

FRAMEWORK ADJUSTMENT 31

to the

NORTHEAST MULTISPECIES FISHERY MANAGEMENT PLAN

**To modify the management measures of the Gulf of Maine cod fishery
and the Georges Bank cod trip limit system
in the 1999-2000 fishing year**

Prepared by

New England Fishery Management Council

in consultation with

National Marine Fisheries Service

Mid-Atlantic Council

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1. Introduction

1.1 Executive Summary

The New England Fishery Management Council (Council) is taking action to modify the fisheries management programs for Gulf of Maine (GOM) cod and Georges Bank (GB) cod. This action is a continuation of the plan review and adjustment process established by Amendment 7 to the Northeast Multispecies Fishery Management Plan (FMP) to ensure that stock rebuilding goals are achieved. The Council is taking this action prior to the normal annual plan review, which occurs during November – January each year, because of the immediate problem of high levels of GOM cod discards under the current regulations, and to forestall a similar situation with Georges Bank cod during the final months of the current fishing year under the trip limit implemented with Framework 30.

The primary purpose of this action is to immediately reduce the levels of cod discards in GOM multispecies fisheries while still achieving the conservation goals of the plan. The Council intends the measures proposed in this framework to take effect as soon as practicable and recommends that the action be implemented as a final rule. This framework will increase the trip limit to address the discard problem and implement commensurate conservation measures to offset the increased trip limit. These other measures include the addition of a February closure of an area encompassing Massachusetts Bay and Stellwagen Bank, and modifications to the provision that allows vessels to land an overage of the cod trip limit by continuing to run their days-at-sea clock while in port.

The Council also intends to modify the trip limit regulations for the Georges Bank cod fishery so that a discarding situation similar to what has occurred in the Gulf of Maine does not arise. The GB cod trip limit rules currently authorize the Regional Administrator to reduce the limit, when 75 percent of the Total Allowable Catch (TAC) target is reached, to a level that is projected to keep catches below the target. The Council is concerned about the possibility that the Regional Administrator could reduce the trip limit to a level where many vessels fishing for multispecies on Georges Bank would be forced to discard their cod catch. This action proposes to eliminate that authority.

The Council is proposing that these changes only be effective for the remainder of the current fishing year which expires on April 30, 2000. It has started the annual plan review process and will submit needed modifications to the plan for the next fishing year by February 1, 2000 in accordance with the FMP regulations.

1.2 Background

1.2.1 Previous actions

Amendment 7

Amendment 7 became effective May 1, 1996. It established a rebuilding program for Georges Bank (GB) and Gulf of Maine (GOM) cod, GB haddock, and GB and Southern New England (SNE) yellowtail flounder stocks based primarily on days-at-sea (DAS) controls, area closures and minimum mesh size. As early as 1995, during the development of the amendment, the Council recognized issues that would have to be addressed after implementation and as the plan evolved. Amendment 7 created a program for reviewing the program annually and making changes to the regulations through the framework adjustment process to insure that the plan goals would be met continually.

Framework adjustments and interim rule

The Council has held three annual reviews and made six adjustments to the FMP to address Amendment 7 rebuilding needs (Frameworks 20, 24, 25, 26, 27 and 30). It held the final Framework 27 meeting on January 27-28, at which time it focused on the finalizing the severe restrictions necessary to achieve the plan objectives for GOM cod. The Council followed immediately with the development of Framework 30 to address GB cod, which it submitted to NMFS on April 30.

Both Frameworks 27 and 30 contained cod trip limits, for GOM and GB cod, respectively. In both cases, the Regional Administrator was authorized to reduce the trip limit, when 75 percent of the target TAC for each stock was reached. On May 28, 1999, the Regional Administrator reduced the GOM cod limit implemented on May 1, 1999 of 200 pounds per day to 30 pounds per day, just three weeks into the fishing year. However, even before the trip limit was reduced, fishermen reported excessive discards of cod as seasonal closures ended.

On May 28, 1999, responding to widespread reports from the industry about the levels of cod discards in the western Gulf of Maine, the Council requested that the Secretary of Commerce increase the trip limit under the emergency action authority provided in §305 of the Magnuson-Stevens Act. On August 3, NMFS published an interim rule that increased the trip limit from 30 pounds per day to 100 pounds per day, with a maximum possession limit of 500 pounds and modifications to the running clock. The interim rule expires on January 30, 2000.

NMFS announced on July 29, 1999 that it disapproved the 30-day closure on Georges Bank but approved the trip limit which took effect on August 15. Framework 30 contains a trip limit of 2,000 pounds per day/20,000 pounds maximum possession limit. The Regional Administrator may reduce the trip limit when 75 percent of the target TAC is landed. The Council wants to prevent a repetition of events in the Gulf of Maine where the trip limit was reduced to as low as 30 pounds per day, before an interim adjustment increased it to 100 pounds per day.

In Framework 27, the Council also set target TACs for the five primary stocks in the FMP. For Gulf of Maine cod, the Council also used a more conservative reference point to design management measures than the objective prescribed in the FMP ($F_{0.1}$ versus F_{MAX}). This would prevent overshooting the target TAC of the severely depleted GOM cod stock. The TACs for the 1998 and current fishing years, and preliminary landings for the 1998 fishing year are shown below in Table 1:

<u>Stock</u>	<u>1998 TAC</u>	<u>1998 landings</u>	<u>1999 TAC</u>
Georges Bank cod	4700	7583	5354
Georges Bank haddock 4797	1735	5600	
Georges Bank yellowtail	2145	2362	2725
SNE yellowtail	814	1145	1115
Gulf of Maine cod (F_{MAX})	1783	3156	1340
Gulf of Maine cod ($F_{0.1}$) 1783	3156	782	

Table 1 1998 preliminary landings (fishing year, live weight) and TACs for 1998 and 1999 (calendar year applied to fishing year) in metric tons for the 5 major groundfish stocks. Landings data are from Northeast Preliminary Fisheries Statistics, NMFS Regional Office, July, 1999.

1.2.2 Stock status and scientific advice

1.2.2.1 Gulf of Maine cod

SAW 27

Gulf of Maine cod was last assessed in SAW 27 and results were presented August, 1998 along with management advice, SFA considerations and forecasts for 1998-2000. Updated stock status and projections prepared for the Multispecies Monitoring Committee were presented to the Council on August 10, 1999. The following was the information from SAW 27:

State of Stock:

- *Overexploited:*
1983 - 1996 fishing mortality, $F > 0.88$
1997, $F = 0.75$.
- *Extremely low biomass level:*
Spawning stock biomass, $SSB_{97} = 8,600$ metric tons
Total stock biomass $B_{97} = 11,300$ metric tons
- *Record low recruitment* in 1996-1998 (1994-1996 year classes), and *record low survival of pre-recruits*.

Management Advice:

“The SARC recommends an immediate reduction in fishing mortality to near zero. Measures should be implemented immediately to cease all directed fishing and minimize bycatch on this stock. Measures implemented in 1998 were only intended to achieve F_{max} . Reductions to F_{max}

will be insufficient to promote rebuilding from record low spawning stock biomass. The combined effects of low spawning stock biomass, high fishing mortality, record low recruitment, and record low survival of pre-recruit fish indicate that the stock is collapsing.”

SFA Considerations (based on total stock biomass, B):

B_{msy}	33,000 metric tons	
$1/4 B_{msy}$	8,300 metric tons	
B_{1997}	11,300 metric tons	
B_{1998}	7,900 * metric tons	*at 1/1/98, projected with $F=0.75$ in 1997
B_{1999}	8,900** metric tons	**at 1/1/99, projected with $F=0.75$ in 1997 & 1998, and recruitment for 1998 and 1999 assumed to be higher than that observed in the last several years.

Forecasts:

1998			F 1999-2000	1999		2000
F	Landings	SSB		Landings	SSB	SSB
0.75	3,800	6,600	0.00	0.0	6,000	8,000
			0.16 ($F_{0.1}$)	800	5,800	7,100
			0.29 (F_{max})	1,400	5,700	6,400
<i>Landings and SSB in metric tons</i>			0.41 ($F_{20\%}$)	1,900	5,600	5,800
			0.75 (F_{98})	3,000	5,400	4,400

MULTISPECIES MONITORING COMMITTEE REPORT (December, 1998)

The MSMC used landings data through August, 1998 to update the projections in SAW 27 with the following results:

- F_{1998} 0.82
- SSB_{1998} 6,505 metric tons
- SSB_{1999} 6,015 metric tons (if $F_{1999}=0.29$)
6,122 metric tons (if $F_{1999}=0.16$)
- B_{1998} 8,069 metric tons
- B_{1999} 7,762 metric tons *projected with $F_{98}=0.82$ and $F_{99}=0.16$*

UPDATED ASSESSMENT FOR 1999

The SAW’s Northern Demersal Working Group held an inter-sessional meeting in July, 1999 and prepared updates assessments for 11 groundfish stocks, including GOM and GB cod. The Council reviewed the updated assessment on August 10, 1999 which included recorded landings for 1998 and survey data through the Spring, 1999. This report is provided to the Multispecies Monitoring Committee for its annual review, but is relevant to the development of measures in Framework 31. According to this report, GOM cod is above $1/4 B_{msy}$ and based on the SFA control rule, fishing mortality should be reduced to a level calculated to rebuild the stock to B_{msy} in five years (biomass weighted $F=0.15$). The fully recruited F_{1998} is estimated to be 0.64, biomass weighted $F_{1998} = 0.47$. The

biomass weighted $F_{1999}=0.30$. Forecasts suggest that under the control rule F , the stock will rebuild to B_{msy} by 2006 (50 percent probability).

1.2.2.2 Georges Bank cod

The Council will address the stock status and rebuilding program GB cod in the annual adjustment framework later this year. However, the status of this stock is relevant to consideration of alternative trip limit systems in this framework. According to the updated assessment report, GB cod is above $1/4 B_{msy}$ and based on the SFA control rule, fishing mortality should be reduced to a level calculated to rebuild the stock to B_{msy} in five years (biomass weighted $F=0.13$). The fully recruited F_{1998} is estimated to be 0.28, compared to an F of 0.22 projected by the MSMC last fall. The biomass weighted $F_{1998}=0.24$ and $F_{1999}=0.19$. Forecasts suggest that under the control rule F , the stock will rebuild to B_{msy} by 2005 (50 percent probability).

2. Purpose and need

2.1 Need for the adjustment

The primary purpose of the proposed action is to reduce as soon as possible Gulf of Maine cod discards resulting from the low trip limit while still achieving the conservation goals of the plan. Secondly, the purpose is also to forestall a potential discarding problem in the Georges Bank cod fishery that could occur if the trip limit is reduced significantly.

2.2 Publication as a final rule

The Council recommends that NMFS publish the proposed adjustments as a final rule, and it has considered the following factors as specified in 50 CFR 648.90 (b) in making this recommendation:

1. timing of the rule
2. opportunity for public comment
3. need for immediate resource protection, and
4. the continuing evaluation of the plan.

2.2.1 Timing of the rule

The timing of the rule is most relevant to the immediacy of the GOM cod discard problem and to the expiration of the interim rule on January 30, 2000. The timing of the rule is relevant to the timing of any adjustment to the GB cod trip limit that might be forthcoming if, and when the Regional Administrator projects that 75 percent of the target TAC will be landed. The changes proposed in this framework should be in place before GB cod landings reach the 75 percent threshold level to prevent any unnecessary reduction in the trip limit. In the first two months of the 1999 fishing year, May and June, vessels landed 46 percent of the GB cod target TAC.

The timing of the rule does not depend on the availability of time-critical data, and the Council did not consider data availability in its decision to recommend publishing the adjustments as a final rule.

2.2.2 Opportunity for public comment

The Framework 31 development process formally started with the July 13-15, 1999 Council meeting when the Council decided to initiate the framework adjustment to address Gulf of Maine cod discards.

The schedule of meetings for which the public notice included discussion of specific alternatives for this framework is as follows:

DATE	MEETING	AGENDA/DISCUSSION
7/13-15/99	Council	• Decision to initiate Framework 30
7/22/99	GF Committee and Advisory Panel	• Develop Framework 31 options
8/10-11/99	Council	• Initial meeting for Framework 31
8/25/99	GF Committee and Advisory Panel	• Develop options for Framework 31
9/9/99	GF Committee and Advisory Panel	• Review options and recommend preferred alternatives for Framework 31
9/21-23/99	Council	• Final meeting for Framework 31

The mailing lists for meeting notices contain approximately 900 and 1,600 interested parties for Groundfish Committee and Council meetings, respectively. Notices are mailed at least two weeks in advance of committee meetings and three weeks in advance of Council meetings. Council meeting notices are also published in the *Federal Register* three weeks ahead of the meeting. Agendas and meeting summaries for the above meetings are available from the Council office.

2.2.3 Need for immediate resource protection

Sections 1.2.2 and 2.1 summarize the most recent information available for GOM and GB cod. The fishing mortality rate on GOM cod has declined in recent years but remains above target levels. Measures implemented under Frameworks 26 and 27 have not been evaluated for their impact on this stock, however the stock is at or near record low biomass levels. While GB cod has begun to rebuild, at current fishing mortality rates, the SAW projects that the stock will actually decline in 2000, due largely to very poor recruitment. If fishing mortality is not reduced as soon as possible, there is a greater likelihood of stock decline in the near term, which would require additional restrictions on the fishing industry to achieve plan objectives.

2.2.4 Continuing evaluation

The regulations require the Council to review the plan annually and make adjustments as necessary to insure that the rebuilding goals are being met (50 CFR 648.90 (a)). The Council is proposing this framework adjustment in accordance with that requirement. Both the Council and NMFS continually monitor catch, effort and resource information and may address problems as needed any time during the year using the framework adjustment procedure, such as they have done recently with Framework 26 to protect GOM cod and propose with this framework. Furthermore, the Council has started its regular annual plan review and adjustment to implement measures as needed for the next fishing year.

3. PROPOSED ACTION AND ALTERNATIVES

The Council is considering the following options for submission in this framework. Area closure measures reference block numbers in Figure 1.

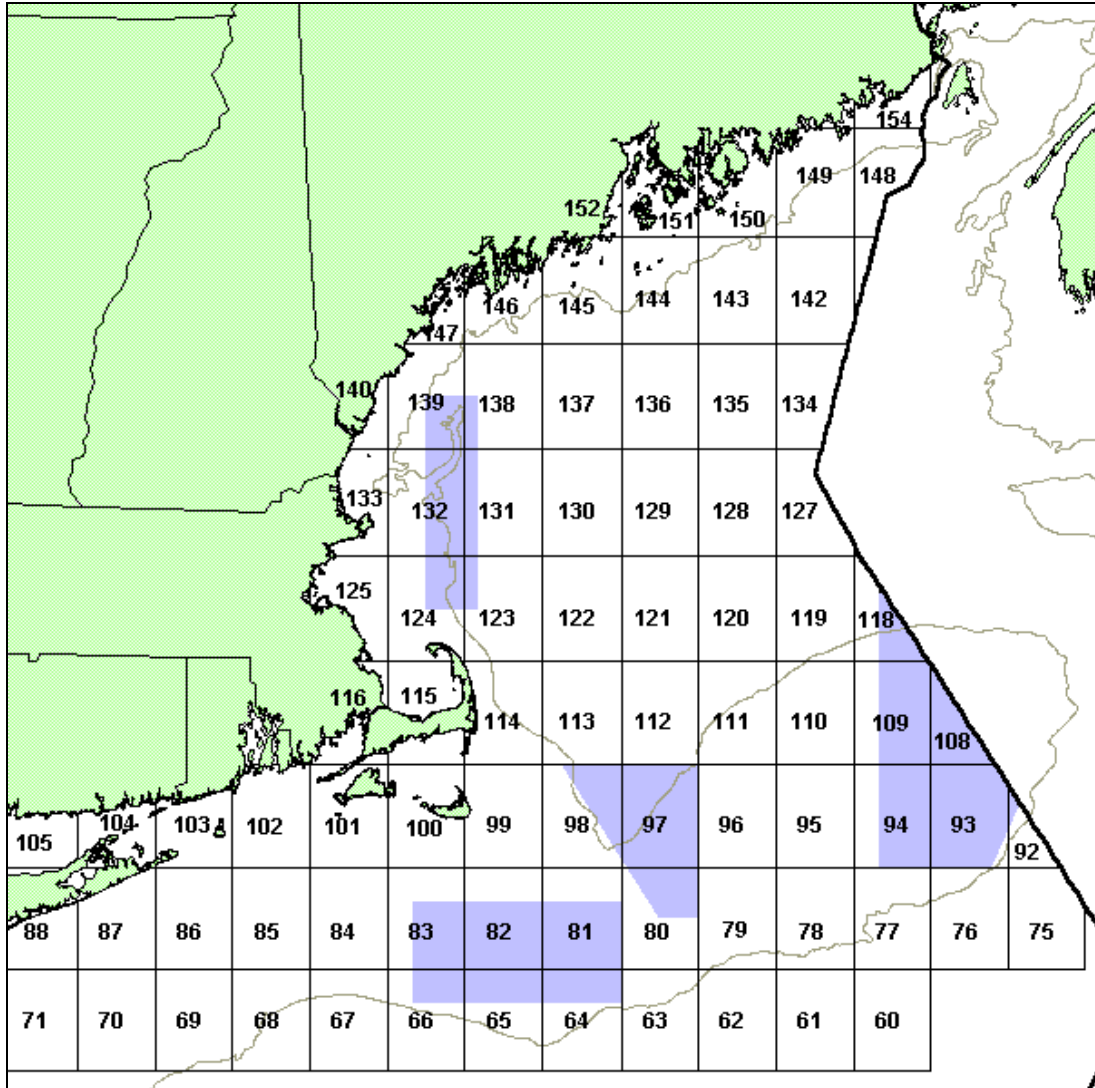


Figure 1 Area closure block reference map

3.1 Proposed action

3.1.1 Gulf of Maine cod measures

The Council considered three main options to address the problem of reducing GOM cod discards while achieving the conservation goals of the plan. The options considered and not recommended are described in Section 3.2. Secondly, the Council initially considered implementing measures for GOM cod in this framework adjustment that would extend through the next fishing year. After deliberating the merits and risks with this approach, including the fact that the annual MSMC report is not yet completed, it decided to limit the current adjustment to the remaining part of this fishing year, and to address the next fishing year during the regular plan adjustment procedure.

3.1.1.1 GOM Option 1 for the current fishing year (1999-2000)

This option would use the existing management system established by Framework 27, supplemented with changes to the trip limit system and additional closures implemented in Framework 26. Measures would take effect when indicated in the final rule and would remain in effect until the end of the fishing year, through April 30, 1999.

Trip limit: 400 lbs./day with a maximum possession limit equal to ten times the daily limit (i.e. 4,000 pounds)

Running clock

The following changes modify the interim rule running clock system that was implemented by NMFS on August 3, 1999 by increasing the maximum possession limit from 500 pounds to 2,000 pounds and extending the rule beyond January 30, 1999 when the interim rule expires.

- Vessels not enrolled in the Gulf of Maine Cod Trip Limit Exemption Program are limited to 400 pounds for each day or part of a day on the trip. On trips under 24 hours a vessel may not land more than 400 pounds of cod, and may not land cod again until 24 hours have elapsed from the start of the prior trip, although the vessel may call-out of the DAS program before 24 hours have elapsed. On trips longer than 24 hours, a vessel may land 400 pounds of cod for each full day (24 hours) of the trip and 400 pounds for any part of a 24-hour period, provided it does not call out of the DAS program until the remainder of that 24-hour period has elapsed. A vessel on a trip longer than 24 hours and landing up to 400 pounds of cod for any part of a (24-hour) day, must call the hail line to report the overage and may not leave port or call out of the DAS program for the remaining part of the 24 hours.
- a vessel may not land more than 4,000 pounds, even if the trip duration exceeds ten days.

Area Closures

For this fishing year, include the February closure of blocks 124 and 125 to the closures already scheduled by Framework 27 (see Figure 1 and Figure 2).

Discussion: This proposal achieves the framework adjustment objectives by increasing the trip limit to a level that will minimize discards of cod while still achieving the conservation goals of the plan. The measure offsets the increased trip limit by adding one month to the closure of Blocks 124 and 125 (resulting in a three-consecutive-month closure of that area) and restricting the ability of vessels to target cod under the running clock program. Taking no action would result in a trip limit of 30 pounds per day, unless NMFS extends the interim rule allowing 100 pounds per day. In the 1998 MSMC report to the Council, the MSMC strongly recommended against a trip limit of 100 pounds per day because of discarding.

The PDT commented that the analysis it had done for Framework 27 indicated that a 200 pound per day trip limit would achieve the $F_{0.1}$ goal with. However, this analysis did not consider the limitations on the use of the running clock and the added closure of Blocks 124 and 125 in February. The PDT also commented that any update to the original Framework 27 analysis must be based on the same 1997 VTR data set since the 1998 data are not audited and since 1998 management measures will affect the spatial and temporal distribution of the reported landings, as well as the relationship between landings and effort due to the imposition of the trip limits. As a result, there is insufficient data to update the Framework 27 analysis, particularly how the trip limit is working, what the discard rates are, and how it is being enforced. The PDT concluded, therefore that it could not provide any further updated analysis of this option.

The PDT reviewed the purpose and objectives of Framework 31. As the primary purpose of the framework is to reduce discards while still achieving the plan objectives, the PDT advised that increasing the trip limit to 200 pounds per day would probably not increase mortality. This conclusion was based on the analysis of Framework 27 measures that indicated a trip limit of 200 pounds in combination with the other measures would achieve the $F_{0.1}$ landings target (based on historical landing rates and not accounting for discards). The PDT stated that actual catches (landings plus discards) may exceed the projected landings because of the potential for increased discarding, unless a backstop mechanism which does not rely on a reduced trip limit is incorporated into Framework 31. The PDT noted that when the areas opened in May, 1999 and the discard problem was particularly acute, the trip limit was 200 pounds, and this situation would only worsen under a lower trip limit.

Due to probable discarding under a 200 pound per day trip limit, increasing the trip limit to as high as 400 pounds per day, especially with limitations on the use of the running clock, will not likely increase fishing mortality but will convert discards to landings. This increase in the trip limit not only raises short-term economic yield and minimizes waste, it also enhances the ability to estimate fishing mortality because discards are not included in the catch data used by the stock assessment. There is no way to establish with any certainty that catches, and therefore fishing mortality, would be any lower under a 200 pounds per day trip limit than a 400 pounds per day limit. Vessels are equally likely to target other species under either limit with the same bycatch rates (mortality impact), especially with the limitations on the use of the running clock.

Furthermore, a sensitivity analysis, described in Section 4.1.1, illustrates that applying the higher trip limit during the last four months of the fishing year, when much of the high cod catch rate areas are closed, will not likely have a significant impact on the fishing mortality rate. Even if discards were substantially lower under the 200 pound per day limit, the analysis does not show a significant difference in the projected 1999 fishing mortality rates under the two trip limits. The impact of any nominal difference in fishing mortality rates under the two trip limits is even less significant when calculating target TACs for the next fishing year.

The PDT also noted that the Framework 27 analysis indicated that a trip limit of 400 pounds would achieve the F_{max} management goal established in Amendment 7. In Framework 27, the Council drafted management measures to achieve a target TAC based on the $F_{0.1}$ reference point to significantly increase the likelihood that the plan target will not be exceeded in the upcoming year. Framework 27 did not change the plan target, although the Council's policy remains precautionary.

The following table compares landings in 1998 and 1999. During the January – April, 1999 period vessels operated under a 400-pound per day trip limit with no maximum limit and no restrictions on the use of the running clock as well as the Framework 26 area closures. Preliminary NMFS landings data indicate a decline of 59 percent during the period (685 mt compared to 1672 mt). Since there are no reliable estimates of discards under the 200- and 30-pound trip limits in May and June, 1999, caution should be used to compare landings during this period. One important difference between the 400 pounds per day limit in 1999 and that proposed for this action is the change to the running clock, which will significantly minimize the incentive to target cod. According to the VTR data about 40 percent of the landings of GOM cod during February through April 1999, under the 400 pounds per day trip limit and the unrestricted running clock, were on trips that exceeded the per-day limit, and about 23 percent of GOM cod landings were overages (in excess of the allowed limit) during that period.

GOM cod Landings (mt)	Jan-Apr	May	June
1998	1,672	620	536
1999	685	267	64

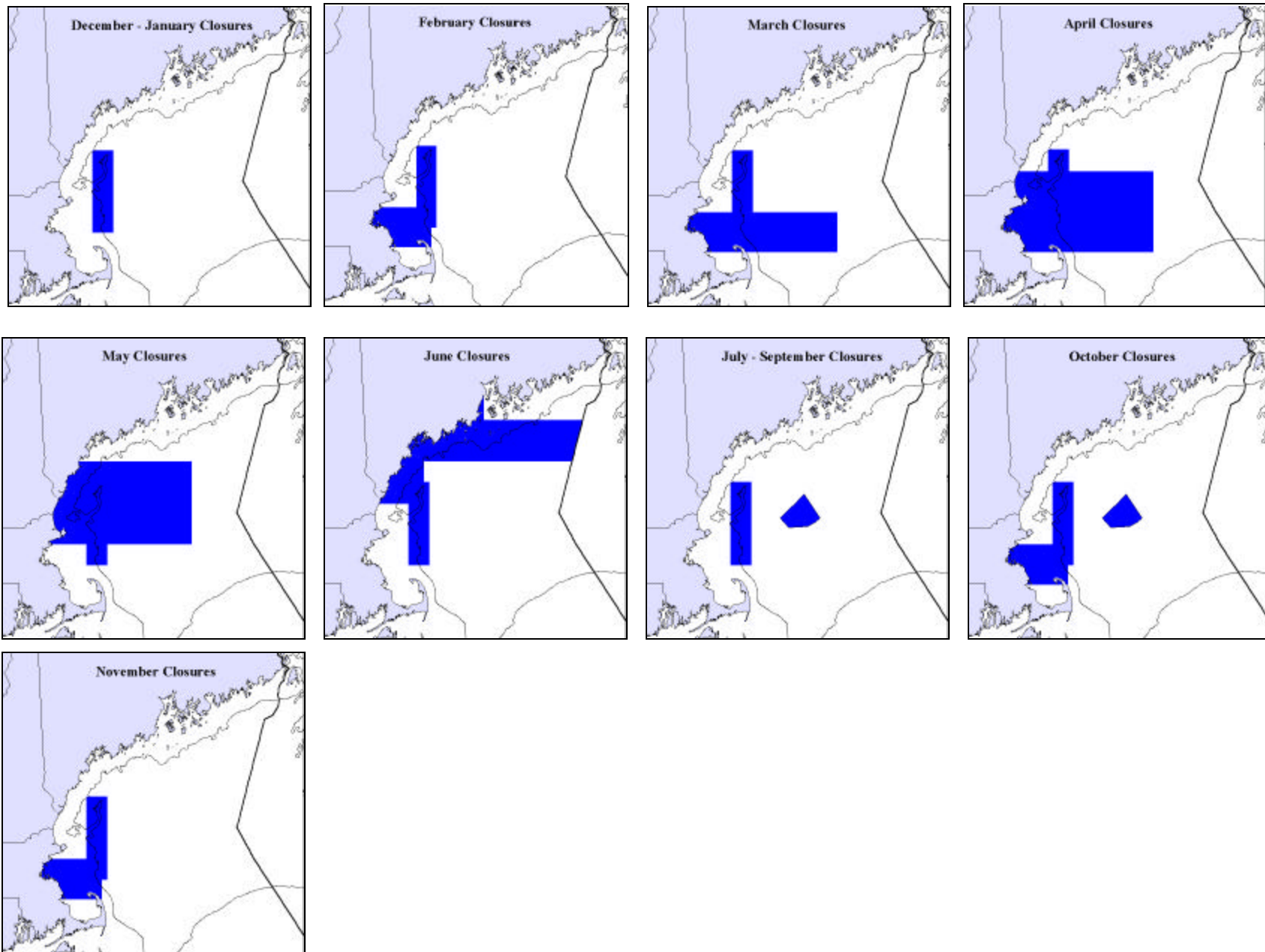


Figure 2 Area closures – Option 1. The proposed action applies only through April, 1999, adding the February closure

3.1.2 GB cod trip limit adjustment mechanism

This measure eliminates the authorization for the NMFS Regional Administrator to reduce the Georges Bank trip limit in the 1999 fishing year, as provided in Framework 30, to a level calculated to keep landings below the TAC.

Discussion: This option would address the Council's stated purpose to forestall the potential situation that a lower trip limit would greatly increase discards and "derby fishing". "Derby fishing" is an increase in fishing in anticipation of added restrictions on fishing. The "derby effect" is one of the reasons why the Council has decided to eliminate the use of a reduction in the trip limit triggered by a landings benchmark. This option would not, however, provide any additional protective measures if, and when the landings exceed the target TAC in this fishing year. In the first two months of the fishing year, vessels landed 46 percent of the target TAC, and will probably exceed the target TAC for the year. However, fishermen, anticipating both an extensive one-month closure of the prime cod fishing areas and a trip limit in Framework 30, reportedly fished very aggressively during those two months.

The PDT recommended this option from among three options under consideration. It concluded that a reduced trip limit does not prevent catches (including discards) exceeding the TAC, and results in wasted fish. The PDT opposes the use of a reduced trip limit as a backstop for a failed trip limit. In response, the Council will be developing, in the annual adjustment framework for GB cod, a broader management system that may include other measures, such as DAS adjustments, time out of the fishery or area closures.

3.2 Alternatives considered and rejected

3.2.1 GOM cod management options

As noted in the previous section, the Council considered three main options to address the problem of reducing GOM cod discards while achieving the conservation goals of the plan. The options considered and not recommended are described in this section.

The Council initially considered implementing measures for GOM cod in this framework adjustment that would extend through the next fishing year. After deliberating the merits and risks with this approach, it decided to limit the current adjustment to the remaining part of this fishing year, and to address the next fishing year during the regular plan adjustment procedure. The Council considered the availability of the MSMC report, uncertainty in the analysis of impacts and the ability to develop other alternatives in the annual adjustment in making this decision.

3.2.1.1 GOM Option 1 for current and next fishing years

This option is the same as that which the Council is proposing for this framework adjustment, except that originally the Council had considered extending this measure through the next fishing year. As noted, the Council decided to address the next fishing year during the annual adjustment procedure.

3.2.1.2 GOM Option 2 for current and next fishing years

This option combined a seasonal (February-May) limitation on the number of DAS/trips a vessel can take a trip limit with a cod trip limit and area closures.

- Trip limit: 700 pounds per day with a running clock and a 2-day layover requirement following any trip landing an overage (and using the running clock). Alternative trip limits were considered when preliminary analysis of the 700-pound limit indicated it would not meet the plan objectives. Layover days would be taken following the call-in to end the running clock and would not be deducted from DAS allocations. The Groundfish Committee, meeting on July 22, also added a cap on total cod possession equivalent based on 10-days catch (7,000 pounds, or less if the daily limit is lower than 700 pounds) to discourage misuse of the running clock
- Area closures: eliminate current rolling closures; modify the Western Gulf of Maine closed area to include year-round closure of parts of Stellwagen Bank and Jeffreys Ledge (Areas I and III); implement a two month closure (September 15 – November 15) of the area off Cape Ann identified as Area II in Figure 3; and retain the current July – October closure of the Cashes Ledge area.
- Days-at-sea: during the February-May period, all multispecies vessels fishing in the Gulf of Maine would be limited to 25 DAS or 25 trips, whichever is less. Alternative numbers of DAS or trips were considered. Since the fishing year starts on May 1, this provision would have applied to the months of May, February, March and April in any fishing year, not February through May on a calendar year basis.

Discussion: The fishermen who designed this proposal, intended it to reduce discards and to achieve the plan objectives by protecting cod spawning and habitat, reducing overall fishing power in the spring months and to provide equitable access to alternative species and fishing grounds. The PDT discussed the components of this option and noted that one of the primary distinguishing elements is the area closures. The size and configuration of the area closures precludes the use of the same analysis method that is used for Options 1 and 3 which are based on quarter-degree squares. Since VTR data is not useful for precise location of fishing activity, and observer data is insufficient to determine the relative impacts of areas within the quarter-degree squares, an assumption must be made about the effect of these area closures. The PDT could not make a comparative analysis of this option with Options 1 and 3 because of the limitations on the area closure analysis.

Furthermore, the PDT does not support opening areas that provide protection to other stocks that are now known to need significant conservation restrictions to meet SFA standards. While this framework is not intended to achieve any specific management goal for those other stocks, it also should not allow for a relaxation of indirect conservation benefits of existing measures. The rationale for changing the area closures under this option is to allow fishing effort to redirect on other stocks, many of which are severely overfished.

At the direction of the Groundfish Committee on September 9, the Council staff conducted an alternative analysis of the area closures in this option. The methodology and results of this analysis are contained in Section 4.1.1.2. The PDT did not formally reviewed this analysis.

The analysis provides a range of possible outcomes depending on the trip limit and on the assumed effect of the area closures. The choice of a specific outcome depends on the expected proportion of reductions in catch from the area closures in comparison year round closure of Block 124 and the Western Gulf of Maine Closed Area, and a two-month closure of Block 132. Embedded in the choice of expected outcomes are assumptions about the relative size of the proposed closures compared to the larger areas, the distribution of cod catches within the larger areas, and the amount and direction of effort displacement. The analysis indicates that under a 200 pound per day cod trip limit, and assuming that the proposed closures would reduce cod catches by 20 percent of the reduction that would be expected from closure of the entire blocks (that contain the proposed area closures), the proposed closures would result in landings of 1,220 metric tons, compared to a 782 mt target TAC. Increasing the assumed benefit of the proposed closures to 70 percent (of the total landings saved by the closures) would reduce the expected landings to 835 mt.

A second distinguishing element of this option is the 25-day/trip limitation for the February – May period. The PDT reviewed a preliminary analysis of this measure which was done when the proposal was to apply to all multispecies vessels, not just those fishing in the Gulf of Maine. The Council staff expanded the analysis to cover only vessels in the Gulf of Maine, see Section 4.1.1.3. The PDT has not reviewed this analysis. The staff analysis results indicate that about five to seven percent of the landings would be constrained by this proposal, not considering effort shifts to other times in the year. No attempt was made to combine the DAS/trip reduction analysis with the area closure analysis for this option primarily because the likely effort shifts to other times of the year will render this specific proposal ineffective at reducing overall catches.

The PDT commented that the proposal to limit DAS and trips on a seasonal basis is complicated and may be difficult to enforce or administer, especially if vessels could continue to fish outside of the Gulf of Maine during the same period when their effort in the Gulf was limited. However, the PDT agreed that the concept of seasonal DAS reductions, at some level, should be explored as a strategy for reducing fishing effort during the period of highest landings-per-unit effort on a target stock, especially if reductions in overall DAS are not an acceptable approach.

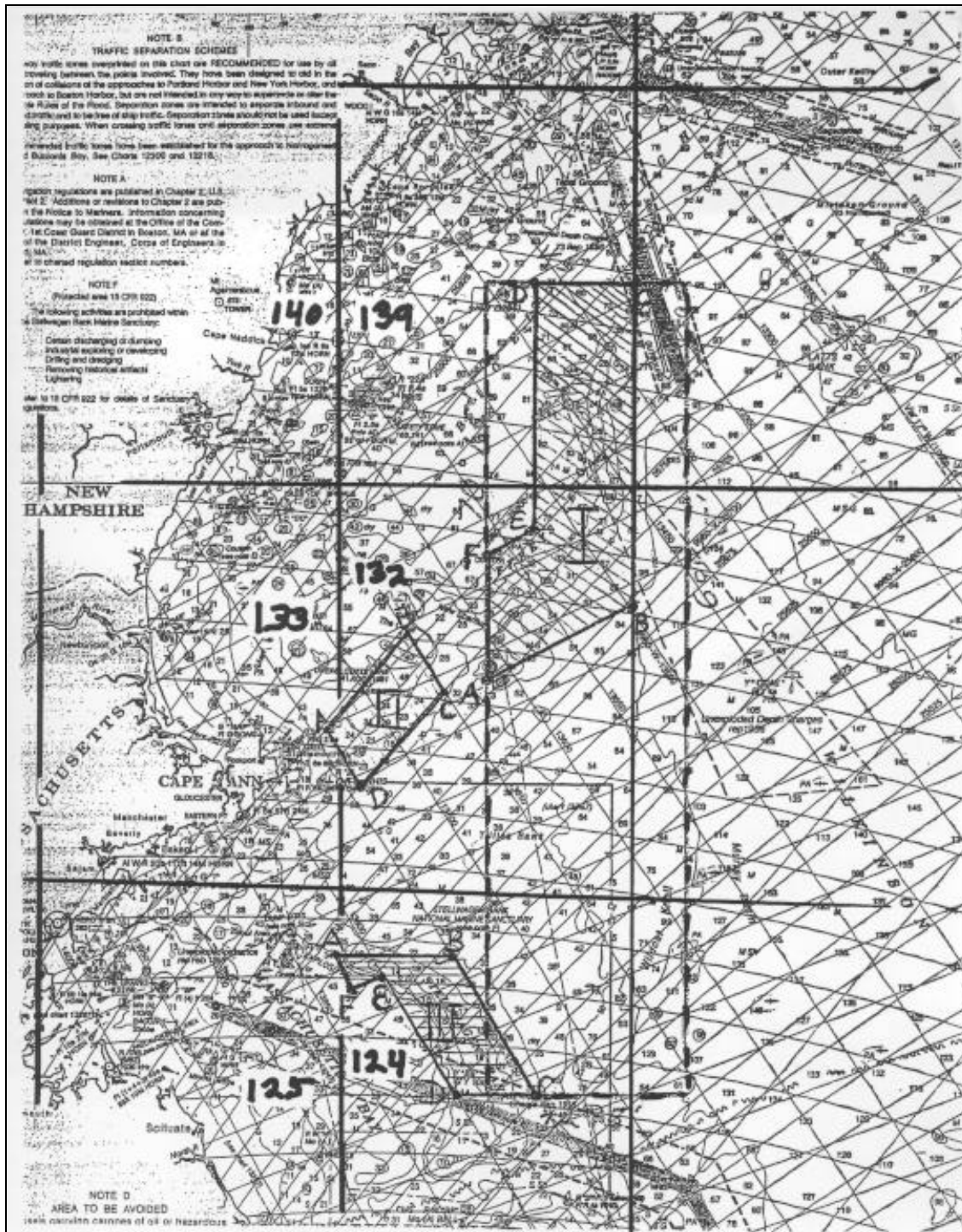


Figure 3 Area Closure Map – Option 2. Areas I and III are year-round closures, Area II is closed Sept. 15 – Nov. 15.

3.2.1.3 GOM Option 3 for current and next fishing years

This option is based on Option 2 for Framework 27, modified by the Council on August 11, 1999. The Council combined final Framework 27 area closures with the closures in Option 2 of Framework 27.

- **Trip limit** – GOM cod: 400 lbs. per day or 200 lbs. per day; eliminate the running clock;
- **Year-round closures** –Western Gulf of Maine Closed Area
- **Seasonal Closed areas** –
 - Blocks 124 & 125: Oct. – February
 - Blocks 121-125: March
 - Blocks 121-125 & 129-133: April
 - Blocks 129-133, 136-140 & 147: May
 - Blocks 132, 133, 139, 140, 141-147: June
 - Block 158 (see description below): May – Oct.
 - Block 158 includes parts of Cashes Ledge and Fippennies Ledge as implemented in Framework 27 and shown in Figure 4.

Discussion: The analysis of the Option 2 in Framework 27 indicated that the impacts on Gulf of Maine cod landings would be comparable to those of the measures finally adopted. At 200 lbs./day, the Option 2 was estimated to result in 989 metric tons compared to 951 for the adopted measures, and at 400 lbs./day it would be 1,463 mt compared to 1,407 mt. As with Option 1, the PDT concluded that based on the analysis in Framework 27, this option would meet the objectives at a 200 pound per day trip limit. The PDT indicated that additional analysis would be needed to determine efficacy at 400 pounds, giving consideration to the added area closures.

In Framework 27, the Council adopted some components of this proposal but rejected others because of public comments and concerns that most of the burden of the rebuilding plan would be placed on the inshore fleet. This fleet segment could not take advantage of the opportunity to fish on other species farther offshore because they would be out of range. The PDT agreed that, due to the extensive area closures, the proposal would have a greater likelihood of achieving the goals than Option 1 with the same trip limit but that the social and economic impacts would likely be far more severe.

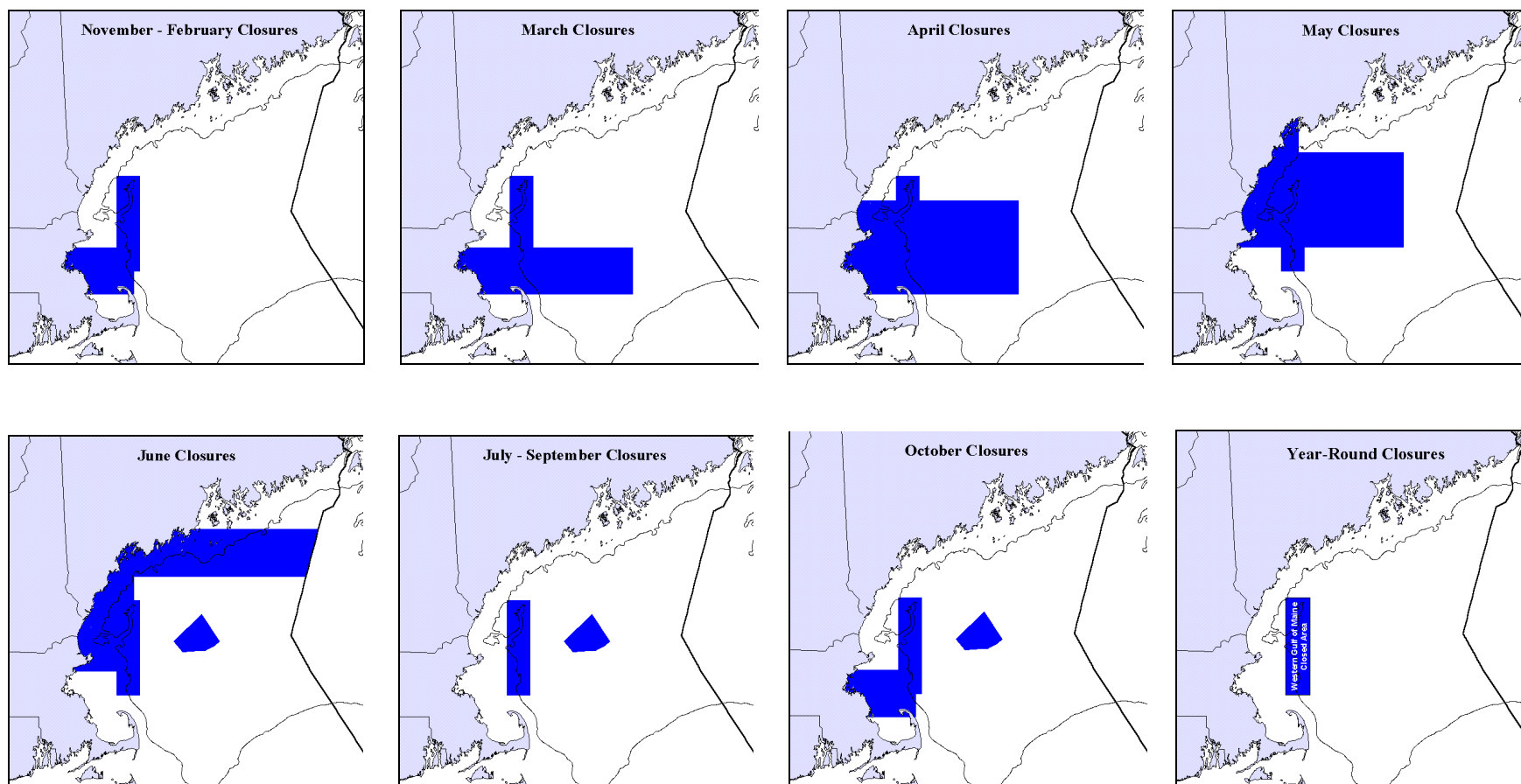


Figure 4 Area closure maps – Option 3

3.2.1.4 Raised Footrope Trawl

At the August 10 Council meeting, the Council motion identifying the three options for Gulf of Maine cod in Framework 31 included the following: “that the Massachusetts raised footrope trawl be analyzed in any applicable option”. On August 25, the committee discussed exempted fishery and experimental fishery proposals for the whiting raised footrope trawl by Mass. DMF, and directed the PDT to analyze two options:

- allowing an exempted fishery as requested by Mass. DMF, or
- modifying the areas of blocks 124 and 125 (NMFS had authorized the experimental fishery for those areas except the parts of blocks 124 and 125 that are closed in October and November)

Discussion: The Council’s decision to limit this framework action to the current fishing year rendered moot the issue addressed by these proposals. The Council will address a number of closed area exemptions in the upcoming annual adjustment framework.

3.2.1.5 Modify running clock under Option 1

The Groundfish Committee directed the PDT to analyze a proposal for Option 1 that would place a maximum possession limit equivalent to 10 times the per-day limit under the running clock mechanism in place prior to the interim rule. A vessel not enrolled in the GOM Cod Trip Limit Exemption Program, and taking trips of 10 days or less in duration could land up to 10 times the per-day limit, but would have to run the DAS clock until sufficient time has elapsed to account for the overage. A vessel taking a trip longer than 10 days would not be allowed to land more than 10 times the per-day limit.

Discussion: The PDT could not quantify the differences between the two running clock options (the interim rule running clock and the one proposed by the committee), but it provided a qualitative, comparative analysis, shown in Table 2. The issue before the Council in considering running clock options was one of finding the balance between allowing fair bycatch amount across a diverse range of fisheries and remaining below an amount that provides some vessels an incentive to target cod. While a maximum cap of 10 days, rather than 5, provides a measure of fairness for vessels that take trips in excess of 5 days, it also may induce some vessels to target cod and misuse the running clock. The PDT supported a mechanism that allows for a small overage on the basis of safety issues, perhaps equivalent to one extra day of trip limit but it should not be constructed such that it allows a directed fishery. The current proposal differs from this option in that vessels are only allowed an overage for any part of a day (less than 24 hours) but cannot land up to 10 times the per day limit on any trip (regardless of length) as long as it runs the DAS clock for sufficient time to account for the overage, as it could under the “old” running clock system.

PROS	CONS
ELIMINATE THE RUNNING CLOCK	
<ul style="list-style-type: none"> + Minimizes opportunity for directed fishing depending on trip limit level + Increases effectiveness and enforceability of trip limit + Increases ability to accurately estimate true fishing effort through DAS usage (no “frontloading” trips and no running the clock after landing means that DAS reported are closer to actual DAS fished) 	<ul style="list-style-type: none"> - May cause discards depending on trip limit level - Vessels with overages must choose between discarding remaining at sea (safety concerns) - Limits flexibility to plan fishing trips
INTERIM RULE RUNNING CLOCK: 5-day cap on trip limit; running clock limited to one day's overage; trips less than 24 hours may not land overages and may not start another trip until 24 hours have elapsed	
<ul style="list-style-type: none"> + Reduces opportunity for directed fishing depending on trip limit level + Prevents dayboats from making more than one trip per 24-hour period + Promotes safety at sea (somewhat) by allowing vessels to return to port with one day's cod overage 	<ul style="list-style-type: none"> - May cause discards depending on trip limit level, especially on trips longer than five days - Five-day cap unfair to vessels on longer trips - Decreases ability to accurately estimate true fishing effort through DAS usage - Difficult to interpret for compliance and enforcement - Very difficult to enforce trip limits with any running clock
OPTION 2 RUNNING CLOCK: “old” running clock with an additional two-day layover requirement following any trip landing an overage	
<ul style="list-style-type: none"> + Prevents vessels from making back-to-back trips during periods of high catch rates (spreads concentrations of fishing effort out across time) + Promotes safety at sea by allowing vessels to return to port with a cod overage + Running clock provides flexibility 	<ul style="list-style-type: none"> - May not prevent directed fishing if two-day layover requirement does not discourage vessels - High cost to vessels (DAS + layover days) may cause vessels to discard rather than land overages - Layover requirement limits ability to plan fishing trips - Decreases ability to accurately estimate true fishing effort through DAS usage - Very difficult to enforce trip limits with any running clock
FRAMEWORK 27 RUNNING CLOCK WITH TEN-DAY MAXIMUM POSSESSION LIMIT: “old” running clock with a ten-day cap	
<ul style="list-style-type: none"> + Reduces the potential for high levels of discards depending on trip limit level + Promotes safety at sea by allowing vessels to return to port with a cod overage + Provides some flexibility in planning fishing trips 	<ul style="list-style-type: none"> - Ten-day cap may not prevent directed fishing depending on trip limit level - Decreases ability to accurately estimate true fishing effort through DAS usage - Very difficult to enforce trip limits with any running clock
FRAMEWORK 27 RUNNING CLOCK WITH NO MAXIMUM POSSESSION LIMIT: “old” running clock with no cap	
<ul style="list-style-type: none"> + Reduces the potential for high levels of discards + Promotes safety at sea by allowing vessels to return to port with a cod overage + Provides maximum flexibility in planning fishing 	<ul style="list-style-type: none"> - Will not prevent directed fishing - Decreases ability to accurately estimate true fishing effort through DAS usage - Very difficult to enforce trip limits with any running

trips	clock
-------	-------

Table 2 Comparative, qualitative analysis of running clock options

3.2.1.6 Increase spawning period out of the fishery

The Groundfish Committee directed the PDT to analyze increasing the required time out of the fishery during the spring months (March-May) from its current 20-day level, in combination with a cap on possession of cod equal to 10 times the per-day limit.

Discussion: The Council did not adopt this measure based on the PDT's comments. The PDT stated that as a stand-alone measure and without area closures, this is primarily a trip limit management system because there are no other controls on fishing effort during most of the year. An analysis that was done earlier this summer indicated that even requiring vessels landing Georges Bank cod to take 30-day blocks out of the fishery each quarter would have minimal impact on the overall fishery effort because the effort could shift to other times in the quarter or year. No additional analysis of this proposal is available at this time, however, as with the discussion of Option 2, the PDT agreed that the concept of seasonal DAS reductions, at some level, should be explored as a strategy for reducing fishing effort during the period of highest catch rates on a target stock.

3.2.2 Georges Bank cod trip limit adjustment mechanism

The Council identified three options to address the backstop component of the Georges Bank cod trip limit program in Framework 31 to prevent a potential situation where the trip limit would be reduced to levels that would simply increase discards and not lower fishing effort on that stock. It will further address Georges Bank cod management in the annual review and adjustment framework action later this year. On September 9, the Groundfish Committee developed a fourth alternative, Option 4 below, which it recommended as a preferred alternative.

The PDT reviewed the three options identified by the Council for adjusting the current trip limit system. It noted that as more haddock is available to the fishery on Georges Bank, and as cod trip limits are reduced, the level of discarding will increase. Potentially, this problem could be minimized if seasonal and spatial distributions are considered in designing the management program. Reducing the current cod trip limit would not reduce the catch by a measurable amount, and anticipation of a reduced trip limit may actually cause vessels to increase their effort before the limit is cut. Furthermore, the trigger mechanism for such a system is predicated on timely, accurate data which is not available for short-term adjustments.

Based on the above considerations, the PDT supported Option 2, which is the Council's proposed action. The PDT recognized that this may result in the target TAC being exceeded in this fishing year. The PDT strongly recommended that the Council develop measures in the annual adjustment that do not rely on incremental reductions in the trip limit as a backstop for a failed trip limit measure and to prevent exceeding the TAC. As with the Gulf of Maine cod trip limit, actual catches may exceed the projected landings because of the potential for discarding, unless a backstop mechanism that does not rely on a reduced trip limit is implemented.

3.2.2.1 GB cod Option 1

The Groundfish Committee and Industry Advisory Panel developed the following option at the July 22 joint meeting:

- to eliminate the authorization for the NMFS Regional Administrator to reduce the Georges Bank trip limit in the 1999 fishing year, as provided in Framework 30. (Framework 30 stated that when 75 percent of the target TAC is reached (at approximately 4,012 metric tons, or 8.9 million pounds), the Regional Administrator may reduce the trip limit (based on a determination of the risk of exceeding the TAC) to a level calculated to keep landings below the TAC.
- on vessels enrolled in the Gulf of Maine Cod Trip Limit Exemption Program, to allow for overages of the trip limit with a running clock at a rate of one-to-one plus one layover day for every “running clock” day. A layover day is 24 hours in port, with no fishing activity. Gillnet vessels could run layover days concurrently with the required 7-day blocks out of the fishery. A vessel could not exceed the 20,000-pound maximum Georges Bank cod possession limit.

Discussion: While this measure addresses discards and safety concerns, it would be difficult to enforce and administer, and does not clearly constrain landings to the level that might be needed to achieve the plan goals (that is, prevent exceeding the target TAC). The cost to vessels, in terms of required time in port for any overage of the trip limit, is high enough that many vessels may still elect to discard overages. This would be most likely on vessels that are targeting other species. Preliminary landings for Georges Bank cod from May 1 – July 31 are 2,100 metric tons, or 39 percent of the 5,354 target TAC. While this level of catch suggests that the 75 percent threshold will likely be reached, the Council received a number of reports that fishermen accelerated their fishing activity during May and June in anticipation of a closure proposed in Framework 30 that was not implemented, and that level of fishing is not expected to continue throughout the remainder of the year.

3.2.2.2 GB cod Option 3

For the 1999-2000 fishing year, the Georges Bank cod trip limit would be reduced to 1,000 pounds per day/10,000 pounds maximum when 60 percent of the target TAC is reached. And when 80 percent of the target TAC is reached, the trip limit would be reduced to 500 pounds per day/5,000 pounds maximum until the end of the fishing year.

Discussion: This option would reduce the risk that landings would exceed the target TAC. It does, however, increase the potential that vessels will discard cod caught in excess of the trip limit, especially at the lower trip limit level. Since the peak catch rates for Georges Bank cod occur in the late winter and spring, this potential is further increased as that is the period when the incremental trip limit reductions will likely occur. The PDT recommended against relying on incremental reductions in the trip limit as a backstop for a failed trip limit measure and to prevent exceeding the TAC.

3.2.2.3 GB cod Option 4

For the 1999-2000 fishing year, when 75 percent of the target TAC for GB cod is reached, the Regional Administrator would be authorized to publish a notice in the *Federal Register* to make the following change:

- any vessel enrolled in the GOM Cod Trip Limit Exemption Program that calls the DAS line to start a trip may not call out to end the trip until 24 hours have elapsed
- a vessel that is calling in to end a trip after 24 hours may also start another trip at that time
- the 24-hour minimum requirement does not apply to vessels that return to port within three hours of starting the trip
- this provision applies to all vessels in the GOM Cod Trip Limit Exemption Program regardless of species landed.

Discussion: This was the Groundfish Committee's preferred alternative. It would provide a backstop mechanism to the GB cod trip limit to prevent exceeding the target TAC that is based on accelerating the rate of DAS usage by day boats. Prior to this move, vessels taking trips less than 24 hours in length can land a day's limit, and have only the actual time at sea deducted from the total DAS allocation. Effectively, a vessel could land two or three times the per-day limit for each full DAS used. If vessels are already using most or all of their DAS, they would be impacted by the requirement to count DAS at an accelerated rate. The potential impact of this rule on cod effort is diminished, however, if the affected vessels are not using all of their DAS during the fishing year; they would simply use a greater percentage of their total allocation of DAS to comply with this requirement.

3.2.3 No action

The no-action alternative would continue the current 30-pound per day GOM cod trip limit upon the expiration of the interim rule on January 30, 2000, unless NMFS takes additional interim action. The result would be a continuation of high levels of discards by vessels pursuing other fisheries. This problem is likely to become more severe as cod aggregate to spawn later in the spring. It will also retain the current rule that authorizes the Regional Administrator to reduce the GB cod trip limit without restriction when 75 percent of the TAC is landed, a measure that could also result in significant discards, depending on the specific trip limit and the time it is in effect.

4. Analysis of impacts

The following discussion incorporates the analysis of impacts of the various options considered by the Council at the final framework meeting, September 21-23, 1999. At that time, the Council considered applying the measures for GOM cod through the next fishing year. The analysis of GOM cod options, therefore, projects impacts of measures applied for a full fishing year. Additional discussion is included to describe potential impacts of the proposed action which would only be in effect for the last three months of the current fishing year.

The analysis of options that were under consideration is severely hampered by the fact that the measures for the current fishing year have only been in effect for five months, and data on the fishery is only available

for the first two months of the fishing year. Since, two of the three main options under consideration paralleled the options under consideration in Framework 27, the following analysis is based primarily on the analysis contained in that document. While Framework 27 evaluates the impacts of measures against 1997 data, the 1998 data is significantly affected by the area closures and trip limits in effect that year, and cannot be used to assess the impacts of measures proposed this year. Thus, the impacts described below should be considered relative, and not absolute.

4.1 Biological impacts

4.1.1 Impacts on regulated species

The proposed action is designed primarily to address discards of GOM cod and to forestall a potential discard problem with GB cod. These measures will be in effect from the date of implementation, approximately February 1, 2000 until April 30, 2000. The limited duration of these measures minimizes the effect on overall fishing mortality on those stocks and on other stocks that may be directly or indirectly affected by the proposed measures. The Council will directly address the broader issues of overfishing and rebuilding of all of the stocks in the FMP in the upcoming annual adjustment framework and in Amendment 13.

The impact on other stocks is not expected to be directly proportional to the impacts on cod because of the different spatial and temporal distribution of fisheries directed on those other stocks. Vessels fishing under a restrictive trip limit for cod may direct their effort on the other stocks. Area closures designed to protect aggregations of cod may also provide protection for other stocks, or, conversely, may concentrate effort in open areas where those stocks are more susceptible to capture. Restrictive trip limits, designed to allow only a bycatch level of landings, also provide an incentive for vessels to direct their effort on other species. Stocks outside of the Gulf of Maine, will only be indirectly impacted by area closures designed to rebuild GOM cod, primarily through effort displacement effects.

Analysis of Framework 31 Proposed Measures

The following analysis of options under consideration by the Council for Framework 31 is based primarily on the analysis of options in Framework 27. Options 1 and 3 correspond to similar options in that earlier analysis. A separate analysis of the proposed action, limited to the months of February through April of the current fishing year is also included.

Assumptions

Each of the proposals was analyzed using a common data set derived from the 1997 Vessel Trip Report (VTR) data. The 1997 data represent the most recent complete set of VTR data and the most recent year in which fishing occurred without the imposition of trip limits and area closures in the Gulf of Maine. That the data represent unrestricted fishing activity is necessary to evaluate the potential impacts of future closures and trip limits.

Two fundamental assumptions were incorporated into the analysis of each of the three draft proposals and the final proposal in Framework 27. The first assumption is a 37% decrease in exploitable biomass for

Gulf of Maine cod between 1997 and 1999, as indicated by the 1998 assessment. This decrease was incorporated directly into the trip limit analysis conducted for Gulf of Maine cod. As well, an increase in Georges Bank cod exploitable biomass of 11% was incorporated directly into the trip limit analyses conducted for this stock. If the decrease is less than 37 percent as assumed then the trip limit will be more effective and fishing mortality would be lower than projected, although discards would increase for a given trip limit level.

The second assumption is a 7.4% decrease in expected days at sea usage in 1999 compared to 1997 based on several factors, including vessels leaving the fishery (for example, buyback or retirement) and changes in DAS usage for each permitted vessel in 1998 relative to 1997. This adjustment was incorporated into the final analysis of each of the 3 proposals in Framework 27. This expected reduction, however, did not occur, as DAS usage was approximately equal or slightly higher in 1997 and 1998.

4.1.1.1 Trip Limit Analyses

4.1.1.1.1 Framework 27 GOM cod trip limit analysis

Gulf of Maine cod

Trip limit regulations have been used for the past three years to reduce targeting of Gulf of Maine cod stocks in an effort to reduce fishing mortality and to promote stock rebuilding. Regulations in effect during calendar year 1998 included a 1000 pound/day absent trip limit from January through April, a 700 pound/day trip limit from May 1 until June 24, 1998, and a 400 pound trip limit for the remainder of the year. The reduction from 1000 pounds/day to 700 pounds/day on May 1, 1998 resulted from implementation of the annual framework reduction at the beginning of the new fishing year. The reduction from 700 pounds/day to 400 pounds/day on June 24, 1998 occurred after less than 2 months of fishing when the cod landings reached 50 percent of the target TAC was reached, triggering a notice action by the Regional Administrator as authorized under Framework 25.

Regulations in effect during the current (1999) fishing year include a 200 pound/day limit from May 1 until May 28, and a 30 pounds/day limit until August 3. The Regional Administrator increased the trip limit to 100 pounds /day on August 3 under an interim rule that also placed a maximum possession limit of 500 pounds and limited the allowable overages using the running clock to one day's limit (100 pounds).

A bag limit analysis was used to evaluate the potential effects of trip limit regulations for cod in the Gulf of Maine. A trip-by-trip analysis of the distribution of cod landings in the Gulf of Maine during calendar year 1997 was used to evaluate the potential effects of Framework 27 trip limit regulations during the 1999-2000 fishing year. There were 15,871 trips reported in the 1997 Vessel Trip Record (logbook) data base that caught (landed or discarded) at least one pound of cod on a trip occurring in the Gulf of Maine (statistical areas 464, 465, 511, 512, 513, 514, 515).

Days absent were estimated relative to the current trip limit regulations, which allow one day of trip limit for each whole or partial day fished. For example, a vessel on a day trip fishing for up to 24 hours is permitted one day of trip limit, while a vessel fishing for 24 hours and 1 minute is permitted 2 days of trip limit (1

whole day and one partial day). In addition, operators may land in excess of the trip limit by calling a special hail line, and leaving their DAS clock running for that trip until an appropriate amount of time has expired to justify excess landings. No effort was made to model this provision, and unless days at sea are limiting to individual vessels, the open running clock provides for a significant level of liberalization relative to current trip limits.

This framework contains proposals to limit the ability of vessels to use the running clock, such as by placing a cap on the maximum landings per trip and/or by limiting the overage allowed to only a partial day. Option 2 also required vessels landing an overage to take one layover day for each running clock day. The PDT could not quantify the differences between the various running clock options, but did provide a qualitative assessment that is summarized in Table 2.

The use of the 1997 calendar year data to estimate the effectiveness of trip limit regulations during the 1999-2000 fishing year requires that the 1997 trips be scaled to account for the decline in exploitable stock biomass that was projected to occur between 1997 and 1999/2000. As stock biomass declines, a given trip limit regulation becomes relatively less effective because catch rates decline as a function of stock size. Projections for the Gulf of Maine cod stock indicated a 37 percent decline in stock biomass between 1997 and 1999. More recent assessment indicates that the exploitable biomass is projected to decline approximately 11 percent from 1997, and that the 1997 biomass level was about 12 percent higher than projected in the Framework 27 analysis.

The exact relationship between commercial LPUE and stock size is unknown, but it was assumed that LPUE would decline as a linear function of stock size in the Framework 27 analysis. Therefore, in that analysis, Gulf of Maine cod catch rates (catch/day) were reduced by 37 percent (adjustment factor = 0.63) to account for the expected reduction in catch rates due to the anticipated decline in stock size. To the extent that LPUE remains higher than that expected from this linear relationship, the reductions in landings projected from the trip limit analyses will be overstated. Furthermore, the Framework 27 analysis incorporated a projected DAS reduction of 7.4 percent that did not occur. Such a deviation may explain why 1998 landings of Gulf of Maine cod remained relatively high in 1998 despite the imposition of trip limits and closed areas.

Projected landings were determined by summing the minimum of actual catch and the calculated trip limit (trip length (days) * trip limit/day) from each trip during the year. For trips with catch rates below the trip limit maximum, all catch was assumed to be landed. For trips with catch rates exceeding the trip limit, landings were assumed to be the maximum level allowed under the trip limit regulation being modeled. Landings within each trip limit interval were then summed over all trips in the VTR database. Because logbook landings represent a subset of the total reported (dealer) landings, the VTR landings were adjusted proportionately to equal the total reported landings of Gulf of Maine cod. The expected landings of Gulf of Maine cod were estimated for trip limits ranging from 100 pounds/day to 1,000 pounds/day in 100-pound increments. Table 3 provides estimates of projected landings under various trip limit scenarios.

Trip Limit

No

(Pounds/ Day Absent)	100	200	300	400	500	600	700	800	900	1000	Trip Limit
Landings (mt)	828	1345	1717	1990	2194	2344	2444	2513	2564	2603	2854

Table 3 Projected landings (mt) of GOM cod estimated under trip limit regulations (only, not considering area closures) ranging from 100 pounds/day to 1,000 pounds/day.

4.1.1.1.2 Gulf of Maine Cod: Elimination of the running clock

In Framework 27, the Council also considered a proposal to eliminate the running clock but did not adopt this in the final proposal because it was concerned for the impact on discards and safety. This proposal was contained within Option 3 in the current framework. The running clock lowers the cost and/or risk for fishermen who must decide whether to discard trip limit overages, remain at sea and continue fishing to account for the overages, or return to port and allow the DAS clock to run. The current proposal does not eliminate the running clock but allows only a limited overage, that is a full day's limit for part of day (for which the DAS clock must run a full 24 hours to account for the overage). A qualitative, comparative analysis of the running clock options considered by the Council is summarized in Table 2.

The running clock was first proposed in Framework Adjustment 20 to allow vessels to land cod in excess of the trip limit and minimize the potential for discard associated with the GOM cod trip limit. The vessel's DAS allocation is reduced by the amount of time required to account for the trip's excess cod landings. Framework 24 adjusted the running clock by mandating that vessels reporting an excess landings of cod remain in port until the sufficient DAS have passed to equate to the cod landings. Framework 24 also required a 14 day call-in for vessels not in the GOM trip limit exemption program. Framework 24 closed a loophole that potentially allowed vessels to direct effort on cod and while the DAS clock continued to run to account for the excess cod, continue to fish for other species. The running clock measure remained unchanged until the NMFS Regional Administrator implemented the interim rule on August 3, 1999. Under this rule, which is also part of Option 1 and the proposed action, vessels on trips less than 24 hours may not land an overage and vessels on trips over 24 hours may land an overage equal to one per-day limit for a partial day provided it runs the DAS clock for the remainder of the 24-hour period.

The running clock was initially considered conservation neutral because the intent was to change discard of legal size cod into yield (no increase in mortality) while accounting for excess cod landings. The conservation neutral aspect of this measure was predicated on the assumption that fishermen would use the running clock to land excess cod overages and not use the running clock to direct on GOM cod. When the running clock was first used in the management plan, the trip limit was 1,000 lbs. per day for the first four days and 1,500 lbs. per day thereafter for vessels not enrolled in the cod trip limit exemption program. An analysis by the MSMC (1997) showed that only 8% of the cod trips in the Gulf of Maine would have exceeded these limits in May-August 1996, if they had been in place. These relatively high trip limits appeared to provide little incentive for behavioral shifts that would increase mortality on GOM cod by combining the running clock with an increased utilization of latent effort to direct on cod.

Framework 25 lowered the GOM cod trip limit to 700 lbs. per day until 50% of the Gulf of Maine cod TAC was taken, at which time the Regional Administrator could reduce the trip limit to between 400 and 700 lbs. The 700 lbs. trip limit went in effect on May 1, 1998 and was subsequently reduced to 400 lbs. on June 25, 1998. An MSMC analysis indicated that the 23 percent of trips of 1997 cod trips in the Gulf of Maine would have exceeded these limits in June 25 through August, 1997 if they had been in place rather than the 1000/1,500 lbs. trip limit with the running clock. These more restrictive trip limits may have provided more incentive to use the running clock to target cod. Some vessels were reportedly utilizing the running clock to target cod.

The MSMC (1998) examined the impact of a 400 lbs. possession limit and running clock on cod landings from June 25, 1998 through August 1998. The analysis covered a range of options from totally eliminating the running clock to capping a trip limit at 10 times the daily trip limit (4,000 lbs. per trip for a 400 lbs. per day possession limit) but did not make any assumptions about discarding. Possession limits of 400 lbs. (no running clock) yielded 15.8% reduction in cod landings and the 4,000 lbs trip limit yielded only a 1.4% reduction in landings.

The impact of the running clock under the very low trip limits in the current fishing year (30 or 100 pounds per day) cannot be assessed, even if all of the landings data were available up to the current date. Under these low trip limits, the incentive to use the running clock is minimized, because the returns (in terms of allowed cod landings) do not offset the cost (in terms of DAS consumed by the running clock). Therefore, more vessels are likely discarding overages, and since those discards are not accounted for, the actual catch rates are not known.

The effectiveness of trip limits and running clock is predicated on behavior response of the fishermen. Excess catch may not be caught if operators move away from areas with high concentrations (avoidance behavior) or shift to other fisheries with little cod bycatch (displacement). The running clock may be used to retain excess catch (conservation neutral by converting discard into yield). However, the running clock can also be combined with latent effort (unused DAS) to maintain or increase effort on cod (maintains or increases mortality on cod). Eliminating the running clock would prevent this from occurring. As noted, however, at current very low trip limits, even the consumption of latent effort under the running clock has probably declined.

At the vessel level, there are two basic responses to exceeding the trip limit without the running clock: extend the trip and fish for other species, or discard cod. Discarding excess cod catch negates the effectiveness of the trip limit and/or eliminating running clock. However, the proposed area closures are designed to close areas during times of high cod catch. This should reduce the frequency that catches exceed the limit and, therefore, cod discards. Deciding to extend the trip (remain at sea) to account for the cod overages rather than discard, on the other hand, raises safety concerns.

During February through April, 1999, vessels operated under a 400 pound per day trip limit with no maximum possession limit, and no restrictions on the use of the running clock. The tables in Appendix II show the cod trips and landings in the Gulf of Maine by trip length and by landings level. These tables are

based solely on the VTR reports, and the total landings is less than what results from a prorating of dealer data.

Based on the VTR data, ninety-one percent of trips landing Gulf of Maine cod were below the trip limit. However, the 9 percent of trips over the limit accounted for 39 percent of the GOM cod landings. Twenty-three percent of the total landings in that period were in excess of the per-day limit (total landings minus allowed landings with no overages). As noted, the impact of eliminating or restricting the ability to land overages under the running clock depends on whether fishermen are targeting cod (and will avoid catching it if they cannot land it) or whether they are catching it incidental to other activities, resulting in discards of the overage. If the former is true, then the proposed modification to the running clock will greatly reduce the catch of GOM cod during this period. If the latter is true, then compared to the 1999 period the modification to the running clock will result in increased discards, although compared to the no-action alternative (30 pounds per day and same running clock) discards will be lower.

4.1.1.1.3 Sensitivity analysis of proposed trip limit

As noted, the effectiveness of the trip limits is predicated on fishermen's behavior. Information on discarding behavior under the 400, 200, 30, and 100 pounds per day trip limits that have been implemented consecutively since June 1998 is not yet available. However, two extreme assumptions about discards under a 200 pound per day trip limit compared to the proposed 400 pounds per day limit provide bounds for a sensitivity analysis about the effect of increasing the trip limit on fishing mortality.

If the change from a 200 pounds per day trip limit to 400 pounds per day trip limit only converts discards into landings, that is, the catch is the same despite a difference in landings, then fishing mortality will not change under the higher limit. No difference in fishing mortality bounds one end of the problem. If the 200 pounds per day trip limit is perfectly effective, that is, there are no discards and catch is reduced by the lower limit, then the fishing mortality rate will be lowered by lowering the trip limit. The reduced fishing mortality rate bounds the other end of the problem.

Sensitivity analysis of the effect of 200 pounds per day trip limit and 400 pounds per day trip limit for January-April 2000.

Observed landings from January through April, 1999 were 685 mts. Management measures in place were 400 pounds per day trip limit, running clock with no cap, and Framework 25 and 26 closures. Framework 31 utilizes the same measures, but with a more restrictive running clock. Under the proposed system, vessels may only land overages for a partial day at sea (on trips over 24 hours) and may not land more than 4,000 pounds under any circumstances. Vessels on trips under 24 hours may not land more than 400 pounds.

The best estimate of landings in January through April, 2000 with a 400 lbs trip limit is the landings from January through April, 1999 when similar measures were in place. To be more accurate, these landings should be modified to accommodate changes in stock size (declining stock sizes should result in lower landings if CPUE and stock size are positively correlated) and implementation of a more restrictive running

clock. The running clock should lower landings, but may not have an impact on actual catches because of regulatory discards. However, this analysis assumes no change in CPUE and considers landings for January-April 2000 to be 685 mts under a 400 pounds per day trip limit, equal to the same period in 1999.

The first step is to estimate the effect of the 200 pound per day trip limit assuming that the lower limit results in no discards, compared to the 400 pound per day limit. The MSMC (1998) predicted landings for 1999 of 2058 mts at a 400 pounds per day trip limit and 1300 mts at a 200 pounds per day trip limit. These estimates are slightly higher than those shown in Table 3 because they do not include the projected 7.4 percent reduction in DAS usage that was incorporated into the Framework 27 analysis. In retrospect, that reduction did not occur. The percent difference in total landings projected by the MSMC between the 200 pounds per day trip limit and 400 pounds per day trip limit is 37%. Assuming that this reduction is proportional throughout the year, decreasing the trip limit to 200 pounds per day will drop expected landings in January through April, 2000 to 432 mts, from 685 mts observed. The difference in expected landings will be 253 mts. The objective this is to determine the impact this has on F in fishing year 1999.

The 253 mts can be compared to expected total landings in 1999. One estimate of landings for 1999 under the proposed 400 pounds per day trip limit can be calculated as follows:

$$685 \text{ mts (Jan-April 99, observed)} + 267 \text{ mts (May 99, observed)} + 1827 \text{ mts (June-Dec 98, observed)} = \mathbf{2779} \text{ mts.}$$

This estimate assumes that landings in June-Dec 99 (under the 30-100 pounds per day trip limit; June, October-November rolling closures, and July- October closure of Cashes ledge, interim running clock) will be similar to June-Dec 98 (400 pounds per day trip limit; June closure of Cashes and blocks 145-147,152; one month northeast closure, and full running clock). This estimate may be considered pessimistic because it assumes no benefit for the additional Framework 27 measures and for purposes of this analysis may be an upper bound of landings in 1999.

The estimate for total landings with the 200 pounds per day trip limit is:

$$432 \text{ mts (Jan-April 99, from Step 1)} + 267 \text{ mts (May 99, observed)} + 1827 \text{ mts (June-Dec 98, observed)} = \mathbf{2526} \text{ mts.}$$

These results are presented in Table 4 as the “pessimistic scenario”.

A similar exercise can be done applying the ratio of Landings_(January to May 1999) / Landings_(January to May 1998) to total 1998 landings. This method assumes that the percent reduction in landings that occur from January-May 1999 will occur from June-December 1999. This estimate is **1668** mts under the 400 pounds per day trip limit. This estimate may be considered optimistic because it assumes the same percent reduction in the second half of the year as occurred in the first half, even though most of the closures occur in the first half

of the year. Subtracting the 253 mts difference, from Step 1, produces an expected landings of **1435** mts under a 200 pounds per day per day trip limit. This is presented in Table 4 as the “optimistic scenario”.

The projected fishing mortality at these assumed landings (under both scenarios) can be estimated by using 1999 survivors from the Northern Demersal Working Group assessment (August, 1999) assuming 1998 partial recruitment and mean weights for 1999, and iterating F until expected landings are achieved. This uses similar methodology that the MSMC has used to estimate projected F with the exception that this calculation is deterministic and does not incorporate uncertainty in terminal year population estimates. Results are shown in Table 4. *Note: comparisons should be made within pessimistic and optimistic scenarios and not across scenario categories.*

Trip limit	Pessimistic scenario		Optimistic scenario	
	landings	Expected F	landings	Expected F
200 lbs.	2526 mts.	0.35	1435 mts.	0.19
400 lbs.	2779 mts.	0.39	1668 mts.	0.22

Table 4 Result of sensitivity analysis on impact of 200 pounds per day and 400 pounds per day trip limit on F in fishing year 1999.

The analysis shows that under a range of assumptions about potential discards at the lower limit increasing the trip limit to 400 pounds per day in January-April 2000 will have a negligible impact on expected landings and resulting F.

Important note: this analysis should not be used as an estimate of the effect of Framework 26 and 27 because the analysis does not address the potential problem of discarding at either 400 pounds per day or 200 pounds per day trip limit and does not incorporate uncertainty in terminal year population estimates into the projection. The “pessimistic” and “optimistic” scenarios are provided to show that at both high and low estimates of F, the impact of the higher trip limit is insignificant.

4.1.1.1.4 Georges Bank Cod Trip Limits

A similar bag limit analysis was used to evaluate the potential effects of trip limit regulations for cod in the Georges Bank stock area in Framework 27 and subsequently in Framework 30. The Council incorporated the GB cod trip limit into the management plan in Framework 30.

A trip-by-trip analysis of the distribution of cod landings from Georges Bank occurring during calendar year 1997 was conducted to evaluate the potential effects of trip limit regulations during the 1999-2000 fishing year. There were 9,076 trips reported in the 1997 VTR (logbook) data base that caught (landed or discarded) at least one pound of cod on a trip occurring in the Georges Bank stock area (statistical areas 521, 522, 525, 526, 561, 562). Days absent were estimated relative to the current trip limit regulations, which allow one day of trip limit for each whole or partial day fished. For example, a vessel on a day trip

fishing for up to 24 hours is permitted one day of trip limit, while a vessel fishing for 24 hours and 1 minute is permitted 2 days of trip limit (1 whole day and one partial day).

The use of the 1997 calendar year data to estimate the effectiveness of trip limit regulations during the 1999-2000 fishing year required that the 1997 trips be scaled to account for the projected increase in stock biomass that occurred between 1997 and 1999/2000. As stock biomass increases or declines, a given trip limit regulation becomes relatively more or less effective because catch rates change as some function of stock size. Projections for the Georges Bank cod stock contained in the MMC report project an 11 percent increase in exploitable biomass between 1997 and 1999 (compared to a 37 percent decline for GOM cod). As noted in Framework 27 for GOM cod, the relationship between LPUE and stock size is unknown, but it was assumed that LPUE would increase as a linear function of stock size. Therefore, cod catch rates (catch/day) were increased by 11 percent (adjustment factor = 1.11) to account for the expected increase in catch rates due to the projected increase in stock size.

The PDT referenced the trip limit analysis that was done for Framework 27. The table of expected 1999 landings of Georges Bank cod at various trip limit intervals represents landings projected forward from 1997 based on an 11% increase in exploitable biomass between 1997 and 1999. This approach assumes that F will have remained constant at the 1997 level (0.26) in 1998 and 1999. In reality, F declined from 0.26 in 1997 to 0.22 in 1998 and for TAC calculation purposes, landings in 1999 were projected at $F_{0.1}$ (0.18).

Landings were determined by summing the minimum of actual landings and the calculated trip limit (trip length (days) * trip limit/day) from each trip during the year. For trips with landing rates below the trip limit regulation, all catch was assumed to be landed. For trips with landing rates exceeding the trip limit, landings were assumed to be the maximum level allowed under the trip limit regulation being modeled. Landings within each trip limit interval were then summed over all trips in the VTR database. Because logbook landings represent a subset of the total reported (dealer) landings, the VTR landings were adjusted proportionately to equal the total reported landings of Georges Bank cod.

Because of the changes in F between 1997 and 1999, the expected landings under the trip limit intervals must be adjusted downward from those in the Framework 27 document. The adjustment is accomplished by first computing the ratio of total 1998 landings /total 1997 landings (stock-wide landings include Canadian catch). This is: $8,243/10,453 = 0.79$. This factor is then multiplied by the row of numbers in the Framework 27 GB cod trip limit table to produce the corrected landings adjusted for the change in F between 1997 and 1998. See Table 5.

The landings associated with the target F (0.18) in 1999 is 5,354 tons (U.S.), assuming 1,900 tons Canadian catch. Thus the difference between the re-computed landings at the various trip limits and the 5,354 tons represent the required additional percentage reductions which must be obtained from other measures such as closed areas. Estimated landings for May through July, 1999 are 2,100 mt. While this represents 39 percent of the target TAC landed in the first three months of the year, it also reflects the behavior of fishermen during that period who anticipated a one-month closure (that was not implemented)

and the imposition of a trip limit on August 15 under the Framework 30 measures that were submitted by the Council on April 30.

Trip Limit (Pounds/Day Absent)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	No Trip Limit
Landings (mt) FW 27	3958	5891	6955	7528	7854	8038	8156	8234	8285	8312	8366
Landings Revised FW 30	3127	4654	5494	5947	6205	6350	6443	6505	6545	6566	6609

Table 5 Framework 27 and Framework 30 revised projected landings (mt) of GB cod estimated under trip limit regulations ranging from 500 pounds/day to 5000 pounds/day during the 1999/2000 fishing year. The target TAC for GB cod in FY 1999 is 5,354 mt.

The PDT discussed the potential impact of the 20,000 pound cap on the total landings when it was proposed in Framework 30. Under a trip limit of 2,000 pounds per day, only trips over 10 days that also landed more than 20,000 pounds of cod would be affected. Without having the trip-length data available, the PDT could not quantify the impact, but qualitatively, it concluded that there would probably not be a significant reduction over what was already attributed to the 2,000 pound per day limit. Analysis provided by the Regional Office following the PDT meeting substantiated this conclusion (see Table 6).

	Number of Trips	Total Kept	Average Kept	Total DA	Avg. DA	Avg. Kept per DA
Trips with Landings of Cod	8,636	12,934,851	1,498	16,429	2	787
Trips with Cod landings >= 20,000 pounds.	52	1,292,937	24,864	371	7	3,484
Trips >= 10 days.	179	500,225	2,795	2,153	12	232
Trips >= 10 days and landed >= 20,000 pounds of Cod	2	42,725	21,363	20	10	2,114

Source: VTR database

Table 6 Commercial cod landings in the 1997-1998 fishing year for trips landing over 20,000 pounds and/or ten days or more in duration.

Vessels fishing on GB cod under a trip limit are also fishing under the haddock trip limit. Having two limits on a vessel that catches both species, often simultaneously, creates a dilemma for the operator who must

decide when the first of the two limits is reached whether to stop fishing or to continue fishing to catch the allowable limit of both species. In the second instance, the vessel would have to discard the overages of the first limit. Even if the vessel moves to a different location, there is no assurance that additional cod (or haddock, as the case may be) would not be caught. Since the outcome of this situation depends on the choices individual operators must make, the tools are not available to quantitatively predict the impact with any reasonable certainty.

Reducing the trip limit to prevent exceeding the target TAC will only exacerbate the problem of discards, and will not necessarily produce the desired result of preventing catches from exceeding the target. Thus, the PDT recommends against relying on incremental reductions in the trip limit to backstop a failed trip limit. As more haddock and other species in the Georges Bank stock area are available to fishermen, the level of discarding under a restrictive trip limit will likely increase.

4.1.1.2 Area closure analysis

The analysis of area closures considered by the Council for this framework is based on the work done for Framework 27. Option 1 is the same as the final provision of Framework 27 with the additional closure of Blocks 124 and 125 in February, and contains the same area closures as the Council's proposed measures for this framework. Option 3 in this framework is Option 2 in Framework 27 plus the closure of additional areas included in the final Framework 27 measures. The area closure analysis of Options 1 and 3 presented here is the same as that done for Framework 27.

The analysis of Option 2 is a separate analysis because the size and configuration of the area closures do not allow for use of data at the resolution of the quarter-degree squares; the proposed areas are smaller than the quarter-degree squares. The PDT did not reviewed this analysis. To determine the potential impact of these closures, some assumptions were made as to the expected reduction in landings (expressed as a percent of the total for the affected blocks), after accounting for the proportion of area covered, differential catch rates inside and outside of the area, and the amount of effort that would be displaced. This analysis begins with a range of expected landings that depend on the assumed effect of the area closures and then applies the same trip limit analysis as Options 1 and 3. In other words, the landings calculated in Framework 27 to result from the trip limit, with no area closures, are reduced by an amount that depends on the expected impact of the area closures.

4.1.1.2.1 Options 1 and 3

The area closure configurations corresponding to the options in Framework 27 was analyzed using the partial effort displacement (2-bin LPUE) model utilizing 1997 VTR data. This model accumulates the landings and effort (days absent) associated with each month-block combination specified in each area closure proposal to form a single closure (bin 1). The landings and effort associated with the remaining month-blocks are then accumulated to form a single open area (bin 2). The LPUE corresponding to the open area is then applied to the total effort in the system to compute the expected landings under the specified closure scheme. In effect, the 2-bin model retains all of the effort in the system, and the expected landings are the product of the total system effort and the LPUE from all of the open month-block

combinations. In other words, the analytical model assumes that all of the effort displaced by closing areas continues to fish in the open areas at the average catch rate for the entire open area.

In Framework 27 the area closure analysis was applied to the three main options under consideration by the Council and to the final proposal. Framework 27 Option 2 contained a provision for a seasonal closure of a portion of the central Gulf of Maine in the vicinity of Cashes and Fippennies Ledges which was adopted in the final proposal. As the proposed boundaries of this area are extremely irregular, the PDT agreed that the boundary could be approximated by defining this area as ½ of blocks 129 and 130.

If, in contrast to the analysis assumptions, all effort is not displaced to open areas or does not catch cod at the average rate for the open areas, the calculated landings for a given trip limit would be lower. Put another way, a higher trip limit would achieve the goals. Furthermore, the lower the trip limit is, the greater likelihood is that discards will replace landings, and the result (in fishing mortality) will not be as low as expected. Analysis of the trip limit/area closure interaction is further complicated by the change in catch rates in the open areas attributed to changes in exploitable biomass.

Modeling these two contingencies, however, involves highly subjective assumptions about behavior, such as predicting the point at which individual fishermen will stop fishing rather than discarding cod, or predicting how fishermen will redirect effort displaced from closed areas. The PDT did not make any of these assumptions in analyzing the biological impact of the proposed measures but instead adopted the most risk-averse set of assumptions. Observations of fishing activity under Framework 27 indicates that some fishermen shifted to other fisheries and others did not fish when they were affected by area closures.

Landings (mt)	100	200	300	400	500	600	700	800	900	1000
Option 1	585	951	1214	1407	1551	1657	1728	1777	1813	1841
Option 3	609	989	1262	1463	1613	1724	1797	1848	1885	1914

Table 7 Projected landings (mt) of Gulf of Maine cod derived by applying area closure adjustments to results of trip limit analyses presented in Table 3. Option 1 corresponds to the final Framework 27 measures, not including February closure of Blocks 124 and 125. Option 3 is Option 2a in Framework 27 and does not include the following added closures: Blocks 121-123, March and April; 129-131, April and May; 136-138, May; and 132, 133, 141-144, June.

The analysis results project landings of 951 metric tons with a 200-pound per day trip limit for Option 1 and landings of 989 mt for Option 3. At a 400-pound per day trip limit, projected landings are 1,407 mt and 1,463 mt, for Options 1 and 3, respectively. The 1999 fishing year target TAC for GOM cod is 782 mt based on an $F_{0.1}$ objective. The MSMC has not yet calculated the 2000-2001 target TAC. In submitting Framework 27 measures (Option 1), the Council asserted its recognition that the model is conservative in some assumptions, particularly regarding effort displacement, and optimistic in others. It also recognized the difficulty in predicting behavior of fishermen, particularly under unprecedented

restrictions. For these reasons, it also adopted a backstop provision to prevent the TAC from being exceeded. The backstop provision resulted in the trip limit being reduced after four weeks.

4.1.1.2.2 Option 2

The Council staff conducted this analysis at the direction of the Groundfish Committee and the PDT did not formally reviewed it. The methodology for estimating the impacts of the area closures is different than that used for Options 1 and 3. The proposed areas are smaller than what can be analyzed with the resolution of available landings data. Therefore, the results are given for a range of assumptions about effort displacement and effectiveness of the areas relative to the areas for which there is data. The choice of a specific assumption reflects the Council's judgement about the expected effect of these closures.

Methodology

1. Framework 27 projected landings under a trip limit ONLY (from Table 3):
 - A. 200-pound trip limit = 1,345 mt
 - B. 400-pound trip limit = 1,990 mt
 - C. 700-pound trip limit = 2,444 mt
2. Calculate expected savings from the two year-round area closures in Option 2, both of which are contained within the current western Gulf of Maine area closure and Block 124
 - A. TOTAL expected savings from current western Gulf of Maine Closed Area and Block 124 (if both are closed year-round and assuming no effort displacement) = 1,064 mt + 799 mt = 1,863 mt savings
 - B. Assume some percentage of the potential year-round savings will be retained with the two Option 2 year-round closures:
 - i. 10% = 186 mt savings
 - ii. 20% = 373 mt savings
 - iii. 30% = 559 mt savings
 - iv. 40% = 745 mt savings
 - v. 50% = 932 mt savings
 - vi. 70% = 1,304 mt savings
3. Calculate expected savings from the two seasonal area closures in Option 2: (1) Cashes Ledge Closed Area, July – October and (2) a portion of Block 132 from 9/15 – 11/15
 - A. Cashes Ledge Closed Area = (Landings from Blocks 129 and 130 from July – October) x $\frac{1}{2}$ = 114 mt savings, assuming no effort displacement
 - B. September 15 – November 15 Closure of Block 132 (if all of Block 132 is closed) = $\frac{1}{2}$ September landings (9 mt) + October landings (52 mt) + $\frac{1}{2}$ November landings (17 mt) = 78 mt savings
 - i. Assume some percentage of the potential Block 132 savings will be retained with the Option 2 closure from 9/15 – 11/15:
 - (a) 10% = 8 mt savings
 - (b) 20% = 16 mt savings
 - (c) 30% = 23 mt savings
 - (d) 40% = 31 mt savings
 - (e) 50% = 39 mt savings
 - (f) 70% = 55 mt savings
4. Calculate the TOTAL expected savings from all Option 2 area closures with different assumptions about percentage of savings retained from the area closures (savings from Cashes closure are held constant):
 - A. 10% = 186 + 114 + 8 = 308 mt savings
 - B. 20% = 373 + 114 + 16 = 503 mt savings
 - C. 30% = 559 + 114 + 23 = 696 mt savings
 - D. 40% = 745 + 114 + 31 = 890 mt savings
 - E. 50% = 932 + 114 + 39 = 1,085 mt savings

F. $70\% = 1,304 + 114 + 55 = 1,473$ mt savings

5. Convert the expected savings from all Option 2 area closures in Step 4 to a percentage (of the 1997 landings with no area closures, 5421 mt) to be applied to the trip limit analysis results:

Total catch in 1997	5,421 mt								
assumed savings	0	10%	20%	30%	40%	50%	70%	100%	
reductions from closures (mt)	0	-308	-503	-696	-890	-1085	-1473	-2055	
total 1997 catch minus reductions from closures	5421	5113	4918	4725	4531	4336	3948	3366	
% reduction in total catch attributed to closure	0.00	0.06	0.09	0.13	0.16	0.20	0.27	0.38	

6. Apply the percent reduction under each assumed area closure effect (Step 5) to the trip limit analysis from Framework 27: the results are projected cod landings under the trip limit and the area closures proposed in Option 2. These results should be compared to the 782 mt target.

assumed savings	0	10%	20%	30%	40%	50%	70%	100%
trip limit								
100	828	781	751	722	692	662	603	514
200	1345	1269	1220	1172	1124	1076	980	835
300	1717	1619	1558	1497	1435	1373	1250	1066
400	1990	1877	1805	1735	1663	1592	1449	1236
500	2194	2069	1990	1912	1834	1755	1598	1362
600	2344	2211	2127	2043	1959	1875	1707	1455
700	2444	2305	2217	2130	2043	1955	1780	1518
800	2513	2370	2280	2190	2100	2010	1830	1560
900	2564	2418	2326	2235	2143	2051	1867	1592
1000	2603	2455	2361	2269	2176	2082	1896	1616
no trip limit	2854	2692	2589	2488	2385	2283	2079	1772

Table 8 Option 2 analysis results- expected landings under a range of trip limits and expected savings due to area closures. The target TAC for comparison is 782 mt.

Based on the preceding analysis, assuming that the area closures would save only 20 percent of the landings that were reported in Block 124 and the Western Gulf of Maine Closed Area (prior to the closure) and Block 132 (Sept. 15-Nov. 15), and applying a trip limit of 200 pounds per day would result

in landings of 1,220 mt, or 438 mt over the 782 target TAC. At the same trip limit, assuming that the savings resulting from the area closures would be 70 percent of the landings from the larger blocks, the expected landings would be 980 mt. This result compares to 951 mt and 989 mt for Options 1 and 3, respectively, with a 200 pound trip limit as shown in Table 7. Even if all of the landings from Block 124 and the Western Gulf of Maine Closed Area (prior to the closure) and Block 132 (Sept. 15-Nov. 15) were assumed to be saved by the proposed area closures (the 100% column), the expected landings would be 835 mt, or 53 mt above the 782 target.

4.1.1.3 Option 2 - Spring DAS limitations analysis

Option 2 included a proposal to limit vessels fishing in the Gulf of Maine to a fixed number of DAS or a fixed number of trips during February through May (actually, in the fishing year, the restriction would apply during May and February – April, and is analyzed as such). When this proposal was first made, it was applied to all multispecies vessels and specified 25 DAS or trips, whichever is less. As noted in Section 3.1.1.2, the PDT reviewed this initial analysis but it did not have available any analysis of the proposal as it applied to GOM vessels only. The following section includes both the original analysis, covering all multispecies vessels, as well as the analysis done excluding vessels that did not fish in the Gulf of Maine during the months of February – May. The PDT agreed that the concept of seasonal DAS reductions, at some level, should be explored as a strategy for reducing fishing effort during the period of highest landings-per-unit effort on a target stock, especially if overall DAS reductions are not an acceptable approach.

The number of days-at-sea (DAS) used by vessels with limited access multispecies permits is summarized below. Data is based on those vessels that called into the DAS system during the 1997 and 1998 fishing years. Buyout vessels are included in the 1997 fishing year data. There are minor differences in this data and data included in the 1998 Multispecies Monitoring Committee Report; the reason for the differences have not been determined, but are likely due to revisions to the databases that are made over time. There are also minor differences between the annual summaries in the overview and the monthly breakdowns. These differences total 28 DAS in the 1998 fishing year and 16 DAS in the 1997 fishing year.

In this data, a trip is defined as one call-in/call-out cycle, regardless of the number of landings made during that period. DAS were allocated to the month actually used. For trips that extended over the end of a month, the DAS were calculated for each month and the resulting proportion used to allocate part of the trip to each month.

4.1.1.3.1 Overview

Table 9 summarizes multispecies days-at-sea (DAS) used in fishing years 1996 through 1998. Data for 1996 is from the 1998 Multispecies Monitoring Committee (MSMC) Report. Data for 1997 and 1998 was generated using DAS information provided by NMFS Northeast Region Law Enforcement staff. The data for 1997 shown here differs slightly from that in the 1998 MSMC report.

In 1998, the number of permits allocated DAS declined to 1,636 from 1,715 in 1997. Even with the decline in permits, the number of DAS allocated to these permits increased by just over 1%. Allocated DAS can increase for a number of reasons. Vessels are allowed to carry-over up to ten DAS into the following year; the number of permits that exercise this option can change from year to year. History permits that are activated contribute to an increase. Finally, DAS sanctions resulting from enforcement actions can change the allocation from one year to the next. Allocated DAS can also decrease from year to year for similar reasons.

1,062 permits called-in to report DAS in 1998, a decline of 29 vessels from 1997. DAS allocated to vessels that called-in increased by 4.4% in 1998. Figure 5 and Figure 6 illustrate DAS allocated and used for the years 1996 through 1998, by permit categories. The number of DAS used by vessels that called-in was 52,935 DAS, an increase of 7% from 1997 and an increase of 1.6% from 1996. Overall, the total percentage of allocated DAS used by all permitted vessels increased to 34%, while the percentage of allocated DAS used by vessels that called-in increased to 50%. The percentage of allocated DAS used by vessels that called-in increased for all permit categories. The greatest number of unused DAS is in the fleet DAS permit category. Hook gear permits use the smallest percentage of allocated DAS.

Table 10 through Table 12 summarize the use of DAS by permit categories. Vessels that did not call-in DAS are not included in these tables. The percentage of DAS used increased for all permit categories. Individual DAS permits used most of the DAS they were allocated. Nearly 95% of individual DAS permits used over half the DAS allocated, and over 90% used more than 70% of the DAS allocated. By comparison, in 1997 87% of individual DAS permits used over half the DAS allocated. For fleet DAS permits that called-in, 43% of the permits used more than half their allocated DAS. Just over one-quarter of the permits used more than 70% of the allocated DAS. These percentages increased from 1997 as well, when only 38% of the permits used over half the DAS allocated. Hook category permits used the smallest percentage of DAS allocated (18% overall). Only 10% of hook gear permits that called-in used more than half the DAS allocated.

In addition to the permits allocated DAS in 1997 and 1998, there are "history" permits that are not assigned a DAS allocation until they are re-activated. As of April, 1999, there were 72 multispecies history permits. The minimum number of DAS that could be allocated to these vessels, if re-activated, is 6,336 DAS (based on 88 fleet DAS). 15 of these permits were converted to history permits during fishing year 1998 and were allocated, and in some cases used, DAS.

4.1.1.3.2 Monthly DAS Use, All Areas

Table 14 compares monthly DAS used in fishing years 1997 and 1998 in all areas. Only permits that called-in to use a DAS are included. Fishing year 1997 data includes permits that were removed through the capacity reduction program. The DAS totals in this table differ slightly from those shown in Table 9.

The overall distribution of DAS used over the course of the fishing year, as a percentage of annual DAS used in a given fishing year, shows little variation from 1997 to 1998. For eleven months of the fishing year, the percentage of DAS used is either constant or changed by no more than 1%. The percentage of DAS used in April 1999 was 2% lower than the percentage used in April 1998. Individual permit categories show more variation. Individual DAS permits used their DAS in a similar fashion in 1997 and 1998. For fleet DAS permits, the percentage of DAS declined by 4% in April 1999 and increased by 2% in May 1998. For hook gear vessels, DAS used declined by 2% in October 1998 and April 1999, but increased by 4% in July 1998 compared to the previous year. Combination and large mesh fleet DAS vessels showed considerable year to year variation based on percentage of DAS used.

Overall, the number of DAS used increased by about 3,500 DAS from 1997 to 1998. Most of the increase can be attributed to the fleet DAS, hook gear, and combination permit categories. (The hook gear permit category does not include vessels that choose to use hook gear in the individual and fleet DAS permit categories). The largest absolute increase came in the fleet DAS category, which used about 3,300 more DAS in 1998 than in 1997, a 10% increase. DAS used by fleet permits increased during every month except October, February, and April. For hook gear vessels, DAS use increased every month except October. The absolute increase in DAS was 365 DAS for hook gear permits, a 24% increase. Combination vessels increased DAS every month of the year except October.

Table 15 summarizes the number of call-in/call-out cycles made by multispecies vessels during fishing years 1997 and 1998. The table refers to each complete cycle as a "trip." It's important to note that a vessel may land fish more than once during one cycle since there isn't a regulatory requirement that a vessel stop its DAS clock when it lands its catch or moors. While the number of DAS increased from 1997 to 1998, the number of complete cycles decreased.

The changes in the percentage distribution over the year of these cycles is similar to the changes in DAS distribution noted earlier. For example, the percentage of annual trips used in April by fleet DAS vessels decreased by 5% from 1997 to 1998, similar to the 4% decrease in DAS. In terms of actual numbers of trips, individual DAS and fleet DAS vessels decreased the number of call-in/call-out cycles from 1997 to 1998, while the other permit categories increased the number of cycles. For the 1998 fishing year, fleet DAS permits decreased the number of trips by 1,684 cycles (from 27,622 in 1997 to 25,938 in 1998). For the period of May 1998 and February through April 1999, fleet DAS decreased the number of call-in/call-out cycles by 2,238 (from 10,507 in fishing year 1997 to 8,269 in fishing year 1998). Individual DAS vessels decreased their total number of trips from 3,418 in 1997 to 3,229 in 1998. Note that while individual DAS vessels also decreased their DAS used from 1997 to 1998, fleet DAS vessels increased their DAS used while decreasing the number of trips. This could either indicate vessels spending more time at sea, vessels "running the clock" because of the Gulf of Maine cod trip limit, or vessels making multiple voyages without stopping the DAS clock.

4.1.1.3.3 Impact of Option 2 DAS/Trip Caps

Option 2 proposed to reduce fishing mortality on Gulf of Maine cod by limiting all vessels to a fixed number of DAS or a fixed number of trips during specific months of the year. The original proposal suggested the limit be set at 25 DAS or trips, with the limit applicable to trips made during February, March, April and May. The analysis assumes that the cap applies to these four months in the same fishing year (for example, May 2000 and February/March/April 2001, not February through May, 2001).

In order to estimate the impacts of this option, fishing activity by multispecies vessels was examined in fishing years 1997 and 1998. The impacts of the proposed cap on the actual fishing activity in those years were then evaluated. The number of DAS and trips that would have been "lost" if the cap were in place was calculated. In addition, the number of DAS and trips that could be "gained" if every permit that used DAS fished to the limit can also be calculated. This approach is similar to the "bag limit" approach used to estimate the impact of limits. Several assumptions in using this method should be noted.

- (1) The analysis does not account for any changes in fishing behavior that may result from the DAS/trip cap. The analysis assumes fishermen would fish at the same times of year as they actually fished, in the same areas, and at the observed levels of effort. It assumes they would be limited by the cap but makes no attempt to model changes in the levels or distribution of effort.
- (2) The analysis assumes there will be a connection between actual voyages (defined as a vessel leaving and returning to port, whether fish are landed or not) and a complete call-in/callout cycle, or trip (as defined in the analysis). If this is not the case, some vessels (those that use a small percentage of their annual DAS allocation but make more than 25 trips during the period) could reduce the impact of the cap by letting their DAS clock run while making multiple voyages.
- (3) The analysis assumes the months in question are in the same fishing year (two different calendar years) and do not overlap two fishing years.
- (4) No allowance is made for permits that did not use groundfish DAS. If the effort represented by these permits were to enter the fishery, the impacts of any proposed cap, would be significantly reduced.
- (5) No estimate is made of cod that may be caught during other times of the year as a result of fishermen shifting DAS or trips capped by the limit into another month of the year.
- (6) The results of this analysis, based on observed fishing effort in the 1997 fishing year, may not be transferable to existing conditions. Changes in regulations, the markets, and conditions of the resource may result in changes in fishing behavior that reduce the reliability of these estimates.

(7) The analysis does not show the impact of a cap on DAS or number of trips on other species or on total revenues for any of the permit categories.

The Vessel Trip Report (logbook) database includes information on fishing locations. There is no direct link between the DAS database and the logbook database. This prevents a particular trip from being directly tied to a specific DAS cycle, making it difficult to analyze exactly how many DAS were used by a vessel in the Gulf of Maine during a given period. For this reason, DAS used and trips taken were first summarized over all areas for all vessels for a four month period in the fishing year. This gives an accurate baseline count of the number of DAS used and trips taken. A further analysis, described below, attempted to identify the vessels that fished in the Gulf of Maine and calculated the impact of the proposed cap on this smaller group of vessels. Fishing year 1997 was examined since additional inshore closures in the Gulf of Maine were in place in fishing year 1998.

The impact of the proposed 25 DAS/25 trip limit was calculated for all vessels in all areas by calculating the number of DAS or trips that would have been "lost" if the cap were in place (subject to the assumptions listed above). The possible increase in DAS or trips if vessels that fished below the cap increased their activity is also calculated. When calculating the increase in DAS, the annual allocation of DAS to each permit was considered – a vessel that fished less than 25 DAS during the period, but used all its DAS over the course of the year, was assumed to be unable to increase its DAS to the cap. This ignores the possibility a vessel may shift its fishing effort from one part of the year to another.

Table 16 and Table 17 summarize this information for the 1997 fishing year with a proposed cap of 25 DAS/25 trips, if these limits were applied to all vessels in all management areas. 19% (3,425) of the DAS used during May, February, March and April in fishing year 1997 would have been limited by a 25 DAS cap. Generally, the DAS cap impacts individual DAS vessels while the trip cap impacts other permit categories. A 25 DAS cap would have impacted 73% (109) of the individual DAS vessels that used DAS in 1997 if it was applied to all management areas. By comparison, 19% (161) of fleet DAS vessels, 4% (4) hook gear, and 0% of the combination or large mesh fleet DAS vessels would have been constrained by the limit. The impacts of the proposed trip cap, however, are different: 17% (2,074) of the trips taken in the four month period in fishing year 1997 would have been limited by a 25 trip cap. For individual DAS vessels, a 25 trip cap would have constrained 2% (3) of the vessels. 18% (145) of fleet DAS vessels, 5% (5) hook gear vessels, and none of the combination or large mesh fleet DAS vessels would have been constrained by the trip cap.

In order to estimate the impact of the proposed caps on vessels fishing in the Gulf of Maine, the vessel logbook database was queried to identify all trips from the Gulf of Maine during the four month period. Reported cod landings were obtained for the vessels that made these trips. For the analysis, vessels that reported landings from the Gulf of Maine in a month the cap would be effective were assumed to make all their trips and use all their DAS in the Gulf of Maine during that month. This assumption may introduce errors into the analysis because vessels may have fished in other areas on some trips. The alternative, however, is a trip by trip analysis that cannot be performed because, as mentioned earlier, there is no direct link between the DAS data and the logbook database. This assumption overestimates the number of DAS

and trips used in the Gulf of Maine and overestimates the impacts of the proposed cap. A lack of time prevents these results from being compared to the list of vessels that applied for an exemption to the Gulf of Maine cod trip limit.

Table 18 and Table 19 summarize the number of DAS and call-in/call-out cycles used in the Gulf of Maine during the months of May 1997, and February through April 1998. 9,523 DAS were used in this area during this time period, roughly 20% of total annual DAS used. The most DAS and the most trips were used in April of 1998. There were 7,217 call-in/call-out cycles in this area during the period, or about 22% of the total number of cycles for the year.

Using the same approach used for all areas, the impact of a 25 DAS and 25 trip limit on Gulf of Maine effort was calculated. Table 20 and Table 21 summarize these impacts. A 25 DAS limit imposed on observed effort in fishing year 1997 would have reduced the number of DAS used by 1,786, or 18.7% of the total during the four-month period. The impact of the DAS limit varies by permit category. Individual DAS vessels would have lost 778 DAS, or 31% of the DAS used during this period. Fleet DAS permits would have lost 978 DAS, or 14.7%. With respect to the 25 trip cap, 1,528 trips (21% of the total in the period) would have been lost if the limit was in effect in fishing year 1997. Individual DAS vessels would have lost only 18 trips (3%). Fleet DAS vessels would have lost 1,491 trips, or 23.8% of the total trips taken.

The number of DAS constrained was calculated for various DAS limits and plotted in Figure 7. The number of vessels that would be constrained by a given number of DAS was also plotted on the same graph. By choosing a DAS limit on the bottom axis, the impact on DAS used in the Gulf of Maine in fishing year 1997 can be estimated. At the same time, the number of vessels that would be constrained by the limit can be determined by using the right hand axis and the vessel curve. Figure 8 shows the impact of various limits on the number of trips (call-in/call-out cycles) on the number of trips in the Gulf of Maine, based on observed effort in the 1997 fishing year.

4.1.1.3.4 Estimated Impact of Limits on Cod Landings

The impact on the Gulf of Maine cod catch of the various trip and DAS limits was estimated based on observed activity and landings in fishing year 1997. The vessel trip report database was queried to identify vessels with landings of any species from statistical areas 464, 465, and 510 through 515. Vessels with landings reported in the months of May 1997 and February through April 1998 were then combined with information on monthly DAS usage from the NMFS Office of Enforcement. A database was constructed that combined these two datasets, focusing on cod landings from these statistical areas.

The monthly Gulf of Maine cod landings identified in this fashion differ from the landings reported by the Northeast Region's Office of Statistics. This is because NMFS uses a combined dealer and vessel logbook database, while the analysis in this section relied entirely on vessel logbook data. The differences between the two sets of data are summarized in Table 22. Because of these differences, the cod landings in the following analysis cannot be directly compared to other data in this document. For this reason, in this

section the landings information, and the impact of the proposed limits, are reported as percentages of the analyzed landings.

Table 23 and Table 24 summarize the percentage of analyzed Gulf of Maine cod landings by permit category. From these tables, it can be seen that in the four months examined in the 1997 fishing year, fleet category permits landed 66% of the Gulf of Maine cod analyzed. Individual DAS vessels landed 31%, and hook gear permitted vessels landed 3%. Combination and large mesh fleet DAS vessels landed an insignificant amount of the analyzed landings. 51% of the cod was landed by vessels that used 30 DAS or less, 65% by vessels that used 35 DAS or less, and 75% by vessels that used 40 DAS or less during the four month period. With respect to number of trips (call-in/call-out cycles), 43% was landed by vessels that used 10 trips or less, 52% by vessels that used 15 trips or less, and 74% by vessels that used 35 trips or less.

The impact of various limits on DAS or number of trips was estimated by assuming that for a given vessel, cod landings would decline by the same percentage as trips or DAS constrained. That is, there is an assumed uniform catch rate on all trips in the period. For example, a 10% loss in DAS equated to a 10% loss in cod landings; a 10% decline in number of trips is assumed to result in a 10% decline in cod landings. The results should be considered the maximum decline in landings for the following reasons. First, if a trip or DAS limit is imposed, fishermen are likely to use their effort when they will maximize their profits. This may mean focusing on days with high cod catch rates. Second, they may shift some of their effort to other times of the year and catch Gulf of Maine cod. While vessels that are not presently using all their DAS may be unlikely to do so, those vessels currently using all or most of their DAS are likely to use up the DAS in some month without a limit. Both of these reactions would reduce the impact of any limit on DAS or number of trips.

The results of these estimates are shown in Table 25 for the DAS cap and in Table 26 for the various trip caps. The percentages in these tables, as noted above, refer to the percentage of analyzed landings (during the four-month period) that would be foregone under the proposed limits. The proposed 25 DAS cap would have constrained 20% of the analyzed landings, with 9% contributed by individual DAS permits and 11% by fleet DAS permits. Because each of these permit categories caught different amounts of cod, this means individual permit vessels would have lost about 30% of their cod landings, and fleet DAS vessels would have lost 17% of their cod landings. Under the proposed 25 trip limit, 13% of the landings would have been constrained; 12% (equal to 18% of the cod landings by this sector) would be contributed by fleet DAS permits, while the other permit categories combined contributed 1%.

During the 1997 and 1998 fishing years, approximately 37 percent and 35 percent, respectively, of cod was landed during the four months, May and February-April. Thus, approximately five to seven percent of the total cod landings for the year would be constrained, not considering effort shifts to other parts of the year.

Figure 9 summarizes the "savings" in analyzed cod landings under various DAS limits for three permit categories. By choosing a particular DAS limit, the percentage of analyzed landings constrained from each

permit category can be estimated. The total amount is the sum of the percentages for all three permit categories. Figure 10 is a similar illustration of the impact on the analyzed landings of various limits on the number of trips. (The lines on these figures are smoothed lines connecting the datapoints for clarity, and are not the result of a regression analysis of the data).

Table 27 and Table 28 summarize the number of DAS constrained by various DAS or trips limits, based on permit categories. These two tables show that the impact of DAS and trip limits differs between the three permit categories that landed most Gulf of Maine cod. While not an explicit measure of the impacts of the limits on other activities of these vessels, these tables do give a sense of the possible impacts on vessel activities. The proposed 25 DAS limit, for example, constrains 31% of the DAS used by individual DAS vessels during the four month period in the 1997 fishing year, but only 15% of the DAS used by fleet category permits and 9% of the DAS used by hook gear permits. This would indicate the proposed DAS limit would affect overall landings and revenues of individual DAS vessels more than the other permit categories. In a similar fashion, Table 28 summarizes the number of groundfish trips constrained by various trip limits based on observed effort in the 1997 fishing year. The proposed 25 trip limit would only constrain 3% of the trips taken by individual DAS vessels in fishing year 1997, while constraining 6% of the hook gear trips and 24% of the fleet DAS trips. Figure 11 and Figure 12 illustrate the data in these tables.

4.1.1.3.5 Discussion

The data presented indicates that a restriction on DAS used and trips taken in the Gulf of Maine during the months of May, February, March and April of a fishing year may reduce cod landings during this period. The information presented must be evaluated with a clear understanding of the assumptions listed previously. Shifts in effort to other times of the year or even in-season changes in the distribution of DAS could reduce the estimated impacts of this approach.

It is clear that the proposed limits have different impacts on different permit categories. For an equitable use of this method, different restrictions may need to be adopted for different permit categories. The information in the figures in this analysis can be used as a starting point for discussion. For example, if the goal is to have each permit category reduce its effort on groundfish in the Gulf of Maine by a similar percentage, Figure 11 and Figure 12 can be examined together. A 35 DAS limit would reduce individual DAS effort by about 15% but would have a much smaller impact on fleet DAS and hook gear permits. A 30-trip limit on fleet DAS vessels during the proposed four month period would reduce effort by 17%, or roughly the same impact as a 30 DAS limit on individual vessels. Lower limits would need to be set for hook permits, but because of this category's low analyzed cod catches, the savings would be negligible.

Using these limits to enter the graphs in Figure 9 and Figure 10, the 35 DAS limit on individual DAS vessels would "save" about 4% of the analyzed Gulf of Maine cod landings observed in 1997. This is about 13% of the cod landings by this sector. A 30 trip limit on fleet DAS vessels would "save" 9% of the cod landings by this sector. This is about 15% of the analyzed cod landings by fleet permits. Total estimated "savings" with these two measures is about 13% of the analyzed cod landings. As noted, this estimate should be viewed with caution because it does not account for changes in behavior or the redirecting of

effort to other times of the year. In addition, the limit on trips will only be effective if a trip is defined as each time a vessel returns to port. If a trip is defined as a call-in/call-out cycle (as defined in this analysis), vessels that use a small percentage of their DAS will be able to avoid the impact of a limit on trips by running their clock and making multiple trips during each cycle.

Permit Category	Number of Permits	DAS Allocated	Permits that Called-in	DAS Allocated to Permits that Called-in	DAS Used	% of DAS Used by Permitted Vessels	% of DAS Used by Permitted Vessels that Called-in
1998							
Individual DAS	137	17,984	130	17,079	15,271	85%	89%
Fleet DAS	1,225	114,843	787	75,408	33,945	30%	45%
Hook Gear	212	19,716	109	10,482	1,910	10%	18%
Combination	44	2,083	22	1,573	1,071	51%	68%
Large Mesh Fleet DAS	18	2,295	14	1,805	738	32%	41%
Total	1,636	156,921	1,062	106,347	52,935	34%	50%
1997							
Individual DAS	174	21,455	150	19,028	15,984	75%	84%
Fleet DAS	1,285	112,893	809	71,093	30,757	27%	43%
Hook Gear	198	17,336	106	9,328	1,545	9%	17%
Combination	43	1,874	15	1,136	596	32%	52%
Large Mesh Fleet DAS	15	1,800	11	1,320	585	30%	41%
Total	1,715	155,358	1,091	101,905	49,467	32%	49%
1996							
Individual DAS	177	27,944	155	25,729	22,119	79%	86%
Fleet DAS	1,349	187,372	732	103,138	28,350	15%	27%
Hook Gear	136	18,904	76	10,564	823	4%	8%
Combination	48	2,615	14	1,021	661	25%	65%
Large Mesh Fleet DAS	8	1,240	6	930	128	10%	14%
Total	1,718	238,075	983	141,382	52,081	22%	37%

Table 9 – Multispecies DAS , 1996 – 1998 fishing years

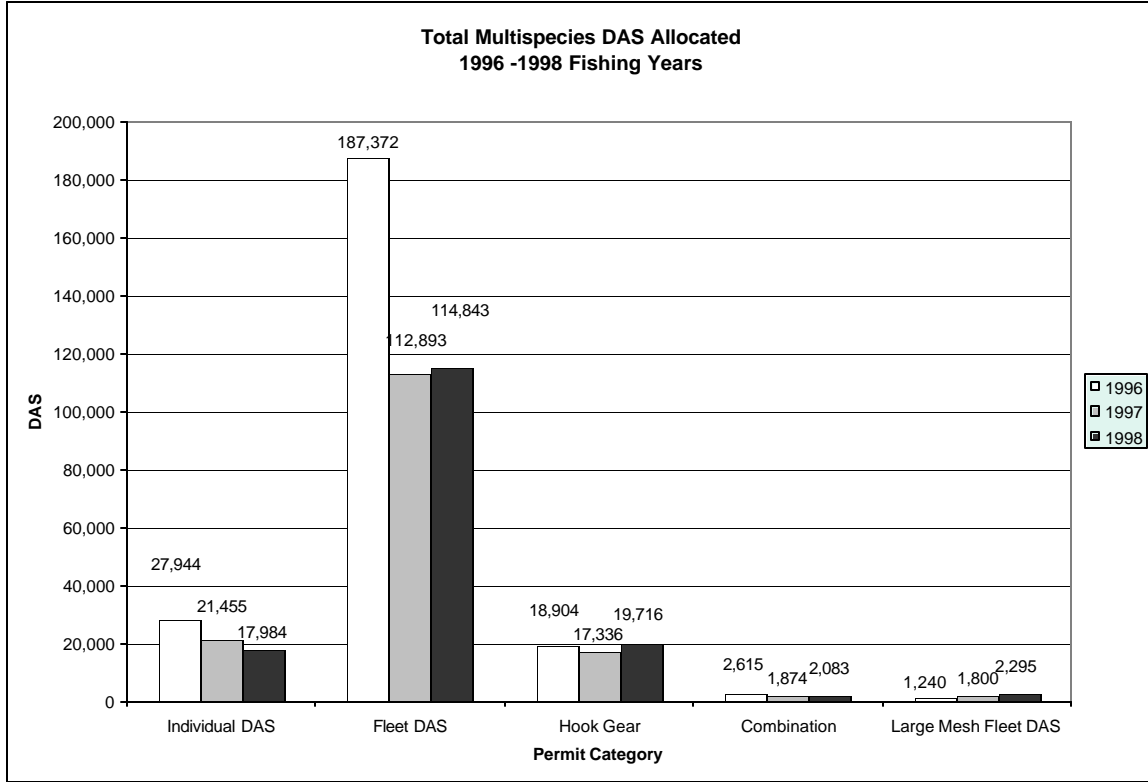


Figure 5 – Multispecies DAS allocated, fishing years 1996 through 1998

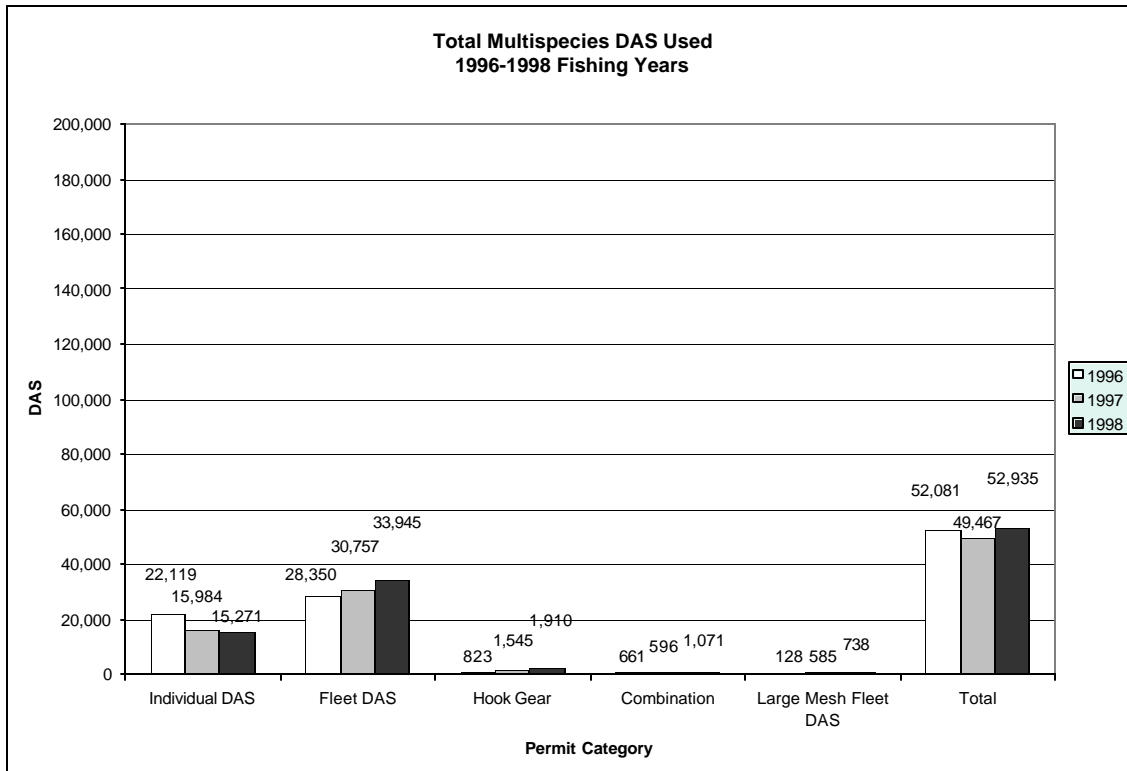


Figure 6 – Multispecies DAS used, fishing years 1996 through 1998

Individual DAS (Category A)						
% Total DAS Used	Fishing Year 1996		Fishing Year 1997		Fishing Year 1998	
	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %
0 -10%	1.3%	100.0%	1.3%	100.0%	1.5%	100.0%
11-20%	1.9%	98.7%	4.0%	98.7%	0.0%	98.5%
21-30%	2.6%	96.8%	2.7%	94.7%	0.8%	98.5%
31-40%	2.5%	94.2%	2.7%	92.0%	0.8%	97.7%
41-50%	3.2%	91.7%	2.0%	89.3%	2.3%	96.9%
51-60%	5.7%	88.5%	1.3%	87.3%	2.3%	94.6%
61-70%	6.4%	82.8%	4.0%	86.0%	1.6%	92.3%
71-80%	7.6%	76.4%	2.7%	82.0%	0.0%	90.7%
81-90%	11.5%	68.8%	10.7%	79.3%	14.0%	90.7%
91-100%	22.9%	57.3%	67.3%	68.6%	73.6%	76.7%
> 100%	34.4%	34.4%	1.3%	1.3%	3.1%	3.1%

Table 10 – Individual DAS vessels. Percent of vessels calling in that used X% of their DAS allocation.

Fleet DAS (Category B)						
% of Total DAS Used	Fishing Year 1996		Fishing Year 1997		Fishing Year 1998	
	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %
0 -10%	33.4%	100.0%	19.7%	100.0%	15.6%	100.0%
11-20%	16.2%	66.6%	12.3%	80.3%	11.7%	84.3%
21-30%	14.1%	50.4%	10.9%	68.0%	9.5%	72.6%
31-40%	12.7%	36.3%	10.4%	57.1%	11.0%	63.1%
41-50%	6.9%	23.6%	8.9%	46.7%	9.1%	52.1%
51-60%	5.3%	16.7%	7.9%	37.8%	8.5%	43.0%
61-70%	3.0%	11.4%	7.4%	29.9%	7.3%	34.5%
71-80%	2.2%	8.4%	6.2%	22.5%	0.0%	27.2%
81-90%	3.2%	6.2%	7.4%	16.3%	15.6%	27.2%
91-100%	1.3%	3.0%	8.3%	8.9%	11.0%	11.6%
> 100%	1.7%	1.7%	0.6%	0.6%	0.6%	0.6%

Table 11 – Fleet DAS vessels. Percent of vessels calling-in that used X% of their total DAS allocation.

Hook Gear (Category D)						
	Fishing Year 1996		Fishing Year 1997		Fishing Year 1998	
% of Total DAS Used	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %
0 -10%			56.6%	100.0%	47.2%	100.0%
11-20%			17.0%	43.4%	17.9%	52.7%
21-30%			6.6%	26.4%	11.3%	34.8%
31-40%			5.7%	19.8%	8.5%	23.5%
41-50%			1.9%	14.1%	4.7%	15.0%
51-60%			7.5%	12.2%	6.6%	10.3%
61-70%			2.8%	4.7%	2.8%	3.7%
71-80%			1.9%	1.9%	0.0%	0.9%
81-90%			0.0%	0.0%	0.9%	0.9%
91-100%			0.0%	0.0%	0.0%	0.0%
> 100%			0.0%	0.0%	0.0%	0.0%

Table 12 – Hook gear vessels. Percent of vessels calling-in that used X% of their total DAS allocation.

Combination Vessels (Category E)						
	Fishing Year 1996		Fishing Year 1997		Fishing Year 1998	
% of Total DAS Used	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %	% of Vessels Calling In that Used X% of Total DAS	Cumulative %
0 -10%	21.5%	100.0%	13.3%	100.0%	4.5%	100.0%
11-20%	7.1%	78.5%	13.3%	86.7%	9.1%	95.4%
21-30%	0.0%	71.4%	13.3%	73.4%	0.00%	86.3%
31-40%	0.0%	71.4%	0.0%	60.1%	13.6%	86.3%
41-50%	7.1%	71.4%	0.0%	60.1%	9.1%	72.7%
51-60%	0.0%	64.3%	13.3%	60.1%	0.00%	63.6%
61-70%	14.3%	64.3%	6.7%	46.8%	4.5%	63.6%
71-80%	7.1%	50.0%	6.7%	40.1%	0.0%	59.1%
81-90%	14.3%	42.9%	6.7%	33.4%	31.8%	59.1%
91-100%	14.3%	28.6%	26.7%	26.7%	27.3%	27.3%
> 100%	14.3%	14.3%	0.0%	0.0%	0.00%	0.0%

Table 13 – Combination DAS vessels. Percent of vessels calling-in that used X% of their total DAS allocation.

Month	Data	Individual DAS		Fleet DAS		Hook Gear		Combination		Large Mesh Fleet DAS		Grand Total	
		1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
May	% of DAS Used	9%	8%	10%	12%	5%	7%	8%	6%	8%	9%	10%	11%
	DAS Used	1,434	1,154	3,180	4,178	80	125	46	65	48	64	4,788	5,586
June	% of DAS Used	9%	8%	13%	12%	7%	7%	5%	5%	14%	11%	11%	10%
	DAS Used	1,471	1,192	3,913	4,070	109	138	32	56	85	81	5,611	5,537
July	% of DAS Used	8%	8%	9%	10%	4%	8%	5%	5%	15%	11%	9%	9%
	DAS Used	1,343	1,198	2,768	3,348	69	146	30	56	89	80	4,299	4,827
August	% of DAS Used	9%	8%	8%	7%	10%	8%	11%	8%	11%	10%	8%	8%
	DAS Used	1,423	1,225	2,413	2,469	149	153	65	79	67	77	4,116	4,003
September	% of DAS Used	10%	11%	7%	8%	6%	7%	8%	9%	13%	13%	8%	9%
	DAS Used	1,604	1,669	2,137	2,612	87	128	47	100	75	95	3,950	4,605
October	% of DAS Used	9%	9%	7%	6%	5%	3%	19%	9%	11%	12%	8%	7%
	DAS Used	1,445	1,449	2,124	2,007	73	61	113	100	66	85	3,821	3,703
November	% of DAS Used	8%	7%	6%	7%	4%	6%	15%	8%	7%	7%	7%	7%
	DAS Used	1,279	1,099	1,828	2,349	69	112	87	88	42	51	3,306	3,699
December	% of DAS Used	7%	9%	7%	8%	12%	11%	9%	10%	5%	7%	7%	8%
	DAS Used	1,177	1,316	2,116	2,683	179	205	56	111	29	55	3,556	4,369
January	% of DAS Used	7%	8%	5%	7%	11%	11%	8%	8%	6%	8%	6%	7%
	DAS Used	1,090	1,224	1,474	2,384	174	208	49	83	37	59	2,825	3,957
February	% of DAS Used	6%	6%	6%	5%	10%	10%	5%	7%	1%	4%	6%	6%
	DAS Used	1,025	950	1,822	1,775	157	182	27	77	7	33	3,038	3,018
March	% of DAS Used	9%	9%	8%	7%	11%	12%	3%	12%	2%	2%	8%	8%
	DAS Used	1,468	1,443	2,444	2,460	176	234	18	124	10	14	4,115	4,275
April	% of DAS Used	8%	9%	15%	11%	14%	12%	4%	11%	5%	6%	12%	10%
	DAS Used	1,214	1,362	4,533	3,713	222	223	24	117	32	44	6,025	5,459
Total	% of DAS Used	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	DAS Used	15,974	15,280	30,752	34,047	1,545	1,917	595	1,056	585	738	49,451	53,037

Table 14 – Monthly DAS used, by permit category, 1997 and 1998 fishing years

Month	Data	Individual DAS		Fleet DAS		Hook Gear		Combination		Large Mesh Fleet DAS		Grand Total	
		1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
May	% of Trips Trips	8% 289	8% 248	12% 3,341	13% 3,323	6% 117	7% 171	4% 4	6% 13	12% 51	13% 88	11% 3,803	12% 3,842
June	% of Trips Trips	8% 281	8% 258	12% 3,443	12% 3,115	7% 134	8% 190	5% 5	4% 9	14% 62	13% 86	12% 3,925	11% 3,658
July	% of Trips Trips	7% 236	7% 235	9% 2,435	10% 2,550	4% 67	7% 156	5% 4	6% 12	17% 76	8% 57	8% 2,819	9% 3,010
August	% of Trips Trips	7% 251	7% 228	7% 2,007	7% 1,781	10% 193	8% 176	8% 8	7% 15	9% 40	9% 61	7% 2,500	7% 2,261
September	% of Trips Trips	8% 277	9% 292	6% 1,667	8% 2,176	7% 135	9% 197	7% 7	8% 16	10% 45	12% 84	6% 2,131	9% 2,766
October	% of Trips Trips	9% 320	9% 284	7% 1,839	6% 1,651	7% 127	5% 120	22% 21	10% 20	9% 38	10% 67	7% 2,346	7% 2,142
November	% of Trips Trips	11% 375	8% 273	6% 1,785	9% 2,249	6% 120	9% 203	17% 16	12% 24	6% 28	9% 62	7% 2,325	9% 2,810
December	% of Trips Trips	9% 302	9% 297	8% 2,184	9% 2,387	11% 213	11% 257	9% 9	11% 23	5% 24	8% 56	8% 2,732	9% 3,020
January	% of Trips Trips	9% 309	9% 296	6% 1,753	7% 1,761	11% 203	8% 186	10% 10	6% 13	4% 19	6% 44	7% 2,294	7% 2,300
February	% of Trips Trips	7% 241	8% 254	6% 1,776	5% 1,411	9% 179	9% 211	5% 4	7% 16	2% 7	4% 27	7% 2,206	6% 1,919
March	% of Trips Trips	8% 285	10% 330	7% 1,964	6% 1,661	9% 169	9% 207	2% 2	11% 22	2% 8	2% 13	7% 2,429	7% 2,233
April	% of Trips Trips	7% 252	7% 235	12% 3,426	7% 1,874	13% 237	9% 212	5% 5	12% 26	9% 40	5% 37	12% 3,960	7% 2,384
Total	% of Trips Trips	100% 3,418	100% 3,229	100% 27,622	100% 25,938	100% 1,895	100% 2,286	100% 97	100% 208	100% 438	100% 682	100% 33,470	100% 32,343

Table 15 – Number of multispecies call-in/call-out cycles, by permit category, fishing years 1997 and 1998

DAS Used	Data	Individual DAS	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
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DAS Used	Data	Individual DAS	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
0	Number of Permits	1	85	26	6	3	121
	DAS Used	0	0	0	0	0	0
	Impact of Cap	0	0	0	0	0	0
	Possible DAS Increase	25	1,980	650	91	54	2,800
>0 - 5	Number of Permits	4	136	41	2	1	184
	DAS Used	14	292	76	6	4	391
	Impact of Cap	0	0	0	0	0	0
	Possible DAS Increase	86	3,068	949	40	21	4,164
>5 - 10	Number of Permits	8	122	17	1	2	150
	DAS Used	63	926	121	5	13	1,129
	Impact of Cap	0	0	0	0	0	0
	Possible DAS Increase	127	2,020	304	20	37	2,507
>10 - 15	Number of Permits	5	111	6	3	3	128
	DAS Used	62	1,377	69	42	38	1,587
	Impact of Cap	0	0	0	0	0	0
	Possible DAS Increase	50	1,279	81	23	37	1,470
>15 - 20	Number of Permits	14	104	8	1	1	128
	DAS Used	248	1,799	146	16	16	2,226
	Impact of Cap	0	0	0	0	0	0
	Possible DAS Increase	90	742	54	0	9	895
>20 - 25	Number of Permits	9	90	4	1	1	105
	DAS Used	194	2,007	88	20	24	2,333
	Impact of Cap	0	0	0	0	0	0
	Possible DAS Increase	23	238	12	5	0	278
>25 - 30	Number of Permits	17	62		1		80
	DAS Used	471	1,706		26		2,204
	Impact of Cap	46	156		1		204
	Possible DAS Increase	0	0		0		0
>30 - 35	Number of Permits	16	38	3			57
	DAS Used	514	1,242	96			1,853
	Impact of Cap	114	292	21			428
	Possible DAS Increase	0	0	0			0

Table 16 – DAS used and impact of 25 DAS limit on observed fishing effort, May 1997, February through April 1998, all areas

DAS Used	Data	Individual DAS	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
>35 - 40	Number of Permits	15	28	1			44
	DAS Used	558	1,031	39			1,628
	Impact of Cap	183	331	14			528
	Possible DAS Increase	0	0	0			0
>40 - 45	Number of Permits	22	12				34
	DAS Used	934	496				1,430
	Impact of Cap	384	196				580
	Possible DAS Increase	0	0				0
>45 - 50	Number of Permits	16	9				25
	DAS Used	766	426				1,192
	Impact of Cap	366	201				567
	Possible DAS Increase	0	0				0
>50 - 55	Number of Permits	13	8				21
	DAS Used	680	417				1,097
	Impact of Cap	355	217				572
	Possible DAS Increase	0	0				0
>55 - 60	Number of Permits	5	1				6
	DAS Used	283	60				343
	Impact of Cap	158	35				193
	Possible DAS Increase	0	0				0
>60 - 65	Number of Permits	2	1				3
	DAS Used	127	62				189
	Impact of Cap	77	37				114
	Possible DAS Increase	0	0				0
>65 - 70	Number of Permits		2				2
	DAS Used		137				137
	Impact of Cap		87				87
	Possible DAS Increase		0				0
>70 - 75	Number of Permits	1					1
	DAS Used	70					70
	Impact of Cap	45					45
	Possible DAS Increase	0					0

Table 16 (cont.) – DAS used and impact of 25 DAS limit on observed fishing effort, May 1997, February through April 1998, all areas

DAS Used	Data	Individual DAS	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
>75 - 80	Number of Permits	1					1
	DAS Used	75					75
	Impact of Cap	50					50
	Possible DAS Increase	0					0
>80 - 85	Number of Permits	1					1
	DAS Used	81					81
	Impact of Cap	56					56
	Possible DAS Increase	0					0
Total Number of Permits		150	809	106	15	11	1,091
Total DAS Used		5,141	11,979	635	115	96	17,966
Total Impact of Cap		1,835	1,553	35	1	0	3,425
Total Possible DAS Increase		402	9,326	2,050	178	158	12,114

Table 16 (cont.) – DAS used and impact of 25 DAS limit on observed fishing effort, May 1997, February through April 1998, all areas

DAS Used	Data	Individual DAS	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
0	Number of Permits	1	84	26	6	3	120
	Number of Trips	0	0	0	0	0	0
	Impact of Cap	0	0	0	0	0	0
	Possible Trips Increase	25	2,100	650	150	75	3,000
>0 - 5	Number of Permits	50	264	40	9	1	364
	Number of Trips	154	676	102	16	4	951
	Impact of Cap	0	0	0	0	0	0
	Possible Trips Increase	1,096	5,924	898	209	21	8,149
>5 - 10	Number of Permits	77	127	17		2	223
	Number of Trips	561	959	131		17	1,668
	Impact of Cap	0	0	0		0	0
	Possible Trips Increase	1,364	2,216	294		33	3,907
>10 - 15	Number of Permits	12	81	6		2	101
	Number of Trips	137	1,027	79		24	1,268
	Impact of Cap	0	0	0		0	0
	Possible Trips Increase	163	998	71		26	1,257
>15 - 20	Number of Permits	6	51	7		2	66
	Number of Trips	100	912	126		37	1,175
	Impact of Cap	0	0	0		0	0
	Possible Trips Increase	50	363	49		13	475
>20 - 25	Number of Permits	1	57	5		1	64
	Number of Trips	21	1,281	111		24	1,437
	Impact of Cap	0	0	0		0	0
	Possible Trips Increase	4	144	14		1	163
>25 - 30	Number of Permits	2	43	3			48
	Number of Trips	54	1,199	86			1,338
	Impact of Cap	4	124	11			138
	Possible Trips Increase	0	0	0			0

Table 17 – Trips (call-in/call-out cycles) taken, and impact of a 25 trip cap on observed fishing effort, May 1997, February through April, 1998, all areas

DAS Used	Data	Individual DAS	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
>30 - 35	Number of Permits		24	2			26
	Number of Trips		780	67			847
	Impact of Cap		180	17			197
	Possible Trips Increase		0	0			0
>35 - 40	Number of Permits	1	23				24
	Number of Trips	40	869				909
	Impact of Cap	15	294				309
	Possible Trips Increase	0	0				0
>40 - 45	Number of Permits		19				19
	Number of Trips		819				819
	Impact of Cap		344				344
	Possible Trips Increase		0				0
>45 - 50	Number of Permits		14				14
	Number of Trips		680				680
	Impact of Cap		330				330
	Possible Trips Increase		0				0
>50 - 55	Number of Permits		8				8
	Number of Trips		423				423
	Impact of Cap		223				223
	Possible Trips Increase		0				0
>55 - 60	Number of Permits		7				7
	Number of Trips		408				408
	Impact of Cap		233				233
	Possible Trips Increase		0				0
>60 - 65	Number of Permits		3				3
	Number of Trips		190				190
	Impact of Cap		115				115
	Possible Trips Increase		0				0

Table 17(cont.) – Trips (call-in/call-out cycles) taken, and impact of a 25 trip cap on observed fishing effort, May 1997, February through April, 1998, all areas

DAS Used	Data	Individual DAS	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
>65 - 70	Number of Permits		2				2
	Number of Trips		136				136
	Impact of Cap		86				86
	Possible Trips Increase		0				0
>70 - 75	Number of Permits		1				1
	Number of Trips		72				72
	Impact of Cap		47				47
	Possible Trips Increase		0				0
>75 - 80	Number of Permits		1				1
	Number of Trips		77				77
	Impact of Cap		52				52
	Possible Trips Increase		0				0
>80 - 85	Number of Permits						
	Number of Trips						
	Impact of Cap						
	Possible Trips Increase						
Total Number of Permits		150	809	106	15	11	1,091
Total Number of Trips		1,066	10,507	702	16	106	12,398
Total Impact of Cap		18	2,028	28	0	0	2,074
Total Possible Trips Increase		2,702	11,745	1,976	359	169	16,951

Table 17(cont.) – Trips (call-in/call-out cycles) taken, and impact of a 25 trip cap on observed fishing effort, May 1997, February through April, 1998, all areas

Month	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
May-97	558	1,767	27	20	9	2,380
Feb-98	524	925	74			1,524
Mar-98	762	1,248	95		6	2,111
Apr-98	659	2,712	121		15	3,508
Total	2,503	6,652	318	20	29	9,523

Table 18 – DAS used in the Gulf of Maine, May 1997, February through April 1998

Month	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Total
May-97	140	2,125	36	3	12	2,316
Feb-98	153	926	84			1,162
Mar-98	167	1,026	82		5	1,280
Apr-98	149	2,186	102		21	2,458
Total	608	6,263	304	3	38	7,217

Table 19 – Trips (call-in/call-out cycles) used in the Gulf of Maine, May 1997, February through April 1998

DAS Group	Data	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Grand Total
0	Permits		42		3		45
	Four Month DAS Total						
	DAS "Lost" by 25 DAS Limit		0		0		0
	Possible Increase in DAS		1,001		28		1,029
>0 – 5	Permits	3	73	15		1	92
	Four Month DAS Total	11	157	25		4	197
	DAS "Lost" by 25 DAS Limit	0	0	0		0	0
	Possible Increase in DAS	24	1,638	350		21	2,034
>5 – 10	Permits	5	68	7			80
	Four Month DAS Total	40	508	56			604
	DAS "Lost" by 25 DAS Limit	0	0	0			0
	Possible Increase in DAS	47	1,122	119			1,288
>10 – 15	Permits	3	52	3		2	60
	Four Month DAS Total	40	645	33		26	744
	DAS "Lost" by 25 DAS Limit	0	0	0		0	0
	Possible Increase in DAS	23	572	42		24	661
>15 – 20	Permits	12	47	3			62
	Four Month DAS Total	209	810	56			1,076
	DAS "Lost" by 25 DAS Limit	0	0	0			0
	Possible Increase in DAS	67	334	19			420
>20 – 25	Permits	9	46	2	1		58
	Four Month DAS Total	199	1,028	43	20		1,290
	DAS "Lost" by 25 DAS Limit	0	0	0	0		0
	Possible Increase in DAS	22	117	7	5		151

Table 20 – Gulf of Maine DAS used, and impact of 25 DAS limit, May 1997, February through April 1998

DAS Group	Data	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Grand Total
>25 – 30	Permits	9	39				48
	Four Month DAS Total	252	1,069				1,321
	DAS "Lost" by 25 DAS Limit	27	94				121
	Possible Increase in DAS	0	0				0
>30 - 35	Permits	8	23	2			33
	Four Month DAS Total	260	755	66			1,081
	DAS "Lost" by 25 DAS Limit	60	180	16			256
	Possible Increase in DAS	0	0	0			0
>35 – 40	Permits	8	17	1			26
	Four Month DAS Total	297	628	39			963
	DAS "Lost" by 25 DAS Limit	97	203	14			313
	Possible Increase in DAS	0	0	0			0
>40 – 45	Permits	7	9				16
	Four Month DAS Total	293	374				666
	DAS "Lost" by 25 DAS Limit	118	149				266
	Possible Increase in DAS	0	0				0
>45 – 50	Permits	7	7				14
	Four Month DAS Total	328	330				658
	DAS "Lost" by 25 DAS Limit	153	155				308
	Possible Increase in DAS	0	0				0
>50 – 55	Permits	5	3				8
	Four Month DAS Total	262	157				419
	DAS "Lost" by 25 DAS Limit	137	82				219
	Possible Increase in DAS	0	0				0
>55 – 60	Permits	2	1				3
	Four Month DAS Total	115	60				175
	DAS "Lost" by 25 DAS Limit	65	35				100
	Possible Increase in DAS	0	0				0

Table 20(cont.) – Gulf of Maine DAS used, and impact of 25 DAS limit, May 1997, February through April 1998

DAS Group	Data	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Grand Total
>60 – 65	Permits	2	1				3
	Four Month DAS Total	127	62				189
	DAS "Lost" by 25 DAS Limit	77	37				114
	Possible Increase in DAS	0	0				0
>65 – 70	Permits		1				1
	Four Month DAS Total		70				70
	DAS "Lost" by 25 DAS Limit		45				45
	Possible Increase in DAS		0				0
>70 – 75	Permits	1					1
	Four Month DAS Total	70					70
	DAS "Lost" by 25 DAS Limit	45					45
	Possible Increase in DAS	0					0
Total Permits		81	429	33	4	3	550
Total Four Month DAS Total		2,503	6,652	318	20	29	9,523
Total DAS "Lost" by 25 DAS Limit		778	978	30	0	0	1,786
Total Possible Increase in DAS		184	4,785	537	33	46	5,583

Table 20(cont.) – Gulf of Maine DAS used, and impact of 25 DAS limit, May 1997, February through April 1998

DAS Group	Data	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Grand Total
0	Permits		42		3		45
	Trips (4 month period)		0		0		0
	Trips "Lost" by Limit		0		0		0
	Possible Increase in Trips		1,050		75		1,125
>0 – 5	Permits	3	73	15		1	92
	Trips (4 month period)	2	186	45		4	238
	Trips "Lost" by Limit	0	0	0		0	0
	Possible Increase in Trips	73	1,639	330		21	2,062
>5 – 10	Permits	5	68	7			80
	Trips (4 month period)	23	635	46			704
	Trips "Lost" by Limit	0	0	0			0
	Possible Increase in Trips	102	1,065	129			1,296
>10 – 15	Permits	3	52	3		2	60
	Trips (4 month period)	12	682	31		34	759
	Trips "Lost" by Limit	0	12	0		0	12
	Possible Increase in Trips	63	630	44		16	753
>15 – 20	Permits	12	47	3			62
	Trips (4 month period)	50	848	79			977
	Trips "Lost" by Limit	0	107	7			114
	Possible Increase in Trips	250	434	3			687
>20 – 25	Permits	9	46	2	1		58
	Trips (4 month period)	30	1,017	29	3		1,079
	Trips "Lost" by Limit	0	240	0	0		240
	Possible Increase in Trips	195	373	21	22		611

Table 21 – Gulf of Maine call-in/call out cycles (trips), and impact of 25 trip limit, May 1997, February through April 1998

DAS Group	Data	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Grand Total
>25 – 30	Permits	9	39				48
	Trips (4 month period)	57	1,317				1,374
	Trips "Lost" by Limit	0	548				548
	Possible Increase in Trips	168	206				374
>30 – 35	Permits	8	23	2			33
	Trips (4 month period)	94	661	45			800
	Trips "Lost" by Limit	4	258	7			269
	Possible Increase in Trips	109	172	12			293
>35 - 40	Permits	8	17	1			26
	Trips (4 month period)	69	391	29			490
	Trips "Lost" by Limit	0	159	4			163
	Possible Increase in Trips	131	193	0			324
>40 – 45	Permits	7	9				16
	Trips (4 month period)	67	255				321
	Trips "Lost" by Limit	0	88				88
	Possible Increase in Trips	108	58				167
>45 – 50	Permits	7	7				14
	Trips (4 month period)	115	168				283
	Trips "Lost" by Limit	15	42				57
	Possible Increase in Trips	74	49				123
>50 – 55	Permits	5	3				8
	Trips (4 month period)	45	33				78
	Trips "Lost" by Limit	0	3				3
	Possible Increase in Trips	80	45				125

Table 21(cont.) – Gulf of Maine call-in/call out cycles (trips), and impact of 25 trip limit, May 1997, February through April 1998

DAS Group	Data	Individual	Fleet DAS	Hook Gear	Combination	Large Mesh Fleet DAS	Grand Total
>55 – 60	Permits	2	1				3
	Trips (4 month period)	19	7				25
	Trips "Lost" by Limit	0	0				0
	Possible Increase in Trips	31	18				50
>60 – 65	Permits	2	1				3
	Trips (4 month period)	19	59				78
	Trips "Lost" by Limit	0	34				34
	Possible Increase in Trips	31	0				31
>65 - 70	Permits		1				1
	Trips (4 month period)		5				5
	Trips "Lost" by Limit		0				0
	Possible Increase in Trips		20				20
>70 - 75	Permits	1					1
	Trips (4 month period)	4					4
	Trips "Lost" by Limit	0					0
	Possible Increase in Trips	21					21
Total Permits		81	429	33	4	3	550
Total Trips (4 month period)		608	6,263	304	3	38	7,217
Total Trips "Lost" by Limit		18	1,491	18	0	0	1,528
Total Possible Increase in Trips		1,435	5,953	539	97	37	8,061

Table 21(cont.) – Gulf of Maine call-in/call out cycles (trips), and impact of 25 trip limit, May 1997, February through April 1998

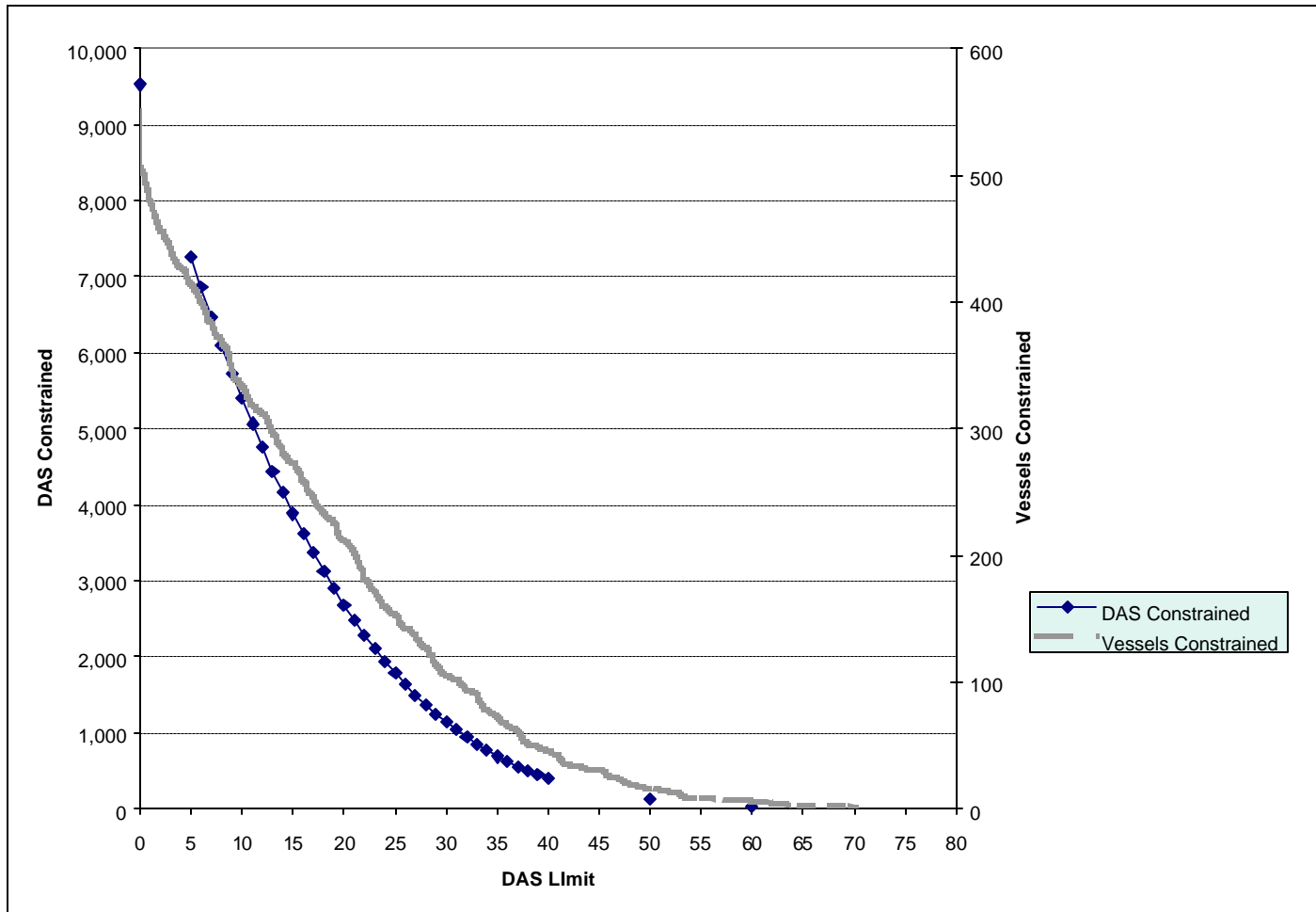


Figure 7 – Impact of various DAS limits on DAS used,, May 1997, February through April 1998

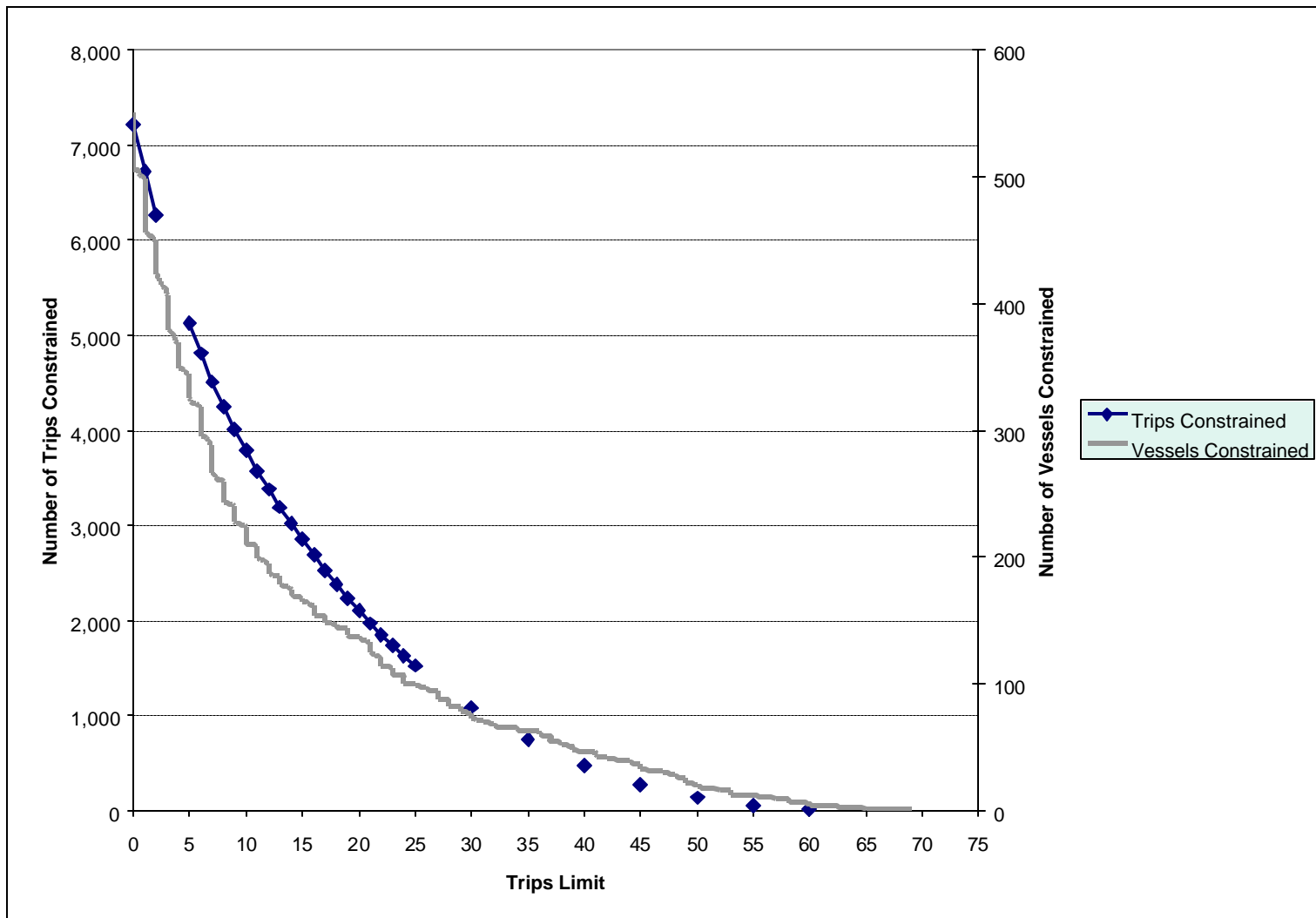


Figure 8 – Impact of various limits on the number of groundfish trips based on observed fishing effort, May 1997, February through April 1998

Month	NMFS Statistics Office	DAS/Trip Limit Analysis	Difference
May-97	1,303,155	1,139,196	163,959
Feb-98	762,000	579,429	182,571
Mar-98	963,000	764,666	198,334
Apr-98	1,236,000	1,040,474	195,526
Total	4,264,155	3,523,765	740,390

Table 22 – Comparison of Gulf of Maine cod landings (pounds) as reported by NMFS Northeast Region and as used in DAS/trip limit analysis in this section

DAS Used	Individual	Fleet	Hook Gear	Combination	Large Mesh Fleet DAS	Total
0	0%	0%	0%	0%	0%	0%
>0 – 5	0%	1%	0%	0%	0%	1%
>5 – 10	1%	3%	0%	0%	0%	4%
>10 – 15	1%	5%	0%	0%	0%	6%
>15 – 20	2%	8%	1%	0%	0%	10%
>20 – 25	2%	8%	0%	0%	0%	11%
>25 – 30	5%	13%	0%	0%	0%	19%
>30 – 35	3%	11%	0%	0%	0%	14%
>35 – 40	4%	5%	1%	0%	0%	10%
>40 – 45	3%	4%	0%	0%	0%	7%
>45 – 50	3%	3%	0%	0%	0%	6%
>50 – 55	4%	2%	0%	0%	0%	6%
>55 – 60	1%	1%	0%	0%	0%	2%
>60 – 65	1%	2%	0%	0%	0%	3%
>65 – 70	0%	1%	0%	0%	0%	1%
>70 - 75	0%	0%	0%	0%	0%	0%
Total	31%	66%	3%	0%	0%	100%

Table 23 – Percentage of analyzed cod landings, May 1997, February through April 1998, by permit category and DAS used

Trips Taken	Individual	Fleet	Hook Gear	Combination	Large Mesh Fleet DAS	Total
0	0%	0%	0%	0%	0%	0%
>0 – 5	12%	10%	0%	0%	0%	23%
>5 – 10	11%	9%	0%	0%	0%	20%
>10 – 15	5%	5%	0%	0%	0%	9%
>15 – 20	1%	4%	0%	0%	0%	5%
>20 – 25	0%	7%	0%	0%	0%	7%
>25 – 30	1%	6%	1%	0%	0%	8%
>30 – 35	0%	2%	0%	0%	0%	2%
>35 – 40	1%	5%	0%	0%	0%	6%
>40 – 45	0%	5%	0%	0%	0%	5%
>45 – 50	0%	5%	0%	0%	0%	5%
>50 – 55	0%	3%	0%	0%	0%	3%
>55 – 60	0%	5%	0%	0%	0%	5%
>60 – 65	0%	1%	0%	0%	0%	1%
>65 - 70	0%	1%	0%	0%	0%	1%

Total	31%	66%	3%	0%	0%	100%
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Table 24 – Percentage of analyzed cod landings, May 1997, February through April 1998, by permit category and number of trips (call-in/call-out cycles) taken

DAS Limit	Individual	Fleet	Hook Gear	Combina- tion	Large Mesh Fleet	Total
40	2%	2%	0%	0%	0%	5%
35	4%	4%	0%	0%	0%	8%
33	5%	5%	0%	0%	0%	9%
30	6%	6%	0%	0%	0%	13%
28	7%	8%	0%	0%	0%	15%
25	9%	11%	0%	0%	0%	20%
23	10%	14%	0%	0%	0%	24%
20	12%	18%	0%	0%	0%	31%
15	16%	27%	1%	0%	0%	44%
10	21%	38%	1%	0%	0%	60%
5	25%	51%	2%	0%	0%	79%

Table 25 – Percentage of analyzed cod landings "saved" by various DAS limits (based on observed landings, May 1997, February through April 1998)

Limit on Trips	Individual	Fleet	Hook Gear	Combina- tion	Large Mesh Fleet DAS	Total
35	0%	6%	0%	0%	0%	6%
30	0%	9%	0%	0%	0%	9%
25	0%	12%	0%	0%	0%	13%
20	1%	17%	1%	0%	0%	18%
15	1%	22%	1%	0%	0%	25%
10	2%	30%	1%	0%	0%	34%
5	9%	41%	2%	0%	0%	52%
3	14%	48%	2%	0%	0%	65%
0	31%	66%	3%	0%	0%	100%

Table 26 – Percentage of analyzed cod landings saved by various limits on number of trips (based on observed landings May 1997, February through April 1998)

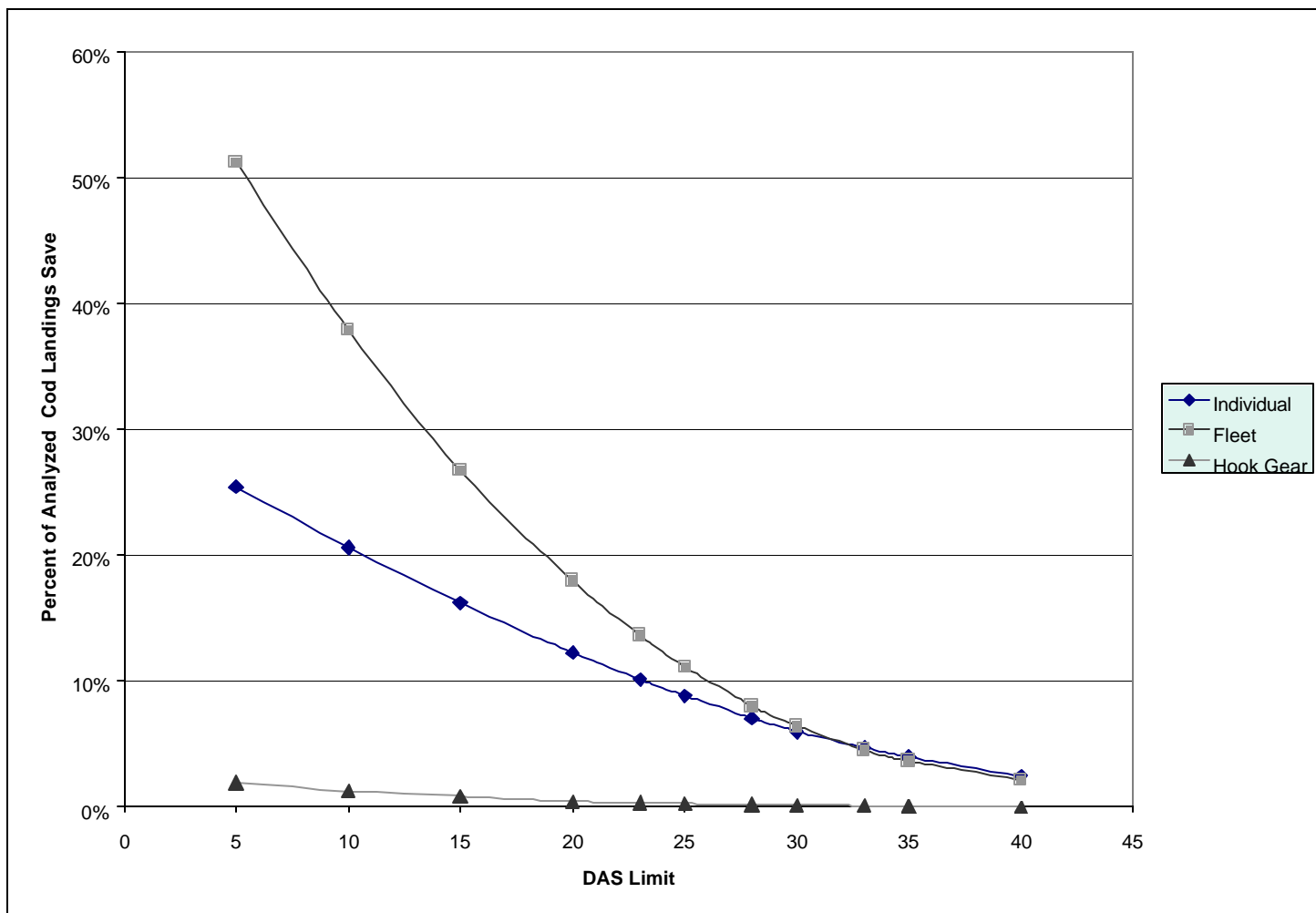


Figure 9 – Percentage of analyzed cod landings constrained by various DAS limits, based on observed landings, May 1997, February through April 1998

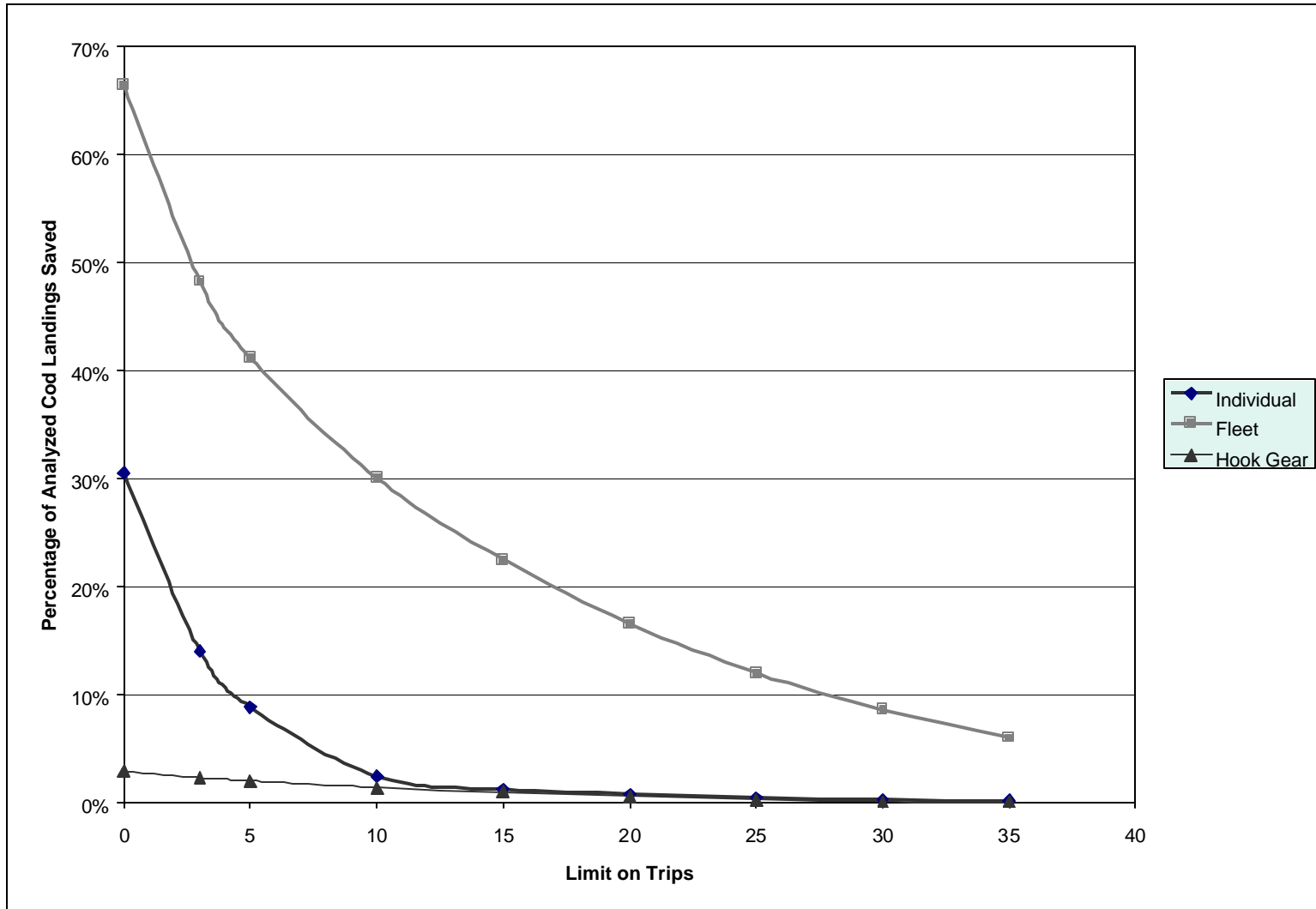


Figure 10 – Percentage of analyzed cod landings constrained by various limits on number of trips (call-in/call-out cycles), based on observed landings, May 1997, February through April 1998

DAS Limit	Individual	Fleet	Hook Gear	Combination	Large Mesh Fleet	Total
40	9%	3%	0%	0%	0%	4%
35	15%	5%	1%	0%	0%	7%
30	22%	9%	5%	0%	0%	12%
25	31%	15%	9%	0%	0%	19%
20	42%	24%	15%	2%	0%	28%
15	54%	37%	27%	26%	0%	41%
10	69%	53%	40%	51%	20%	57%
5	84%	74%	64%	75%	54%	76%

Table 27 – Percent of DAS used by each permit category constrained by a given DAS limit, based on observed effort, May 1997, February through April 1998

Trip Limit	Individual	Fleet	Hook Gear	Combination	Large Mesh Fleet	Total
40	0%	8%	0%	0%	0%	7%
35	1%	12%	0%	0%	0%	10%
30	2%	17%	1%	0%	0%	15%
25	3%	24%	6%	0%	0%	21%
20	6%	32%	14%	0%	0%	29%
15	10%	43%	25%	0%	13%	39%
10	19%	57%	38%	0%	37%	52%
5	46%	74%	59%	0%	63%	71%

Table 28 – Percent of trips (call-in/call-out cycles) taken by each permit category constrained by a given limit on number of trips, based on observed effort, May 1997, February through April 1998

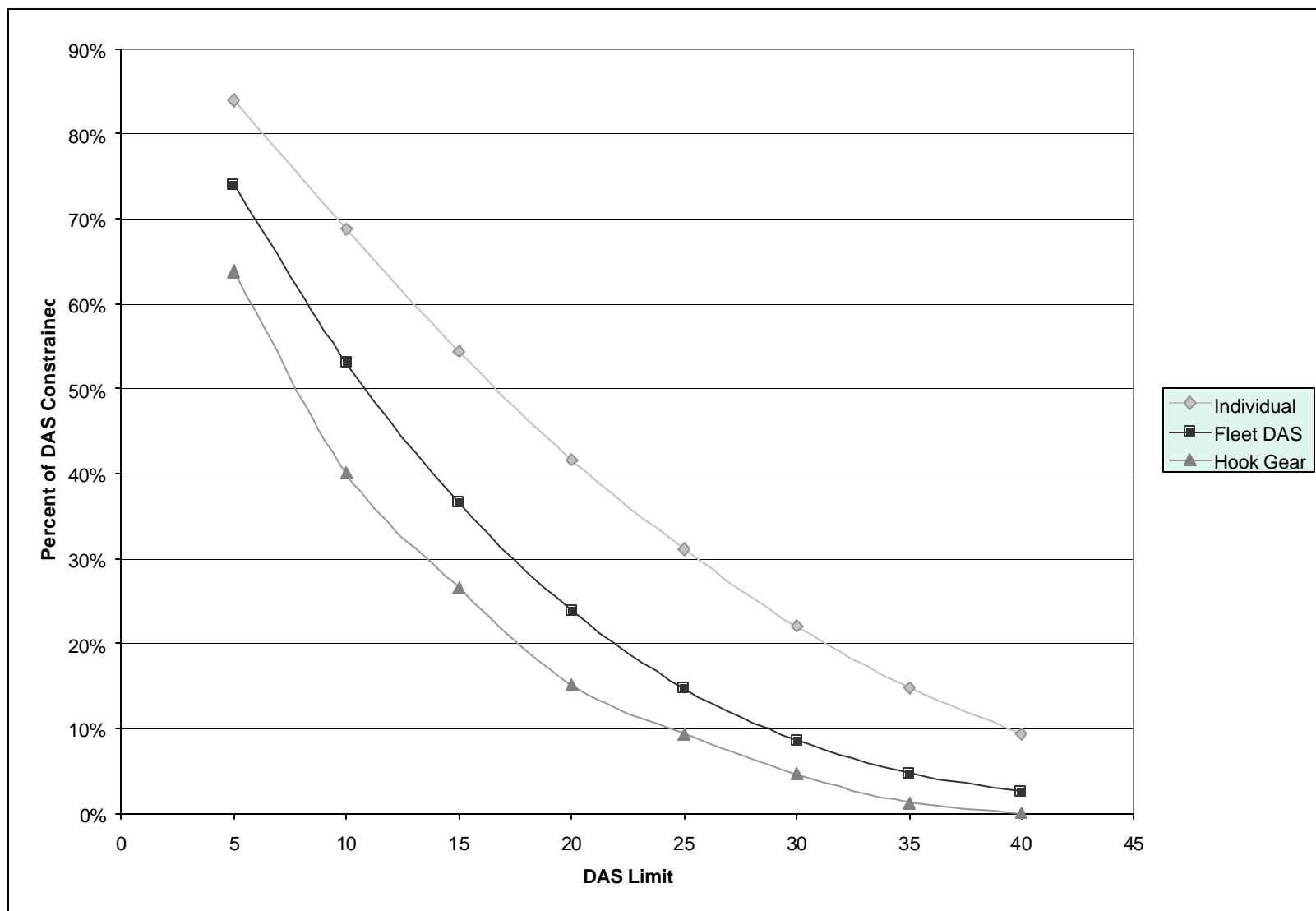


Figure 11 – Percent of DAS used in the Gulf of Maine during May 1997, February through April 1998, that would have been constrained by a given limit on DAS, by permit category

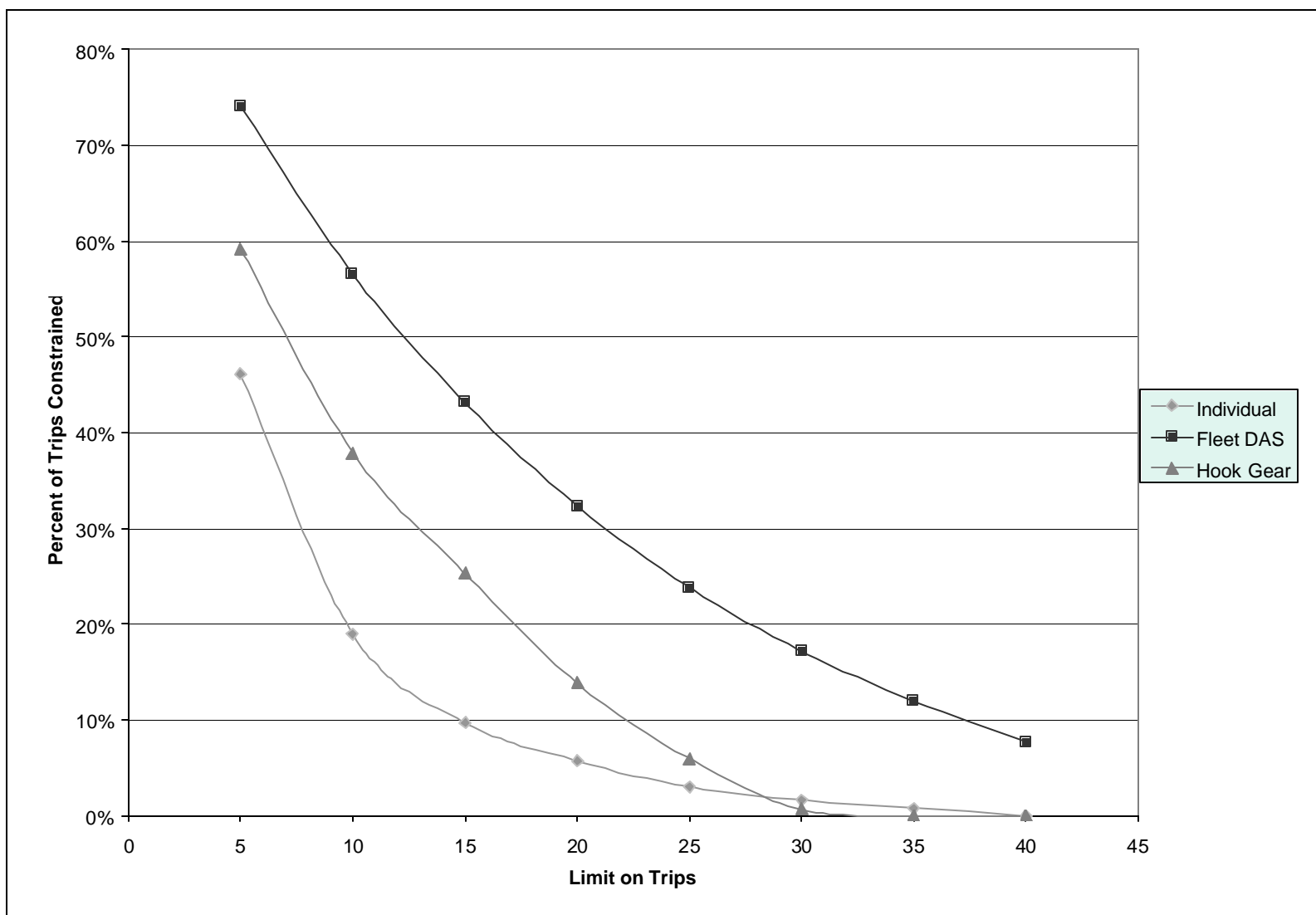


Figure 12 - Percent of trips (call-in/call-out cycles) in the Gulf of Maine during May 1997, February through April 1998, that would have been constrained by a given limit on number of trips, by permit category

The following tables show the monthly DAS usage by gear sector and vessel size class (Table 29) and the percentage of DAS used by gear sector and vessel size class (Table 30) in the 1998-1999 fishing year (all multispecies vessels). Table 30 results are also shown graphically in Figure 13 - Figure 16. These figures indicate that different gear sectors have noticeably different DAS usage patterns, with otter trawls vessels using a greater percentage of DAS in the spring, gillnet vessels in the summer, and hook vessels in the winter. Effort usage patterns in 1999 are likely to be significantly different as vessels in the Gulf of Maine and Georges Bank anticipated or responded to changes in the management plan under Frameworks 27 and 30.

GEAR SECTOR & VESSEL CLASS (GRT)		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	TOTAL	
														DAS Usage	Vessels
Otter Trawl	< 5	93	69	34	14	12	21	39	28	9	5	18	15	358	8
	5 - 25	756	586	388	233	202	170	293	253	227	115	285	587	4,094	121
	26 - 50	876	843	664	477	477	428	526	584	514	390	511	813	7,102	148
	51 - 75	507	471	377	293	336	294	391	417	372	350	386	439	4,635	72
	76 - 100	358	321	372	364	346	352	303	421	290	281	367	501	4,276	65
	101 - 150	1,155	1,127	1,023	936	1,120	875	635	800	637	562	1,029	1,115	11,012	124
	150+	534	500	470	472	663	540	397	466	459	370	628	549	6,048	62
	SUM	4,280	3,916	3,327	2,790	3,156	2,680	2,583	2,969	2,508	2,073	3,224	4,019	37,525	600
Gillnet	< 5	14	11	11	11	10	8	8	7	2	0	0	0	81	2
	5 - 25	418	666	613	448	566	460	397	309	255	126	178	308	4,744	94
	26 - 50	298	321	240	172	239	206	228	217	231	97	106	291	2,646	43
	51 - 75	16	40	49	47	58	66	42	51	46	39	44	56	553	6
	SUM	746	1,039	912	677	872	739	676	584	534	261	328	655	8,024	145
Hook	< 5	2	0	0	1	0	0	2	4	9	7	3	3	31	2
	5 - 25	40	85	104	127	140	70	64	186	232	153	172	180	1,553	38
	26 - 50	36	61	65	74	54	24	34	54	60	38	61	68	629	8
	51 - 75	14	17	18	0	0	0	2	7	0	9	9	17	93	2
	76 - 100	0	0	0	0	0	0	0	0	8	13	2	10	34	2
	101 - 150	0	11	16	12	3	0	0	0	8	11	13	0	75	1
	SUM	92	175	202	214	198	93	102	252	317	231	260	279	2,414	53
Other Gear	< 5	50	47	35	63	49	26	37	49	19	18	34	35	463	35
	5 - 25	358	335	218	161	155	86	186	368	441	281	309	441	3,340	173
	26 - 50	39	37	45	18	33	3	7	39	35	38	67	109	469	23
	51 - 75	29	4	3	1	0	0	0	27	17	43	53	46	224	4
	76 - 100	6	9	1	0	1	0	6	6	48	38	49	58	222	5
	101 - 150	34	26	13	17	27	8	5	21	8	15	22	55	250	5
	150+	51	17	33	40	70	63	54	95	93	70	95	86	766	12
	SUM	568	474	348	300	334	186	295	605	662	503	628	830	5,734	257
All Gears	< 5	159	127	79	89	71	55	86	87	39	30	56	54	933	47
	5 - 25	1,573	1,672	1,323	970	1,063	786	939	1,116	1,156	675	943	1,517	13,732	426
	26 - 50	1,248	1,262	1,014	740	803	661	796	895	841	562	745	1,280	10,847	222
	51 - 75	566	533	446	342	394	360	435	503	434	441	492	558	5,504	84
	76 - 100	364	330	373	364	346	352	309	427	346	333	419	569	4,532	72
	101 - 150	1,189	1,163	1,052	964	1,149	883	640	821	653	588	1,063	1,169	11,336	130
	150+	586	517	502	512	733	603	451	561	552	440	723	635	6,814	74
	SUM	5,685	5,604	4,790	3,981	4,560	3,699	3,655	4,410	4,022	3,069	4,440	5,782	53,697	1,055
Unknown Gear	28	22	32	12	27	11	36	67	9	27	13	36	319	30	
Sources:	Enforcement DAS Call-in Database, Vessel Trip Report Database & Permit Database														

1. Limited Access Vessels with Multispecies DAS allocations that did not call in their trips to the call-in database during the 98/99 FY														
(a total of 572 vessels) have been excluded from this data.														
2. Trips in the "unknown" category have data in the DAS database but not the Vessel or Permit databases. Reasons unkwn.														

Table 29 Monthly DAS Utilization by gear sector and vessel size class, May 1998 – April 1999

GEAR SECTOR & VESSEL CLASS		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	TOTAL DAS Usage
Otter Trawl	< 5	26	19	9	4	3	6	11	8	3	1	5	4	100
	5 - 25	18	14	9	6	5	4	7	6	6	3	7	14	100
	26 - 50	12	12	9	7	7	6	7	8	7	5	7	11	100
	51 - 75	11	10	8	6	7	6	8	9	8	8	8	9	100
	76 - 100	8	8	9	9	8	8	7	10	7	7	9	12	100
	101 - 150	10	10	9	9	10	8	6	7	6	5	9	10	100
	150+	9	8	8	8	11	9	7	8	8	6	10	9	100
	SUM	11	10	9	7	8	7	7	7	8	7	6	9	11
Gillnet	< 5	17	14	13	13	12	10	10	8	2	0	0	0	100
	5 - 25	9	14	13	9	12	10	8	7	5	3	4	6	100
	26 - 50	11	12	9	6	9	8	9	8	9	4	4	11	100
	51 - 75	3	7	9	8	10	12	8	9	8	7	8	10	100
	SUM	9	14	11	8	11	9	8	7	7	3	4	8	100
Hook	< 5	5	0	0	4	0	0	7	13	28	23	10	10	100
	5 - 25	3	5	7	8	9	4	4	12	15	10	11	12	100
	26 - 50	6	10	10	12	9	4	5	9	10	6	10	11	100
	51 - 75	15	19	19	0	0	0	2	7	0	10	9	19	100
	76 - 100	0	0	0	0	0	0	0	0	23	40	7	30	100
	101 - 150	0	15	22	16	4	0	0	0	11	15	17	0	100
	SUM	4	7	8	9	8	4	4	10	13	10	11	12	100
Other Gear	< 5	11	10	7	14	11	6	8	10	4	4	7	8	100
	5 - 25	11	10	7	5	5	3	6	11	13	8	9	13	100
	26 - 50	8	8	10	4	7	1	2	8	7	8	14	23	100
	51 - 75	13	2	1	1	0	0	0	12	8	19	24	21	100
	76 - 100	3	4	1	0	0	0	3	3	22	17	22	26	100
	101 - 150	14	10	5	7	11	3	2	8	3	6	9	22	100
	150+	7	2	4	5	9	8	7	12	12	9	12	11	100
	SUM	10	8	6	5	6	3	5	11	12	9	11	15	100
All Gears	< 5	17	14	9	10	8	6	9	9	4	3	6	6	100
	5 - 25	11	12	10	7	8	6	7	8	8	5	7	11	100
	26 - 50	12	12	9	7	7	6	7	8	8	5	7	12	100
	51 - 75	10	10	8	6	7	7	8	9	8	8	9	10	100
	76 - 100	8	7	8	8	8	8	7	9	8	7	9	13	100
	101 - 150	10	10	9	9	10	8	6	7	6	5	9	10	100

	150+	9	8	7	8	11	9	7	8	8	6	11	9	100
	SUM	11	10	9	7	9	7	7	8	8	6	8	11	100
Unknown Gear		9	7	10	4	8	3	11	21	3	8	4	11	100
Sources:	Enforcement DAS Call-in Database, Vessel Trip Report Database & Permit Database													
1.	Limited Access Vessels with Multispecies DAS allocations that did not call in their trips to the call-in database during the 98/99 FY													
	(a total of 572 vessels) have been excluded from this data.													
2.	Trips in the "unknown" category have data in the DAS database but not the Vessel or Permit databases. Reasons unknown.													

Table 30 Percent of monthly DAS utilization by gear sector and vessel class, May 1998-April, 1999

PERCENT DAS UTILIZATION FOR OTTER TRAWL VESSELS: FY 1998-1999

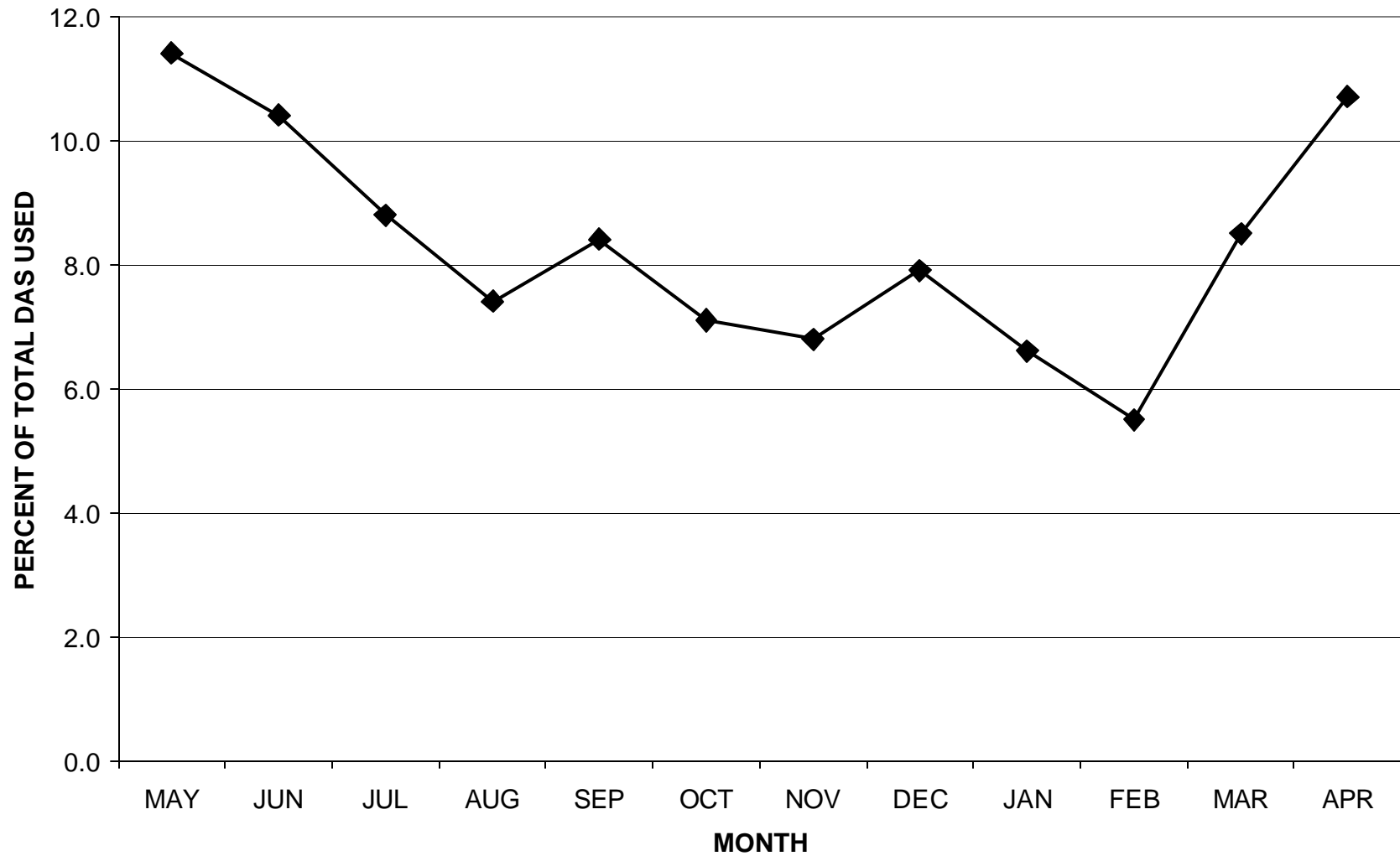


Figure 13 Percent DAS utilization by month by otter trawl vessels, May 1998-April 1999

PERCENT DAS UTILIZATION FOR GILLNET VESSELS: FY 1998-1999

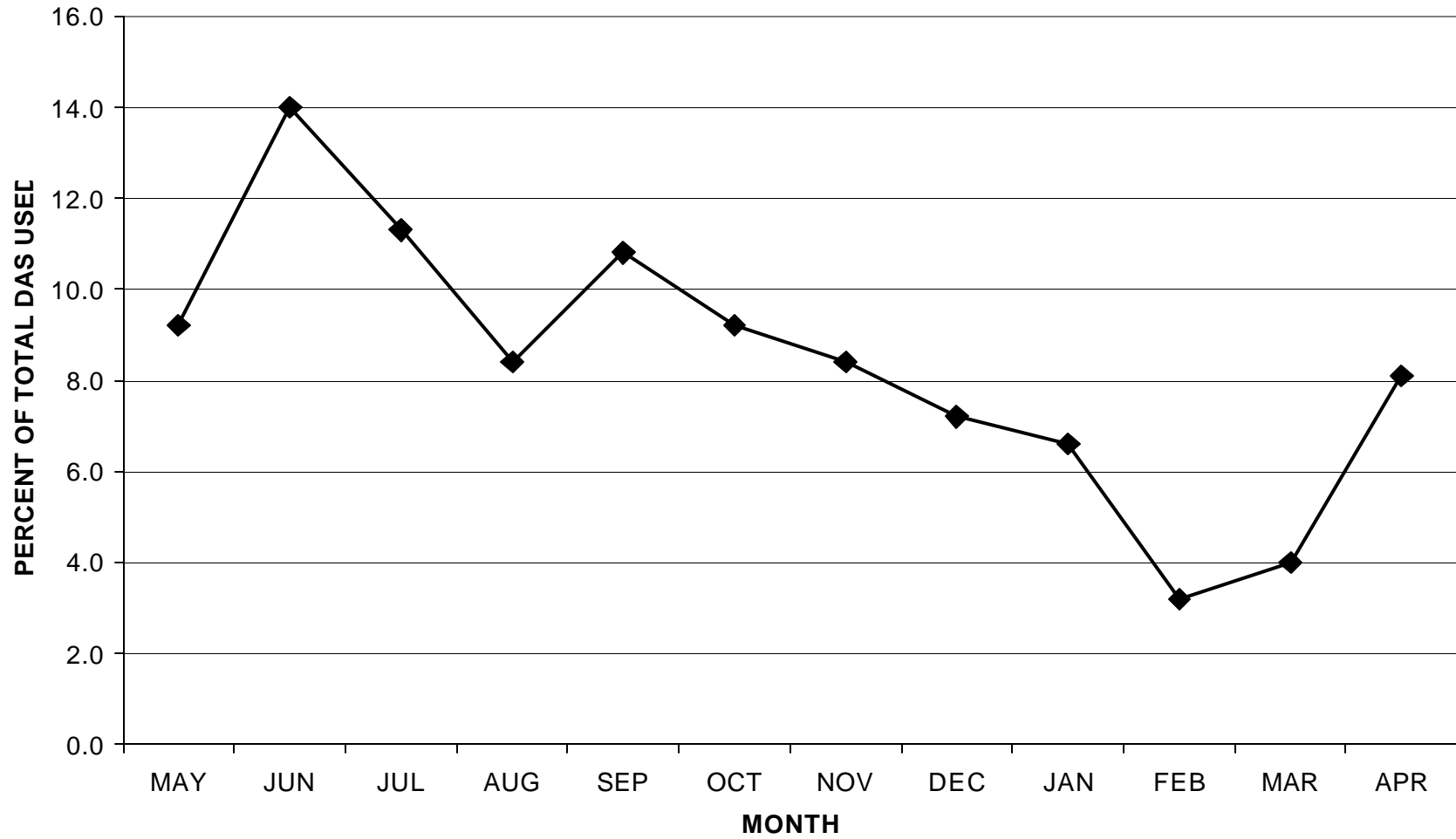


Figure 14 Percent DAS utilization by month by gillnet vessels, May 1998-April 1999

PERCENT DAS UTILIZATION FOR HOOK VESSELS: FY 1998-1999

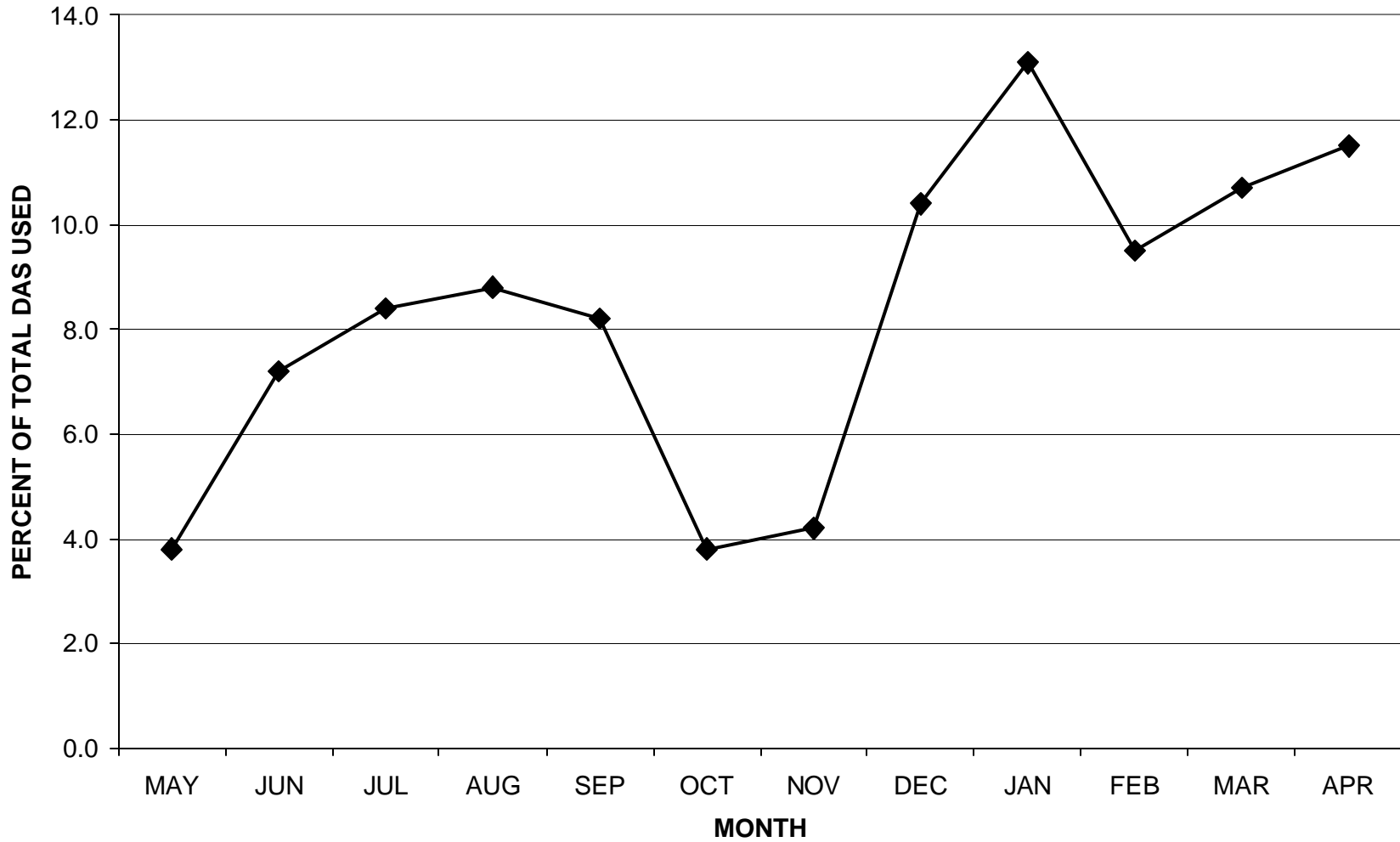


Figure 15 Percent DAS utilization by month by hook vessels, May 1998-April 1999

PERCENT DAS UTILIZATION FOR OTHER GEAR SECTORS: FY 1998-1999

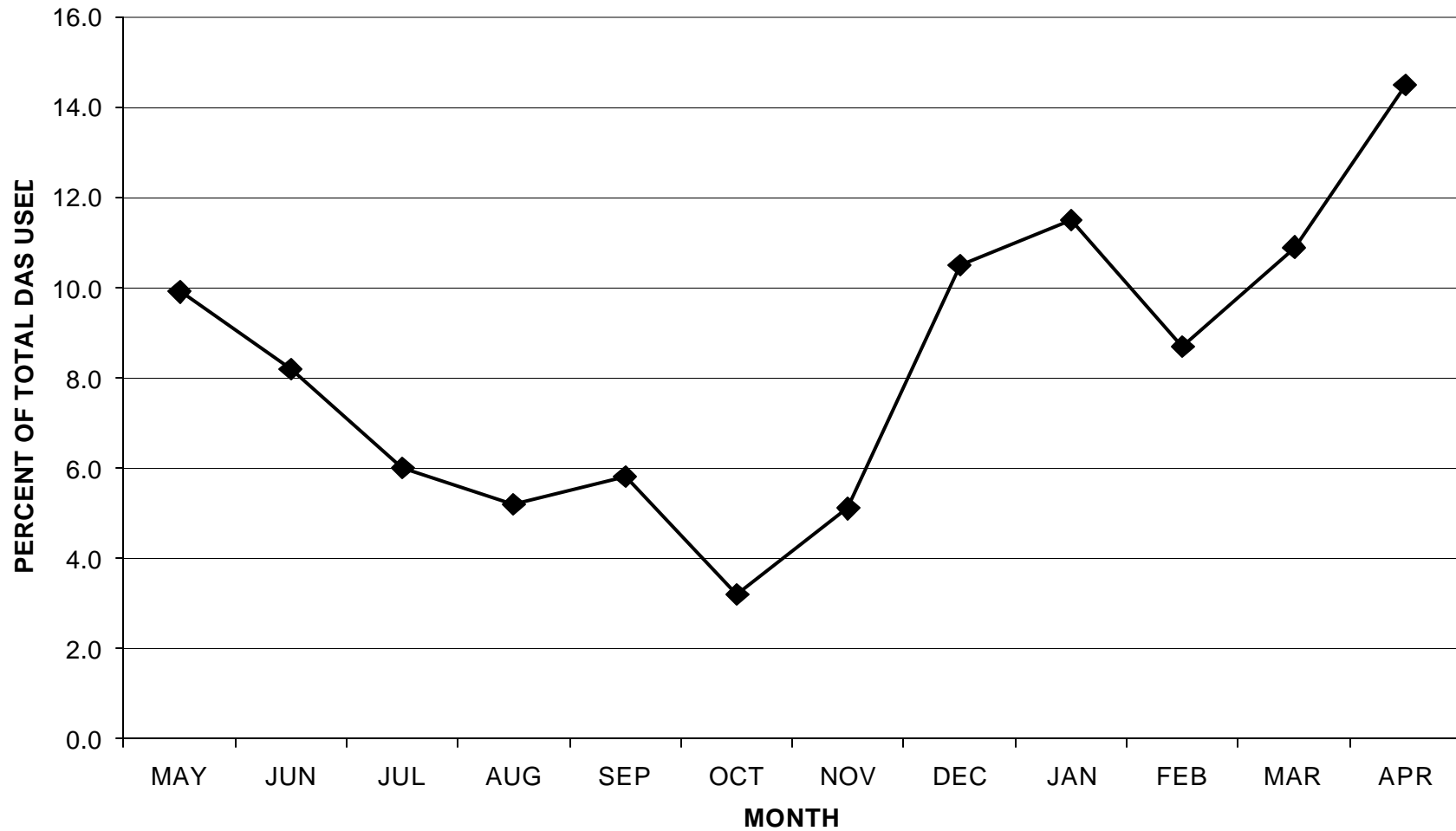


Figure 16 Percent DAS utilization by month by other gear vessels, May 1998-April 1999

4.1.1.4 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. Analysis of the impact of area closures in Framework 27 on American plaice and white hake, using the 2-bin effort displacement model, indicated that landings would increase 2.65 and 5.01 percent, respectively, while cod landings would be reduced by 23.65 percent. The increase in plaice and hake landings was partially attributed to the concentration of seasonal closures in the spring months, when fishermen are targeting cod compared to summer and fall, when more of the effort was historically directed at plaice and white hake. This analysis has not been updated or expanded to reflect the impact of the additional closures proposed in this framework, any observed shifts in effort, and the implementation of the 6.5-inch square mesh, all of which could affect the outcome of the analysis. Option 2 is designed to increase the opportunity for fishermen to target other species, including other regulated species by reducing the size of the areas closed. Increased fishing effort on the other stocks, many of which require significant rebuilding programs to achieve SFA-mandated levels, will delay rebuilding of those stocks, and potentially increase the severity of measures needed to achieve rebuilding.

The Council will consider the status of the other regulated species in more detail in the annual adjustment framework and in Amendment 13, where it will implement stock-specific rebuilding programs.

4.1.2 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 small-mesh otter trawl fishery that also catches herring, discussed in the previous section, is not conducted under the exempted gear provision, but under a defined exempted fishery based on low observed regulated species bycatch rates. In 1997, ten vessels reported landing a total of 230 metric tons of herring in this fishery. Since the GOM herring fishery lands 70,000 – 80,000 metric tons per year, any impact of proposed regulations on the inshore bottom trawl fishery would have negligible biological impact.

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.

In the case of monkfish, one of the major ways, especially in the Gulf of Maine, that the Monkfish FMP is anticipated to achieve the required mortality reduction is that it relies on the choice of using up to 40 multispecies days-at-sea to target monkfish. According to the Monkfish FMP, there are about 600 multispecies vessels with days-at-sea allocations that could use up to 40 multispecies days-at-sea to target monkfish. The success of the plan depends on how many of these vessels will not target monkfish for the entire 40 days, because they need those days to target groundfish. The measures contained in Framework 27 and in this action, however, jeopardize the desired mortality reduction for monkfish because they make targeting groundfish on a day-at-sea more uneconomic, relative to the revenue that could be generated by targeting monkfish.

Since the more active monkfish vessels that also have multispecies permits now target monkfish when they are not on a multispecies days-at-sea, the Monkfish FMP would force them to choose between targeting monkfish or groundfish on a multispecies day-at-sea. This choice that vessels would have to make is intended to be a major contributor to monkfish mortality reduction, primarily in the Gulf of Maine. In Southern New England and the Mid-Atlantic, there are other measures (larger size limits, fewer nets, more vessels without multispecies days-at-sea permits) that will produce the monkfish mortality reductions.

Monkfish frequently spawn in June and early July in the Gulf of Maine, outside of the time frame of measures in this framework. When monkfish spawn, they often migrate to shallow banks where their movement and location makes them vulnerable to gillnet fishing gear. Prime spawning areas include Fippennies and Cashes Ledges, within blocks 129 and 130, which are closed in April and May (entire

blocks) and July (Cashes Ledge and Fippennies Ledge only). At other times of the year, monkfish tend to inhabit the deeper water in the Gulf of Maine and co-occur in the catch with flatfish, white hake, and cusk. These species are targeted by groundfish trawlers when they are not targeting cod and haddock.

4.1.3 Impacts on marine mammals and protected species

The following analysis is based on the discussion contained in Framework 27.

Background

A number of endangered and other protected species inhabit the area affected by the action proposed in Framework Adjustment 31. See Volume I, FSEIS 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, FSEIS 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.

Relative to the Multispecies Plan, the fishery of greatest concern with respect to threatened and endangered species, as well as other marine mammals, is the multispecies sink gillnet fishery, which comprises the majority of gillnet activity in the Northeast. A detailed description of the fishery and gear is provided in Amendments 5 and 7 to the FMP.

As part of the Multispecies Plan management unit, the impacts of the gillnet fishery were considered in formal consultations pursuant to Section 7 of the Endangered Species Act (ESA) for Amendment 5 in 1993 and Amendment 7 in 1996. Both Biological Opinions concluded that existing fishing activities and related management measures proposed under these amendments may affect, but were not likely to jeopardize, the continued existence of any endangered or threatened species under NMFS jurisdiction. The measures contained in Framework 31 fall within the scope of consultations on previous actions taken under the Multispecies FMP. None of the measures is expected to result in the addition of adverse impacts that would change the basis for determinations in those consultations.

Recent Protected Species Management Actions Affecting the Multispecies FMP

Following an unprecedented number of northern right whale deaths in 1996, consultation was reinitiated for the Multispecies FMP. At that time NMFS determined that the continued operation of fishing under the FMP was likely to jeopardize the continued existence of the right whale. To remove the threat of jeopardy, the Council adopted the reasonable and prudent alternative provided by NMFS in the December 13, 1996 Biological Opinion. The action was implemented as Framework 23 to the Northeast Multispecies FMP and closed right whale critical habitat in Cape Cod Bay and the Great South Channel to sink gillnet gear during times of peak whale abundance.

In July, 1997, NMFS published the interim rule for the Atlantic Large Whale Take Reduction Plan (ALWTRP), a program to reduce takes of right, humpback fin and minke whales in four east coast

fisheries, including the multispecies sink gillnet fishery. Accordingly, consultation was reinitiated again in 1997 to consider the ALWTRP and the operation of the sink gillnet fishery, among others. With the conclusion that the fishery may affect but would not jeopardize the continued existence of any listed species of whale or turtle under NMFS jurisdiction, the ALWTRP was substituted as an expanded reasonable and prudent alternative.

On February 16, 1999, NMFS published the Final Rule implementing the ALWTRP (64 FR 7529, February 16, 1999). The consultation that was conducted on the interim final rule concluded that the operation of fisheries under the elements of this plan, including the multispecies sink gillnet fishery, may affect but will not jeopardize the continued existence of any listed species under NMFS jurisdiction.

Although NMFS has made a final determination that listing the Gulf of Maine/Bay of Fundy population of harbor porpoise as threatened under the Endangered Species Act is not warranted at this time, concerns remain because of the high level of bycatch in the multispecies (and monkfish) sink gillnet as well as several other fisheries. Because of this concern, a number of framework adjustments to the Multispecies FMP (4, 12, 14, 16 and 19) were proposed by the Council and implemented specifically to protect harbor porpoise beginning in 1994. Building on several of the time/area closures implemented under the Northeast Multispecies FMP, NMFS published a Harbor Porpoise Take Reduction Plan (HPTRP) for the Gulf of Maine and mid-Atlantic waters in December, 1998.

The plan is intended to meet the potential Biological Removal level of 483 animals established for this species by requiring the expanded use of acoustic deterrents (“pingers”), in addition to time and area closures. The effect of HPTRP was further enhanced by the implementation of Framework Adjustments 25 and 26 to Multispecies FMP, actions that reduced catches of Gulf of Maine cod and protected the stock during the spring spawning season. Coupled with the HPTRP, these closures of additional areas to all gear capable of catching groundfish provided further protection for harbor porpoise as well as endangered whales and other protected species by reducing the risk of entanglement in gillnets as well as other gears used in the multispecies fishery.

On April 1, 1999 NMFS published the final rule for Framework 28 to this FMP. Framework 28 allows the use of gillnets in areas otherwise closed to gillnet gear provided they are equipped with pingers. The framework also makes the multispecies regulations consistent with the HPTRP.

Endangered Species

Of the endangered species expected to be present in the action area, only right, humpback and fin whales, loggerhead, green, Kemp’s ridley and leatherback sea turtles, and shortnose sturgeon are known to become entangled in gillnet gear. Species known to interact with bottom trawl gear, the other predominant gear type used in the multispecies fishery include humpback whales and loggerhead, Kemp’s ridley, leatherback and green turtles. Encounters with bottom trawl gear, however, appear to be infrequent, particularly in view of the prevalence of the gear in the Northeast. Because of their extremely low stock status, right whales are a particular concern. Sea turtles are unlikely to be present during the timeframe and in the areas affected by the action proposed in Framework 31.

Harbor Porpoise

Although other marine mammals may be affected by the action proposed, harbor porpoise are among most vulnerable to interactions with the multispecies fishery, given that their distribution overlaps in time and area with the gillnet activity and that fixed gear is used extensively throughout the action area. Porpoise also remain a species of concern because of their continued high level of bycatch in the gillnet fishery, both in the Northeast and the mid-Atlantic area.

Impacts of the Proposed Action and Alternatives

Details concerning the need for action and the Council's rationale are discussed in section 2.0 of this document. The management measures proposed are discussed in section 3.0

The TRPs currently in place will not be affected by the closures proposed in Options 1 and 3 of this framework, except that their effectiveness may be enhanced by the closure of adjacent areas to all gear capable of taking groundfish, as defined in the Multispecies FMP. Along with the continuation of the year-round Western Gulf of Maine Closed Area (Options 1 and 3), which includes parts of Jeffreys Ledge, Tillies Bank, Stellwagen Bank and Wildcat Knoll, the Framework 31 measures should provide added protection in areas that represent important habitat to right whales. Critical habitat should not be affected by the proposed action.

Option 2 would have reduced the Western Gulf of Maine Closed Area but also included a year-round closure of the top part of Stellwagen Bank, an important seasonal feeding and gathering area for many large whale species. Because Option 2 would have greatly reduced the overall area closed to groundfish gear, it also could have resulted in an increased risk of entanglement to most marine mammal species in area.

The 400 pound/4,000 pound cod trip limit proposed, coupled with the area closures, may cause a number of vessels to cease fishing during the time period in which the action would be effective. This appeared to be the case for Framework 27, although 400 pounds now represents an increase in the trip limit. The monkfish and spiny dogfish fisheries remain alternatives for some groundfish vessels until proposed fishery management plans are implemented that would severely curtail effort. The impacts of this or any effort shifts to other fisheries or open areas are difficult to predict and remain speculative.

Conclusion

Overall, the management measures contained in the proposed action should not diminish, and will likely enhance the conservation benefits discussed in the Framework 26 and 27 consultations on endangered species.

4.1.4 Impacts on habitat

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. The measures proposed in this framework adjustment will not increase any long-term adverse impacts on essential fish habitat (EFH) resulting from fishing activity.

All proposed measures are intended to reduce discards of cod, primarily in the Gulf of Maine region while still achieving the effort control objectives of Amendment 7. The strategy to achieve this goal is to increase the per-day cod trip limit in the Gulf of Maine and to offset any potential increase in fishing mortality with a closure of Blocks 124 and 125 in February and modification of the running clock.

Closed Areas:

An increase in areas closed temporarily to certain types of bottom-tending mobile fishing gear and other fishing gear capable of catching groundfish will reduce some of the 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. 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. 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. If a fraction of the fishing effort within the proposed closed areas is not displaced to other areas or seasons, the proposed closures may decrease the impacts on habitat, especially that habitat preferred by cod. 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.

The proposed action expands the rolling closures in Framework 27 by adding a closure of Blocks 124 and 125 in February, and retains the Western Gulf of Maine Closed Area.

Trip Limits:

Increasing trip limits would not be expected to have a direct effect on the habitat of the region if the increase is limited to a level that merely converts discards into landings, and does not allow for an increase in fishing effort.

4.1.5 Impact of taking no action

The primary impact of taking no action would be, in the Gulf of Maine, to continue the low trip limit (either 30 pounds per day, or 100 pounds per day if NMFS extends the interim rule beyond January 30) and resulting discard problem, and on Georges Bank, to allow the trip limit to be reduced to a level that may cause discards. Available data is insufficient, however, to quantify the discards that are taking place. Furthermore, as stock conditions and markets change, the impact of a low trip limit is less predictable because of the adaptive behavior of fishermen. For example, while some fishermen may have developed cod-avoidance strategies over the past year to minimize their discards, such strategies may become less effective as cod abundance increases from its record-low levels (in the Gulf of Maine). Consequently, discards will likely increase with no apparent reduction in fishing mortality.

4.2 Economic impacts

4.2.1 Introduction

Framework 31 proposes a combination of measures including time-area closures, adjustment to the cod trip limit, and modification to the running clock system. The Gulf of Maine cod trip limit will be increased to 400 per day to minimize the discards of cod while still achieving the conservation goals of the plan. For this fishing year, the area closures will include the February closure of blocks 124 and 125 in addition to the closures already scheduled by Framework 27. The proposed action also includes an elimination of the authority for the Regional Administrator to reduce the Georges Bank cod trip limit when 75 percent of the target TAC is reached.

These 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 impacts of these measures on fleet revenues compared to the expected levels under the existing system established by Framework 27 measures are examined in this section.

4.2.2 Revenue Impacts of Framework 31 proposed action

The economic impacts show the impacts on total revenues of the fishing vessels that will be affected by the proposed action. These impacts are examined subject to availability of data, and relative to taking no action to modify the current measures, that is, those determined by Framework 27. The impact of the proposed adjustment to the GB cod trip limit system cannot be quantified due to uncertainty about what the new trip limit would be and when it would take effect if the measure were not approved (the no-action alternative). Qualitatively, the action would increase short-term revenues due to the higher allowed landings. Over the long term, however, the impact cannot be gauged because of uncertainty about future management measures that might be implemented if the target TAC is exceeded.

Regarding GOM cod measures, the proposed action will close the blocks 124 and 125 during the months of February to April. This is just an additional month of closure in February compared to the status quo, that is, compared to the Framework 27 action which already scheduled the closure of these blocks in March and April. In addition the cod trip limit will be increased to 400 pounds a day from 30 pounds per day, with a maximum possession limit of 4,000 pounds. The running clock will be modified so that vessels will be limited to allowable overages for partial days only.

The revenue impacts of increasing the trip limit to 400 pounds/day are examined in Table 31. The Gulf of Maine cod landings from the open areas in 1999 during those three months was 457 metric tons or 1.01 million pounds (Table 31). During the same months of 1999, the ex-vessel cod price averaged \$1.39

per pound. Multiplying the landings with the ex-vessel price, it is estimated that total fleet revenue from Gulf of Maine cod was about \$1.4 million in 1999. These changes in quantities are not expected to substantially affect prices. The trip limit at the time was also 400 pounds, although the cod landings per day averaged 205 pounds/day from all trips. Before accounting for changes to the running clock, it is assumed that the cod revenues will remain at \$1.4 million, in year 2000 for the months of February, March and April since the proposed trip limit is 400 pounds/day and the same areas will be closed. Since approximately 23.1 percent of the GOM cod landings were overages of the running clock, the proposed modification to the running clock will reduce revenues by that proportion (see Appendix II).

	estimated cod landings (pounds)	ex-vessel cod price (\$ / pounds)	estimated cod revenues (in dollars)
Trip limit with old running clock			
30	130,975	1.39	182,293
400	1,007,502	1.39	1,402,252
Increase in fleet revenue			1,219,959
Increase in fleet revenue reduced 23.1% by eliminating overages allowed by the old running clock (\$281,811)			938,148

Table 31. Impact of proposed increase in trip limit to 400 pounds/day and modification to the running clock

In the absence of Framework 31 measures, however, the trip limit will be reduced to 30 pounds per day (unless NMFS extends the interim rule with 100 pounds per day). This reduction in the trip limit was estimated to reduce cod landings by 87.1% compared to the level corresponding to a trip limit of 400 pounds/day. As Table 31 shows, the trip limit of 30 pounds/day would reduce Gulf of Maine cod landings to about 130,975 pounds in year 2000 for the months of February, March and April. If it were also assumed that the ex-vessel cod price would stay constant at about \$1.39 per pound, then the ex-vessel cod revenues would also decrease by 87.1 percent to \$182,293. Therefore, with Framework 31 measures, the Gulf of Maine cod revenues will increase by about \$938,148 (\$1.4 million minus \$182,293, reduced 23.1 percent) compared to the status quo level with a trip limit of 30 pounds/day (Table 31).

This increase should be compared with the reduction in revenue as the February closure of blocks 124 and 125 are added to the closures already scheduled by Framework 27. Table 32 shows the total revenue from these blocks by geartype in the month of February. Since the area closure analysis was based on 1997 data (the year prior to implementation of the area closures), the revenues are adjusted down by the 7.4 % reduction in DAS that was projected in Framework 27 and for the 400 pounds per day trip limit for the Gulf of Maine cod. Overall, even without any effort displacement to other areas/months, the total reduction in revenues is estimated not to exceed \$400,000. After adjusting for the projected DAS reduction that did not occur, the total reduction in revenues is estimated to be \$430,000. The impacts on net revenues (i.e., revenues minus costs), will be less than this level since the

operating costs will also decline as effort is reduced by the closures if the vessels do not fish in other areas.

Geartype	Blocks		Total
	124	125	
Gillnet	159,786	3,686	163,472
Hook	3,710	1,874	5,584
Trawl	160,400	69,870	230,270
Total	323,896	75,430	399,326
7.4% DAS adjustment			428,951

Table 32. Total projected fleet revenue from blocks 124 and 125 in the month of February

The combined revenue impacts of the proposed trip limit and the area closures are summarized in Table 33. Overall, the Framework 31 proposed action is estimated to increase the fleet revenues by \$509,198 in year 2000 for the months of February, March and April compared to the status quo option (Framework 27 measures). These results should be interpreted with caution for the following reasons:

- It is assumed that there will be no displacement of effort to other areas/months
- Ex-vessel prices of fish are assumed to stay constant after the closures
- The variable cost savings associated with the reduced effort are not taken into account.

If the vessels recover some part of their revenue loss from the closed areas by fishing in the open areas, the increase in the fleet revenue will be more than is estimated here. In addition, the increase in the trip limit will reduce the costs of discarding and, therefore, will have a positive impact on net fleet revenues.

The impacts of the modifications in the running clock could not be fully quantified with the available data. Limiting cod landings to 400 a day on trips under 24 hours for each day or part of a day in a trip provides prevents vessels from using the DAS clock to land large trip limit overages. As noted earlier, 23.1 percent of the cod landings during this period in 1999 were on trips that exceeded the per-day limit and were required to use the running clock. On trips longer than 24 hours, vessels may land 400 pounds for a partial day provided the vessels does not call out of the DAS program until the remainder of that 24-hour period had elapsed. This measure will reduce the costs of discarding for those boats that have an overage of the trip limit while targeting species other than cod.

Proposed Action	Change in Fleet Revenue (in dollars)
Reduction in fleet revenue because of the Framework 31 GOM area closures	-428,951
Increase in revenue due to the increase in the trip limit to 400 pounds/day and modification of the running clock under Framework 31	938,148
Net change in fleet revenue with Framework 31 GOM proposed action	509,198

Table 33. Summary of Revenue Impacts from Framework 31 proposed measures

4.2.3 Qualitative economic impacts of the area closures and trip limits

The economic impacts discussed above represent only short-term losses or increases from the proposed measures. **Table 34** provides a qualitative analysis of these short-term impacts on prices, consumer and producer surpluses and net economic benefits.

Overall, since the measures proposed in this framework will reduce discards of cod and increase cod landings, it will probably have a negative impact on cod prices but a positive (however slight) impact on consumer benefits (measured by the consumer surplus). The producer surplus is measured by the difference of total revenue and variable costs. Since total fleet revenue is expected to increase and the variable costs to decrease with the increase in the trip limit, the producer surplus is likely to increase as well. The net economic benefits will be also positive since its components, that is, the change in the producer and the consumer surplus, will be positive under the Framework 31 proposed measures.

SHORT TERM ECONOMIC COSTS AND BENEFITS OF FRAMEWORK 31								
	Effort Displacement	Impact on prices	Impact on Landings	Impact on Gross Revenues	Impact on Consumer Surplus	Impact on Operating Expenses	Impact on Producer Surplus	Net Benefits
Increase in Cod trip limit		Decrease	Increase	Increase	Increase	Decrease	Positive	Short-term Positive
Area Closures	Zero or partial Displacement of Effort	Increase	Decrease	Decrease	Decrease	Decrease	Negative	Short-term Negative
Estimated Net Impact		Decrease	Increase	Increase	Increase	Decrease	Positive	Short-term Positive

Table 34. Economic Costs of Benefits of Framework 31

4.2.4 The impacts on vessels, states and ports

As discussed above, the increase in the cod trip limit to 400 pounds per day in the Gulf of Maine area will have a slightly positive impact on the revenues of the vessels compared to the status quo trip limit of 30 pounds per day and old running clock system. The additional closure of the blocks 125 and 125 in February will reduce revenues and the increase in the trip limit will increase revenues, although increase would be less (by 23.1 percent) due to the loss in the ability to land trip limit overages under the proposed modifications to the running clock. The net impacts on fleet and, therefore, the vessel revenues will be slightly positive as discussed above. Furthermore, the increase in the trip limit will reduce the vessel costs and costs of discarding associated with the 30 pounds/day trip limit. Therefore, the net impacts of Framework 31 measures on vessel profits are expected to be positive. This analysis does not include the impact of relief funds appropriated by Congress that will have the effect of minimizing losses at the vessel and community level.

All vessels that possess a limited access or open access multispecies permit will be subject to the proposed measures in Framework 31. However, not all vessels will actually be affected by the measures either because they do not fish in the closed areas or in the Gulf of Maine, their current activity already complies with the new regulations, or they do not participate in the groundfish fishery even though they possess a permit to do so.

According to the 1997 data, there were about 319 identifiable vessels that fished in the Gulf of Maine area during the months of February, March, and April as shown in Table 35. The actual number of vessels could be more than this since the 1997 data also includes some aggregate trips without identifying the actual vessels that took these trips. Table 35 shows only the identifiable vessels, therefore, does not include these aggregate trips.

	Number of vessels	Average GRT
Gillnet	65	22
Hook	35	24
Trawl	219	79
Total	319	

Table 35. The Number of Vessels that fished in Gulf of Maine in 1997 during February-April

Since potentially all vessels with a limited access or open access multispecies permit can fish in these areas in any month they choose, the universe of vessels that could be potentially affected by these measures are much higher. Based upon calendar year 1997 data there were a total of 601 vessels that were found to have fished in Gulf of Maine within one or more of the rolling closures implemented by Framework 27 and would be affected the proposed trip limits. The majority of these vessels (434) were less than 50 gross registered tons in size and/or listed a Massachusetts homeport (404) on their 1997 permit application (Table 36). The number of affected vessels by homeport is shown in Table 37. For more information on these vessels see the economic impact analysis in Framework 27 document.

State	Ton Class 1	Ton Class 2	Ton Class 3	Ton Class 4	Total
Massachusetts	15	263	100	26	404
Maine	5	90	15	1	111
New Hampshire	6	32	1	0	39
New York	0	7	5	0	12
Rhode Island	0	4	2	3	9
Other	0	12	9	5	26
Total	26	408	132	35	601

Table 36. Summary of size and home state for vessels that fished in proposed rolling closure areas during calendar year 1997 and the vessels that will be affected by the cod trip limits

Home Port	Total
Northern Maine	65
Southern Maine	46
New Hampshire	39
Northern Mass	304
Central Mass	46
Southern Mass	54
Rhode island	9
Other	38
Total	601

Table 37. The homeport area of vessels that fished in proposed rolling closure areas during calendar year 1997 and the vessels that will be affected by the cod trip limits

4.2.5 Economic Impacts of the Alternatives Considered but Rejected

The Council considered three other options that would extend through the next fishing year. The economic impacts of these options are examined below. The Council decided not to apply these measures, and limit the current adjustment to the remaining part of this fishing year, and to address the next fishing year during the regular plan adjustment procedure. The analysis discussed below is based on annual impacts, not just February through April as with the proposed action.

4.2.5.1 Summary of results for the rejected alternatives

- The proposed area closures under Option 1 combined with a 200-pound trip limit is estimated to reduce the fleet revenues by approximately \$358,400 (from the levels estimated under Framework 27 measures). This assumes that the vessels will not be able to recover some part of their revenues by fishing in open areas (Table 38, Scenario A).
- The Option 3 area closures with a 200 pound trip limit will reduce fleet revenues by \$539,500 assuming no effort displacement (Table 38, Scenario A).
- The revenue loss will be smaller, \$162,500 for Option 1, and \$339,500 for option 3, if the vessels were able displace 50 percent of their effort to open areas, and derive half as much of revenues per DAS from the open compared to the closed areas (Table 38, Scenario B).
- An increase in trip limit to 400 pounds for Option 1 will increase the fleet revenues by \$957,100 under no displacement, and by more than \$1.3 million with partial effort displacement.
- Option 3 combined with a 400 pound trip limit is estimated to increase the fleet revenues by \$759,700 with no displacement, and by more than \$1.1 million with partial effort displacement.
- Since Option 2 includes smaller closure areas and provides more area to fish for other species, it will probably result in a smaller reduction in fleet revenues compared to Options 1 and 3.

4.2.5.2 Assumptions and methodology

- The economic impacts are examined subject to availability of data, and are relative to taking no action to modify the current measures (Framework 27). The status quo trip limit is 200 pounds because that is what was analyzed in Framework 27.
- The potential impacts are estimated using the information on landings, revenues, and effort in 1997 in the proposed closure areas under the various assumptions regarding effort displacement:
 1. No effort displacement (Scenario A)
 2. Partial effort displacement
 - at the same catch per unit effort (Scenario C)
 - at a reduced catch per unit effort, 50 percent (Scenario B)
- The no-displacement model (Scenario A) assumes that the vessels do not fish in other areas and/or increase their fishing effort in the closure areas in other months so that the revenues and landings from a closed block-month are lost and can not be recovered from other areas.
- The scenarios with partial effort displacement, Scenarios B and C, provide some examples of the likely impacts if only 50 percent of the effort from the closed areas was directed to the open areas. The impacts are examined separately for each type of gear in Table 38.
- For partial effort-displacement scenarios, the revenue recovered from the open areas was estimated by multiplying the displaced effort (total DAS in the closed areas (by gear type) with the average revenue per DAS (by gear type). In this way, the effort displacement model takes into account the differences of the DAY-AT-SEA used and the revenue-per-day of a trawl from a dredge, hook or gillnet vessel, and vice versa. Average revenue per DAS was reduced by 50 percent for scenario B, and assumed to be constant for scenario C.
- Sometimes, due to the higher revenue per DAS in the open areas, effort displacement results in an increase in revenues as areas are closed. However, this is an unrealistic result. If the vessels were able to fish in open areas and could obtain higher revenues per DAS, they would do that even under the status quo conditions. The limitations in size do not allow all vessels to fish in the open areas. Even if all vessels could displace their effort to the open areas, it would be unrealistic to assume that they would derive the same level of revenues per DAS in the open areas as those vessels already fishing in those areas. For these reasons, the maximum increase in revenues with effort displacement compared to the status quo levels is set to zero.
- The impacts of the cod limits are included in the analysis to estimate total economic impacts.

4.2.5.3 Impacts of area closures on fleet revenues combined with a 200-pound trip limit

The impacts of area closures on total revenues are shown by gear type in Table 38 for Options 1 and 3. It should be emphasized these impacts show the net change, or incremental impacts, compared to the status quo option which assumes the continuation of Framework 27 closures. It was not possible to estimate the revenue impacts for Option 2 because the data is available only for the quarter degree

squares and the closure areas are much smaller than the blocks that contain them. For this reason, only a qualitative analysis is provided for Option 2.

The assumption of no effort displacement, or Scenario A, shows the maximum loss in revenues from the proposed closures combined with a trip limit of 200 pounds. If the vessels are not able to recover their losses by shifting effort to other times or areas, the decline in total revenues would be \$358,390 million for Option 1, and \$539,500 for Option 3. Since Option 2 includes smaller closure areas and was designed by fishermen to increase their opportunity to fish on other species, it will probably result in a smaller reduction in fleet revenues. Compared to the existing system implemented under the Framework 27 measures, Option 2 may even have positive impacts on fleet revenues, even with a 200 pound trip limit.

The impacts of the DAS measures under Option 2 are uncertain, however. There are some concerns regarding to the impacts of restricting DAS-use, particularly during the months of February, March and April, since during these months the excess demand for fresh fish tends to be highest. According to comments from the Portland Fish Exchange, a disproportionate amount of many vessels' incomes is generated during this period when market supplies are low and prices are high. Furthermore, the customers of the Fish Exchange (seafood buyers and sellers) may seek to substitute product where volumes are more consistent and reliable (frozen fish) which could result in loss of market infrastructure for fresh fish.

The impacts on net revenues (i.e., revenues minus costs) for Options 1 and 3, however, could be less than the levels shown in Table 38, since operating costs will also decline if effort that is affected by the closures is not reapplied elsewhere (partial or no displacement). The relative impacts of Option 1 and Option 3 in terms of gear type are similar, both having the largest impacts on trawl fleet in absolute value, followed by gillnets and hook gear.

If all the vessels could shift their effort to open areas and if their landings and revenues per DAS average the same level prior to the closures, then the proposed closures would have little impact on their revenues. It is highly unlikely, however, that vessels would fully recover the revenue loss from the closed areas by fishing in the open areas. First of all, the size and horsepower of some vessels restrict their ability to fish farther off-shore, so that not all effort can actually shift to open areas. In addition, the crowding-out impacts of many vessels fishing in the open areas would reduce the catch per unit effort from these areas. For these reasons, the results of the scenario with total displacement at the constant revenue per DAS are not shown in Table 38.

A more realistic scenario with the effort displacement is to assume that the vessels may be able to shift their effort to other areas/periods only partially. Table 38 provides a range of impacts assuming that only 50 percent of the displaced effort may shift to other areas/times. Scenario B, shows the impacts of proposed closures on the revenues from all species assuming extra effort can generate only half as much revenue per DAS, and Scenario C shows the impacts assuming that the revenue per DAS stays constant at the level prior to the closures.

Scenario B, probably portrays a more realistic outcome in terms of the impacts of the proposed closures. Under this scenario and Option 1, the revenue loss for the fleet as a whole is estimated to be \$162,500 million, but could reach \$339,500 for option 3. Scenario C, on the other hand, represents a more optimistic case with smaller reduction in revenues since vessels can recover at least half of their revenue losses from closed areas by fishing in the open areas.

These results should be interpreted with caution for the following reasons:

- ex-vessel prices of fish are assumed to stay constant after the closures
- The variable cost savings associated with the reduced effort are not taken into account.

4.2.5.4 The revenue impacts of cod trip limits

In addition to the area closures, the Council identified two cod trip limit options, either 200 pounds a day or 400 pounds a day. As discussed in the previous section, area closures combined with a 200 pounds trip limit will reduce the fleet revenues, although this reduction is not expected to exceed \$358,000 for Option 1, and \$539,500 for Option 3 with no effort displacement.

Increasing the trip limit, however, will have positive impacts on fleet revenues. As Table 38 shows, for Option 1 and no-displacement scenario (Scenario A), the fleet revenues will increase by \$957,000 compared to the levels expected with the continuation of Framework 27 measures. For Option 3, the increase will be somewhat less, \$759,700 with no-displacement. If vessels were able to recover some part of their revenues by fishing in the open areas, the increase in trip limit to 400 pounds/day would increase the fleet revenues by more than \$1.3 million for Option 1, and more than \$1.1 million for Option 3.

The fleet revenues would be even higher with a 700-pound trip limit proposed under Option 2 as one of the alternatives. On the other hand, such a high trip limit may require more extensive area closures to achieve the conservation objectives for Gulf of Maine cod. Therefore, the net impact on revenues of a high trip limit under Option 2 could be negative rather than positive.

The change in fleet revenues in Table 38 was estimated assuming a trip limit of 200 pounds per day under the continuation of the Framework 27 measures. On the other hand, Framework 27 also provided an adjustment process for reducing the trip limit when 402 metric tons, or 51 percent of the Gulf of Maine cod TAC is landed. In accordance with this provision, the trip limits were first reduced to 30 pounds/day, subsequently adjusted to 100 pounds/day. If the status quo trip limits were set to these levels in the analysis, the expected reductions in revenues would be less, and the increase in the revenues would be higher than presented in Table 38.

GEARTYPE	(Scenario A) No Displacement	Partial Effort Displacement	
		(Scenario B) 50% Displacement at 50% of revenue per day at sea	(Scenario C) 50% Displacement at the same revenue per day at sea
Option 1, Trip limit=200 pounds			
gillnet	-150,996	-111,774	-72,552
hook	-3,271	0	0
trawl	-204,126	-50,752	0
Total	-358,393	-162,526	-72,552
Option 1, Trip limit=400 pounds			
gillnet	118,600	190,453	262,306
hook	33,930	101,140	168,350
trawl	804,578	1,052,328	1,300,077
Total	957,108	1,343,920	1,730,733
Option 3, Trip limit=200 pounds			
gillnet	-136,753	-116,467	-96,181
hook	-19,579	0	0
trawl	-383,175	-223,064	-62,953
Total	-539,506	-339,531	-159,134
Option 3, Trip limit=400 pounds			
gillnet	127,131	178,311	229,492
hook	18,721	48,522	78,323
trawl	613,863	868,008	1,122,153
Total	759,714	1,094,841	1,429,968

Table 38. Change in total fleet revenues by gear under the proposed alternatives compared to status quo (Framework 27 level with a trip limit of 200 pounds, in dollars)

4.2.5.5 Qualitative analysis of impacts of Georges Bank cod trip limit adjustment options

The Groundfish Committee and Industry Advisory Panel developed four options to limit or eliminate the authority for the NMFS Regional Administrator to reduce Georges Bank cod trip limit and to provide new protective measures if the cod landings exceed the target TAC (except Option 2, which is the one selected by the Council for this framework adjustment). A quantitative analysis of the potential economic impacts of these options is not possible at this time and with the available data. For this reason, only a qualitative discussion of impacts is provided in this section.

The elimination of the authority for the NMFS Regional Administrator to reduce Georges Bank trip limit under all options is expected to reduce the costs of discarding and increase revenues when compared to a lower trip limit. Over the short-term, the proposed action will have a positive impact compared to the no-action alternative. However, the proposed action does not include any backstop measure to prevent the landings exceed the target TAC in this fishing year, and, therefore, it can have negative biological impacts. Consequently, the long-term impacts of exceeding the TAC on fishing revenues can be negative if more stringent measures are implemented in the future to rebuild the Georges Bank cod resource. However, since this measure is only proposed for the remainder of this fishing year, and since the Council will implement management measures to achieve plan objectives in the next fishing year, the long-term economic impacts of the proposed action are expected to be minimal.

Of the options considered but rejected by the Council, Option 1 allowed overages of the trip limit, but reduced the fishing time (with a running clock at a rate of one-to-one plus layover day) to prevent exceeding the trip limit. It therefore reduced costs of discarding when the catch is significantly above the trip limit, but would also reduce the fishing revenues not only from cod but also from other species because of the running clock and layover days. If the catch is slightly above the trip limit, however, the vessels would still choose to discard the extra pounds of cod in order not to lose fishing time under the running clock/layover day requirement.

Option 3 proposed a different trigger mechanism and restricted the reduction in trip limits to 1000 pounds per day when 60 percent of the target TAC is reached, and to 500 pounds per day when 80 percent of the target TAC is reached. This option did not eliminate entirely the costs of discarding when cod is caught in excess of the trip limit. It did, however, restrict these costs by not allowing the trip limit to go down any level below 500 pounds. In other words, it reduced the discarding costs relative to the status quo measure provided in Framework 30 (i.e., by possible reduction of trip limit to any level by NMFS regional Administrator).

Option 4 provided a backstop mechanism to the GB cod trip limit to prevent exceeding the target TAC that is based on accelerating the rate of DAS usage by day boats. This alternative would reduce the costs of discarding compared to taking no action because the trip limit would not be reduced. It would reduce, however, the revenues of the day-boats that take trips less than 24 hours in length, by eliminating their opportunity to land two or three times of the per-day cod limit for 24 hours deducted

from the DAS allocation. On the other hand, this measure may provide more incentive for these boats to take longer trips (up to 24 hours) and target other species in order to maximize their revenues per DAS allocated and used.

4.3 Social and community impacts

When the Council implemented the stock rebuilding plan in Amendment 7, it recognized that the measures required to achieve the plan objectives would have significant social and community impacts. It stated that the breadth and scope of those measures would likely cause some social change proportional to the individual or community dependence on the affected stocks. It also noted that the social impacts are largely related to the economic impacts, and as such would be negative in the short term and positive in the long term, although some fundamental changes would probably occur for which a value cannot be assessed.

Some of the expected impacts are already manifested in changes at the vessel and community level. On the positive side, such changes include ways of adding value to landed species through the establishment of display auctions in some of the major groundfish ports and the growth of the live-cod market. Communities have also evolved to support redirection of effort to other fisheries (including establishment or expansion of shoreside infrastructure to support those fisheries, such as herring). Negative impacts have included a loss in employment levels, or a need to seek new or supplementary employment outside of fishing, for many fishermen. The changes that have occurred also include a disruption in patterns of work, family and community life caused by more constraints on fishing seasons, areas and landings.

A fundamental problem exists, however, in attributing social change to specific factors such as management regulations when the communities or other societal groups are constantly evolving in response to numerous external factors, such as market conditions or technology. Certainly, management regulations influence the direction and magnitude of social change, but attribution is difficult with the tools and data available. Attribution is particularly difficult considering the dynamic nature of fishing communities and other social groupings of individuals in the industry, and in comparison to the no-action alternative in the context of a declining or collapsing resource. In recognition of this problem, the Council has convened a Social Sciences Advisory Committee to improve the methods and results of the social impact analysis of proposed management actions.

As noted in Framework 27, the Council recognized that the measures contained in that framework would result in short-term hardships on the fishermen and communities that depend on fishing for cod, or fishing in the areas that were to be closed. The direct social impacts of proposed actions were expected to be proportional to the dependence of each community or vessel class on the cod landings, and on other fisheries affected by the area closures. In recognition of the losses incurred by fishermen due to closures under Frameworks 26 and 27, Congress appropriated \$5 million to NOAA to provide emergency disaster relief. On September 7, 1999, NMFS published a notice in the *Federal Register* (64 FR 48594, Sept. 7, 1999) detailing the final information concerning criteria for eligibility, limitations and conditions for receiving the disaster relief. On October 5, 1999, Massachusetts Senators Kennedy and Kerry announced that the Agriculture Appropriations Conference report contains \$15 million in

funding that will be directed to groundfish fishermen hard hit by recent closures and low trip limits in the Gulf of Maine. The money will be used to fund industry-based research activities and will help offset economic losses due to the restrictions needed to rebuild Gulf of Maine cod.

While the data and methodology for assessing the social and community impacts of the proposed measures are not readily available, public comment provides some insight. If the volume and intensity of comment is any indication, perhaps the greatest social impact resulted from the trip limit that was in effect when the seasonally closed areas re-opened. Fishermen expressed outrage and extreme frustration at the wasteful discarding that occurred as they re-deployed their gear in search of other species. Fishing strategies that in past years produced only a small cod bycatch were resulting in catches that greatly exceeded the 200-pound limit (which was subsequently lowered), and even with the use of the running clock, fishermen reported that they were forced to discard large quantities of cod.

To the extent that the proposed measures will allow for an increase in the cod trip limit, therefore, the short-term social impacts should be positive. However, Option 1 which is the basis for the proposed action, and Option 3, which was not adopted by the Council, expand the area closures in Framework 27 by adding the February closure of Blocks 124 and 125, which will continue to affect some communities and vessel classes. Option 2, which was also rejected by the Council, eliminated most of the area closures, and opened areas that provide alternative fisheries for inshore vessels. While this strategy would provide some short-term relief, it would likely prolong the effects of management measures that the Council will develop in upcoming months to address other overfished stocks. Economic opportunity created by expanding fisheries on species other than cod, in this case, would also increase the amount of restrictions needed to rebuild those stocks when that action is taken. How these two countervailing factors will impact fishermen and their communities cannot be determined at this time.

As has been stated in numerous framework adjustments, subsequent to Amendment 7, the Council realizes that the cost of conservation is borne by the fishermen and communities dependent on the fisheries being restricted. The justification for imposing these costs is the overwhelming long-term economic benefit of a resource base that is rebuilt to and managed at maximum sustainable levels. While some stocks of fish are responding to management measures implemented since Amendments 5 and 7, other stocks are still in need of conservation. Strategies that minimize short-term social impacts may cause long-term impacts to be more significant due to the longer rebuilding times that will result. The social impacts of measures designed to rebuild other multispecies fisheries will be discussed when those measures are identified and analyzed in Amendment 13.

The options that the Council considered for modifying the GB cod trip limit adjustment mechanism would likely reduce the social impact of that measure by reducing the derby effect of an impending trip limit reduction and by minimizing the potential for creating a discard problem such as what occurred in the Gulf of Maine cod fishery. Option 3, which would have programmed trip limit reductions at 60 and 80 percent of the target TAC, would only minimize the uncertainty associated with the current system, but would not eliminate the trip limit reduction and its social consequences.

Option 4, which also was not adopted by the Council, would affect only those vessels that take trips of less than 24 hours, because these vessels would be required to keep their DAS clock running until 24 hours has passed. These vessels would likely alter their fishing strategies such that they maximize their catch for the DAS they are being charged by remaining at sea and fishing for longer than they ordinarily would. Since most of the day boats are smaller vessels, this change in behavior raises safety concerns. Furthermore, if fishermen adopt this strategy it would likely cause some change to their family and community relationships. The magnitude of this impact cannot be predicted, and it is partially dependent on the timing of the implementation of the adjustment (when 75 percent of the TAC is reached). The impacts are likely to be more severe if the rule becomes effective during the winter.

5. Applicable law

5.1 Magnuson-Stevens Act (FCMA)

5.1.1 Consistency with National Standards

Section 301 of the Magnuson-Stevens Act requires that regulations implementing any fishery management plan or amendment be consistent with the ten national standards listed below.

1. *Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.* The measures proposed in this framework are designed to achieve the conservation objectives of Frameworks 27 and 30, while minimizing discards. Both of those frameworks are consistent with this national standard, and the Council has continually adjusted the fishery management plan as new information becomes available about the stock status and overfishing. The Council will conduct its annual plan review and adjustment process later this year, and it has started development of a full plan amendment to further address stock rebuilding over the long term. The proposed action is of a short duration, lasting only until the end of this fishing year, and is not likely to have a significant impact on the fishing mortality of either cod stock in comparison to taking no action.

Restrictive trip limits on cod, which is widely distributed and caught incidentally in a variety of fisheries, only reduce fishing mortality if fishermen's behavior (for example, time, area and method of fishing) changes sufficiently to reduce cod catches commensurate with the reduced limit. Such a change takes time, as fishermen explore and develop alternatives, and comes at a significant cost, in terms of lost revenues and increased vessel costs. Before that change occurs, when catches exceed the trip limits, vessels are forced to discard fish, and those fish usually die. It is unlikely that vessels fishing in the last three months of this fishing year, when the proposed action would be in effect, could make the necessary changes to minimize discards. Therefore, fishing mortality rates would not be significantly reduced if the trip limit were reduced during that period.

2. *Conservation and management measures shall be based on the best scientific information available.*

The Council considered scientific information available from the annual multispecies plan review and analysis prepared for Framework 27 in developing the measures for this proposed action. It also considered the most recent landings information available from NMFS. The annual plan review for the current fishing year is just getting underway, and that information is not yet available to the Council. For that reason, the Council decided to only implement measures for the remainder of this fishing year rather than extend them into the next fishing year as it originally intended to do. When the annual SAFE report is presented to the Council in November, 1999, it will develop measures for the next fishing year.

3. *To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.* The proposed measures are specific to the two recognized stocks of cod, Gulf of Maine and Georges Bank, and apply throughout the range of those stocks. The Council has discussed the management of the boundary area between the Georges Bank and Gulf of Maine cod stocks. It recognizes that there is mixing between the two stocks and that landings attributed to one stock may actually be fish that spawn in a different stock area. Since the two stocks exhibit different dynamics and biological characteristics (for example, growth and maturity rates), the Council has retained the distinction, although it supports scientific research that will improve the stock delineation for management purposes.

4. *Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.*

The proposed measures do not discriminate between residents of different states. However, as noted in Framework 27, the Council recognizes that measures to conserve stocks that are distributed predominantly inshore may have a greater impact on inshore vessels and the ports bordering the affected areas. While vessels that have depended on the stocks in need of rebuilding, will be most affected by the conservation measures, the Council does not consider the differential impact to be the result of an allocation of fishing privileges by the management plan, but the consequence of individual circumstances. It has worked closely with the affected public to develop a set of measures that fairly and equitably distributes the burden of the rebuilding program across a broad segment of the industry while still achieving the needed conservation.

5. *Conservation and management measures shall, where practicable consider efficiency in the utilization of fishery resources; except that not such measure shall have economic allocation as its sole purpose.*

The primary purpose of this action is to reduce the level of discards under the cod trip limits. As such, this action enhances the efficiency in the utilization of the fishery resource by minimizing waste

and improving yields.

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

The Council proposes to increase the trip limit in large part out of recognition that vessels engaged in other fisheries in the Gulf of Maine have widely varying cod bycatch rates. The rates vary seasonally and depending on target species. Additionally, fishermen have reported that fisheries that previously had very low cod bycatch rates have recently seen an increase, which they attribute to a rebuilding stock. Vessels fishing on Georges Bank, either directed on cod or on other regulated species, exhibit similar variation. Reducing the trip limit only affects the vessels whose catch is above the limit.

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

The Council considered the costs and benefits of a range of alternatives that would achieve the conservation goals of the plan. It considered costs to the industry, particularly in terms of foregone revenues, including revenues lost due to regulatory discards, and costs of compliance, enforcement and administration in selecting the proposed action. It has avoided unnecessary duplication by considering the impacts of proposed measures on all stocks in the multispecies complex that are in need of rebuilding. In other words, the Council chose specific closed areas, for example, not only for their benefit to Gulf of Maine cod, but also because of collateral benefits for other stocks, especially as result from continuation and expansion of closed areas.

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

The Council considered the impacts on fishing communities in selecting from the range of alternatives that analysis showed would achieve the conservation goals of the plan. It's decision to proceed with an increase in the GOM cod trip limit, and to forestall a reduction in the GB cod trip limit is partly based on a recognition of the impacts that widespread discarding has on the affected communities. The Council has noted that communities that are most dependent on the stocks that are in need of conservation will likely experience the most negative short-term impact from the action, but these are the same communities that will also benefit over the long term from rebuilding the resource base to maximum sustainable levels.

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

The primary purpose of the proposed action is to reduce the discards of cod that result from low trip limits. By increasing the GOM cod trip limit to 400 pounds per day, discards will be reduced

significantly without significantly increasing fishing mortality. Similarly, by forestalling a reduction in the GB cod trip limit, the Council is also preventing a widespread discard situation in those fisheries where GB cod is caught, either as a target or incidental catch.

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

Under a per-day trip limit system, vessels that catch more than the limit, even if that catch is unexpected and incidental to the directed fishery, must decide whether to remain at sea until sufficient time has passed to account for the overage, or to discard fish. This decision raises safety concerns. The Council has deliberated extensively over the past year on how to allow vessels to land overages of the trip limit and not create an opportunity for vessels to use the allowance to target cod. The proposed modifications to the running clock, that allows vessels to land overages and remain in port with the DAS clock running to account for the overage, strikes a balance between these two concerns.

5.1.2 Other FCMA requirements

Section 303 (a) of FCMA contains 14 required provisions for FMPs. These are discussed below. Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery, shall--

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the national standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law;

See Section 3.0 for a description of the measures contained in the amendment, and Section 5.1.1 for a discussion of the amendment's consistency with the national standards.

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any;

The Environmental Assessment contained in this document (Section 5.2.1) supplements the documents submitted with preceding amendments (particularly Amendment 5, 7 and 9), in forming the description

of the fishery. There is no foreign fishing for species covered under this FMP, nor are there any Indian treaty fishing rights.

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

Amendment 9 contains proposed overfishing definitions based on achieving maximum sustainable yield, and a revised specification of optimum yield. The report of the Overfishing Definition Review Panel in Appendix II of that amendment contains a complete description of the information used in calculating the target and limit reference points. This FMP provides for timely adjustment to management measures to rebuild overfished stocks to levels that will produce maximum sustainable yield based on the most recent and best scientific information available. The target TACs for the critical stocks represent optimum yield for those stocks which are the primary focus of the rebuilding plan. The FMP also specifies a target TAC for the group of other regulated species in the multispecies fishery management unit that are not individually managed. As future conditions warrant, the Council may adopt individual rebuilding target fishing mortality rates based on the overfishing definition control rules which will facilitate the calculation of annual yield targets for individual stocks.

(4) assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3), (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing, and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

Based on the annual Multispecies Monitoring Committee analysis of DAS utilization rates, fishing mortality rates and target TACs, the total capacity of the fleet exceeds that needed to harvest optimum yield at current stock levels and fishing mortality targets designed to rebuild the resource. Consequently, no portion of the allowable catch is available for foreign fishing. However, much of the capacity, in terms of permitted vessels, is inactive or only uses a fraction of its allotted fishing effort (DAS). As the stocks rebuild, that now-excess capacity will provide the means to harvesting the available resource competitively, efficiently and safely. The Council has an annual review and adjustment process to manage the effort levels and keep them within the target range and it has established a Capacity Committee to review of current fishing capacity and future capacity under rebuilt stock conditions.

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors;

Section E.6.1.1 of Amendment 9 contains a discussion of the FMP's data considerations and the Council's participation in the Atlantic Coastal Cooperative Statistics Program (ACCSP) and in the stock assessments. The Council has initiated efforts to organize and compile all of the data requirements for managing the stocks in a manner consistent with the Sustainable Fisheries Act. These efforts include calling on NMFS to prepare an annual publication of a Stock Assessment and Fishery Evaluation (SAFE) Report, activation of the Science and Statistical Committee and Social Sciences Advisory Committee and continued participation in the Stock Assessment Workshop Steering Committee.

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery;

The Council has carefully considered the impacts of needed conservation restrictions on vessels that are constrained because of size or other factors in their ability to fish offshore. This has been the single most difficult issue in the development of the GOM cod rebuilding strategy because the area where those measures will be most effective in achieving rebuilding are inshore areas where the cod aggregate, especially to spawn, and where the highest cod landings are observed. It has similar concerns with the small vessel fleets that fish on Georges Bank cod to the east of Cape Cod. It has worked closely with the industry to develop alternatives that minimize these impacts, and it has a framework adjustment process for making changes as needed to address safety consistent with National Standard 10 while maintaining fair and equitable access to the fishery within the limitations of the conservation program.

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

The Council has undertaken a major effort to bring all of its FMPs into compliance with this requirement. It submitted Amendment 11 to this FMP for Secretarial review in October, 1998 as mandated by the SFA. The final rule for Amendment 11 was published on April 21, 1999 (64 FR 19503, April 21, 1999).

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

The Council is working closely with NMFS to coordinate the reporting of scientific information in a timely manner so it coincides with the annual plan review and adjustment process. See discussion under item 5 above.

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on--(A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

The Environmental Assessment contains analysis and discussion of the impacts of the proposed action on the human environment, including fishing communities. The Council developed measures in this framework in consultation with the Mid-Atlantic Council through their participation on the Groundfish Committee and attendance at Council meetings.

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

The revised overfishing definitions in Amendment 9 specify both biomass and fishing mortality criteria for evaluating a stock's status. The Overfishing Definition Review Panel Report in Appendix II to Amendment 9 contains a full description of the analysis and methodology used to establish these criteria. The FMP contains measures to stop overfishing and an annual review and adjustment process to keep the rebuilding plan on track. The Council has initiated the development of Amendment 13 to address rebuilding programs for all overfished stocks in the FMP.

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority--

(A) minimize bycatch; and

(B) minimize the mortality of bycatch which cannot be avoided;

The Vessel Trip Reports (logbooks) mandatory under the FMP since 1994, require fishermen to report discards. In conducting the stock assessments, NMFS uses information provided in the VTR as well as information gathered in the Northeast Fisheries Observer Program. In recent years, assessment scientists have expanded the analysis of discards in the stock assessments for some species. The Council and NMFS are both participating in the Atlantic Coastal Cooperative Statistics Program which is a long-term effort to improve the collection and utility of fisheries data (including bycatch).

The FMP contains a number of measures that directly or indirectly minimize bycatch or bycatch mortality as discussed in the submission documents for previous amendments and framework adjustments, for example, minimum mesh size and exempted fishery programs based on minimum bycatch standards for regulated species. The Council recognizes that low trip limits have caused discards and it is proposing this framework adjustment explicitly to minimize those discards.

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

The FMP contains no recreational fishery catch-and-release programs.

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors; and

Amendment 9 contains several sections that update the FMP in the context of this requirement: Appendix III describes the social and cultural aspects of the multispecies fishery; Section E.6.4. contains additional descriptions of the halibut fishery and recreational fishery, including trends in landings; and Appendix II, the Report of the Overfishing Definition Review Panel, describes the long-term landings history by species for all of the stocks in the multispecies fishery. Furthermore, Amendments 5 and 7 to the Multispecies FMP contain detailed descriptions of the commercial recreational and party/charter sectors participating in the fishery which provides additional historical perspective. The Council will update the descriptions of the fisheries in the Environmental Impact Statement for Amendment 13.

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery.

The Council has incorporated all sectors of the fishery into the FMP. It has determined that recreational and party/charter landings have declined proportionally relative to the required reductions in fishing mortality needed to achieve plan goals. It will monitor the recreational fishery and make adjustments as needed.

5.2 National Environmental Policy Act (NEPA)

The Council conducted an analysis of the environmental impacts of the stock rebuilding plan under Amendment 7. The Final Environmental Impact Statement (FSIES) indicated that the impacts of Amendment 7 would be significant, particularly the positive biological and long-term economic impacts of rebuilding the stocks. The proposed action is intended to modify the management measures to achieve the objectives and purposes of Amendment 7. The impacts discussed in this document are consistent with those that were expected under Amendment 7, as the measures are modifications to the Amendment 7 management program which failed to fully achieve its stated purpose.

5.2.1 Environmental Assessment

Section 2.1 of this document contains a discussion of the purpose and need for the proposed action. Section 3.0 contains a description of the proposed action and alternatives, including the no-action alternative. Section 4.0 contains an analysis of potential impacts.

In developing the proposed measures and in reviewing the analysis of impacts contained in this Environmental Assessment, the Council has consulted with NMFS, the Mid-Atlantic Fishery Management Council, Atlantic States Marine Fisheries Commission and the state marine fisheries agencies (New England states) through their participation in Council and Groundfish Committee meetings. The Council has also informed the interested public of the proposed action and review of environmental documents through notice in the *Federal Register* and by mailing of Council meeting notices and agendas to approximately 1,650 persons. About 850 interested parties receive notices of the Groundfish committee meetings.

5.2.2 Finding of No Significant Impact (FONSI)

NOAA Administrative Order 216-6 provides guidance for the determination of significance of the impacts of fishery management plans and amendments. The five criteria to be considered are addressed below:

1. *Can the proposed action be reasonably expected to jeopardize the long-term productive capability of any stocks that may be affected by the action?*

The proposed action is of a limited duration, approximately three months, and is not expected to have a significant impact on overall fishing mortality rates of either the stocks which are the target of

this action, cod, or on other fisheries. The Council has started its fourth annual review and adjustment procedure designed to keep the stock rebuilding program on target.

2. *Can the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats?*

Due to its limited duration, the proposed action, including the one-month extension of one of the rolling closures, will not have a significant impact on ocean or coastal habitats.

3. *Can the proposed action be reasonably expected to have an adverse impact on public health or safety?*

The proposed action will not have an adverse impact on safety, although vessels that greatly exceed the per-day limit may be forced to discard most of the overage under the proposed changes to the running clock. This change allows a modest overage, partly out of concern for vessel safety, so that vessel can return to port rather than be faced with a decision of remaining at sea (until sufficient time has elapsed to account for the overage) or discarding the overage.

4. *Can the proposed action be reasonably expected to have an adverse effect on endangered, threatened species or a marine mammal population?*

The proposed action is not expected to have an adverse effect on any protected species.

5. *Can the proposed action be reasonably expected to result in the cumulative adverse effects that could have a substantial effect on the target resource species or any related stocks that may be affected?*

The proposed action will not result in cumulative adverse impacts on any target or related stocks, due to its limit duration, and its minimal impact on fishing mortality rates.

Based on the preceding criteria and analysis, the Council proposes a finding of no significant impact.

FONSI STATEMENT: In view of the analysis presented in this document and in the FSEIS for Amendment #7 to the Northeast Multispecies Fishery Management Plan, the proposed action will not significantly affect the quality of the human environment with specific reference to the criteria contained in NAO 216-6 implementing the National Environmental Policy Act. Accordingly, the preparation of a Supplemental Environmental Impact Statement for this proposed action is not necessary.

**Assistant Administrator
for Fisheries, NOAA**

Date

5.3 Regulatory Impact Review

This section provides the information necessary for the Secretary of Commerce to address the requirements of Executive Order 12866 and the Regulatory Flexibility Act.

The purpose and need for management (statement of the problem) is described in Section 2.0 of this document. The proposed action is described in section 3.1 of the amendment document. Alternatives to the proposed action are also summarized in section 3.2. The economic impacts are described in section 4.2 and summarized below under the discussion of how the proposed action is characterized under Executive order 12866.

The Framework 31 document contains all the elements of RIR and the relevant sections are identified by reference to the document. Although no RFA is required for this action, the affected entities and the impacts are discussed in section 4.2 under the impacts on vessels.

5.3.1 Executive Order 12866

The proposed action does not constitute a significant regulatory action under Executive Order 12866 for the following reasons:

- (a) The Framework 31 proposed action is developed as a part of the adjustment process to address the problem of reducing Gulf of Maine cod discards while achieving the rebuilding goals of Amendment 7. Specifically, the Framework 31 measures are proposed to increase the trip limit to a level (400 pounds per day) that will minimize discards of cod, supplemented with additional closures of blocks 124 and 125 in February to ensure the conservation goals of the plan are still met.

The economic impacts of the Framework 31 measures are estimated to be positive as summarized in section 4.2 of this document. The proposed area closures are expected to reduce the fleet revenues from cod and other species by about \$430,000 in year 2000 during the months of February, March and April if no effort is displaced to other areas/months. The reduction of revenue will be even less if some part of the loss is recovered by fishing in other areas or months. The increase in the trip limit will have positive impacts, however, by increasing the Gulf of Maine cod revenues by about \$938,148 compared to the status quo level with a trip limit of 30 pounds/day, after adjusting revenues downward by 23.1 percent to take into account the impacts of the modifications into the running clock which eliminates overages over the trip limit.

Overall, the positive impacts will more than offset the reduction in revenues due to the area closures. As a result, Framework 31 proposed action is estimated to increase the fleet revenues by \$509,198 in year 2000 for the months of February, March and April compared to the status quo option (Framework 27 measures).

The proposed measures contained in this framework are designed to achieve the biological objectives of Amendment 7 at a minimum economic cost to the industry whenever possible without compromising the conservation goals. The increase in the cod trip limits will reduce the cod discards

and the costs of discarding for the vessels. The impacts on the consumer surplus, producer surplus and the net benefits will also be positive. For these reasons, the proposed action will not adversely affect in a material way the economy, productivity, competition and jobs. The proposed action will not have an annual effect on the economy of more than \$100 million.

- (b) For the same reasons as above, the proposed action will not significantly affect competition, jobs, the environment, or state, local or tribal governments and communities. The area closures and trip limits will not affect safety or public health.
- (c) The proposed action will not create an inconsistency or otherwise interfere with an action taken or planned by another agency. No other agency has indicated that it plans an action that will impact the same areas and the fisheries.
- (d) The proposed action will not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of their recipients.
- (e) The proposed action does not raise novel legal or policy issues. Regulations regarding area closures, trip limits, and running clock have already been used to manage fisheries in the Northeast.

5.3.2 Regulatory Flexibility Act (RFA)

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

The RFA applies to any rule or regulation that must undergo “notice and comment” under the Administrative Procedures Act (APA), specifically those rules published as proposed rules. When RFA applies, the Council must assess the impacts of the regulations to determine if they will have a “significant economic impact on a substantial number of small entities”. Since this action is submitted as a final rule, not subject to further notice and comment under the APA, the RFA does not apply, however, the Council has carefully considered which groups will be affected by the proposed action, possible alternatives to conserve cod and reduce discards, and how to minimize negative regulatory impacts. See Sections 3.0, 4.2, and 4.3 for the discussion of alternatives and their impacts on vessels of different sizes and gear types. The Council also considered a large amount of input from the regulated entities and anticipates evaluating the effectiveness and impacts of the proposed action on a continuing basis (see sections 2.2.2, 2.2.4, and 4.3).

5.4 Endangered Species Act (ESA)

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that may affect threatened or endangered marine species to ensure that those effects do not

jeopardize the continued existence of listed species. The Council has concluded that the proposed action may affect, but is not likely to jeopardize the continued existence of any endangered and threatened species. Consultation on the Multispecies Plan in 1996 resulted in a jeopardy finding for the northern right whale. Consultation was reinitiated in 1997 to incorporate the Atlantic Large Whale Take Reduction Plan (ALWTRP) as an expanded reasonable and prudent alternative. Implementation of this plan, in conjunction with simultaneous right whale recovery actions taken by NMFS and other agencies, is expected to remove the threat of jeopardy to the northern right whale represented by the multispecies fishery. The Council does not anticipate any adverse modification to right whale critical habitat. Should activities associated with the Multispecies FMP change significantly or new information become available that changes this determination, the Council will reinitiate consultation.

5.5 Coastal Zone Management Act (CZMA)

The Council has reviewed the coastal zone management programs for states whose coastal waters are within the range of areas affected by the proposed actions, including: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware and Maryland. It has determined that the proposed action is consistent with the CZM programs of those states and has sent a notification of this determination, along with a copy of the amendment document, for their concurrence. Copies of the correspondence are on file at the Council office.

5.6 Paperwork Reduction Act (PRA)

The proposed action has no new collection-of-information requirements.

5.7 Marine Mammal Protection Act (MMPA)

The Council has reviewed the impacts of Framework 27 on marine mammals (Section 4.1.3) and concludes that this action is consistent with the provisions of the MMPA and will not alter existing measures to protect species likely to inhabit the management unit. Overall, positive benefits may accrue to species inhabiting the areas affected by the proposed measures.

FRAMEWORK 31

APPENDIX I

Draft Final Rule

The draft final rule is submitted under a separate cover.

FRAMEWORK 31

APPENDIX II

**Gulf of Maine
Cod Trips and Cod Landings
February – April, 1999
Based on NMFS VTR Data**

These tables are in a separate file: FW31_Finaldoc_Appendix II