0.06	0.06	0.10	NA	0.11	0.09	0.08	0.08

Table 75 Estimated Enrollment in Certification Program and Revenue Impacts for Participating Gulf of Maine Party/Charter Vessels. Shaded cells are proposed three-month programs.