

#### 7.1.8.1.2 Economic effects

The proposed 14-inch minimum tail size would preclude landings in the peewee market category (up to 12 inches) and narrow the range of sizes in the small market category (currently about 12 to 15 inches). In the short run, monkfish landings and revenues would most likely decline until stocks rebuild. For example, had a 14-inch tail length restriction been in place during 1994 and 1995, and assuming that landings in the small market category were evenly distributed by length, then the average price of tails would have been an estimated \$1.31 and \$1.56, respectively, compared to \$1.16 and \$1.42 (excluding landings of unclassified tails in both cases), but tails revenues would have been 25 and 30 percent less--about \$11.5 and \$14.5 million during 1994 and 1995, respectively, compared to \$14.6 and \$19.0 million.

The implications of size restrictions for future total revenues cannot be analyzed at this time because yield streams are not segmented by fish size.

#### 7.1.8.2 Realized fishing mortality rates

The anticipated mortality reduction is approximately the same for all the alternatives, however changes in discarding will influence the effectiveness of the proposed actions to achieve the desired mortality rates. Current fishing mortality is 0.17 in the northern area and 0.45 in the southern area, although the NEFSC is conducting an updated assessment that may change this information. These values are unlikely to change substantially, however. The threshold mortality rates, to be achieved no later than July 1, 2002, are 0.05 and 0.22 in the northern and southern areas, respectively. The year 2 fishing mortality rate objective is 0.07 in the northern area and 0.26 in the southern area, corresponding to a TAL of 3,000 and 6,000 mt, respectively. The current fishing mortality rate and the overfishing threshold mortality reference points will change slightly with the updated assessment now underway. The interim mortality rates, expected from the proposed action, are certain to fall between current levels and the thresholds, according to plan.

Gradual reductions in mortality are expected between July 1, 1998 and July 1, 2002, and overfishing may be halted due to reductions in monkfish bycatch and unquantified management measures introduced by the proposed action. If the mortality rates are not lower than expected from the proposed action, then the Councils will have to make framework adjustments to bring management in line with the biological milestones. Changes in discarding mortality, brought on by the proposed actions, would change the relationship between F and the TALs, possibly causing the Councils to take additional action to compensate.

#### 7.1.8.3 Total allowable catch

The TAL limits gradually decrease from current landings to a threshold amount meant to stop overfishing by July 1, 2002. These TAL reductions are intended to produce reductions in mortality down to sustainable levels.

The TAL limits for alternatives 1 and 4 are approximately the same as for non-preferred alternative 4, although they act more as concrete limits rather than targets. For Alternative 1, the anticipated monkfish bycatch is deducted from the TALs to determine annual quotas to allocate in seasonal portions to the limited access fishery. For Alternative 4, the same procedure is used to determine an allocation for the limited access fishery, which is translated, based on the fishery history of qualifying vessels, into annual days-at-sea allocations. The TALs for preferred alternative 3, on the other hand, are targets to be used in evaluating the effectiveness of the management program. They would serve the same function as do the TACs for cod, haddock, and yellowtail flounder in the Multispecies FMP.

#### 7.1.8.4 Size limit

The proposed 11-inch minimum tail size limit is intended to reduce mortality on small, immature monkfish. This limit approximates the size at which 50 percent of females are sexually mature and capable of spawning (Table 103). The effectiveness of the size limit for improving selectivity of the fishery depends on a variety of factors and influences that are described elsewhere in this document.

#### 7.1.9 Endangered or Protected Species

A number of endangered and other protected species inhabit the management unit addressed in the Monkfish Fishery Management Plan. Eleven are classified as endangered or threatened under the Endangered Species Act (ESA) of 1973; the remainder are protected by the provisions of the Marine Mammal Protection Act (MMPA) of 1972. In the Northeast and Mid-Atlantic regions, endangered and protected species utilize marine habitats for purposes of feeding, reproduction, as nursery areas and as migratory corridors. Some species occupy the area year round while others use the region only seasonally or move intermittently inshore and offshore.

Entanglements of several species of marine mammals have been documented in sink gillnets, one of the principal gears used in the monkfish fishery. They include the northern right whale, humpback whale, fin whale, minke whale, harbor porpoise, white-sided dolphin, bottlenose dolphin, common dolphin, harp seal, harbor seal and gray seal. The status of these and other marine mammal populations inhabiting the Northwest Atlantic has been discussed in detail in the *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments*. Initial assessments were presented in Blaylock *et al.* (1995) and are updated in Waring *et al.* (1997). The reports present information on stock definition and geographic range, population size and productivity rates, a description of current population trends, an estimate of the annual human-caused mortality and serious injury as well as other causes of stock declines or impediments to recovery, a description of the commercial fisheries that interact with these stocks and an estimate of Potential Biological Removals (PBR). Endangered and threatened species found in New England and Mid-Atlantic waters are listed below. Right and humpback whales and harbor porpoise, however, are the species of particular concern because of their vulnerability to entanglements, their stock status and/or historic high levels of interactions with commercial fishing gear.

##### Endangered

Right whale (*Eubalaena glacialis*)  
Humpback whale (*Megaptera novaeangliae*)  
Fin whale (*Balaenoptera physalus*)  
Sperm whale (*Physeter macrocephalus*)  
Blue whale (*Balaenoptera musculus*)  
Sei whale (*Balaenoptera borealis*)  
Kemp's ridley (*Lepidochelys kemp*)  
Leatherback turtle (*Dermochelys coriacea*)  
Green sea turtle (*Chelonia mydas*)  
Shortnose sturgeon (*Acipenser brevirostrum*)

##### Threatened

Loggerhead turtle (*Caretta caretta*)

##### Species Proposed for ESA Listing

Harbor porpoise (*Phocoena phocoena*)

More detailed descriptions of the species in the above list were provided the Final Environmental Impact (EIS) Statements for Amendments 5 and 7 to the Northeast Multispecies FMP, which governs the federally regulated use of sink gillnet gear in the Northeast multispecies (groundfish) fishery, and in the EIS prepared for Amendment 4 to the Atlantic Sea Scallop FMP. The low level of incidental takes and serious injuries and mortalities of marine mammals in otter trawl and sea scallop gear also has been discussed in these documents and in framework

adjustment documents submitted to NMFS subsequent to these amendments. (Northeast Multispecies FMP Framework Adjustments 4, 12, 14, 15 and 23 were implemented specifically to protect harbor porpoise and Atlantic large whales by reducing encounters with sink gillnet gear.)

Other species of marine mammals likely to occur in the monkfish management unit include the minke whale (*Balaenoptera acutorostrata*), white-sided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*), bottlenose dolphin (*Tursiops truncatus*), [coastal stock listed as depleted under the MMPA], pilot whale (*Globicephala melaena*), Risso's dolphin (*Grampus griseus*), common dolphin (*Delphinus delphis*), spotted dolphin (*Stenella* spp.), striped dolphin (*Stenella coeruleoalba*), killer whale (*Orcinus orca*), beluga whale (*Delphinapterus leucas*), Northern bottlenose whale (*Hyperoodon ampullatus*), goosebeaked whale (*Ziphius cavirostris*) and beaked whale (*Mesoplodon* spp.). Pinnipeds species include harbor (*Phoca vitulina*) and gray seals (*Halichoerus grypus*) and less commonly, hooded (*Cystophora cristata*) harp (*Pagophilus groenlandicus*) and ringed seals (*Phoca hispida*).

### 7.1.9.1 Species of concern - Harbor porpoise

Beginning in 1994, NMFS implemented a number of Council-approved framework adjustments to the Multispecies FMP with the intent of reducing porpoise entanglements in the Gulf of Maine sink gillnet fishery through time/area closures. Because gillnets deployed in the monkfish fishery were fished by multispecies gillnet vessels, in addition to the fact that they had documented entanglements of marine mammals, they also became subject to the Gulf of Maine closures. The most recent estimate of harbor porpoise mortality in the gillnet fishery, calculated from observed takes in 1996, is 1,200 animals, while the weighted stock size estimate is 54,300 animals. The PBR level is estimated at 480.

In response to the MMPA mandates to establish Take Reduction Teams (TRTs) and to reduce the porpoise bycatch to PBR levels, a Gulf of Maine Harbor Porpoise TRT was established in 1996. The TRT developed a plan based on the Council's established time/area closures, added to them and mandated the use of acoustic deterrents in certain times and areas. The TRT met again in December 1997 and responded to a NMFS-modified Take Reduction Plan published as a proposed rule in *Federal Register* [62(156): 44302-43307]. To date, NMFS has not published a final rule that addresses porpoise bycatch in New England. The current closures which prohibit the use of sink gillnet gear are listed below.

Northeast Closure Area: August 15 through September 13 - implemented in 1994.

Mid-coast Closure Area: September 15 through December 31 - implemented in 1994. November 1 through December 31 this area will be open to gillnet vessels using acoustic devices deployed on the nets according to NMFS specifications.

Mid-Coast Closure Area: March 25 through April 25 - implemented in 1996.

Mass Bay Closure Area: March 1- 31 - implemented in 1995.

Cape Cod South Area: March 1 - 31 - implemented in 1996.

Although not associated directly with marine mammal protection, additional management actions occurred that directly affected gillnet vessels. In May 1998, the Council approved Framework Adjustment 25 to the Multispecies FMP, which included a series Gulf of Maine groundfish gear closures to address the overfished condition of Gulf of Maine cod. As evaluated in the NMFS Biological Opinion, rendered as part of the ESA Section 7 consultation process for the framework, the sequential "rolling closure" feature in this action is projected to have a beneficial impact on entanglements of marine mammals because the cod closures overlap in time, and also extend the duration and areas in which sink (and monkfish) gillnets are already prohibited. A year-round closure of areas of Jeffreys Ledge, Tillies Bank/Stellwagen Bank/Wildcat Knoll, known as the Western Gulf of Maine closure [*Federal Register* 63(61):15326-15333] should also provide significant protection in view of porpoise distribution, seasonal movements and bycatch patterns. The overall result of Framework 25 should be a substantial reduction in fishing effort and any associated porpoise bycatch in this region.

While investigating porpoise bycatch in the Gulf of Maine, it became apparent that animals from this same stock were being taken incidentally in monkfish and other gillnet fisheries off the mid-Atlantic states. Bycatch estimates for 1995 and 1996 were 103 and 310 animals, respectively. A separate Take Reduction Team was convened to address the problem, and although members did not reach consensus on a plan, certain elements were agreed to and submitted to NMFS. The team found that bycatch rates were higher on New England boats fishing in the region – apparently owing to their use of lighter weight twine, different mesh sizes, greater numbers of nets and longer soak times. Therefore, rather than recommending the use of time/area closures and pingers<sup>45</sup>, the TRT recommended to NMFS a series of seasonal gear restrictions including minimum twine diameters, caps on the number of nets, lengths of float lines, maximum mesh sizes, a one-month closure of the gillnet fishery off New Jersey from February 15 through March 15 and a 20 day block of time out of the fishery for each vessel sometime during the period of highest bycatch – February 1 through April 30. A mid-Atlantic Take Reduction Plan is currently under development by NMFS and will be published as a proposed rule in the near future.

### 7.1.9.2 Species of concern - Right and humpback whales

Because of an unprecedented number of right whale mortalities in the right whale critical habitat/calving grounds off Florida and Georgia in 1996, trends which indicated a population decline, uncertainty in the rate of recovery and an historic record of right whale entanglements in sink gillnet gear, the National Marine Fisheries Service asked the New England Council to initiate Northeast Multispecies FMP management measures that would reduce the risk of right whale entanglements. The Council responded by approving Framework Adjustment 23 to the FMP that closed portions of right whale critical habitat to fishing with sink, including monkfish, gillnets.

Right Whale Critical Habitat/Cape Cod Bay (federal waters portion): January 1 through May 15 - Closed to sink gillnet gear unless gear or alternative practices are developed that reduce the likelihood of entanglement or reduce the chances that entanglements will result in serious injury or mortality.

Right Whale Critical Habitat/Great South Channel: April 1 through June 30 - Closed to sink gillnet gear unless gear or alternative practices are developed that reduce the likelihood of entanglement or reduce the chances that entanglements will result in serious injury or mortality.

The Western Gulf of Maine closure, which was discussed in the context of harbor porpoise earlier in this section, also will serve to protect right, humpback and other Atlantic large whales. The rolling closure scenario effectively extends the Cape Cod Bay critical habitat closure in area during the month of March. Other actions implemented in 1997-1998, specifically to protect right, humpback, fin and minke whales were required by or undertaken through the Atlantic Large Whale Take Reduction Plan [*Federal Register* 62(140):39157-39188]. These include gear modifications, gear research, expanded disentanglement efforts, extended outreach efforts in key areas and expanded whale surveillance (Early Warning System) program. In association with the effort reductions required in the Monkfish FMP, these and other activities associated with the Atlantic Large Whale Plan should reduce the risk entanglements in monkfish gillnets.

### 7.1.9.3 Overview of monkfish management measures and impacts

The proposed action and alternatives are described in detail in Section 3.0 of the FMP and in Section 7.1.4 of the EIS, respectively. Primary measures proposed by the Councils include: qualification criteria for limited access and allocations of days-at-sea to vessels that qualify for limited access; trip limits for vessels on a monkfish day-at-sea and bycatch allowances for vessels not on a monkfish day-at-sea; minimum size limits; a cap on the number of gillnets; mandatory time out of the fishery during the spawning season; and a framework adjustment process.

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<sup>45</sup> Acoustic deterrent.

Given that the overall goal of the FMP is to reduce fishing mortality by limiting fishing effort, the monkfish management program is expected to reduce the likelihood of encounters between endangered and protected species and commercial fishing gear. Qualification criteria that will preclude new entrants into the fishery, a substantial reduction in the number of days available to fish for monkfish for vessels that qualify for limited access or have multispecies permits, trip limits for all other vessels, a 160-net cap for gillnets and time out of the fishery during spawning season are all the measures that are likely to produce reductions in incidental takes of marine mammals in this fishery.

#### 7.1.9.4 Impacts of fishing gear

The discussion of impacts of the proposed action and alternatives to endangered and protected species will focus on sink gillnet gear because of high level of documented entanglements of a number of marine mammals in the fishery and because of the low probability of interactions with otter trawls and sea scallop gear. (For a complete description of the major gear types used in the monkfish fishery see Section 5.4). Otter trawls and scallop dredges are classified as Category III fisheries in the Final List of Fisheries for 1998 [*Federal Register* 63(23):5748-5762], prepared in accordance with Section 118 of the MMPA. Category III fisheries have an annual mortality and serious injury that is less than or equal to 1 percent of the PBR level.

The impacts of bottom trawling and sea scallop dredging on endangered species of whales, sea turtles, and fish under NMFS jurisdiction, as well as impacts on critical habitat areas designated for the northern right whale have previously been addressed pursuant to Section 7 of the ESA for the Amendments 5 and 7 to the Northeast Multispecies FMP and for Amendment 4 to the Atlantic Sea Scallop FMP.

For purposes of the 1998 List of Fisheries, gillnet gear employed in the monkfish fishery is an extension of the multispecies sink gillnet fishery, and as such is classified as Category I, that is, fisheries in which the annual mortality and serious injury of a marine mammal stock is greater than or equal to 50 percent of the PBR level. Monkfish gillnets, therefore, are subject to all of the management actions taken to reduce entanglements of marine mammals in sink gillnet gear permitted under the Northeast Multispecies FMP. A description of gillnet gear and its use in the monkfish fishery is provided in Section 5.4.3.3.

#### 7.1.9.5 Impacts of alternatives

Given that the behavioral responses of fishermen under any circumstances vary widely and could be affected as much by market and biological conditions as the particular management regime selected, it is difficult to predict impacts to marine mammals. The following examples, therefore, represent only a few among the range of responses that could occur under the proposed action or the alternatives not selected by the Councils.

Under the proposed action, vessels not qualifying for monkfish limited access could fish under the trip limit which applies to their gear or area fished, or shift into other fisheries or reduce their fishing effort (see Section 6.0). Obviously, the latter would have the most beneficial impact on marine mammals that are vulnerable to entanglement in this gear type. Gillnet vessels fishing in the Gulf of Maine and on Georges Bank might continue to participate in the multispecies fishery, but might increase their utilization of days-at-sea up to the limit of their allocation to compensate for income lost as the result of monkfish effort reductions. These boats would be subject to the marine mammal restrictions discussed earlier in this section, but the potential increase in effort could negatively impact marine mammals in areas where entanglements are likely to occur. Another possible response for gillnet vessels would be to target dogfish. The resulting impacts could be negative for marine mammals over the short-term, given the current lack of management measures in that fishery, although a Spiny Dogfish Plan is currently under development that would nearly eliminate directed fishing by 2000.

Similarly, in the Mid-Atlantic, gillnet vessels are most likely to target dogfish, based on an analysis of the permit data. Some small-scale vessels also participate in the coastal gillnet fisheries for shad, menhaden, weakfish and croaker and could increase their participation in those fisheries. While the impacts of greater effort in these fisheries are currently unknown, the results of expanded observer coverage in 1998 should be available in the near future to assess marine mammal bycatch levels, and in particular possible interactions with bottlenose dolphins.

For purposes of evaluating the impacts on endangered and protected species there are a number of differences between the proposed action and the two non-preferred alternatives. The most substantive with respect to gillnet activity is that more vessels qualify under the proposed action than in either of the non-preferred alternatives in Section 7.1.4.2. (Alternatives to the Preferred Alternative) of the EIS. This could mean a difference in the impacts to marine mammals in the first three years of the plan if measured in terms of monkfish effort reductions. By year four of the plan, however, monkfish mortality reductions are projected to be roughly equivalent between the alternatives, as well as the proposed action, as more stringent effort reduction measures become effective.

Under non-preferred alternative 3a, fewer monkfish-only vessels would qualify for limited access, with the possible outcomes that: a) they could fish under the trip limit which would reduce effort and possibly entanglements; and b) vessels could switch to an alternative fishery, possibly one in which gillnets are also used, such as the dogfish fishery. In the case of the latter, few, if any reductions in risks to marine mammals would occur and may increase over the short-term, again because of the current lack of effort controls in the dogfish fishery. Multispecies vessels that qualify for monkfish limited access under this alternative could target monkfish on any of the vessel's allocated days-at-sea resulting in a potential increase in monkfish fishing mortality. The outcome for marine mammals could be neutral, however, since gillnet vessels would fish the same gear type whether targeting monkfish or multispecies and given that nets caps would be in place for both fisheries. Non-preferred alternative 3b has the fewest number of vessels qualifying for monkfish limited access when compared to the proposed action, but much the same responses could be expected as described in non-preferred alternative 3a.

#### 7.1.9.6 Conclusions

Although there is some uncertainty about the impacts of the monkfish management actions initially, over time limited access as well as a cap on landings and effort should contribute toward a reduction in marine mammal interactions, and harbor porpoise specifically. Additionally, NMFS intends to promulgate rules under the MMPA that are based on measures submitted to the agency by the Gulf of Maine and Mid-Atlantic Harbor Porpoise Take Reduction Teams. In concert with the Atlantic Large Whale Take Reduction Plan, monkfish management measures should, at a minimum, not jeopardize these efforts to reduce total marine mammal bycatch in the Northeast to less than the Potential Biological Removal (PBR) levels. Additionally, less gillnet fishing, provided that effort does not simply shift, may have a direct positive impact on achieving the PBR goals for endangered whales.

Based on information collected in similar fisheries, the major gear types used in the monkfish fishery appear to have few interactions with sea turtles, although it must be acknowledged there is little or no information available from the Southern Management Area where such occurrences are likely to take place.

Like marine mammals, seabirds are vulnerable to entanglement in commercial fishing gear. The interaction has not been quantified in the monkfish fishery, but impacts are not considered significant. Human activities such as coastal development, habitat degradation and destruction, and the presence of organochlorine contaminants are considered the major threats to some seabird populations. Endangered and threatened bird species, which, in the Northeast, include the roseate tern and piping plover, are unlikely to be impacted by the gear types employed in this fishery.

#### 7.1.10 Adverse Impact on Public Health and Safety

The impacts on public health and safety are described in Section 4.10 of the FMP.

#### 7.1.11 Cumulative impacts of the proposed action in concert with other laws, regulations, or plans on the target resource species or related stocks

Two proposed management changes that would substantially affect catches of monkfish are Amendment 7 to the Atlantic Sea Scallop FMP and gillnet closed areas in the Mid-Atlantic to protect harbor porpoise. A third

management change having potential impacts on monkfish mortality is the area closures to conserve Gulf of Maine cod. These area closures were implemented in May 1998 via Framework 25 to the Multispecies FMP. The impacts of these three management changes are analyzed and/or described below. Days-at-sea restrictions in the multispecies and scallop fisheries are a fourth type of regulation that has cumulative effects on monkfish, multispecies, and sea scallop mortality. This potential effect is evaluated qualitatively below.

#### 7.1.11.1 Proposals to manage sea scallops

The potential effects of Amendment 7 to the Atlantic Sea Scallop FMP are 1) days-at-sea reductions for limited access scallop vessels and 2) area closures. Both options in Draft Amendment 7 are subject to change and cannot be fully analyzed. The proposed day-at-sea reductions would reduce total fishing effort available for qualifying vessels to target monkfish and to reduce monkfish bycatch on less days that the vessel uses to target sea scallops. Since monkfish bycatch is a significant fraction of the total landings, especially in the Southern Fishery Management Area, changes in sea scallop days-at-sea will have a significant impact on monkfish mortality and are described below.

The effect of potential area closures to conserve sea scallops is to divert fishing away from areas of small scallops and intensify fishing effort in the remaining open areas (assuming days-at-sea limits are unchanged). If the proposed area closures reduce the availability of scallops to the fleet, it would reduce catch per unit effort and make scalloping less attractive. Depending on the location of the area closures and the availability of monkfish in areas that remain open, targeting monkfish with sea scallop days-at-sea could become more attractive and increase monkfish mortality. Since these scallop proposals have been developed, however, time has been insufficient to modify the Gulf of Maine area-closure assessment models and estimate the impacts of closed areas in the Mid-Atlantic. A more complete estimate of the fishery impacts of the final scallop management measures will be included in the final amendment.

The New England Fishery Management Council has proposed to reduce scallop day-at-sea allocations, stop overfishing, and rebuild sea scallop biomass. It is informative to compare the monkfish mortality implications from the proposed scallop days-at-sea reductions with the monkfish preferred alternative without Amendment 7 (i.e. the status quo with respect to scallop management). Amendment 7 to the Atlantic Sea Scallop FMP is currently in draft form and the actual impacts of the final management measures may however be different from those predicted below.

During the first four years following implementation of the Monkfish FMP, the comparative impacts of Amendment 7 compared to the status quo (for sea scallop management) would result in a reduction of monkfish mortality of five percent in the Northern Fishery Management Area and seven to ten percent in the Southern Fishery Management Area. Within Draft Amendment 7, the annual full-time scallop day-at-sea allocations are expected to be 75 days in 1999, 70 days in 2000, and 55 days in 2002. These correspond to the year 1, year 2 and year 4 results, respectively, in Table 167 and Table 168.

This estimated impact of Amendment 7 accounts for 30 percent of the quantitative shortfall in mortality reduction in the north and 60 percent in the south. This analysis only includes the effects of limited access, days-at-sea allocations, and trip limits. Other management measures (i.e. size limits, mesh restrictions, gillnet limits, closed areas for groundfish and harbor porpoise, etc.) are anticipated to account for the difference between the estimated impacts and the mortality reduction goals. Thus the proposed reductions in scallop days-at-sea in Amendment 7 will have a significant bearing on the Monkfish FMP's mortality results and increase the probability of success.

In the northern area (Table 167), landings under Amendment 7 are expected to be 7,086 mt, rather than 7,718 mt with the preferred alternative alone in year 1 (1999). Most of the added reduction in landings is within the "DAS qualifiers" category due to reductions in scallop days-at-sea. There is also an equivalent eight percent reduction in landed monkfish bycatch by vessels that do not qualify for monkfish limited access. Regulatory discards, although a small fraction of the total catch, is estimated to be 30 percent less (38 mt compared to 53 mt) than the status quo (for scallop management). The anticipate impacts are similar in years 2 and 4 due to decreasing scallop days-at-sea for targeting scallops or monkfish.

**Table 167.** Northern Fishery Management Area: Summary of estimated landings and discards after applying the proposed qualification criteria day-at-sea limits and trip limits. These results are compared to the total 1995-1996 landings for vessels in each category to estimate the anticipated monkfish mortality reduction. The qualification criteria for the Scallop Amendment 7 preferred alternative are the same as those for non-preferred alternative 3b.

	Vessel classification	Mortality reduction objective	Preferred alternative			Preferred alternative for Amendment 7 to the Atlantic Sea Scallop FMP – Monkfish preferred alternative qualification criteria		
			Expected landings (mt)	Expected discards (mt)	1995-1996 Landings (mt)	Expected landings (mt)	Expected discards (mt)	1995-1996 Landings (mt)
Year 1	DAS Qualifiers		6,492	53	7,991	5,911	38	7,991
	DAS Non-qualifiers		706	49	1,599	656	49	1,599
	Monkfish-only		416	115	708	416	115	708
	Bycatch fisheries		104	33	389	104	33	389
	Total		7,718	250	10,687	7,086	235	10,687
	Percent reduction	<b>55%</b>	<b>25%</b>			<b>31%</b>		
Year 2	DAS Qualifiers		5,781	49	7,991	5,324	37	7,991
	DAS Non-qualifiers		697	49	1,599	654	49	1,599
	Monkfish-only		309	115	708	309	115	708
	Bycatch fisheries		104	33	389	104	33	389
	Total		6,891	246	10,687	6,391	233	10,687
	Percent reduction	<b>55%</b>	<b>33%</b>			<b>38%</b>		
Year 4	DAS Qualifiers		2,546	1,663	7,991	2,152	1,569	7,991
	DAS Non-qualifiers		656	68	1,599	609	63	1,599
	Monkfish-only		68	243	708	68	243	708
	Bycatch fisheries		104	33	389	104	33	389
	Total		3,374	2,007	10,687	2,933	1,908	10,687
	Percent reduction	<b>68%</b>	<b>50%</b>			<b>55%</b>		

In the southern area (Table 168), monkfish landings are estimated to be reduced by the effects of Amendment 7, landings declining from 8,672 to 7,437 mt and regulatory discards declining from 425 to 403 mt in year 1. This is equivalent to a 14 and 5 percent reduction in mortality, respectively. Unlike the northern area, a greater fraction of mortality reduction is anticipated from the days-at-sea vessels that do not qualify for monkfish limited access. Landings are estimated to decline from 1,104 to 779 mt for vessels that do not qualify for monkfish limited access, a 29 percent decline compared to a seven percent decline for the comparable category in the north (Table 167). Similar impacts are estimated for year 2 and year 4 (Table 168). This additional reduction in monkfish bycatch would reduce monkfish mortality by a few percentage points in the southern area. In year 4, the additional effort reduction causes the quantitative estimate of monkfish mortality to be only five percentage points short of the overfishing definition threshold. Thus the proposed reductions in scallop days-at-sea in Amendment 7 will have a significant contribution for monkfish mortality reduction and increase the probability of meeting the FMP goals.

**Table 168.** Southern Fishery Management Area: Summary of estimated landings and discards after applying the proposed qualification criteria day-at-sea limits and trip limits. These results are compared to the total 1995-1996 landings for vessels in each category to estimate the anticipated monkfish mortality reduction. The qualification criteria for the Scallop Amendment 7 preferred alternative are the same as those the preferred alternative in the Monkfish FMP.

	Vessel classification	Mortality reduction objective	Preferred alternative			Preferred alternative for Amendment 7 to the Atlantic Sea Scallop FMP – Monkfish preferred alternative qualification criteria		
			Expected landings (mt)	Expected discards (mt)	1995-1996 Landings (mt)	Expected landings (mt)	Expected discards (mt)	1995-1996 Landings (mt)
Year 1	DAS Qualifiers		6,391	48	7,853	5,481	36	7,853
	DAS Non-qualifiers		1,104	212	3,200	779	202	3,200
	Monkfish-only		1,091	105	1,426	1,091	105	1,426
	Bycatch fisheries		86	60	935	86	60	935
	Total		8,672	425	13,414	7,437	403	13,414
	Percent reduction	<b>59%</b>	<b>32%</b>			<b>42%</b>		
Year 2	DAS Qualifiers		4,903	44	7,853	4,179	35	7,853
	DAS Non-qualifiers		1,046	210	3,200	766	201	3,200
	Monkfish-only		409	105	1,426	409	105	1,426
	Bycatch fisheries		86	60	935	86	60	935
	Total		6,444	419	13,414	5,440	401	13,414
	Percent reduction	<b>59%</b>	<b>49%</b>			<b>56%</b>		
Year 4	DAS Qualifiers		2,432	712	7,853	1,758	584	7,853
	DAS Non-qualifiers		955	233	3,200	639	210	3,200
	Monkfish-only		104	180	1,426	104	180	1,426
	Bycatch fisheries		85	59	935	85	59	935
	Total		3,576	1,184	13,414	2,586	1,033	13,414
	Percent reduction	<b>78%</b>	<b>65%</b>			<b>73%</b>		

### 7.1.11.2 Proposals to reduce impacts on harbor porpoise

NMFS is evaluating the potential of possible management regulations to reduce interactions with harbor porpoise in the Mid-Atlantic. One of the primary fisheries that these regulations would impact is the gillnet fishery for monkfish. In addition to limits on the amount and type of fishing gear, the regulations that are under evaluation include seasonal closed areas. It is too early, however, to quantify the anticipated impacts because these regulations have not yet been formally proposed and are subject to change. Generally, the effect of closed areas to protect harbor porpoise is to change seasonal and geographic fishing patterns so as to reduce encounters.

This type of management measure, promulgated under the Marine Mammal Protection Act would also have coincidental effects on monkfish mortality and economic yield. The harbor porpoise closed area discussions include closed areas during February through April, overlapping the peak in spring fishing activity by vessels using gillnets to target monkfish. The seasonal distribution of landings is described in Section 5.4.2 and Section 5.4.3.

Two responses by fishermen to these area closures are possible. Fishermen in the Mid-Atlantic could relocate to Southern New England and Gulf of Maine waters to continue targeting monkfish. To some extent, the ability for monkfish vessels to relocate is limited because many would have to fish in fisheries (defined by area and gear) that are exempt from the multispecies days-at-sea regulations. Vessels with multispecies limited access permits, could however fish in the more northern and eastern areas during a multispecies day-at-sea. The other likely response is to fish harder during the open season. It is impossible to predict at this point whether fishermen would fish harder for monkfish during June and July to compensate or fish harder during October to January. Although prices for monkfish livers are higher during October to January, gillnet fishermen prefer not to fish during this season because of poor weather conditions. When the weather is poor, fishermen report that net efficiency is compromised due to agitation of the net and the response of monkfish to the different conditions. Typically, gillnets fish better during the calmer spring season when the monkfish are moving to their spawning areas.

### 7.1.11.3 Area closures to conserve Gulf of Maine cod

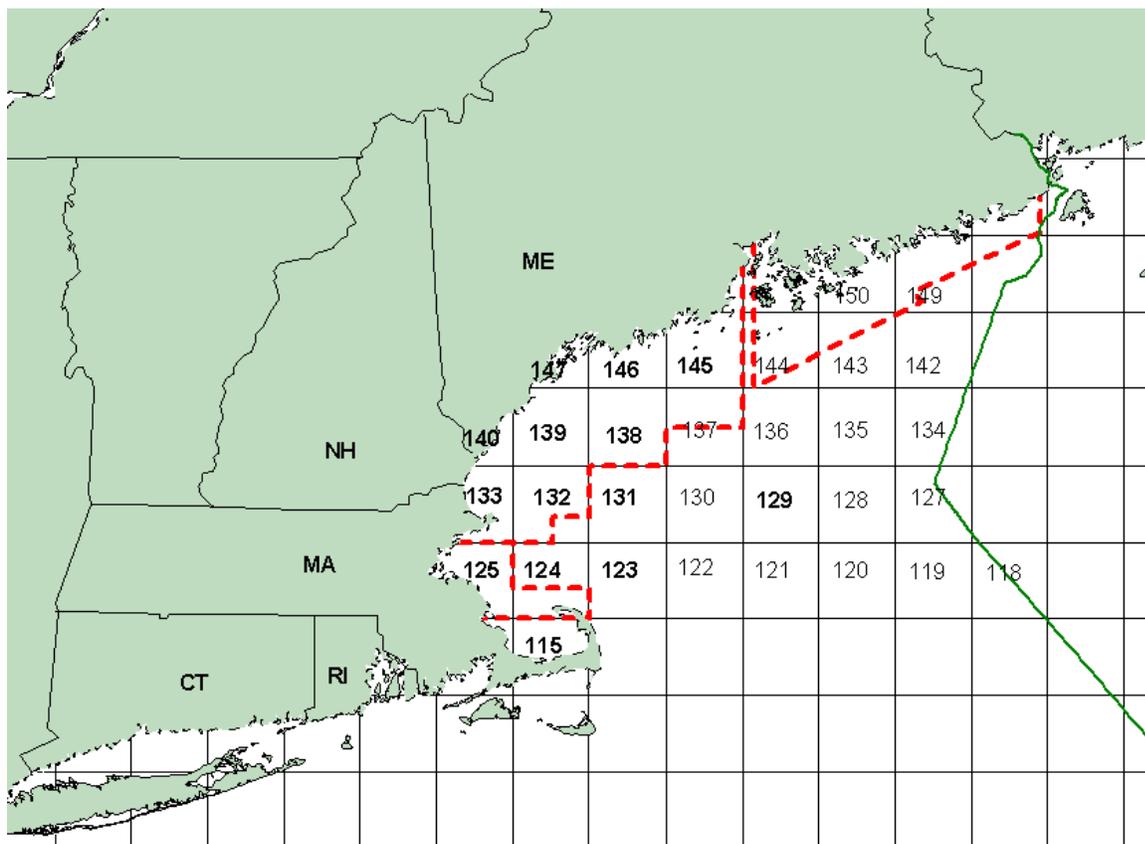
Public comments often identified closed areas for groundfish conservation as having a major contribution to monkfish mortality reduction. The groundfish area closures on Georges Bank and Nantucket Shoals were in place during most of the baseline period (1995-1996) for evaluating various management options. Only the recently implemented Gulf of Maine cod closures were not included in the monkfish analyses. As the proposed area closure management options solidified in the Multispecies FMP, the impacts on monkfish mortality were also analyzed using a two-bin model developed by the Northeast Fisheries Science Center (NEFSC; John Walden, pers. comm.) to evaluate codfish conservation.

Simplistically, the two-bin model uses catch per trip to predict where the next-best fishing area would be given a proposed closure area. It does not take into account added travel time from port or cost thresholds when it becomes unprofitable to fish. The NEFSC included monkfish catch-per-effort data in the model to also evaluate the impacts of the proposed cod area closures on monkfish. The preliminary results for area closure options (6, 7, and 8) in the Multispecies Monitoring Committee (MSMC) report indicated very little impact on monkfish mortality. The net change in monkfish mortality was estimated to range from a decrease of 2 percent to an increase of 1.4 percent in monkfish landings (Table 169). This result was not surprising, since the model estimates shifts in effort based on potential economic return. The proposed area closures in the MSMC report were chosen to maximize the effect on cod mortality. As a result, areas that have higher monkfish catches would experience more fishing effort and mitigate the positive benefits of monkfish conservation in the closed areas.

The area closures that the Council included in Framework 25 (Table 169; Figure 49) included more areas, but closed them for shorter periods of time than those proposed by the MSMC. The chosen alternative was intended to have equivalent mortality impacts for cod without unfairly penalizing the fishery in only one area of the coast. The additional area closures could have had more effect on monkfish mortality than originally estimated, but the same two-bin model suggests that this is not the case. In fact, monkfish mortality is expected to increase slightly by 1.6 percent (Table 169).

**Table 169.** Estimated implications for monkfish mortality caused by closing areas to protect groundfish. The framework 25 option was implemented on May 1, 1998.

Multispecies monitoring committee option	Closed areas and times (Figure 49)	Net change in monkfish landings
6	Blocks 129 and 130 – January through June Blocks 132 and 139 – January through July, excluding February	No change
7	Blocks 129, 130, 132, 139 – June through November	Increase of 1.4 %
8	Blocks 129, 130 – year round Block 132 – October through December	Decrease of 2 %
Framework 25 implementation	Blocks 124, 125 – March 1 to 31 Blocks 131, 132, and 133 – April 1 to 30 Blocks 138, 139, and 140 – May 1 to 31 Blocks 129, 145, 146, 147, and 152 – June 1 to 30 Northeast area closure – August 15 to September 13 Western Gulf of Maine closure area – Year round	Increase of 1.6 %



**Figure 49.** Gulf of Maine area closure reference blocks. The groundfish/harbor porpoise closed areas that existed prior to Framework 25 are indicated by dashed lines.

Added to the quantitative estimates of the area closure impacts on monkfish are intra-species shifts in fishing effort caused by the more restrictive measures for codfish. These shifts cannot be analyzed with the two-bin model currently in use, however. The area closures and trip limits in the Gulf of Maine are intended to cap landings

and decrease the opportunity to target cod. If the economics are more attractive for multispecies vessels that qualify for monkfish limited access, multispecies fishermen could use more of a vessel's days-at-sea allocation to target monkfish, rather than cod. Thus, the effect of the Framework 25 measures could increase monkfish mortality by 5 percent or more, depending on how the fishery reacts to the new multispecies regulations.

#### 7.1.11.4 Unquantified effects of days-at-sea regulations in the multispecies and scallop fisheries

There are important implications of the proposed management system that the Councils believe will contribute to the realized monkfish mortality reductions. These benefits, however, could not be predicted because they would result from behavioral changes that could not be analyzed. The Monkfish FMP proposes to require multispecies and scallop vessels that qualify for monkfish limited access to target monkfish while using a multispecies or scallop day-at-sea (Section 3.3.2). Non-qualifying vessels would not be able to exceed the bycatch trip limits, greatly reducing their opportunity to target monkfish.

The effect of the existing days-at-sea regulations in these fisheries has been estimated within the models used to assess the implications of the proposed management measures for monkfish. The Councils, however, anticipate that the inclusion of monkfish in the existing multispecies and scallop days-at-sea programs will have a positive synergistic effect that could not be quantified. Unlike the status quo, multispecies and scallop vessels would have to relinquish a valuable day-at-sea to target monkfish, increasing the cost of vessel conversion to pursue monkfish<sup>46</sup>. Vessels that use most or all of their allotted days-at-sea to target groundfish or scallops would lose revenue from those species in order to target monkfish. The Council believes that this added cost would dissuade multispecies and scallop fishermen from targeting monkfish, even though the vessel qualifies for monkfish limited access and would have the opportunity to use up to 40 multispecies or scallop days-at-sea for monkfish.

The PDT analysis<sup>47</sup> assumed that a vessel would target monkfish during an unused day-at-sea<sup>48</sup>, regardless of the amount of monkfish that it formerly caught on a directed trip. On the other hand, a trip that had a mixed catch of groundfish/monkfish or scallops/monkfish was assumed to target only groundfish or scallops, unless the revenue from monkfish exceeded the revenue derived from other species. The actual response by fishermen, however, will be governed by many factors that could not be taken into account by the PDT. These factors include relative changes in price and availability, the costs of targeting other species versus the cost of targeting monkfish, and the relative stock biomass of the alternative species.

As groundfish biomass rebuilds, fewer days-at-sea will be available to target monkfish because the days-at-sea would be used to target more-profitable groundfish as catch per unit effort increases. When fishermen take these factors into account, it could have a beneficial effect on monkfish mortality if it remains more attractive to target multispecies or scallops, rather than monkfish. In this case, many vessels that qualify for monkfish limited access would use few of the 40 allotted days to target monkfish. Conversely, if fishing for monkfish is more attractive than fishing for groundfish or sea scallops, vessels may use a higher proportion of days to target monkfish and thereby reduce fishing mortality on groundfish and sea scallops. This response would have a beneficial effect on overfished groundfish and scallop stocks. It is unclear how much benefit will accrue from this synergistic effect on the rebuilding schedules for all implicated stocks or how much of the benefit will apply to each species. The Councils believe however that there will be a substantial unquantified benefit that will account for the difference between the monkfish mortality reduction goals and those calculated to accrue through days-at-sea restrictions, size limits, and area closures.

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<sup>46</sup> For vessels that do not use all of the allotted annual days-at-sea, there is no cost associated with conversion to target monkfish, other than the cost of the needed gear and equipment.

<sup>47</sup> The PDT analyzed the expected landings and discard by qualifying and non-qualifying vessels, based on the history of that vessel during 1995 and 1996. This analysis is described in more detail in Section ???.

<sup>48</sup> An unused day-at-sea is one in which a multispecies or scallop vessel used fewer days during the 1996-97 fishing year than were allotted to the vessel during the fishing year. This number for each vessel was reduced to account for planned reductions in day-at-sea during 1998 and 1999 in the Atlantic Sea Scallop FMP.

## 7.1.12 EIS Circulation List

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

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