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Gerry E. Studds Stellwagen Bank National Marine Sanctuary
Ecosystem Alteration Action Plan

Overview

Ecosystems can be altered by humans in numerous ways. A wide variety of issues of direct relevance to the alteration of the Stellwagen Bank ecosystem were identified through the public scoping process for the SBNMS management plan review. The Ecosystem Alteration (EA) Working Group (WG) was tasked with the responsibility of developing action plans for ten of these issues. The EA WG began its deliberations by prioritizing these issues. The issues were ranked as follows:

1a Alteration of benthic habitat as a result of mobile fishing gear[1];
1b. Alteration through biomass removal as a result of fishing activities;
2. Alteration as a result of pollution;
3. Alteration caused by ocean dumping and marine debris;
4. Alteration resulting from the disposal of dredged materials;
5. Alteration caused by emerging issues;
6. Alteration resulting from the laying of pipelines and cables;
7. Alteration caused by exotic species;
8. Alteration by mariculture; and
9. Alteration resulting from coastal activities;

Each of these issues comprises numerous sub-issues. While the EA WG members agreed to tackle the issues in the order of priority ranking, the members felt that it might be advantageous to begin the process with a lower ranked (and theoretically less contentious) issue so that they could gain an understanding of the action planning process and their relative roles in deliberations. As a consequence, the first strategy presented in the Action Plan focuses on alteration relating to the laying of pipelines and cables within the SBNMS.

Within the time constraints presented by the SBNMS action planning process, the EA WG was unable to deliberate on issues 2, 4, 5, 7, 8, and 9. The main reason for not attending to these issues was the extensive amount of time and effort required to reach consensus on the two issues concerning ecosystem alteration and fishing activities. The EA WG recommends that a new EA WG be constituted to attend to at least some of these remaining issues. It will be important for the Sanctuary staff and the Sanctuary Advisory Council (SAC) to consider whether or not the issue of ecosystem alteration caused by pollution has been dealt with sufficiently by the WQ WG. Further, some of the issues that were ranked as a low priority by the EA WG may not necessitate the full development of action planning strategies.

[1] There was initial disagreement within the EA WG as to whether or not the alteration of benthic habitat as a result of mobile fishing gear (1a) and ecosystem alteration through biomass removal as a result of fishing activities (1b) were the highest priority issues for the group's deliberation. However, the group ultimately accepted top ranking for these issues because they were heavily emphasized during the public scoping process and the need for the sanctuary to receive guidance on the issues.

STRATEGY EA.1 – THE SANCTUARY SHOULD DEVELOP A PLAN FOCUSED ON THE ECOSYSTEM IMPACTS OF THE LAYING OF CABLES AND PIPELINES WITHIN THE SBNMS

Overview

The laying of submarine cables and pipelines is a prohibited activity in the SBNMS. Prohibited activities can be authorized, however, under certain limited circumstances, through the issuance of a Special Use Permit (SUP). The issuance of such permits depends on the extent to which the prohibited activity is compatible with the resource protection mandate of the sanctuary and the degree to which the activity meets regulatory and other requirements.

In August of 2000, the SBNMS issued a SUP to 360 networks, Inc. to allow the laying of a high-capacity fiber optic cable within the sanctuary, as part of a connection between the United States and Europe (the Hibernia Transatlantic Telecommunications Project). The SUP allowed 360network Inc. to traverse approximately 12.1 miles (19.49 kilometers [km]) of the northern portion of the SBNMS. In 2002, 360 networks, Inc. filed for bankruptcy. The cable was later purchased by CVC, Inc.

Public comment received during the SBNMS MPR process raised questions pertaining to the existence of cables and pipelines within the sanctuary and the appropriateness of the sanctuary's management process in relation to cables and pipelines. The issue was considered particularly important because the proximity of the SBNMS to Boston increases the probability that the sanctuary might receive future requests to allow cables or pipelines within its boarder. To that end, the EA WG recommended a series of strategies for managing cables and pipelines.

The EA WG emphasized that, while cables and pipelines are considered together because they each involve laying permanent or semi-permanent material on the seabed, the risk posed by pipelines is several orders of magnitude greater than that posed by fiber optic cables. EA WG members also agreed that this asymmetry should not lower the standard of scrutiny received by cables. Rather, it should increase the standard of scrutiny to which pipelines should be held. In general, the EA WG agreed with rules currently proposed by the National Marine Sanctuary Program (NMSP) contained in the Advanced Notice of Proposed Rulemaking: Installing and Maintaining Commercial Submarine Cables in National Marine Sanctuaries (Federal Register 65[164]:51264-51270). One major difference is EA WG recommendation that a "performance bond" be posted by companies to ensure accountability and that "non-market value" be considered when calculating fees charged to cable and pipeline applicants. The EA WG also considered it important to stress that applications would be assessed on a "case-by-case" basis and that the existence of one cable or pipeline in the sanctuary did not necessarily mean that others would be approved.

Existing Regulations Pertaining to the SBNMS

The SBNMS designation document prohibits "drilling into, dredging or otherwise altering the seabed of the sanctuary; or constructing, placing or abandoning any structure or material or other matter on the seabed of the sanctuary, except as an incidental result of (i) anchoring vessels; (ii)

traditional fishing operations; or (iii) installation of navigation aids" (Section 950.5[4], pp. A7 & A8). As such, the laying of cables and pipelines are prohibited activities. The NMSP has published an Advanced Notice of Proposed Rulemaking: Installing and Maintaining Commercial Submarine Cables in National Marine Sanctuaries (Federal Register 65,[164]: 51264-51270) providing guidance for when sanctuaries might allow the laying of pipelines and cables through the issuance of a SUP. The SBNMS issued one such permit in August of 2000.

Activities (5)

(1.1) *The laying of cables and pipelines should remain a prohibited activity within the SBNMS.* SUPs, however, may be issued by the sanctuary following guidelines published in the National Oceanic and Atmospheric Administration (NOAA) Advanced Notice of Proposed Rulemaking: Installing and Maintaining Commercial Submarine Cables in National Marine Sanctuaries (Federal Register 65,[164]: 51264-51270) and the actions contained in this plan.

> *Rationale:* There was agreement on a general prohibition on cables and pipelines within the sanctuary. EA WG acknowledged that, in some cases, allowing a sanctuary option might decrease overall environmental harm (e.g., the proposed route impacted more sensitive areas outside the sanctuary). The EA WG emphasized that the risk posed by pipelines was considered "several orders of magnitude greater" than that posed by cables and that pipeline should be held to a higher standard of scrutiny than cables.

(1.2) *Identification of areas that should be avoided.*
The sanctuary should identify areas that should be avoided. These may include rocky, hard bottom areas, areas where cables or pipelines cannot be buried, essential fish habitat (EFH), endangered species habitat and/or designated areas of special ecological concern.

> *Rationale:* Some areas within the sanctuary are particularly sensitive to disruption and should not be considered as routes for cables or pipelines.

(1.3) *The sanctuary should establish minimum criteria to be met before an application is considered.*
Stipulations are included in the following Actions.

> *Actions:*
>
> 1.3.1 No feasible alternative route exists
>
> > *Rationale:* There was agreement that this phrase should not be used by industry as a way to structure alternatives so that the SBNMS is the only feasible alternative. It should not mean that the SBNMS is the least expensive route. Ecological considerations should be considered first followed by economic considerations.
>
> 1.3.2 Impact to sanctuary resources should be minimal and temporary.

Rationale: The EAWG preferred this wording to the “negligible” and “short-term” wording in the proposed rule because "minimal" and "temporary" are defined in the Sustainable Fisheries Act, whereas no legal definition exists for "negligible" and "short-term".

1.3.3 Appropriate mitigation and monitoring is included and paid for by the applicant.

Rationale: The EAWG felt that research on conditions at the proposed site must be carried out pre- and post-construction. Pre-construction research is seen as necessary in order to develop baseline data about the habitat potentially being disturbed. Post construction research is needed to assess any potential impacts of the construction. It was also agreed that research would have to be conducted at set periods prior to construction to develop baseline data and after construction to monitor the site for long-term impacts and restoration. The applicant should pay for such research and any needed mitigation. Funds would be provided to the sanctuary, which could, if appropriate, either use sanctuary researchers or hire outside contractors through an open and competitive request for proposal (RFP) process. The sanctuary should have full access to all data. The EA WG did no support allowing the applicant to choose its own contractor for the research, as it was felt that this could result in a conflict of interest.

1.3.4 The route will not have detrimental impacts on fishing interests or other human activities

Rationale: Fishing and other human activities play an important economic and social role in the coastal communities associated with the SBNMS. The laying of cable and pipeline should not significantly disrupt or harm these interests in the short or long term.

1.3.5 The applicant agrees to remove all or part of the cable at the end of its life if determined appropriate by NOAA

Rationale: The sanctuary should have the option of having the cable or pipeline removed rather than leaving it in situ as marine debris.

(1.4) *The sanctuary should assess an application and/or permit fees to cover:*

a. Costs incurred or expected to be incurred as part of issuing a SUP
b. Costs incurred, or expected to be incurred, as a direct result of the conduct of permitted activities, including monitoring costs
c. Costs that represent the Fair Market Value for the impacts to resources within the sanctuary caused by laying cables and pipelines.
d. Costs that represent the Non-market Value for the impacts to resources within the sanctuary caused by laying cables and pipelines.

(1.5) *The sanctuary should require the posting of a "Performance Bond."*
A "Performance Bond" should be posted by the applicant or companies acting on the behalf of the applicant to ensure that permit safeguards and conditions are met.

STRATEGY EA.2 – THE SANCTUARY SHOULD DEVELOP A PLAN FOCUSED ON ALTERATION OF BENTHIC HABITAT BY MOBILE FISHING GEARS

Overview

Commercial fishing can alter the benthic environment through the loss or dispersal of physical features (e.g., piled boulder reefs and sand waves) or the loss of structure forming organisms (e.g., hydroids, sponges, anemones, and bryozoans). These alterations can lead to changes in the biomass, species diversity, age and size composition, and productivity of the associated biota (Jennings and Kaiser 1998; Collie et al., 2000). Key factors effecting such changes include the type of fishing gear, level of fishing effort, the spatial distribution of the fishing effort and physical and biological characteristics of the bottom where fishing is conducted (McGee, New England Fisheries Management Council [NEFMC] and Stevenson NOAA Fisheries, presentations to the EA WG, 2004).

Meta-analysis suggests that, of gears commonly fished in the SBNMS, scallop dredges and otter (bottom) trawls are likely to have the greatest benthic impact. Most of the damager occurs during the first few passes (tows) of gear over virgin bottom (Kaiser, University of Whales, presentation to the EA WG, 2004). While scallop dredges are judged to be more disruptive than otter trawls on a unit effort basis (Collie et al., 2000), in the Northeast Region (Maine to North Carolina) bottom trawling accounts for more than twice as many days absent (from port) as scallop dredges and is represented in more than twice the area fished (NEFMC, 2003).

Another key factor is the type of habitat being fished. In general, benthic habitats characterized by unstable, high-energy environments tend to be inhabited by fast-growing, mobile organisms with small body size and high reproductive rates, while stable, low-energy environments are characterized by long-lived, slow-growing organisms with large body size and lower reproductive rates. The latter types of organisms are more vulnerable to the impacts of habitat alteration by commercial fishing gears. Unstable physical environments can be made more stable by organisms that add biogenic structure (e.g., worms and mussels). These biogenic structures can also be heavily impacted by anthropogenic disturbance to the bottom. Among specific habitats, hard bottom (boulder and gravel) and mud substrates appear to be the most sensitive to the removal of physical and biological structure by mobile fishing gear and coarse sand the least (McGee, NEFMC and Stevenson NOAA Fisheries, presentations to the EA WG, 2004). In the SBNMS, the make-up of substrate type is approximately, 38% gravel, 28% mud and 34% sand. (SBNMS, unpublished data). Thus, approximately 66% of the sanctuary might be considered particularly vulnerable.

Different habitat types exhibit different recovery rates from disturbance. Experiments to investigate recovery times have been conducted by examining fishing across a range of sediment types. Using the results from these experiments, the biological recovery time for communities

on specific sediment types can be predicted due to the high degree of correlation between habitat and the rate of biological recovery. In general, recovery in coarse sand, being mainly physical in nature, is quite quick. A longer recovery time is needed with mud, which has many chemical processes associated with it. Muddy sand, a stable hybrid, takes the longest to recover often requiring many years (M. Kaiser, presentation to the EA WG, 2004). Otter trawl fishing effort by sediment type within the SBNMS (1994-1995), as determined from monthly standardized shipboard survey sightings, was gravel 25.84%, sand 36.10% and mud 38.06%, (total n=200). In 2001-2002, otter trawl fishing effort by sediment type within the SBNMS was gravel 23.32%, sand 38.85% and mud 37.83%, (total n=78). Scallop dredge fishing effort by sediment type within the SBNMS (1994-1995), was gravel 18.61%, sand 39.41% and mud 41.97%, (total n=6)[2]. In 2001-2002, scallop dredge fishing effort by sediment type within the SBNMS was gravel 23.72%, sand 62.45% and mud 13.83%, (total n=52) (Exhibits 1 & 2; SBNMS, unpublished data[3]).

Related research conducted within the SBNMS corroborates recovery rates based on sediment type at the scale of the sanctuary. A comparison of the recovery rates of areas inside and outside of the Western Gulf of Maine (GOM) Closure Area[4] (WGOMCA) (1998-2002), demonstrated little difference in key benthic community indices for sandy substrate areas. For mud substrate, no differences were observed over the period 1998-2001. In 2002, however, significantly higher abundance, evenness, and diversity of species were documented in the unfished site (inside the WGOMCA) as compared to the fished site (outside the WGOMCA). This sequencing indicates that the area had been impacted by fishing and that recovery was beginning after many years (Lindholm, Pflegler Institute of Environmental Research [Pfleger Institute], presentation to the EA WG, 2004).

Meta-analysis indicates that once a habitat has been degraded by initial fishing pressure, it is not necessarily continuously degraded by continued fishing pressure. Although continued pressure does not allow habitat to recover, it might retain sufficient productivity to remain viable as a commercial fishery (Kaiser, University of Whales, presentation to the EA WG, 2004). These results were corroborated at the scale of the sanctuary. Two areas with long trawling histories, and located a few tens of kilometers from the sanctuary's western boarder, were experimentally fished to investigate changes caused by additional fishing using a smooth bottom trawl. After six tows over soft bottom there was no difference in pre/post indices of infaunal diversity, richness or composition (Mirarchi, F/V Christopher Andrew and CR Environmental, presentation to the EA WG, 2004).

The rate and magnitude of natural disturbance is another important variable when considering the susceptibility of benthic habitats to alterations by bottom fishing gears. Areas that are frequently exposed to storm actions represent high-energy environments that are less susceptible to the impacts of fishing gear. The SBNMS is subject to severe storms throughout the year.

[2] These data have not been adjusted for small differences in effort. Effort was most complete during 1994-1995.
[3] Methods used for surveys can be found in Wiley, D.N., J.C. Moller and K. Zilinskas. 2003. The distribution and density of commercial fisheries and baleen whales within the Stellwagen Bank National Marine Sanctuary: July 2001-June 2002. Marine Technology Society Journal 37(1):35-53.
[4] The Western Gulf of Maine Closed Area is an area closed to ground fishing. However, it is open to shrimp trawling, herring trawling, tuna purse seines, lobster gear, and recreational fishing.

Data indicate, however, that storm driven turbulence has little to no effect below 60 meters and 64.6% of the SBNMS is below that depth (Lindholm, Pfleger Institute, presentation to the EAWG, 2004). In addition, the difference between the episodic nature of natural disturbance and the chronic nature of fishing pressure is important to consider when evaluating the impact of these two disturbance types and their biologic importance (Auster, National Undersea Research Center, presentation to the EA WG, 27 April 2004). The erosional and depositional effects of bottom ocean currents at the sale of the sanctuary are largely unknown.

Groundfishing Effort within the SBNMS

Substantial changes have occurred to fisheries operating in the SBNMS since the sanctuary was designated in 1992. Many of these changes could be expected to impact the degree to which the benthic habitat of the sanctuary has been and is currently being altered. Effort reduction actions taken by the NEFMC have likely decreased the frequency with which bottom otter trawl vessels visit the sanctuary. At the time of designation there was no limit to the number of days a vessel could fish. In 2003 most small groundfish fleet permit vessels were limited to ~70 days-at-sea (DAS). This has been reduced to approximately 53 groundfish DAS in 2004. This could decrease the frequency with which some habitats are trawled. Alternatively, DAS reductions could cause the larger vessels that currently bypass the sanctuary to fish closer to shore to reduce transit time. This could increase fishing pressure in the sanctuary. Gear modifications such as limiting roller gear to 12 inches in diameter have also reduced the spatial area available to otter trawlers and probably provide a greater degree of protection to certain key habitats such as piled boulder reefs. In addition, a series of "rolling closures" limit ground fishing in all or parts of the SBNMS during March, April, May, October, and November (for details on rolling closure actions taken by the NEFMC see Appendix EA.I, Existing Regulations, pp. EA.A-9 to EA.A-11, EA.A-15 to EA.A-17). Even if areas of the sanctuary are being trawled with reduced frequency, however, this should not necessarily be equated with recovery since even occasional trawling can have substantial impact (see above). The WGOMCA prohibits ground fishing and scalloping year-round in approximately 22% of the sanctuary (for details on the WGOMCA action taken by the NEFMC see EA.I, Existing Regulations, pp. EA.A-11 & EA.A-12). The Western GOM Habitat Closure, an area contained within the WGOMCA, provides additional restrictions (see below).

Effort reduction might also impact the spatial distribution of fishing pressure, thereby providing further habitat advantages. In the United Kingdom, broad fishery closures resulted in fishermen moving to new grounds that were not previously impacted. In contrast, management through effort reduction tended to cause the remaining fishery to contract into historic core fishing grounds, leaving more pristine habitats untouched The implications are that (1) management through effort reduction might result in better environmental protection than the use of closed areas per se and, (2) that managers might consider zoning specific areas for fishing rather than specifying where fishing should not occur (M. Kaiser, University of Whales, Presentation to the EA WG, 2004). However, considerable data exist concerning the conservation benefit of closing areas to commercial fishing (e.g., National Research Council [NRC] 2001, Jameson et al., 2002).

To address the issue of the alteration of benthic habitat by mobile fishing gear, the EA WG developed a series of actions. These actions focus mainly on research needs. The EA WG

recognized that NEFMC and NOAA Fisheries have already taken steps to reduce benthic habitat alteration by mobile fishing gears in the GOM, including the sanctuary. Nevertheless, the members of the EA WG were not in agreement concerning either the need for or the adequacy of the NEFMC measures. Some members felt that effort reduction measures are already increasing groundfish stocks and decreasing habitat damage, making additional restrictions unnecessary. They believed that the current problem is a socio-economic crisis being faced by the commercial fishing industry, not a biological one. Others felt that the current improvements are extremely small when viewed within the context of the historic ecosystem and that substantial additional measures must be taken to protect and rebuild the system.

Additional information on the habitat impacts of bottom-tending fishing gears can be found in Appendix EA.II, which is the preamble to the Affected Environment section of the Northeast Multispecies Amendment 13 SEIS prepared by the NEFMC. This document briefly describes the alteration of physical structure, sediment suspension, changes in chemistry, and changes to benthic communities from fishing and summarized several well known documents on the subject.

Existing Regulations within the SBNMS

Substantial regulations currently govern fishing effort in the SBNMS some of which directly or indirectly affect the impact of mobile gear on benthic habitats, particularly in areas considered to be Essential Fish Habitat (EFH). EFH is defined to be "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802[10]). These regulations have been promulgated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Section 303(a)(7) of the amended MSA, directs the NOAA Fisheries and the NEFMC (as one of the eight regional Fishery Management Councils) to (1) describe EFH and identify EFH in each fishery management plan, (2) minimize to the extent practicable the adverse effects of fishing on EFH, and (3) identify other actions to encourage the conservation and enhancement of EFH. It is important to note that these regulations have been promulgated to advance the goals of the MSA (development and maintenance of sustainable fisheries) and may or may not advance the goals of the NMSA (protection of biodiversity and compatible human use).

Regulations promulgated by the New England Fishery Management Council through NOAA Fisheries apply to the SBNMS, but the sanctuary does not have the independent ability to modify or maintain those regulations. Should the sanctuary identify a need to change fishery management within the sanctuary to meet NMSA goals, the sanctuary must first request that the NEFMC and the NOAA Fisheries draft any necessary regulations. If the NEFMC and NOAA Fisheries do not draft such regulations, the sanctuary may then proceed to exercise its own authority to meet the goals of the NMSA (see Appendix EA.III: Regulatory Coordination Between the National Marine Sanctuaries Program and Fishing Management Agencies). However, commercial fishing activities are not listed in the SBNMS' designation document as an activity subject to sanctuary regulation and, at the time of SBNMS' designation, an exemption was made for traditional commercial fishing operations. For example, section 940.5 of the designation document prohibits "drilling into, dredging or otherwise altering the seabed of the sanctuary…except as an incidental result of…traditional fishing operations" (Stellwagen Bank

National Marine Sanctuary, Final Environmental Impact Statement/Management Plan, Volume II: Appendices, pp. A7-A8). Sanctuary regulation of commercial fishing would require a change to its designation document (see Appendix EA.IV: Memo from Michael Weiss, Deputy Director, National Marine Sanctuary Program).

Based on suggestions from the scientific community (i.e., NRC 2002 and Northeast Region Essential Fish Habitat Steering Committee [NEREFHSC] 2002 Gear Effects Workshop) the NEFMC has employed closed areas, effort reduction and gear modifications as tools to reduce habitat impacts from fishing gear.

Closed Areas:

- *WGOMCA*
  The WGOMCA is closed year-round to all fishing vessels with the following exemptions: Charter, party (charter and party vessels must have a Letter of Authorization (LOA) from the Regional Administrator to enter or fish in this area) or recreational vessels; and vessels fishing with spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, mid-water trawls, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, and shrimp trawls (with properly configured grates). A Charter/Party LOA is valid from the date of enrollment until the end of the fishing year and is available by calling the Permit Office at 978-281-9278. The WGOMCA encompasses about 22% of the eastern section of the SBNMS (see Appendix EA.I, Existing Regulations, p. EA.A-11)

- *Western GOM EFH Closure*
  Habitat closures are "closed year-round to all bottom-tending mobile gears." Bottom tending mobile gear is defined as the following: Gear in contact with the ocean bottom, and towed from a vessel, which is moved through the water during fishing in order to capture fish, and includes otter trawls, beam trawls, hydraulic dredges, non-hydraulic dredges, and seines (with the exception of a purse seine)." The Western GOM Habitat Closure Area (WGOMHCA) encompasses about 22% of the eastern section of the SBNMS and is contained within the WGOMCA (see Appendix EA.I Existing Regulations, p. EA.A-12).

- *GOM Seasonal Rolling Closure Areas -*
  Rolling closures limit groundfishing (but not all mobile bottom tending gear) in all or parts of the SBNMS during March, April, May, October, and November (for details on rolling closure actions taken by the NEFMC (see Appendix EA.I, Existing Regulations, pp. EA.A-9 to EA.A-11, EA.A-15 to EA.A-17).

Effort Reduction
DAS restrictions would limit most groundfish fleet permit vessels to ~53 DAS in 2004 (see Appendix EA.I, Existing Regulations, p. EA.A-1).

Gear Modifications
Raised footrope trawl gear in the seasonal whiting fishery, limiting roller gear to 12" in diameter and prohibition of brush-sweep trawl gear.
More information on the NEFMC policies involving EFH can be found in EA.IV.

Federal legislation impacting fishing activities and fishing vessels within the SBNMS includes[5]:

- MSA
- Atlantic Tunas Conservation Act (ATCA)
- Atlantic Fisheries Act (AFA)
- Endangered Species Act (ESA)
- Marine Mammal Protection Act (MMPA)
- Migratory Bird Treat Act (MBTA)
- Clean Water Act (CWA)

Activities (4)

(2.1) *The sanctuary should work with the NEFMC and other appropriate agencies and stakeholders to set aside an area(s) within SBNMS that allows for research on topics including habitat recovery, biological succession and community ecology.*
These area(s) should be set aside for a period that is identified by the research needs, commitments, long-term monitoring and recommendations as identified by a sanctuary WG.

The area(s) should be representative of habitat types and depths within the sanctuary under the direction of the sanctuary research WG. The area should be located to the greatest extent feasible within the existing WGOMHCA, where it overlaps the SBNMS and thus would not increase the total area already restricted to fishing. Any additional area closed to fishing within the SBNMS in the exercise of this action would be compensated for by a reduction of comparable area elsewhere in the WGOMHCA or other comparable area and/or measure.

Restrictions on human activities will depend upon the desired research planned for particular area(s). Area(s) could be closed to:

2.1.1.a Bottom tending fishing gears only

Rationale: The Group considered an option that any proposal to the New England Fishery Council for closed area(s) for research purposes should be confined or "piggybacked" within areas already closed by the Council for species mortality reduction programs or essential fish habitat protection. To this end, the closed area will be applicable to mobile trawl gears and bottom tending gear currently restricted access by existing or new Council sponsored regulations. Recreational fishing for all species and fishing for pelagic highly migratory species with all gears will continue to be exempt from any such research closures for any purposes. Any other new or existing fisheries deemed to have minimal or

[5] Not all of these impact activities related to the alteration of benthic habitat.

inconsequential impacts on the marine ecosystem shall also be exempted from restricted access.

2.1.1.b All fishing activity

Rationale: The goals of the research projects include habitat recovery, biological succession, and community ecology. Therefore, areas where no fishing activity is permitted must be created. These areas will provide critical controls sites that will provide researchers with baseline areas against which impacts from various activities can be compared. It will be difficult if not impossible to accurately evaluate habitat recovery rates if pot and trap fisheries are allowed in the research areas as storm action drags the pots across the seafloor as does routine setting and hauling of traps. Additionally, it will be difficult if not impossible to accurately evaluate biological succession and community ecology if fisheries that remove key forage species and top predators are permitted to continue in the research areas. For these reasons, there must be dedicated control sites for research experiments where no fishing is permitted. A more detailed rationale for this position can be found in Appendix EA.VI.

2.1.1.c Any other activity impacting the resources to be studied

(2.2) *The SBNMS should investigate areas within its borders to recommend to the NEFMC as Habitat Areas of Particular Concern (HAPC) pursuant to NEFMC designation.*

Rationale: HAPCs are subset areas of designated Essential Fish Habitat. EFH that is judged to be particularly important to the long-term productivity of populations of one or more managed species, to be particularly vulnerable to degradation, or to be particularly rare should be identified as a "habitat area of particular concern" to help provide additional focus for conservation efforts. There are four basic criteria for consideration of an area for HAPC designation which include:

(1) the importance of the ecological function provided by the habitat;

(2) the extent to which the habitat is sensitive to human-induced environmental degradation;

(3) whether, and to what extent, development activities are, or will be, stressing the habitat type; and,

(4) the rarity of the habitat type.

Habitats that are particularly vulnerable to specific fishing equipment types should be identified for possible designation as habitat areas of particular concern. The intent of the HAPC designation is to identify those areas that are known to be important to species, which are in need of additional levels of protection from adverse impacts (fishing or non-fishing). Designation of habitat areas of particular concern is intended to determine what areas within EFH should receive

more of the Council's and NOAA Fisheries' attention when providing comments on federal and state actions, and in establishing higher standards to protect and/or restore such habitat.

(2.3) *The SBNMS should establish a research WG that will be charged with specific activities or goals to address issues pertinent to the SBNMS including those raised in scoping as well as issues pertinent to the councils.*
The WG should be comprised of approximately 10 members from the SBNMS staff, the NEFMC research steering committee or staff, academics, fishing industry and conservation organization representatives.

(2.4) *The research WG recommended in Activity 2.3 should be charged with developing a research plan that focuses on the effects of varying levels of human use on the sanctuary. The sanctuary should conduct and/or encourage research resulting in a greater understanding of benthic habitat alteration and ways to mitigate its impact from mobile fishing gears. The Actions recommended under this Activity should be evaluated in light of the NMSA.*

Actions:

2.4.1 The sanctuary should assess the effects of specific mobile bottom gear types along a gradient of effort and specific habitat types.

2.4.2 The sanctuary should conduct and/or encourage research on the impacts of mobile gears on ecosystem alteration compared to other anthropogenic impacts and natural disturbances.

2.4.3 The sanctuary should conduct and/or encourage research to determine recovery rates for various habitat types.

2.4.4 The sanctuary should conduct and/or encourage research to identify fishing effort and identify changes over time.

2.4.5 The sanctuary should conduct and/or encourage research on how current changes in fishing effort have impacted the SBNMS.

2.4.6 The sanctuary should conduct and/or encourage research on the economic and social value of fishing within the SBNMS.

2.4.7 The sanctuary should conduct and/or encourage research to determine how changes in benthic habitat impact the recruitment and survival of commercial and non-commercial species.

2.4.8 The sanctuary should encourage research on the development or improvement of low impact mobile fishing gear.

STRATEGY EA.3 – THE SANCTUARY SHOULD DEVELOP A PLAN FOCUSED ON THE ECOSYSTEM IMPACTS OF BIOMASS REMOVAL BY FISHING ACTIVITY

Biomass removal was examined as involving (1) the bycatch and discards of unintended species and size/age classes, (2) the targeted removal of particular commercial species and (3) the removal of species that function as important prey items. These issues are addressed in Activities 3.1 – 3.3.

Activities (3)

(3.1) *The sanctuary should work with all parties to reduce unintended bycatch and discard of all species, in all fisheries (commercial and recreational) and all gear types.*

Overview

The at-sea discarding (and subsequent mortalities) of fish has been recognized as an inherent problem in the management of world fisheries for many years (Alverson et al., 1994). Such practices constitute a waste of valuable resources, helping to contribute to observed declines in many of the world's marine fisheries. A less studied aspect of biomass removal through bycatch is its potential to alter the ecosystem through the differential survival of discarded species. Fisheries (both recreational and commercial) that remove biomass and return bycatch in the form of discard could have a very substantial affect on the overall ecological balance of species within an area (e.g., the SBNMS).

Substantial fishing activity (commercial and recreation) occurs within the SBNMS. No fishing activity is free from bycatch. Therefore, biomass removal through bycatch has the potential to alter the ecology of the SBNMS. The degree to which the sanctuary might be altered depends on the scale of bycatch within the sanctuary, the survival rate of bycatch and the variation in survival among those species constituting the bycatch. Management of fishing activities within the SBNMS falls primarily within the jurisdiction of NOAA Fisheries and the NEFMC. However, the sanctuary has a responsibility to protect the ecology and biodiversity of the sanctuary and should work with those agencies to address the potential influence of fisheries bycatch and discard on sanctuary resources.

Little detailed information currently exists on levels of bycatch and discard within the SBNMS. It seems likely that discard rates might approximate those in other fisheries globally and in the GOM[6]. At the global level, the United Nations Food and Agricultural Organization (UNFAO) estimated that 27 million tons of bycatch are discarded at sea in the course of producing the annual seafood landings of approximately 100 million tons. In contrast, an analysis conducted from 1990 – 1994 by the Manomet Center for Conservation Sciences of 10,000 hauls from commercial trawlers in the northeastern United States indicated that 47% of the total catch was discarded at sea. Within the GOM, mandated mesh size increases and reductions in effort since 1994 have reduced the total level of biomass removal and potentially reduced absolute discard quantities. However, it is clear that all

[6] Data from these studies occurred prior to the sustainable fisheries initiatives undertaken by the NEFMC and might not reflect current bycatch rates.

fishing gears have inherent inefficiencies, and few if any fishing gears have been developed that have minimal bycatch and discard.

To address the issue of fishing's biomass removal through the bycatch and discard of unwanted species, The EA WG developed a series of actions. These actions focus heavily on research needs. The EA WG felt this was appropriate because the current paucity of data is seen as the biggest impediment to a full and lucid understanding of the effects of bycatch and discard on the sanctuary. The EA WG recognizes that the sanctuary is not an isolated system and that the bycatch and discards from other areas impact it to an unknown degree. The EA WG also recognizes that the NEFMC and NOAA Fisheries have already taken major steps to reduce the unintended bycatch and discard of fish and some invertebrate species from the GOM, including the sanctuary. Nevertheless, the EA WG was not in agreement concerning either the need for or the adequacy of those measures for meeting sanctuary objectives. Some felt that the issue of bycatch and its potential consequences for maintaining the ecology of the SBNMS provided another line of support for limiting sanctuary access, particularly within recommended research areas. Others felt that the changes mandated by the NEFMC were already substantial and having a noticeable impact (e.g., the decrease in juvenile codfish seen in tows) and that additional measures should be avoided.

Existing Regulations within the SBNMS

Substantial regulations currently govern the unintended bycatch and removal of fish and some invertebrate species from the SBNMS. These regulations have been promulgated under MSA. The MSA states that "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 most recent management action to affect the groundfishing fleet operating in New England is Amendment 13 to the Northeast Multispecies Fishery Management Plan. The amendment was developed by the NEFMC and implemented by NOAA Fisheries beginning on May 1, 2004 to end overfishing on all groundfish stocks and to rebuild those stocks that are overfished. The amendment contains a variety of measures designed to reduce the unintended bycatch and discard of fish species. A summary of these regulations can be found in Appendix EA.I. Additional information on measures to reduce bycatch can be found in NOAA Fisheries' Current Bycatch Priorities and Implementation Plan - Northeast Region (see Appendix EA.VII).

Measures for reducing the unintended bycatch and discard of fish and some invertebrate species involve mesh size restrictions in the northeast multispecies and monkfish fisheries, a measure that prevents all fisheries operating outside of the DAS program from occurring in the GOM, until such time that it can be determined that it has less than a 5% bycatch of regulated groundfish species, raised footrope trawls for some fisheries (e.g., seasonal whiting fishery), fish exclusion devices in the northern shrimp fishery, and ring size restrictions for the scallop fishery. Indirect bycatch reduction measures include effort reduction actions such as DAS restrictions, closed areas and landing limits. It is important to note that these regulations have been promulgated to advance the goals of the MSA (development and maintenance of sustainable fisheries) and may or may not advance the goals of the NMSA (protection of biodiversity and compatible human use).

For more information on the ability of the SBNMS to regulate fishing within the sanctuary and other federal actions relating to commercial fisheries see *Existing Regulations within the SBNMS* contained in Strategy EA-2: Alteration of Benthic Habitat by Mobile Fishing Gears.

Actions:

3.1.1 The sanctuary should seek to reduce the unintended bycatch and discard that occurs within the SBNMS.

a. Methods should be found to avoid the capture of non-target species and size/age classes. These methods should concentrate on gear modifications to separate target and non-target species and size classes.

Rationale: Reduction of bycatch requires developing methods to avoid the capture of non-target species and size classes. Focusing on such reductions through gear modification will minimize negative impacts to fisheries, while achieving the desired reduction goals.

b. The capture of non-target species and size/age classes could be facilitated by spatially separating species and size classes from fishing pressure.

c. The sanctuary should promote cooperative research into methods to eliminate all types of unintended bycatch through gear modification.

Rationale: The development of gear innovations to reduce bycatch requires the direct cooperation of all interested parties. Fishermen know the most about fishing gear, how it works and how it can be modified, while scientists can provide experimental design aspects that aid in the public acceptance of results. Involving conservation interests can further assure that research results meet specific environmental requirements. Forming cooperative projects among these groups will facilitate robust results that can succeed in problem solving.

3.1.2 The sanctuary should increase awareness of low bycatch/discard gear options and provide incentives for their use.

a. The sanctuary should convene periodic workshops to gather, assess, and disseminate information concerning the ability of particular gear modifications to achieve desired goals in bycatch reduction.

Rationale: The sanctuary should convene periodic workshops to gather comments on the ability of particular gear modifications to achieve the desired goal(s) in bycatch reduction. These workshops could also act as showcases to aid in the acceptance of new technologies by industry and conservation interests and facilitate the diffusion of successful or

promising technologies. Such workshops could also be used to direct funding towards the most promising areas of research and focus research on sanctuary goals.

b. The sanctuary should establish a WG to identify appropriate fishing gear and explore sanctuary endorsement for such gear types that could be used in conjunction with "green marketing".

Rationale: The identification of acceptable gear types is a complex process that requires diverse expertise. The establishment of a sanctuary WG would make such expertise available to the sanctuary and create the ability to identify gear modifications that can be deemed beneficial.

c. The sanctuary should provide incentives to use sanctuary-endorsed gear through the creation of incentives for the purchase, construction, and use of sanctuary endorsed gear.

Rationale: Once gear modifications are proven experimentally successful, they must be transferred to the industry. Such change often requires the disposal of economically viable gear and the purchase of new gear at possibly considerable and unanticipated expense. The sanctuary could explore grants or other mechanisms to offset the immediate cost of changing to low impact gear(s). In addition, the sanctuary could explore market incentives that would encourage fishermen to make changes to current fishing practices.

d. The sanctuary should work through its outreach and education program in making information available about gear methodologies.

Rationale: Outreach and education is an important component of the sanctuary's mission. This component of the sanctuary program could be extremely helpful in disseminating information about innovative technologies that might be available to reduce unintended bycatch and discards.

3.1.3 The sanctuary should maximize information concerning bycatch and discard occurring within the SBNMS.

a. The sanctuary should work in coordination with other agencies, fishing groups and nongovernmental organizations (NGO's) to develop a study fleet of all vessels fishing in the sanctuary. The purpose of this fleet is to understand the rate and composition of bycatch, and how it differs spatially and temporally within the sanctuary (e.g., acquisition of tow by tow data with built-in mechanisms for checking data accuracy and timely reporting). Data could be made available directly

to the sanctuary or through a third party filter or "firewall" that would protect the individual identity of the contributors.

Rationale: It is currently impossible to quantify the level of bycatch within the sanctuary or understand how it varies by fishery, area or season. Such data are fundamental to understanding how bycatch might alter the local ecology and in the design of effective management measures.

b. The sanctuary should improve information pertaining to the spatial and temporal distribution of commercial and recreational fishing effort within the sanctuary.

Rationale: Information on the spatial and temporal distribution of fishing gear would allow the sanctuary to identify where and at what level bycatch and discard might occur.

c. The sanctuary should conduct and facilitate directed surveys to determine the spatial and temporal distribution of species within the sanctuary.

Rationale: Bycatch involves the unwanted capture of non-target species or size/age classes. An understanding of the distribution of species and size classes is an aid to designing methods to avoid unintended capture.

d. The sanctuary should work with fishermen to use local knowledge to identify the spatial and temporal distribution of species and size/age classes of key species within the sanctuary.

Rationale: Fishermen have an immense body of knowledge concerning the spatial and temporal distribution of many species and size/age classes. These data could be collected by interview much more rapidly than through scientific field surveys. This knowledge could allow for more rapid decision-making, particularly when corroborated with empirical data. It could also be used to help structure future field surveys.

(3.2) *The sanctuary should work with all parties to understand the implications of the biomass removal of marketable species from within the sanctuary by commercial and recreational fisheries, and to ensure the ecological integrity and sustainability of sanctuary waters.*

Overview

There is substantial evidence that the ecology of the GOM region, of which the SBNMS is a part, has been substantially altered through biomass removal by fisheries. This has been well documented through observed declines in the abundance of a variety of fish species, and as a

result of changes in the relative abundances of predators in the ecosystem. Historical changes in the fisheries have been reported (e.g., Jackson et al. 2001), as have changes to the entire GOM ecosystem (Steneck et al. 2004). The ecosystem has been altered indirectly by the methods used for biomass removal (e.g. habitat alteration), and directly by the removal of bycatch and targeted catch.

The EA WG heard several presentations dealing with the direct removal of targeted catch and the consequences for regional ecology. Leavenworth and Alexander (University of New Hampshire [UNH], History of Marine Animal Populations [HMAP] Program, presentation to the EA WG, 2 April 2004) compared cod biomass and size from historical records from the 18th century with present day stocks. Their analysis indicated that the sizes of individuals caught were substantially larger during this earlier period. For the Scotian Shelf region, they calculated that historic biomass was approximately 10 fold greater than today. A similar analysis for the GOM is underway. These findings are supported by Jackson et al. (2001) who demonstrated that the average size of cod from the 1990's was approximately 5 times smaller the average historic size (4,000 years before present (BP); Leavenworth and Alexander, University of New Hampshire, presentation to the EA WG, 2004).

Analysis of historic research trawl data specific to the SBNMS supports this trend. The length of the largest individuals from the sanctuary for 14 commercially important demersal fish species was examined over a 38 year period from 1963-2000. The analysis showed that for all of the species there was a systematic decrease in the size of the largest individuals within the sanctuary. For some species these declines were substantial. White hake showed a decrease of 50% over this period, or a decrease in length of approximately 11 cm (4.5 inches) per decade. Goosefish, pollock, winter flounder, silver hake, and cod also showed large decreases in maximum length (decrease > 25%) (Crawford, Conservation Law Foundation, presentation to the EA WG, 2004).

The changes in population structure evidenced by these data are important in the assessment of ecosystem alteration for several reasons. First, the largest individuals play a critical role in sustaining healthy populations because large females produce a disproportionate number of eggs, and recent evidence suggests that the quality of the eggs of older, large females is greater. Second, the role of the larger individuals as predators in the system is different from that of smaller individuals. Thus, shifting the size distribution away from larger fish is expected to have impacts on predator-prey relationships through which biological communities are in part structured. Third, by systematically removing the largest fish from the populations of a few species, the competition between predator species is altered, catalyzing the kinds of role shifts demonstrated by Lang and Link (e.g. emergence of dogfish as dominant predators, and loss of cod, see below).

Ecological changes have also been revealed for fish species in the western North Atlantic. Data show that there has been a dramatic decrease in the relative abundance of groundfish (bottom living) species such as cods, hake, and flatfishes since the 1960s, and that over the same period there has been an increase in the abundance of pelagic species and some elasmobranchs (e.g., skates). These data suggest that the role of some of the principal bottom fishes as ecologically dominant predators has been shifted to other species as a consequence

of their large-scale removal from the ecosystem (Lang and Link, NOAA Fisheries, presentation to the EA WG, 2004).

While there has been a substantial decrease in the abundance of key commercial species in the GOM, overall biomass has remained relatively stable as a result of increases in species not targeted by commercial fishing. These changes have produced measurable changes in the predator-prey relationships in the system, the consequences of which are not easily predicted.

A detailed analysis of the food web by Lang and Link reveals some of the ecosystem effects during the period 1977 to 1997. The predator-prey relationships existing in 1977, represented by patterns of energy flow, were complex, with moderately strong linkages existing among a set of predator and prey species. In 1977, cod and goosefish played a relatively large role as predators, with stock sizes exceeding that of spiny dogfish. The sand lance population was relatively large and served as a major prey source. With the passage of two decades, the food web had changed, including the emergence of a few very strong linkages to dogfish. The roles of cod, goosefish, and sand lance were diminished in a relative sense.

Ecological change has many ramifications, some are known, and others are difficult to predict. In general, when the number species is high and the interactions among them are complex and diverse, the overall response of the system to alteration of any particular part of the system (e.g., removal of a species by disease or over-predation) is thought to be relatively small, i.e., the ecosystem is thought to be resilient. When a system becomes dominated by a few very strong dependencies because it has been heavily harvested, this resilience could be compromised. Whether this description of ecosystem resilience holds for all situations is not well-understood, further emphasizing the need for research on this subject.

Groundfishing Effort within the SBNMS

Substantial changes have occurred to fisheries operating in the SBNMS since the sanctuary was designated in 1992 and many of these were specifically designed to reduce the catch of commercial species, particularly groundfish. At the time of designation there was no limit to the number of days a vessel could fish. In 2003 most small groundfishing fleet permit vessels were limited to ~70 DAS. This has been reduced to approximately 53 DAS in 2004[7]. Gear modifications such as limiting roller gear to 12 inches in diameter have also reduced the ability to fish productive areas such as piled boulders, which could protect biomass in those areas. In addition, a series of "rolling closures" limit ground fishing in all or parts of the SBNMS during March, April, May, October, and November (for details on rolling closure actions taken by the NEFMC see Appendix EA.I, Existing Regulations, pp. EA.A-9 to EA.A-11, EA.A-15 to EA.A-17). The WGOMCA prohibits commercial ground fishing and scalloping year round in approximately 22% of the sanctuary (for details on the WGOMCA

[7] Vessels are now allocated days on an individual basis, therefore some may have more than others, depending on their demonstrated history in the fishery.

action taken by the NEFMC (see Appendix EA.I, Existing Regulations, pp. EA.A-11 & EA.A-12).

To address the issue of biomass removal of marketable species the EA WG developed a suite of actions. The EA WG recognizes that the sanctuary is not an isolated system. The EA WG also recognizes that the NEFMC and NOAA Fisheries have already taken major steps to reduce the catch of commercial species from the GOM, including the sanctuary. However, the members of the EA WG were not in agreement concerning the need for or adequacy of those measures.

Existing Regulations within the SBNMS

Substantial regulations currently govern the removal of commercial species in the SBNMS. These regulations were promulgated by the NEFMC through NOAA Fisheries and are not specific to the SBNMS. Those most particular to the removal of commercial species involve:

1. *Area Closures* – A series of "rolling closures" limit ground fishing in all or parts of the SBNMS during March, April, May, October, and November (for details on rolling closure actions taken by the NEFMC (see Appendix EA.I, Existing Regulations, pp. EA.A-9 to EA.A-11, EA.A-15 to EA.A-17). The WGOMCA/WGOMHCA prohibits ground fishing and scalloping year round in approximately 20% of the sanctuary (for details on the WGOMCA action taken by the NEFMC (see Appendix EA.I, Existing Regulations, pp. EA.A-11 & EA.A-12).

2. *Effort Reductions* – At the time of designation there was no limit to the number of days a vessel could fish. In 2003 most small groundfishing fleet permit vessels were limited to ~70 DAS. This has been reduced to approximately 53 DAS[8] in 2004.

3. *Net Mesh Restrictions* – Net mesh restrictions are fishery specific and can be found in Appendix EA.I, Existing Regulations, pp. EA.A-3 & EA.A-4. In general, net mesh requirements have increased substantially since the SBNMS was designated in 1992. For example mesh size for gillnets and otter trawls have increased from 5'' to 6.5 inches.

4. *Species Specific Size Limits* – Species specific minimum size limits have been established for most species. These limits have generally increased since the sanctuary was designated in 1992. For specific species and size restrictions (see Appendix EA.I, Existing Regulations, p. EA.A-5 to EA.A-6).

5. *Catch Limits* – Some species have a Total Allowable Catch (TAC) assigned to them. If the TAC is exceeded, the fishery is subject to closure, although this does not always happen. TAC specifics can be found in Appendix EA.I, Existing Regulations, pp. EA.A-7 to EA.A-9. Other species have daily trip limits that should not be exceeded (see Appendix EA.I, Existing Regulations, pp. EA.A-7 to EA.A-9). In general, catch limits have decreased since the sanctuary was designated in 1992.

[8] Vessels are now allocated days on an individual basis, therefore some may have more than others, depending on their demonstrated history in the fishery.

For more information on the ability of the SBNMS to regulate fishing within the sanctuary and other federal actions relating to commercial fisheries see *Existing Regulations within the SBNMS* contained in Strategy EA-2: Alteration of Benthic Habitat by Mobile Fishing Gears

Actions:

3.2.1 The SBNMS should work with NOAA Fisheries and the NEFMC to ensure that the removal of commercial and recreational species from the sanctuary is managed appropriately.

a. The sanctuary should support the NOAA Fisheries and the NEFMC in their attempts to manage the biomass of commercial fish/shellfish populations in the GOM as appropriate on a stock-by-stock basis.

Rationale: The NOAA Fisheries and the NEFMC are currently working to rebuild fish stocks in the GOM and Georges Bank through effort reduction measures. Although not directed at the SBNMS, these efforts will provide substantial benefit to the sanctuary in terms of reducing the biomass of marketable species removed from the SBNMS and helping to restore food web complexity and ecosystem stability.

b. The SBNMS should work with the NOAA Fisheries and the NEFMC to ensure that stock rebuilding efforts will benefit the SBNMS and that rebuilding plans will not inadvertently shift greater fishing effort into the sanctuary, thereby increasing biomass removal rates within its boundaries.

Rationale: Some effort reduction measures instituted within the wider GOM and Georges Bank area might alter fishing practices and increase fishing pressure within the sanctuary. The sanctuary should work with NOAA Fisheries and the NEFMC to make sure that such shifts do not occur.

c. The sanctuary should work with the NOAA Fisheries and the NEFMC to conduct/encourage research into the characteristics (e.g., species, size, number) of fish caught by recreational fisheries.

Rationale: Little is known about the quantities and characteristics of fish removed through recreational fisheries. Such information is needed to understand the potential impact of such fisheries and to understand the contribution of recreational fisheries to the local economy

d. The SBNMS should work with the NOAA Fisheries, NEFMC and the Coast Guard to enforce fishing regulations within the SBNMS. In cases where the Coast Guard is unable to adequately enforce sanctuary

fishing regulations, the sanctuary should seek other agencies (e.g., Massachusetts Environmental Police) to aid enforcement.

Rationale: Fishing regulations that apply to the SBNMS can result in reduced biomass removed from the sanctuary. Enforcement of such regulations ensures that amounts of fish removed are not excessive and that management activities are equitable.

(3.3) *The SBNMS should work with NOAA Fisheries and the NEFMC to develop a management strategy for key prey species sufficient to maintain the integrity of the ecosystem. Prey species considered include:*

- *Herring*
- *Mackerel*
- *Sandlance*

Overview

Atlantic herring (*clupea harengus*), Atlantic mackerel (*Scomber scombrus*) and American sandlance (*Ammodytes spp.*) are key prey components of the SBNMS food web. As such public scoping identified concerns about the harvest of these species from within the sanctuary and the impacts such removals might have on higher trophic predators such as the sanctuary's marine mammals, seabirds and medium and large fishes (e.g., cod [*Gadus morhua*], and Atlantic bluefin tuna, [*Thunnus thynnus*]). In some areas, the over harvesting of forage species has resulted in reported declines in some predator species (e.g., Trites and Donnelly 2003), although such relationships are often not clear or direct.

In order to understand predator-prey interactions within an ecosystem and how human related removals might impact them, it is necessary to know, among other things, the abundance and life history characteristics of the prey species and the type and removal levels of the fisheries. It is also important to understand the ecological system that is being considered. For example, boreal systems are characterized by few species with high connectivity. In such cases, changes in the abundance of one species (e.g. a prey species) can have a direct and sometimes large impact on the reproduction, growth and abundance of other species in the system. In contrast, temperate systems, such as that making up the SBNMS, tend to be characterized by a large number of species with a large number of complex interactions among them (low connectivity). Prey shortages are less likely to cause population declines in temperate systems because of the ability of predators to switch to alternative prey species (presentation to the EA WG by William Overholtz, NOAA Fisheries, 26 February 2004).

The opportunistic nature of predator-prey relationships has been demonstrated by Overholtz et al. (2000) who found that the consumption of prey by predators in the shelf ecosystem of the northeastern U.S. (of which the SBNMS is a part) closely tracked the abundance of available prey. For example, in years when sandlance abundance was high the diet of an array of piscivorous fish was dominated by sandlance. Similarly, when the abundance of herring or mackerel was high, the diet of piscivorous fish was dominated by those species.

Therefore, the decline of one species of prey was not sufficient to cause the direct decline of its predators.

While declines in prey abundance might not be sufficient to cause a direct population decline in temperate ecosystems, they can cause shifts in the distribution of species. Kenney et al. (1996) documented large scale shifts in the distribution of cetaceans in the GOM/Georges Bank following the over exploitation of herring and mackerel stocks by foreign fishing fleets in the 1960s and early 70s. Payne et al. (1990) correlated the fluctuating abundance of humpback and right whales in the SBNMS with the local abundance of sandlance. Similarly, the local abundance of Atlantic bluefin tuna is suspected to be primarily influenced by spatial variation in prey. Stomach content analysis indicated that foraging on sandlance was a major reason for the occurrence of bluefin tuna in the SBNMS (Chase 2001). A number of commercial and recreational fishing members of the EA WG felt that sandlance abundance also affected the number/occurrence of groundfish within the sanctuary.

Abundance and life history of herring, mackerel and sand lance

Atlantic Herring – Atlantic herring are a relatively small (< 17 inches), migratory schooling fish that occur from North Carolina to Labrador. Spawning in the GOM takes place during late August to October along the Maine coast, Jeffreys Ledge, Nantucket Shoals, and Georges Bank. The species becomes fully mature at age 4, although age of maturity varies annually in response to density dependent factors. Eggs are demersal and usually deposited on gravel substrate. In the GOM, herring migrate from summer feeding areas along the Maine coast to winter areas off southern New England and the Mid-Atlantic coast. The early year classes are particularly important as prey for a variety of finfish, seabirds and marine mammals.

Management – Juvenile herring (ages 1 – 3) have been an important regional fishery for over 100 years. The development of a fishery for adult fish has occurred more recently. Herring along the eastern seaboard of the United States are managed as a single stock. Current management measures instituted by NOAA Fisheries and the NEFMC include spawning area closures, a three area management scheme, a domestic annual harvest quota for the entire stock and total allowable catches specific to each of the three management areas. Domestic annual harvest quota for the stock is 250,000 metric tons, with a total allowable catch (TAC) of 60,000 metric tons for the GOM. The herring stock is not over fished and over fishing is not occurring (presentation to the EA WG by William Overholtz, NOAA Fisheries, 26 February 2004). However, there was concern among some members of the group that harvest of the inshore GOM stock might be excessive. In particular, some members of the group were concerned about the ability of intense, short term concentrations in fishing effort to bring about local herring depletion or dispersal and the impact that might have on local aggregations of fish, birds and marine mammals.

Population Trend - The population has continued to rebuild since over exploitation by foreign fisheries caused its collapse in the late 1970's. The population is currently considered to be at or near historic highs. Catches could be increased from current levels

without adversely affecting spawning stock biomass (presentation to the EA WG by William Overholtz, NOAA Fisheries, 26 February 2004).

Additional information concerning Atlantic herring can be found in Reid et al (1999) at http://www.nefsc.noaa.gov/nefsc/publications/tm/tm126

Fishing in the SBNMS - Vessel trip report (VTR) data for the trips occurring within the SBNMS indicated that from 1994-1998 a total of 16,911 metric tons of Atlantic herring were caught from sanctuary waters. In 1999, 441 metric tons were reported caught. Most of these landing occurred around southern Jeffreys Ledge with a secondary area around the northwest corner of Stellwagen Bank. Fisheries were mid-water otter trawl, mid-water pair trawl and purse seine (SBNMS unpublished data).

Atlantic Mackerel- Mackerel are relatively small (<18.5 inches), migratory schooling fish with a distribution from North Carolina to Labrador. The population has two major spawning areas: the Mid-Atlantic Bight (April and May) and the Gulf of St. Lawrence, Canada (June and July). Wintering areas for both groups range from Nova Scotia to North Carolina, with extensive migration between those areas. Sexual maturity is from 2-3 years of age. The early year classes are particularly important as prey for a variety of finfish, seabirds and marine mammals.

Management - Mackerel are seasonally subjected to commercial and recreational fisheries throughout their range. Since April 1983, the fishery has been managed by the Mid-Atlantic Fishery Management Council's Atlantic Mackerel, Squid and Butterfish Plan which sets annual quotas for the species. The domestic annual harvest quota for 2005 (all regions) is 165,000 mt. The Atlantic mackerel stock is not over fished and over fishing is not occurring (presentation to the EA WG by William Overholtz, NOAA Fisheries, 26 February 2004).

Population trend - The population has continued to rebuild since over exploitation by foreign fisheries caused its collapse in the late 1970's. The population is currently considered to be at or near historic highs. Catches could be increased from current levels without adversely affecting spawning stock biomass (presentation to the EA WG by William Overholtz, NOAA Fisheries, 26 February 2004).

Additional information concerning Atlantic mackerel can be found in Studholme et al. (1999) at http://www.nefsc.noaa.gov/nefsc/publications/tm/tm141

Fishing in the SBNMS - VTR data for the trips occurring within the SBNMS indicated that from 1994-1998 a total of 1010 metric tons of Atlantic mackerel were caught from sanctuary waters. In 1999, 66 metric tons were reported caught. Location and fishery data were not analyzed (SBNMS unpublished data).

Sandlance - Sandlance are a small (< 10 inches), **non-migratory** schooling fish that burrow into sediments when not feeding. Sandlance are distributed from North Carolina to Labrador. They are found in shallow (< 300 ft) water in coastal areas or on the tops of offshore banks in association with sand or light gravel sediments. Sexual maturity is reached

at age 2 and spawning occurs in the winter. Key sand lance areas in the GOM are Stellwagen Bank and the Great South Channel.

Management - There is currently no management of sandlance in the western North Atlantic, nor does a commercial fishery currently exist in that area (Overholtz et al. 2000). A major multinational, industrial fishery exists in the eastern North Atlantic, primarily for fish meal and fish oil. Sandlance are the largest fishery in the North Sea with annual landings of around 1 million metric tons over the past decade. A combination of over fishing and environmental factors has caused the North Sea population to collapse in recent years, forcing fishery closures. The International Council for the Exploration of the Sea (ICES) recommended that local depletion of sandlance (sand eel) aggregations by fisheries should be prevented, particularly in areas where predators congregate.

Population trend - Sandlance are difficult to sample and little reliable local population data exist. Relative abundance fluctuates markedly on an annual basis (presentation to the EA WG by William Overholtz, NOAA Fisheries, 26 February 2004).

Fishing in the SBNMS - There is no commercial fishery for sand lance in the SBNMS. However, sandlance fisheries have occurred in the GOM in the past (R. Taylor, EA WG 26 February 2004).

Actions:

3.3.1 Encourage and cooperate with the NOAA Fisheries and the NEFMC to maintain ecologically sustainable levels of prey species.

a. The sanctuary should work with NOAA Fisheries and the NEFMC to ensure that a directed fishery for sandlance is not developed within the SBNMS.

Rationale: Sandlance are a key prey species for many commercial and non-commercial species that occur within the SBNMS. There is currently no commercial fishery for the species. Proposals for a sandlance fishery have been developed in the past and short-term fisheries have occurred elsewhere in the GOM. By implementing a prohibition on the development of a sandlance fishery, the sanctuary can protect an essential component of the sanctuary food web without inflicting economic hardship on fishermen using the SBNMS. Because sandlance do not migrate extensively, management at the scale of the sanctuary is appropriate.

b. The sanctuary should conduct/encourage research to understand the role of prey species within the sanctuary and the interaction of actual or potential prey species fisheries on the sanctuary ecosystem.

c. The sanctuary should conduct/encourage research to understand the population dynamics of sandlance, mackerel and herring within the sanctuary.

   Rationale: An understanding of the population dynamics of key prey species is instrumental to understanding the ecology of the SBNMS.

d. The sanctuary should conduct/encourage research to understand the predator-prey relationships within the sanctuary.

   Rationale: An understanding of predator-prey interaction is instrumental to understanding the ecology of the SBNMS.

e. The sanctuary should conduct/encourage research to understand the inter-annual variability of sandlance and what is driving this variability.

   Rationale: Sandlance abundance within the SBNMS and elsewhere shows substantial inter-annual variability. This variability affects the abundance of many other species that occur within or come to the SBNMS. An understanding of the factors driving this variability would be a key component of understanding the ecology of the SBNMS.

f. The sanctuary should conduct/encourage research to understand the potential impact of prey species removal on the SBNMS.

   Rationale: The impact of the removal of prey species on an ecosystem at the scale of the sanctuary is an important management question. The issue is particularly germane for a national marine sanctuary because it is tasked with protecting resources while allowing compatible human use.

STRATEGY EA.4 – THE SANCTUARY SHOULD DEVELOP A PLAN FOCUSED ON THE ECOSYSTEM IMPACTS OF OCEAN DUMPING, THE DISPOSAL OF DREDGED MATERIALS AND MARICULTURE

Overview

The EA WG did not deliberate on these issues. A general discussion occurred directing the Chair and the Sanctuary Lead to develop a strategy based on the concepts below. A draft strategy was developed and circulated to the EA WG for comment as part of the final draft EA Action Plan, resulting in the final strategy (below). The sanctuary is currently planning to work with the NEFMC and the NOAA Fisheries to convene a workshop on non-fishing impacts to the marine environment. This workshop is expected to take place in January 2005.

Existing Regulations Pertaining to the SBNMS

The SBNMS' designation document prohibits "discharging or depositing, from within the boundary of the sanctuary, any material or other matter except: (i) fish, fish wastes, chumming materials or bait used in or resulting from traditional fishing operations in the sanctuary; (ii) biodegradable effluent incidental to vessel use and generated by marine sanitation devices approved in accordance with Section 312 of the Federal Water Pollution Control Act, as amended, (FWPCA), 33 U.S.C. 1322 et seq.; (iii) water generated by routine vessel operations (e.g., cooling water, deck washdown and graywater as defined by Section 312 of the FWPCA excluding oily wastes from bilge pumping; or (iv) engine exhaust (p. A7).

The designation document also prohibits "drilling into, dredging or otherwise altering the seabed of the sanctuary; or constructing, placing or abandoning any structure or material or other matter on the seabed of the sanctuary, except as an incidental result of (i) anchoring vessels; (ii) traditional fishing operations; or (iii) installation of navigation aids" (Section 950.5(4), pp. A7 & A8).

Mariculture is not listed as a prohibited activity in the SBNMS designation document. Rather, it is listed as an "Activity Subject to Regulation." Activities subject to regulation are "subject to regulation under the Act, including prohibition, to the extent necessary and reasonable to assure the protection and management of the conservation, recreational, ecological, historical, research, educational, or esthetic resources of the area" (Stellwagen Bank FEIS/MP Appendices, p. A2). Concerning mariculture, NOAA has determined that "the granting of permits for conducting this activity in a national marine sanctuary is extremely unlikely. This determination is based on U.S. Army Corps of Engineers (USACE) guidance relating to permits for fish pen mariculture operations, which prohibits fish farms in Congressionally, Presidentually, or Federally established natural resource areas such as national seashores, wilderness areas, wildlife refuges, parks or other areas designated for similar purposes (e.g., national marine sanctuaries). By listing this activity as subject to Sanctuary regulation, NOAA reserves the ability to determine the need for regulation, including prohibition, should the establishment of a mariculture operation within the Sanctuary boundary be proposed in the future" (Stellwagen Bank FEIS/MP Appendices, pp. G8-G9).

Activities (1)

(4.1) *Ocean dumping, the disposal of dredged materials, and mariculture should remain prohibited activities (ocean dumping and disposal of dredged materials) and subject to regulation (mariculture) within the SBNMS.*
A SUP may, however, be issued by the sanctuary following guidelines contained in Strategy 1 of this Action Plan "The sanctuary should develop a plan focused on the ecosystem impacts of the laying of cables and pipelines within the SBNMS."

> *Rationale:* There was agreement on maintaining a general ban on ocean dumping, the disposal of dredged materials and mariculture within the sanctuary through the existing prohibitions on (1) the discharging or depositing, from within the boundary of the sanctuary, any material or other matter and (2) drilling into, dredging or otherwise altering the seabed of

the sanctuary; or constructing, placing or abandoning any structure or material or other matter on the seabed of the sanctuary. Specific circumstances might arise, however, in which the issuance of a SUP would be deemed necessary and appropriate. In such cases, the terms and provisions stipulated by the EA WG in Strategy 1 should be used as guidance.

STRATEGY EA.5 – THE SANCTUARY SHOULD CONTINUE THE WG PROCESS TO ADDRESS THE REMAINING ISSUES ASSIGNED TO THE EA WG

Overview

Time constraints prevented the EA WG from deliberating on and making recommendations concerning ecosystem alteration as a result of:

- pollution;
- emerging issues;
- exotic species; and
- coastal activities

The sanctuary is currently planning to work with the NEFMC and the NOAA Fisheries to convene a workshop on non-fishing impacts to the marine environment. This workshop is expected to take place in January 2005 and should help address these issues.

Activities (3)

(5.1) *The sanctuary should address the remaining issues assigned to the EA WG.*

(5.2)*The present EA WG should remain constituted to address the ecosystem impacts of pollution.*

Rationale: The EA WG considered the ecosystem impacts of pollution the most serious issue left unaddressed. Pollution ranked number three in the prioritization of initial issues and the EA WG did not want to abrogate its responsibility in that area. To that end, the EA WG recommends that the sanctuary continue the current WG process and immediately convene a meeting focusing on pollution. If current EA WG members are unable to continue in their roles, the sanctuary should replace them. The EA WG felt that it would be able to make recommendations to the SAC in the December time period.

(5.3) *The sanctuary should constitute a new WG to focus on the ecosystem impacts of exotic species, coastal activities and emerging issues.*

EXHIBITS
(ECOSYSTEM ALTERATION)

EXHIBIT EA.I – Distribution of mobile fishing vessels relative to sediment type within the SBNMS.

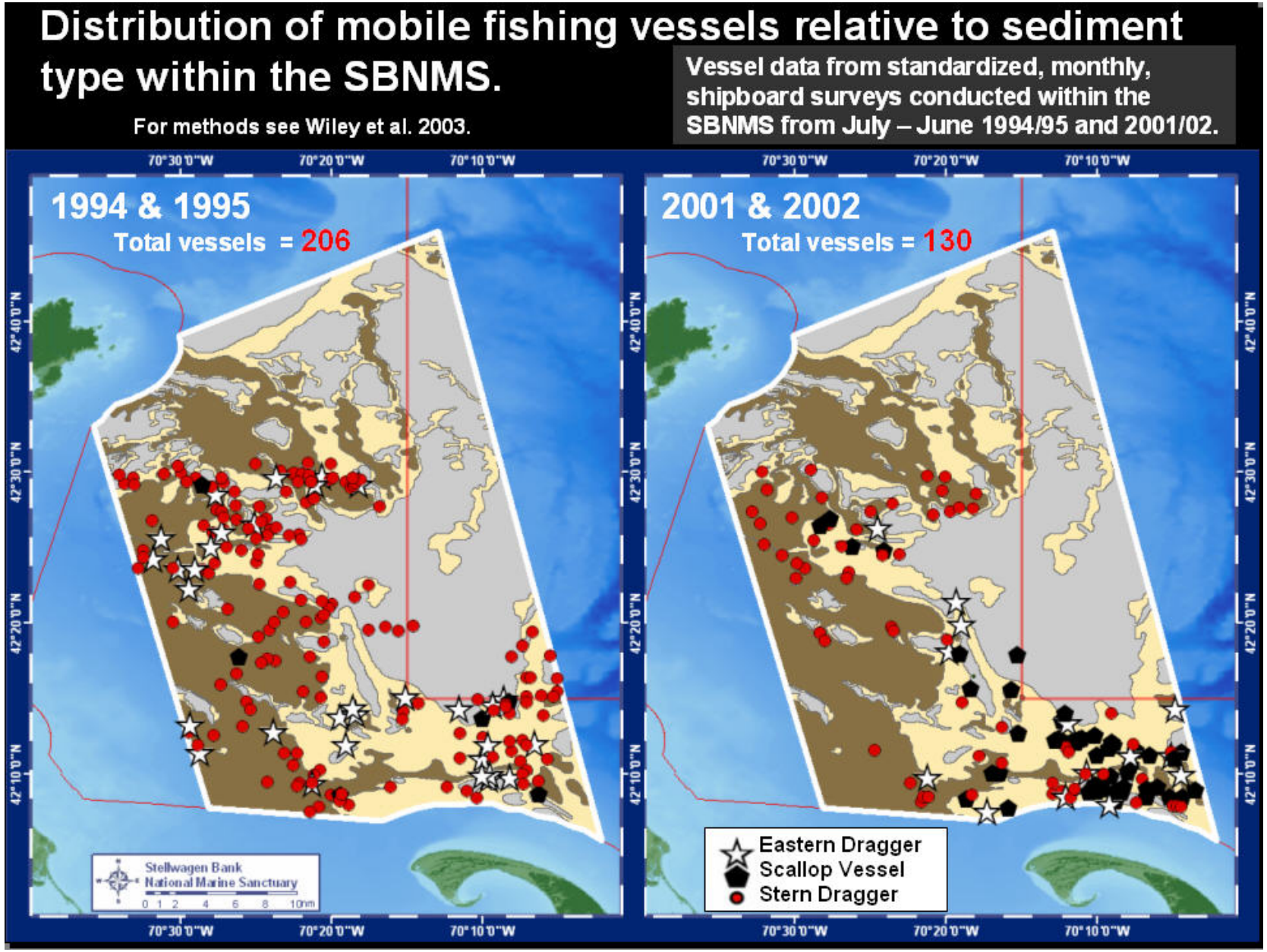
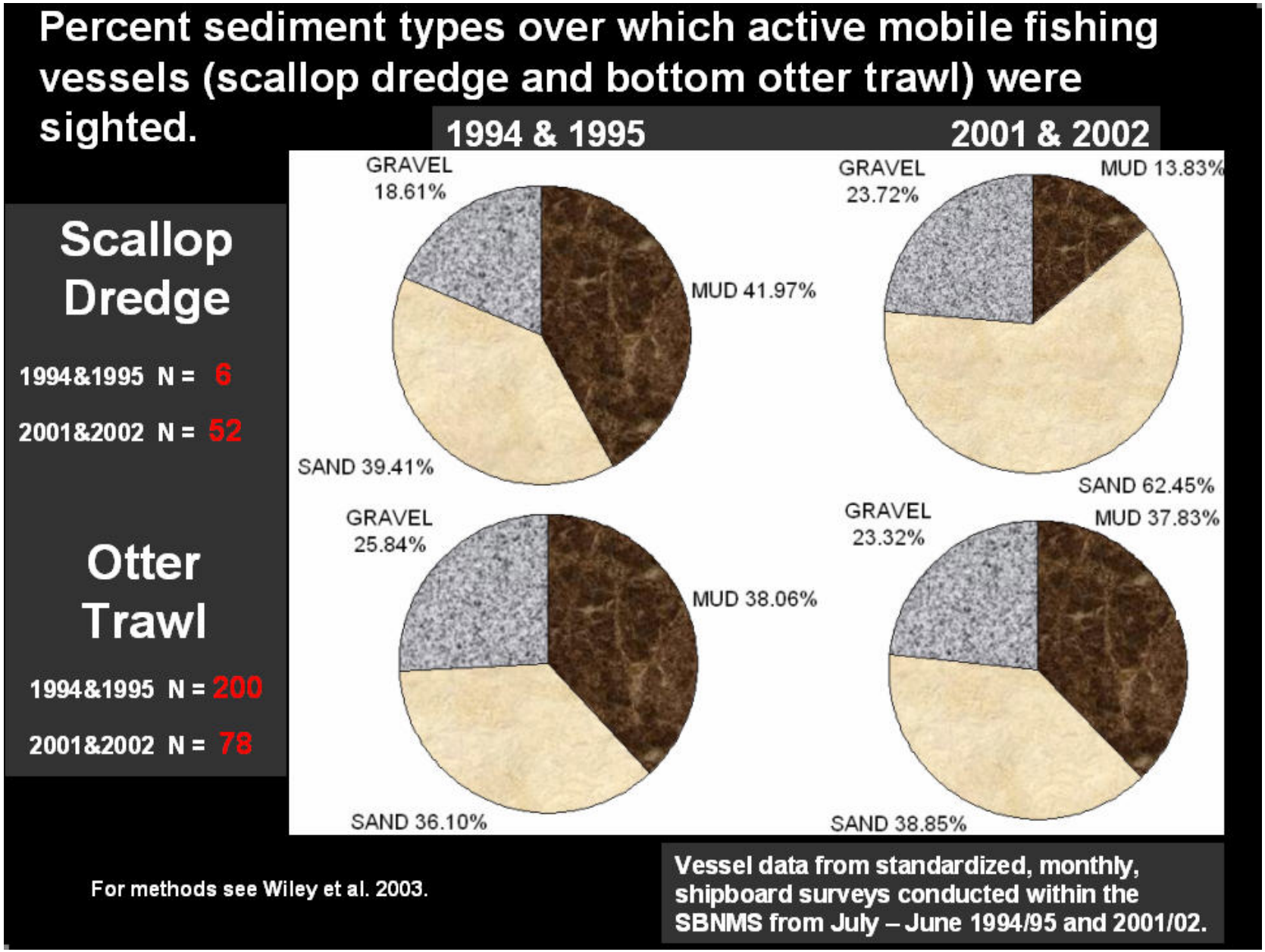


EXHIBIT EA.II – Percent sediment types over which active mobile fishing vessels (scallop dredge and bottom otter trawl) were sighted.



APPENDICES
(ECOSYSTEM ALTERATION)

APPENDIX EA.I – Existing Rgulations

A number of existing regulations and plans applies to, but are not specific to, the Stellwagen SBNMS and can be found in detail in 50 CFR Part 648. These are summarized as follows:

1. **Gear Restrictions**

The most recent management action to affect the fishing fleet operating in New England is Amendment 13 to the Northeast Multispecies Fishery Management Plan. The amendment was developed by the NEFMC and implemented by the NOAA Fisheries beginning on May 1, 2004 to end overfishing on all groundfish stocks and to rebuild those stocks that are overfished. It contains a variety of measures applicable to commercial and recreational fishing to:

- Address impacts of the fishery on Essential Fish Habitat;
- Minimize bycatch;
- Implement improved reporting and record keeping requirements; and
- Address other conservation and management issues.

The new measures significantly revise the components of the existing program such as target catch rates, adjustments to trip limits, and reductions in the number of DAS that can be fished. In addition, Amendment 13 includes several new elements such as:

- Leasing and transferring fishing days among limited access northeast groundfish permit holders;
- Allowing sectors of the groundfish fishery to develop their own sector allocation plans;
- Creating a Special Access Program to target healthy stocks such as yellowtail flounder;
- Implementing a U.S./Canada Sharing Understanding whereby an allocation of total allowable catch for portions of some Georges Bank groundfish stocks would be allocated to U.S. fishing vessels; and
- Implementing phased and adaptive rebuilding strategies for groundfish stocks.

For many small vessel owners, DAS have been reduced from an average of about 70 days in 2003 to approximately 53 days in 2004. Vessels are now allocated days on an individual basis, therefore some may have more than others, depending on their demonstrated history in the fishery. Under the new rules for Northeast Multispecies, pair-trawling is prohibited and a 5% regulated species bycatch cap when fishing outside DAS has been implemented. In accordance with 50 CFR §648.80, gear restrictions for the GOM Regulated Mesh Area apply to the SBNMS.

The table below summarizes gear restrictions organized by the GOM, Georges Bank (GB), Southern New England (SNE), and Mid-Atlantic (MA) Regulated Mesh Areas. Concerning trap/pot gear, the SBNMS is located primarily within lobster EEZ Nearshore Management

Area 1 (Area 1; see §697.18(a) for latitude/longitude coordinates). There is one small section of the southeastern corner of the SBNMS that extends into the EEZ Nearshore Outer Cape Lobster Management Area (Outer Cape Area; see §697.18(h) for latitude/longitude coordinates).

Unless otherwise noted, the gear regulations described below apply to fishing vessels issued valid federal fishing permits or any vessel fishing in federal waters (see 50 CFR §648.4 for federal fishing permit requirements). This information is only a summary (NOAA, 2004) of applicable fishing regulations and is not a substitute for the actual regulations, which can be found at 50 CFR §648.

Gear Restrictions by Regulated Mesh Areas (Adapted From Federal Register 69[81]:22910-22911)

	GOM	GB	SNE	MA
MINIMUM MESH SIZE RESTRICTIONS FO GILLNET GEAR				
NE Multispecies Day Gillnet Category[1]	Roundfish nets 6.5" (16.5 cm) mesh; 50-net allowance; 2 tags/net	All nets 6.5" (16.5 cm) mesh; 50-net allowance; 2 tags/net	All nets 6.5" (16.5 cm) mesh; 75-net allowance; 2 tags/net	Roundfish nets 6.5" (16.5 cm) mesh; 75-net allowance; 2 tags/net
	Flatfish nets 6.5" (16.5 cm) mesh; 100-net allowance; 1 tags/net			Flatfish nets 6.5" (16.5 cm) mesh; 75-net allowance; 2 tags/net
NE Multispecies Trip Gillnet Category[1]	All nets 6.5" (16.5 cm) mesh; 150-net allowance; 1 tags/net	All nets 6.5" (16.5 cm) mesh; 150-net allowance; 2 tags/net	All nets 6.5" (16.5 cm) mesh; 75-net allowance; 2 tags/net	All gillnet gear 6.5" (16.5 cm) mesh; 75-net allowance; 2 tags/net
Monkfish Vessels[2]	10" (25.4 cm) mesh/150-net allowance			
	1 tag/net			
MINIMUM MESH SIZE RESTRICTIONS OF TRAWL GEAR AND DREDGES				
Codend Only Mesh Size[1]	6.5" (16.5 cm) diamond or square mesh; 12" (30.5 cm) roller gear for Inshore Restricted Roller Gear Area		7.0" (17.8 cm) diamond or 6.5" (16.5 cm) square mesh	6.5" (16.5 cm) diamond or square mesh
Large Mesh Category - Entire Net	8.5" (21.59 cm) diamond or square mesh			7.5" (19.0 cm) diamond or 8.0" (20.3 cm) square mesh
Small Mesh Exemption - Northern Shrimp	1.75" (4.45 cm) diamond or square mesh; Fish Excluder Device (FED) with 1" (2.54 cm) spacing at 45° angle; 15 fathom maximum distance between trawl doors			
Small Mesh Exemption - Raised Footrope Trawl	2.5" (6.35 cm) diamond or square mesh; 8" (20.3 cm) diameter floats, maximum 4' (122.0 cm) apart on headrope; footrope longer than headrope, with or without chain sweep; footrope rigged for no contact with ocean bottom; FED needed in GOM Grate Raised Footrope Whiting Fishery Exemption Area Jul. 1 to Nov. 30		N/A	2.5" (6.35 cm) diamond or square mesh; 8" (20.3 cm) diameter floats, maximum 4' (122.0 cm) apart on headrope; footrope longer than headrope, with or without chain sweep; footrope rigged for no contact with ocean bottom
Small Mesh Exemption - Atlantic Herring	No minimum mesh size required; 165' (50.3 m) maximum vessel length overall (LOA); 750 gross registered tonnage (GRT) (680.4 mt) maximum vessel weight; 3,000 horsepower maximum propulsion			
Small Mesh Exemption - Squid	1.875" (48 mm) diamond mesh			
Small Mesh - Scup[3]	25 meshes of 4.5" (11.43 cm) diamond mesh forward of codend terminus and 100 meshes of 5" (12.75 cm) mesh forward of the 4.5" (11.43 cm) mesh			
Small Mesh - Black Sea Bass[3]	4.5" (11.43 cm) diamond mesh			

Gear Restrictions by Regulated Mesh Areas (Continued)

	GOM	GB	SNE	MA
MINIMUM MESH SIZE RESTRICTIONS OF TRAWL GEAR AND DREDGES				
Scallop Trawl - Entire Net	5.5" (14.0 cm) diamond or square mesh; 144' (43.9 m) maximum sweep length			
Scallop Dredge	31' (9.4 m) maximum dredge width; 5.5" (14.0 cm) diamond or square mesh; 3.5" (8.9 mm) ring diameter			
Small Scallop Dredge Category	1 dredge only; 10.5' (3.2 m) maximum dredge width; 5.5" (14.0 cm) diamond or square mesh; 3.5" (8.9 mm) ring diameter			
MAXIMUM NUMBER OF HOOKS AND SIZE RESTRICTIONS FOR HOOK GEAR[4]				
Limited Access Multispecies Vessels	2,000 hooks	3,600 hooks	2,000 hooks	4,500 hooks (Hook gear vessels only)
	No less than 6" (15.2 cm) spacing allowed between the fairlead rollers			
	12/0 circle hooks required for longline gear			N/A
TRAP AND POT RESTRICTIONS				
Traps and Pots[5] - Lobster	1.9375" (4.92 cm) by 5.75" (14.61 cm) or 2 circular 2.4375" (6.19 cm) escape vent; 3.75" (9.53 cm) by 3.75" (9.53 cm) ghost panel; single buoy for 3 traps/pots or less; 1.5 nm maximum trawl length, marked with a radar reflector and a single flag or pennant on the westernmost end, while the easternmost end of a trap trawl must be configured with a radar reflector only if over 3 traps/pots; 1 tags/pot or trap			
	Areas 1 & Outer Cape 800 traps; 22,950 in^3 (376,081 cm^3) maximum trap/pot volume	Areas 2 (with 2-3 overlap) & Outer Cape 800 traps; 22,950 in^3 (376,081 cm^3) maximum trap/pot volume	Areas 2 (with 2-3 overlap), 4 & 5 800 traps; 22,950 in^3 (376,081 cm^3) maximum trap/pot volume	Areas 4 & 5 800 traps; 22,950 in^3 (376,081 cm^3) maximum trap/pot volume
	Area 3 (with 2-3 Overlap) 1,800 maximum traps/pots; 30,000 in^3 (493,249 cm^3) maximum trap/pot volume			
Traps and Pots - Scup[3]	Degradable hinges; 3.1" (7.9 cm) diameter or 2.25" (5.7 cm) square minimum escape vent; 1 tags/pot or trap			
Traps and Pots - Black Sea Bass[3]	Degradable hinges; 1.375" (3.49) by 5.75" (14.61 cm) or 2.375" (6.03 cm) circular or 2" (5.08 cm) square minimum escape vent; 3" (7.62cm) by 6" (15.24 cm) ghost panel; 1 tags/pot or trap			
Traps and Pots - Red Crab	600 trap/pot maximum; no parlor allowed; 18 ft^3 (0.51 m^3) maximum volume; 1 tags/trap or pot if fished under a limited access lobster permit[5]			

[1] When fishing under a NE multispecies DAS
[2] Monkfish Category C and D vessels, when fishing under a monkfish DAS
[3] Fishery not conducted in the GOM
[4] When fishing under a NE multispecies DAS or when fishing under the Small Vessel Permit
[5] Federal lobster regulations specified at 50 CFR 697, vessels in possession of a Federal lobster permit are required to abide by the most restrictive of state or Federal lobster regulations and the most restrictive management measures for all lobster management areas (LMA) in which the vessel elects to fish

2. Minimum Landing Size (MLS)

Unless otherwise noted, the landing size regulations described below apply to fishing vessels issued valid federal fishing permits or any vessel fishing in federal waters (see 50 CFR §648.4 for federal fishing permit requirements). This information is only a summary (NOAA, 2004) of applicable fishing regulations and is not a substitute for the actual regulations, which can be found at 50 CFR §648.

Commercial and Recreational MLS

	COMMERCIAL	RECREATIONAL
Haddock	19" (48.3 cm)	21" (53.3 cm)
Cod	22" (55.9 cm)	23" (58.4 cm)
Pollock	19" (48.3 cm)	
Redfish	9" (22.9 cm)	
Monktail	In the Northern Fishery Management Area (NFMA): 11" (27.9 cm) In the Southern Fishery Management Area (SFMA): 14" (35.6 cm)	
Whole monkfis	In the NFMA: 17" (43.2 cm) In the SFMA: 21" (53.3 cm)	
Dab	14" (35.6 cm)	
Witch Flounder (Grey Sole)	14" (35.6 cm)	
Winter Flounder (Blackback)	12" (30.5 cm)	
Yellowtail Flounder	13" (33.0 cm)	
Halibut	36" (91.4 cm)	
Summer Flounder (Fluke)	14" (35.6 cm)	17" (43.2 cm)
Scup	Moratorium Permit: 9" (22.9 cm) No Moratorium Permit: 10" (25.4 cm) Charter & Party Vessels: 12" (25.4 cm)	To be decided

Commercial and Recreational MLS (Continued)

	COMMERCIAL	RECREATIONAL
Black Sea Bass	Moratorium Permit: 11" (22.9 cm) No Moratorium Permit: 12" (25.4 cm) Charter & Party Vessels: 12" (25.4 cm)	To be decided
Sea Scallop	3.5" (8.9 cm)	
Surfclams	4.75" (12.065 cm)	Subject to state regulations

3. <u>Possession Limits</u>

Current trip and possession limits have been implemented under Amendment 13 and apply indirectly to addressing bycatch. In addition to the possession limits in the table below, the following species are subject to a set commercial catch quota (refer to 50 CFR § 648 for quota details), which when attained, results in the closure of the following fisheries:

- Summer Flounder
- Scup
- Black Sea Bass
- Deep-Sea Red Crab
- Tilefish
- Maine Mahogany Quahog
- Illex & Loligo Squid
- Butterfish
- Atlantic Mackerel
- Spiny Dogfish

Other management methods apply indirectly to bycatch reduction as well. The Atlantic Herring fishery is regulated by a total allowable catch (TAC) within specified fishing areas (see 50 CFR §648.200 through §648.202) which results in fishery closure when the TAC is attained. Management for the Surfclam/Ocean Quahog fishery is guided by an individual transferable quota (ITQ) system (see 50 CFR §648.70 and §648.71) which limits harvesting by specific quotas. Amendment 13 also makes allowances for small incidental catches by non-directed fishing vessels to reduce regulatory discards.

Unless otherwise noted, the possession regulations described below apply to fishing vessels issued valid federal fishing permits or any vessel fishing in federal waters (see 50 CFR §648.4 for federal fishing permit requirements). This information is only a summary (NOAA, 2004) of applicable fishing regulations and is not a substitute for the actual regulations, which can be found at 50 CFR §648.

Commercial Possession Limits

	LIMITS
Haddock	Multispecies Days At Sea (DAS) May 1 to Sep. 30: 3,000 lb/day, or up to 30,000 lb/trip Oct. 1 to Apr. 30: 5,000 lb/day, or up to 50,000 lb/trip Scallop DAS 300 lb/day
Cod	Multispecies DAS Gulf of Maine (North of 42°20'): 800 lbs/day, or up to 4,000 lbs/trip Georges Bank (South of 42°20'): 1,000 lbs/day, or up to 10,000 lbs/trip Hook: 1,000 lbs/day or 10,000 lbs/trip Open Access Handgear 75 lbs/day Scallop DAS 300 lbs/day Recreation 10 fish/day
Monkfish (Tail)	Incidental NFMA: 400 lbs/trip SFMA: 50 lbs/trip Scallop DAS 300 lbs/day Small Mesh, Small Vessels, and Handgear 50 lbs/trip Monkfish DAS SFMA Catagory A & C Vessels: 550 lbs/day SFMA Catagory B & D Vessels: 450 lbs/day Multispecies DAS SFMA Category C & D Vessels: 300 lbs/day
Monkfish (Whole)	Incidental NFMA: 1,328 lbs/trip SFMA: 166 lbs/trip Scallop DAS 996 lbs/day Small Mesh, Small Vessels, and Handgear 166 lbs/trip Monkfish DAS SFMA Catagory A & C Vessels: 1,826 lbs/day SFMA Catagory A & C Vessels: 1,494 lbs/day Multispecies DAS SFMA Category C & D Vessels: 996 lbs/day
Yellowtail Flounder	Cape Cod/GOM Area Apr. to May & Oct. to Nov.: 250 lbs/trip Jun. to Sept. & Dec. to Mar.: 750 lbs/trip SNE/MA Area Mar. to Jun.: 250 lbs/trip Jul. to Feb.: 750 lbs/day, or up to 3,000 lbs/trip All other months: same as Cape Cod/GOM Area
Halibut	Non-rgulated Multispecies Permit: 1 fish/trip Recreation 1 fish/trip

Commercial Possession Limits (Continued)

	LIMITS
Summer Flounder (Fluke)	Multispecies Permit May 1 to Oct. 31: 100 lbs Nov.1 to April 30: 200 lbs Recreation 4 fish/person/trip
Atlantic Herring	At or Exceeding 95% Total Allowable Catch (TAC) 2,000 lbs/day or 2,000 lbs/trip, pursuant to areas specified by NMFS
Silver Hake (Whiting)	Smaller Than 2.5" (6.36cm) Mesh 3,500 lbs combined with offshore hake 2.5" (6.36cm) or Greater Mesh: 7,500 lbs combined with offshore hake 3" (7.62 cm) or Greater Mesh 30,000 lbs combined with offshore hake Shrimp Fishery Combined with offshore hake, equal weight to shrimp on board, up to 3,500 lbs
Offshore Hake	Smaller Than 2.5" (6.36cm) Mesh 3,500 lbs combined with silver hake 2.5" (6.36cm) or Greater Mesh 7,500 lbs combined with silver hake 3" (7.62 cm) or Greater Mesh 30,000 lbs combined with silver hake Shrimp Fishery combined with silver hake, equal weight to shrimp on board, up to 3,500 lbs
Spiny Dogfish	May 1 to Oct. 31 600 lbs/trip Nov. 1 to April 30 300 lbs/trip
Skate	Multispecies, Scallop, or Monkfish DAS 22,700 lbs/trip under 24 hours duration 45,400 lbs/trip over 24 hours duration
Skate (Skate Wings)	Multispecies, Scallop, or Monkfish DAS 10,000 lbs/trip under 24 hours duration 20,000 lbs/trip over 24 hours duration
Scup	No Moratorium Permit 50 fish/person/trip
Black Sea Bass	Moratorium Permit Jan. 1 to Mar. 31: 500 lbs/trip Apr. 1 to Dec. 31: 100 lbs/trip No Moratorium Permit 25 fish/person/trip
Butter Fish	Incidental 2,500 lbs/trip
Loligo Squid	Incidental 2,500 lbs/trip
Illex Squid	Incidental 10,000 lbs/trip
Tile Fish	Incidental 300 lbs/trip

Commercial Possession Limits (Continued)

	LIMITS
Sea Scallops	Multispecies DAS 300 lbs/trip Scallop DAS (Limited and General Access) 400 lbs/trip shucked or 50 bu/trip whole State Waters 40 lbs/trip shucked or 5 bu/trip whole Sea Scallop Area Access Program Hudson Canyon Access Area: 18,000 lbs shucked/trip
Red Crab	Red Crab Limited Access DAS 75,000 lbs/trip, unless qualified for larger trip limit Limited Access Non-DAS 500 lbs/trip Incidental 500 lb/trip

4. Northeast Multispecies Closed Area Regulations

Unless otherwise noted, the closed area regulations described below apply to fishing vessels issued valid federal fishing permits or any vessel fishing in federal waters (see 50 CFR § 648.4 for federal fishing permit requirements). This information is only a summary (NOAA, 2004) of applicable fishing regulations and is not a substitute for the actual regulations, which can be found at 50 CFR Part 648.

GOM Rolling Closure Areas

The GOM Rolling Closure Areas and the GB Seasonal Area described below, unless further restricted under the EFH Closure Areas, are closed to all fishing vessels with the following exemptions: Vessels that do not have a Federal Northeast multispecies permit and are fishing exclusively in state waters; charter, party or recreational vessels; and vessels fishing with spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, mid-water trawls, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, shrimp trawls (with properly configured grates), and sea scallop dredge gear (see conditions under Georges Bank Seasonal Closure Area).

Charter and party vessels may fish in the GOM Rolling Closure Area provided they have a Letter of Authorization from the Regional Administrator to enter or fish in these areas. A Letter of Authorization is valid from the date of enrollment through the duration or the closure of three months duration, whichever is greater, and is available by calling the Permit Office at 978-281-9278.

- **Gulf Of Maine Seasonal Rolling Closure Areas**

Rolling Closure Area I - Closed March 1 through March 31

Point	N. Latitude	W. Longitude
GM3	42°00'	(1)
GM5	42°00'	68°30'
GM6	42°30'	68°30'
GM23	42°30'	70°00'
(1) = Cape Cod shoreline on the Atlantic Ocean		

Rolling Closure Area II - Closed April 1 through April 30

Point	N. Latitude	W. Longitude
GM1	42°00'	(1)
GM2	42°00'	(2)
GM3	42°00'	(3)
GM5	42°00'	68°30'
GM13	43°00'	68°30'
GM9	43°00'	(4)
(1) Massachusetts shoreline		
(2) Cape Cod shoreline on Cape Cod Bay		
(3) Cape Cod shoreline on the Atlantic Ocean		
(4) New Hampshire shoreline		

Rolling Closure Area III - Closed May 1 through May 31

Point	N. Latitude	W. Longitude
GM1	42°00'	(1)
GM2	42°00'	(2)
GM3	42°00'	(3)
GM4	42°00'	70°00'
GM23	42°30'	70°00'
GM6	42°30'	68°30'
GM14	43°30'	68°30'
GM10	43°30'	(4)
(1) Massachusetts shoreline		
(2) Cape Cod shoreline on Cape Cod Bay		
(3) Cape Cod shoreline on the Atlantic Ocean		
(4) Maine shoreline		

Rolling Closure Area IV - Closed June 1 through June 30

Point	N. Latitude	W. Longitude
GM9	42°30'	(1)
GM23	42°30'	70°00'
GM17	43°30'	70°00'
GM19	43°30'	67°32' or (2)
GM20	44°00'	67°21' or (2)
GM21	44°00'	69°00'
GM22	(3)	69°00'
(1) Massachusetts shoreline		
(2) U.S. - Canada maritime boundary		
(3) Maine shoreline		

Rolling Closure Area V - Closed October 1 through November 30*

Point	N. Latitude	W. Longitude
GM1	42°00'	(1)
GM2	42°00'	(2)
GM3	42°00'	(3)
GM4	42°00'	70°00'
GM8	42°30'	70°00'
GM9	42°30'	(1)
(1) Massachusetts shoreline		
(2) Cape Cod shoreline on Cape Cod Bay		
(3) Cape Cod shoreline on the Atlantic Ocean		

*****Raised Footrope Trawl Whiting Fishery
are exempt from Rolling Closure Area V.

- **Year-Round Groundfish Closure Areas- Gulf of Maine (GOM)**
  The Western GOM and Cashes Ledge Closure areas are closed year-round to all fishing vessels with the following exemptions: Charter, party (charter and party vessels must have a Letter of Authorization from the Regional Administrator to enter or fish in this area) or recreational vessels; and vessels fishing with spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, mid-water trawls, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, and shrimp trawls (with properly configured grates). A Charter/Party Letter of Authorization is valid from the date of enrollment until the end of the fishing year and is available by calling the Permit Office at 978-281-9278.

Western GOM Area Closure

Point	N. Latitude	W. Longitude
WGM1	42°15'	70°15
WGM2	42°15'	69°55'
WGM3	43°15'	69°55'
WGM4	43°15'	70°15'
WGM1	42°15'	70°15

- **Year-Round Essential Fish Habitat (EFH) Closures**
  EFH Closure Areas are closed year-round to all bottom-tending mobile gears. Bottom tending mobile gear is defined as the following: Gear in contact with the ocean bottom, and towed from a vessel, which is moved through the water during fishing in order to capture fish, and includes otter trawls, beam trawls, hydraulic dredges, non-hydraulic dredges, and seines (with the exception of a purse seine).

Western GOM Habitat Closure Area

Point	N. Latitude	W. Longitude
WGM4	43°15'	70°15'
WGM1	42°15'	70°15
WGM5	42°15'	70°00'
WGM6	43°15'	70°00'
WGM4	43°15'	70°15'

Jeffery's Bank Habitat Closure Area

Point	N. Latitude	W. Longitude
JB1	43°40'	68°50'
JB2	43°40'	68°40'
JB3	43°20'	68°40'
JB4	43°20'	68°50'
JB1	43°40'	68°50'

- **Transiting Regulations**
  NE Multispecies GOM Rolling Closure Areas, GB Seasonal Closure Area, Western GOM Closure Area, Cashes Ledge Closure Area, Nantucket Lightship Closed Area, Closed Area I, and the EFH Closure Areas (unless otherwise prohibited): Vessels may transit these areas during the closure periods, provided that the gear is stowed in accordance with the regulations summarized below.

- **Gear Stowage Requirements**
  To legally stow gear, a vessel must meet one or more of the following requirements:

  <u>Trawl Gear</u>:

  - ***A net stowed below deck provided***: It is located below the main working deck from which the net is deployed and retrieved; the towing wires, including the leg wires, are detached from the net; and it is fan-folded (flaked) and bound around its circumference.

  or

  - ***A net stowed and lashed down on deck, provided***: It is fan-folded (flaked) and bound around its circumference; it is securely fastened to the deck or rail of the vessel; and the towing wires, including the leg wires, are detached from the net.

  or

  - ***On-reel stowage for vessels transiting the GOM Rolling Closure Areas and the GB Seasonal Closure Area*** - A net that is on a reel and is covered and secured, provided: the entire surface of the net is covered with canvas or other similar opaque material that is securely bound; the towing wires are detached from the doors; and no containment rope, codend tripping device, or other mechanism to close off the codend is attached to the codend.

  or

  - ***On-reel stowage for vessels transiting the Western GOM Closure Area, Cashes Ledge Closure Area, Closed Area I, Closed Area II, and the Nantucket Lightship Closed Area*** - A net that is on a reel and is covered and secured, provided: the entire surface of the net is covered with canvas or other similar opaque material that is securely bound; the towing wires are detached from the net; and the codend is removed and stored below deck.

  or

  - ***Nets that are secured in a manner authorized in writing by the Regional Administrator***

  <u>Scallop Dredges</u>:
  - The towing wire is detached from the scallop dredge, the towing wire is reeled up onto the winch, and the dredge is secured and covered so that it is rendered unusable for fishing.

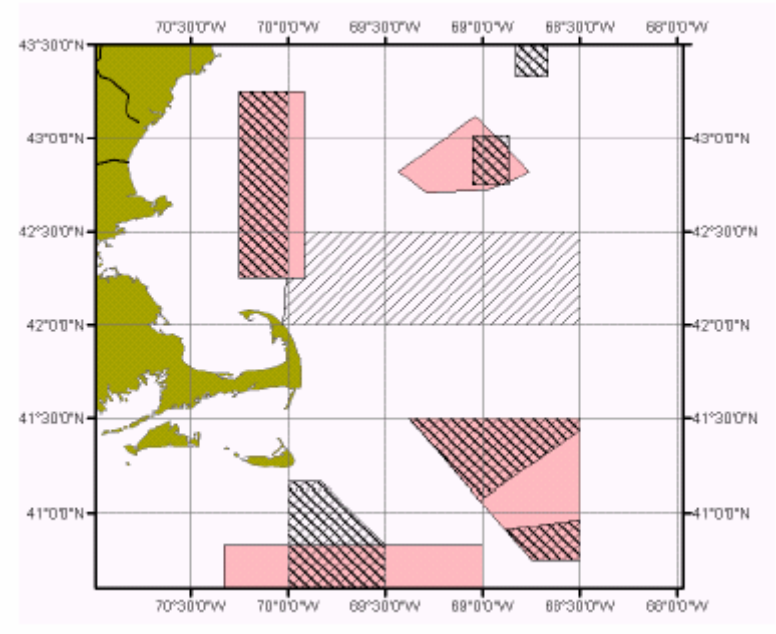
<u>Hook Gear</u>: (other than pelagic)

- All anchors and buoys are secured and all hook gear, including jigging machines, is covered.

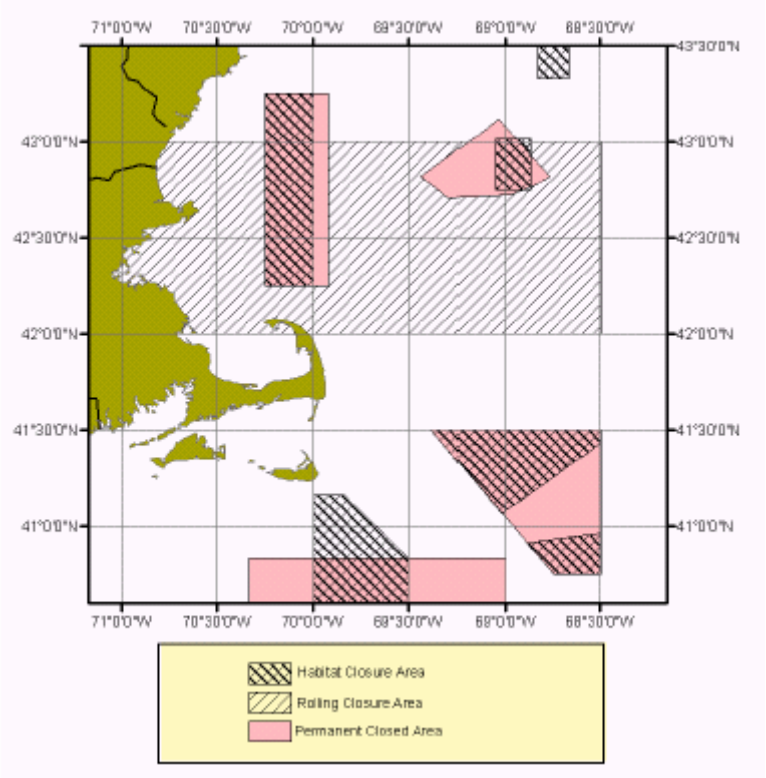
<u>Sink Gillnet Gear</u>:

- All nets are covered with canvas or other similar material and lashed or otherwise securely fastened to the deck or rail, and all buoys larger than 6 inches (15.24 cm) in diameter, high flyers, and anchors are disconnected.

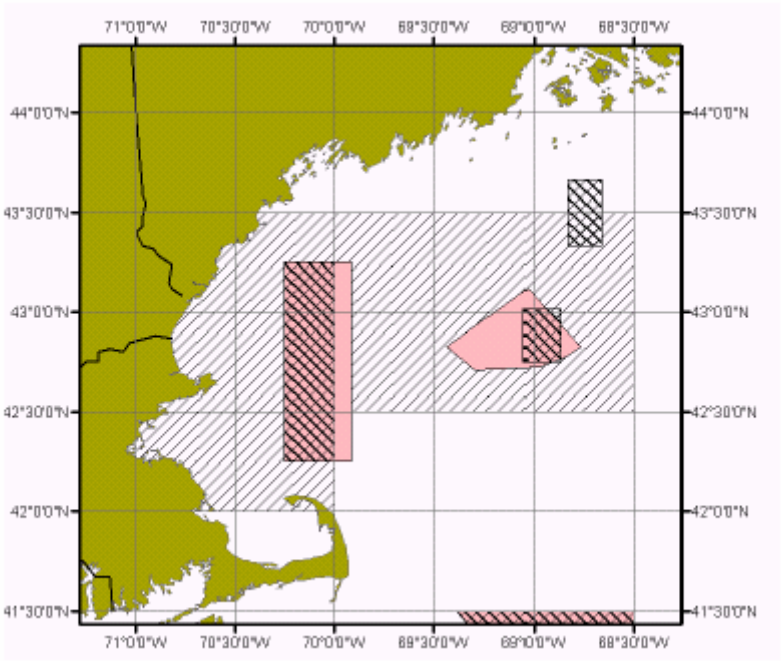
Gulf of Maine Rolling Closure Area I



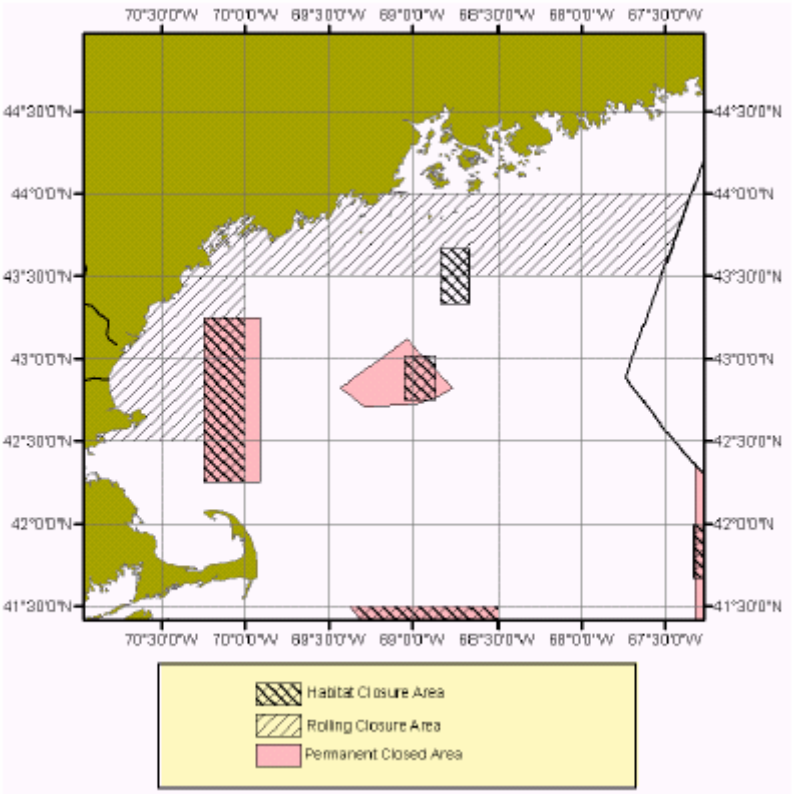
Gulf of Maine Rolling Closure Area II



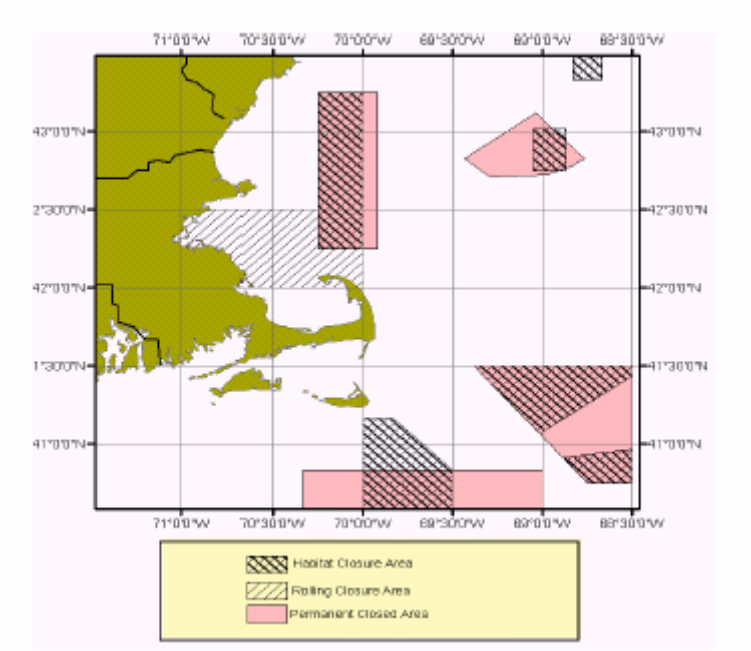
Gulf of Maine Rolling Closure Area III



Gulf of Maine Rolling Closure Area IV



Gulf of Maine Rolling Closure Area V



APPENDIX EA.II – Preamble to Affected Environment Section of Northeast Multispecies Amendment 13 SEIS

A number of authors have reviewed, to varying extents, existing scientific literature on the effects of fishing on habitat (e.g., Auster et al. 1996, Cappo et al. 1998, Collie 1998, Jennings and Kaiser 1998, Rogers et al. 1998, Auster and Langton 1999, Hall 1999, Collie et al. 2000, Lindeboom and de Groot 1998, Barnette 2001, National Research Council 2002). The following summary of the conclusions reached by these authors is extracted from a recent NOAA report (Johnson 2002).

A number of review papers have focused specifically on the physical effects of bottom trawls. In Europe, an ICES working committee (ICES 1973) concluded that otter trawls, beam trawls and dredges all have similar effects on the seabed, but the magnitude of disturbance increases from shrimp to beam trawls with tickler and stone guards, to Rapido trawls, to mollusc (e.g., scallop) dredges. Kaiser et al. (1996) and Collie et al. (2000) state that, because beam trawls are used almost exclusively in areas that are adapted to frequent wave/tidal action, they are less likely to adversely affect bottom habitats. As mentioned elsewhere in the Northeast Multispecies Amendment 13 SEIS, scallop dredges used in Europe and Australia are designed differently than the sweep dredge used in the Northeast region of the U.S. Specifically, they have a row of teeth that penetrate several inches into the bottom and therefore have a greater impact on benthic habitats than the sweep dredge. Beam trawls and Rapido trawls are not used in the U.S. groundfish fishery.

Auster et al. (1996) conducted three studies of mobile fishing gear in the Gulf of Maine and concluded that mobile fishing gear alters the seafloor, and reduces habitat complexity, sedimentary structures, and emergent epifauna. Collie (1998) reviewed studies from New England and concluded that hard bottom benthic habitats (e.g., boulders and gravel pavement) experience significant impacts of mobile bottom-tending fishing gear, while mobile sand habitats are less vulnerable. Jennings and Kaiser (1998) concluded that fishing activities lead to changes in the structure of marine habitats and influence the diversity, composition, biomass, and productivity of the associated biota. They further concluded that these effects vary according to gears used, habitats fished, and the magnitude of natural disturbance, but tend to increase with depth and the stability of the substrate. Auster and Langton (1999) reviewed 22 studies from a wide geographic range and concluded that mobile fishing gear reduces habitat complexity by: (1) directly removing epifauna or damaging epifauna leading to mortality, (2) smoothing sedimentary bedforms and reducing bottom roughness, and (3) removing taxa which produce structure (i.e., taxa which produce burrows and pits). They also concluded that for fixed gear, the area impacted per unit effort is smaller than for mobile gear, but the types of damage to emergent benthos appear to be similar (but not necessarily equivalent per unit effort).

Collie et al. (2000) analyzed 39 published studies to compile and evaluate current findings regarding fishing gear effects on different types of benthic habitat. They found: (1) 89% of the studies were undertaken at depths less than 60 m; (2) otter trawl gear is the most frequently studied; (3) most studies have been done in Northern Europe and Eastern North America. The authors reached several conclusions regarding the effects of fishing: (1) intertidal dredging and

scallop dredging have the greatest initial effects on benthic biota, followed by otter trawling and then beam trawling (although beam trawling studies were conducted in dynamic sandy areas, where effects might be less apparent); (2) fauna in stable gravel, mud and biogenic habitats are more adversely affected than those in less consolidated coarse sediments; (3) recovery appears most rapid in less physically stable habitats (inhabited generally by more opportunistic species); (4) we may accurately predict recovery rates for small-bodied taxa, but communities often contain one or two long-lived, vulnerable species; (5) large-bodied organisms are more prevalent before trawling; and (6) the mean initial response to fishing impacts is negative (55% reduction of individual taxa). Based on these findings, the authors suggested that the scientific community abandon short-term small-scale experiments and undertake larger scale experiments that mimic the timing and frequency of disturbance typical of commercial fishing activities.

A working committee of the International Council for the Exploration of the Seas (ICES) issued, in November 2000, a report on the "Effects of Different Types of Fisheries on North Sea and Irish Sea Benthic Ecosystems." This report (ICES 2000) was a summary of findings based on a comprehensive report of the same title edited by Lindeboom and de Groot (1998). The ICES report identified a number of possible effects of beam trawls and bottom otter trawls on benthic habitats and species. Two general conclusions were: 1) low-energy environments are more affected by bottom trawling; and 2) bottom trawling can affect the potential for habitat recovery (i.e., after trawling ceases, benthic communities and habitats may not always return to their original pre-impacted state). Regarding direct habitat effects, the committee concluded that:

Bottom trawls can cause the loss or dispersal of physical features such as peat banks or boulder reefs. These changes are always permanent and lead to an overall change in habitat diversity. This, in turn, can lead to the local loss of species and species assemblages dependant on such features.

1. Bottom trawling can cause the loss of structure-forming organisms (e.g., colonial bryozoans, Sabellaria, hydroids, seapens, sponges, mussel beds, and oyster beds). These changes may be permanent and can lead to an overall change in habitat diversity. This, in turn, can lead to the local loss of species and species assemblages dependant on such biogenic structures.

2. Bottom trawling can cause a reduction in complexity by redistributing and mixing surface sediments as well as degrading habitat and biogenic features. This can lead to a decrease in the physical patchiness of the sea floor. These changes are not likely to be permanent.

3. Bottom trawling can alter the detailed physical structure of the sea floor by reshaping seabed features such as sand ripples and damaging burrows and associated structures. These features provide important habitats for smaller animals and can be used by fish to reduce their energy requirements. These changes are not likely to be permanent.

The committee also identified a number of possible effects of bottom trawling on species.

- Bottom trawling can cause the loss of species from part of their normal range.
- Bottom trawling can cause a decrease in populations which have low rates of turnover.

- The relative abundance of species is altered by bottom trawling.
- Fragile species are more affected by bottom trawling than robust species
- Surface-living species are more affected by bottom trawling than deep-burrowing species.
- Bottom trawling can have sub-lethal effects on individuals.
- Bottom trawling can cause an increase in populations which have high rates of turnover.
- Bottom trawling favors populations of scavenging species.

Direct habitat effects of fishing have also been summarized by Johnson (2002) in four categories: alteration of physical structure, sediment suspension, chemical modifications, and benthic community changes. Most of the effects mentioned below can also be found in the review of the existing gear effects literature that is included in the Gear Effects Evaluation of the Northeast Multispecies Amendment 13 SEIS.

Alteration of Physical Structure

Physical effects of fishing gear can include scraping, plowing, burial of mounds, smoothing of sand ripples, removal of stones or dragging and turning of boulders, removal of taxa that produce structure, and removal or shredding of submerged aquatic vegetation (Fonseca et al.1984, Messieh et al. 1991, Black and Parry 1994, Gordon et al. 1998, Kaiser et al. 1998, Lindeboom and de Groot 1998, Schwinghamer et al. 1998, Auster and Langton 1999, Kaiser et al. 1999, Ardizzone et al. 2000). These physical alterations reduce the heterogeneity of the sediment surface, alter the texture of the sediments, and reduce the structure available to biota as habitat. As mobile gear is dragged across the seafloor, parts of some gears can penetrate up to 5-30 cm into the substrate under usual fishing conditions, and likely to greater depths under unusual conditions (Drew and Larsen 1994). This action can leave tracks or even trenches in the seafloor, depending on the sediment type. It is unknown whether or to what extent these human-made features might compensate for the sediment smoothing actions of the gear.

Sediment Suspension

Re-suspension of sediments occurs as fishing gear is dragged along the seafloor. Effects of sediment suspension can include reduction of light available for photosynthetic organisms, burial of benthic biota, smothering of spawning areas, and negative effects on feeding and metabolic rates of organisms. If re-suspension occurs over a large enough area it can actually cause large scale re-distribution of sediments (Messieh et al. 1991, Black and Parry 1994). Re-suspension may also have important implications for nutrient budgets due to burial of fresh organic matter and exposure of deep anaerobic sediment, upward flux of dissolved nutrients in porewater, and change in metabolism of benthic infauna (Mayer et al. 1991, Pilskaln et al. 1998).

Effects of sediment re-suspension are site-specific and depend on sediment grain size and type, water depth, hydrological conditions, faunal influences, and water mass size and configuration (Hayes et al. 1984, LaSalle 1990, Barnes et al. 1991, Coen 1995). Effects are likely more significant in waters that are normally clear compared with areas that are already highly perturbed by physical forces (Kaiser 2000). Schoellhamer (1996) concluded that re-suspension by natural mechanisms in a shallow estuary in west-central Florida was less frequent and of smaller magnitude than anthropogenic mechanisms (e.g., fishing) and that sediments disturbed by fishing were more susceptible to re-suspension by tidal currents. Modeling by Churchill

(1989) revealed that re-suspension by trawling is the primary source of suspended sediment over the outer continental shelf of the eastern U.S., where storm-related stresses are weak. In the Kattegat Sea (Sweden), sandy sediments above the halocline were more affected by wind-induced impacts than by fishing, but mud sediments below the halocline experienced an increase in frequency of 90% in the spring and summer and of 75-85% in the autumn and winter due to fishing (Floderus and Pihl 1990). Thus, even when recovery times are fast, persistent disturbance by fishing could lead to cumulative impacts. In contrast, Dyekjaer et al. (1995) found that in Denmark, although local effects of short duration might occur, annual release of suspended particles by mobile fishing gear is relatively unimportant compared with that resulting from wind and land runoff.

Chronic suspension of sediments and resulting turbidity can also affect aquatic organisms through
behavioral, sublethal and lethal effects, depending on exposure. Species reaction to turbidity depends on life history characteristics of the species. Mobile organisms can move out of the affected area and quickly return once the disturbance dissipates (Simenstad 1990, Coen 1995). Even if species experience high mortality within the affected area, species with short life history stages and high levels of recruitment or high mobility can repopulate the affected area quickly. However, if effects are protracted and occur over a large area, recovery through recruitment or immigration will be hampered. Furthermore, chronic re-suspension of sediments may lead to shifts in species composition by favoring those species that are better suited to recover or those that can take advantage of the pulsed nutrient supply as nutrients are released from the seafloor to the euphotic zone (Churchill 1989).

Changes in Chemistry

Fishing can produce changes to the chemical makeup of both the sediments and overlying water mass through mixing of subsurface sediments and porewater. In shallow water this mixing might be insignificant in relation to that produced by tidal and storm surge and wave action, but in deeper, more stable waters, this mixing can have significant effects (Rumohr 1998). In a shallow, eutrophic sound in the North Sea, fishing caused an increase in average ammonia content (although horizontal variations prevented interpretations of these increases) and a decrease in oxygen due to the mixing of reduced particles from within the sediments (Riemann and Hoffman 1991). Also in the North Sea, fishing enhances the phosphate released from sediment by 70-380 metric tons per year for otter trawls and by 10,000-70,000 metric tons per year for beam trawlers (ICES 1992). These pulses are partially compensated by lower fluxes after the trawl passes. It is important to remember that these releases recycle existing nutrients, rather than adding new nutrients, such as nutrients derived from rivers and land runoff (ICES 1992). During seasons when nutrients are low, mixing of the sediments could cause increased primary production and/or eutrophication.

Changes to Benthic Communities

Benthic communities are affected by fishing gear through damage to the benthos in the path of the gear and disturbance of the seafloor to a depth of up to 30 cm. Many kinds of epibenthic animals are crushed or buried, while infauna is excavated and exposed on the seabed. This is in addition to smothering addressed above.

Specific impacts from fishing depend on the life history, ecology and physical characteristics of the biota present (Bergman and Van Santbrink 2000). Mobile species that exhibit high fecundities and rapid generation times will recover more quickly than non-mobile, slow-growing organisms. In Mission Bay, California, polychaetes with reduced larval phases and postlarval movements had small-scale dispersal abilities that permitted rapid re-colonization of disturbed patches that maintained high infaunal densities (Levin 1984). Those with long-lived larvae were only available for successful re-colonization if the timing of disturbance coincided with periods of peak larval abundance; however, these species were able to colonize over much larger distances. Rijnsdorp and Van Leeuwen (1996) found that increased growth in the smallest size classes of plaice in the North Sea correlated to eutrophication and seabed disturbance caused by beam trawls. The authors hypothesized that trawling caused a shift in the benthic community from low-productive, long-lived species to high-productive, short-lived species that benefited from increased nutrient availability. This potentially could have led to increased prey availability, and thus, higher growth rates for the juvenile plaice.

The physical structure of biota also affects their ability to sustain and recover from physical impacts with fishing gear. Thin shelled bivalves and starfish show higher damage than solid-shelled bivalves in fished areas (Rumohr and Krost 1991). Animals that are able to retract below the surface of the seafloor or live below the penetration depth of the fishing gear will sustain much less damage than epibenthic organisms that inhabit the sediment surface. Animals that are more elastic and can bend upon contact with fishing gear will suffer much less damage than those that are hard and inflexible (Eno et al. 2001). Kaiser et al. (2000) found that chronic fishing around the Isle of Man, in the Irish Sea, has removed large-bodied fauna such that benthic communities are now dominated by smaller-bodied organisms that are less susceptible to physical disturbance. Off the northwest shelf of Australia, a switch of dominant fish species from lethrinids and lutjanids (which are almost exclusively associated with habitats supporting large epibenthos) to saurids and nemipterids (which were found on open sand) occurred after removal of epibenthic fauna by trawling (Sainsbury et al. 1993, 1994) has been documented.

Increased fishing pressure can also lead to changes in distribution of species, either through movement of animals away from or towards the fished area (Kaiser and Spencer 1993, 1996, Ramsay et al. 1996, Kaiser and Ramsay 1997, Ramsay et al. 1998, Bradshaw et al. 2000, Demestre et al. 2000). Frid and Hall (1999) found higher prevalence of fish remains and scavengers and a lower abundance of sedentary polychaetes in stomach contents of dabs in the North Sea in areas of higher fishing effort. Kaiser and Spencer (1994) document that gurnards and whiting aggregate over beam trawl tracks and have higher numbers of prey items in their stomachs shortly after trawling. Based on these studies, researchers have speculated that mobile fishing may lead to increased populations of species that exhibit opportunistic feeding behavior. Fonds and Groenewold (2000) modeled results for the southern North Sea indicating that the annual amount of food supplied by beam trawling is approximately 7% of the food demand of common benthic predators. This level could help maintain populations but is insufficient to support further population growth.

The most recent and comprehensive summary of gear effects on benthic marine habitats was prepared by the National Research Council. This report, entitled “Effects of Trawling and

Dredging on Seafloor Habitat" (NRC 2002) reiterated four general conclusions regarding the types of habitat modifications caused by trawls and dredges:

- Trawling and dredging reduce habitat complexity.
- Repeated trawling and dredging result in discernable changes in benthic communities.
- Bottom trawling reduces the productivity of benthic habitats.
- Fauna that live in low natural disturbance regimes are generally more vulnerable to fishing gear disturbance.

The NRC report also summarized the indirect effects of mobile gear fishing on marine ecosystems. It did not consider the effects of all gear types, only the two (trawls and dredges) that are considered to most affect benthic habitats. It also provided detailed information from only a few individual studies. An additional source of information used in Northeast Multispecies Amendment 13 SEIS is the report of a gear effects workshop sponsored by the New England and Mid-Atlantic Fishery Management Councils in October 2001 (NREFHSC 2002). This report includes conclusions reached by a panel of experts on the effect of different gears on benthic habitat types in the Northeast U.S. and is appended the Northeast Multispecies Amendment 13 SEIS. Refer to the following tables in that report for conclusions on these gear types: Clam Dredges, Scallop Dredges, Otter Trawls, Pots and Traps, and Sink Gill Nets and Bottom Longlines.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

January 27, 2003

The following information sheet (attached) on the regulatory coordination between the National Marine Sanctuaries Program (NMSP) and federal/state fishery management agencies was drafted at the request of a working group at one of the sanctuaries. This working group is providing advice to the sanctuary on fisheries issues within the sanctuary during their management plan review. It should be noted that the authorities and processes described in this information sheet are not new but part of the longstanding language contained within the NMSA. Please contact the National Marine Sanctuary Program at 301-713-3125 or *nmscomments@noaa.gov* if you have any questions about the authorities or processes described in this information sheet.

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

January 27, 2003

Regulatory Coordination Between the National Marine Sanctuaries Program and Fishery Management Agencies

Under the National Marine Sanctuaries Act (NMSA), NOAA, on behalf of the Secretary of Commerce, is responsible for protecting sanctuary resources and facilitating within the sanctuaries multiple uses that are compatible with resource protection. The NMSA provides sufficient regulatory authority to accomplish these management objectives, including authority to regulate fisheries and fishing activities as necessary to address specific issues at a particular sanctuary. Any such regulation would be developed in cooperation with appropriate state and federal authorities and fishery management councils, as required by section 304 (a)(5) of the NMSA.

The regulation of fishery resources in national marine sanctuaries is a collaborative process, where sanctuary managers work with other fishery managers in the region to ensure that these important resources are protected. When appropriate, the sanctuary manager may request that the relevant fishery management agency address sanctuary concerns within that agency's own statutory and regulatory context. However, sanctuaries may manage fishery resources within their boundaries by imposing specific sanctuary regulations on certain fishing methods and gear or preventing the taking of fish when it is determined to be necessary to protect cultural sites, to protect important natural resources or to maintain biodiversity or the health and balance of the sanctuary ecosystem. NOAA has adopted such regulations under the NMSA in the Monitor, Florida Keys, Fagatele Bay, Flower Garden Banks, and Gray's Reef Sanctuaries. Where the regulatory measures taken by state and the fishery management councils and NMFS are found to afford appropriate protection to sanctuary resources and meet sanctuary management objectives, the sanctuary achieves its objectives by working with these entities to ensure that the appropriate level of protection is maintained.

It may be determined that additional fishing regulations should be imposed in the sanctuary to achieve management objectives under the NMSA or for the goals and objectives of the particular sanctuary. In such a situation, the sanctuary would consult with the appropriate fishery management council, NMFS, any affected state (if applicable), and the public. In state waters, the sanctuary will work with state fishery agencies to implement necessary regulations. In federal waters, if the fishery management council or the sanctuary determine that the regulations should be implemented, pursuant to subsection 304 (a)(5) of the NMSA the appropriate fishery management council would be given the opportunity to prepare draft sanctuary fishing regulations for that portion of the sanctuary. If the council decides to prepare such draft regulations it is to use as guidance the national standards of section 301(a) of the

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Magnuson-Stevens Act to the extent those standards are consistent and compatible with the goals and objectives of the sanctuary. If the draft regulations are found by NOAA to meet the goals and objectives of the sanctuary and the purposes and policies of the NMSA, they will be published as sanctuary regulations. If, however, the council declines to make a determination as to the need for fishing regulations in the sanctuary, makes a determination that is rejected by NOAA, requests that NOAA prepare the draft regulations, or does not prepare the draft regulations in a timely manner, NOAA will prepare the fishing regulations. Regardless of whether the council or NOAA drafts the sanctuary fishing regulations, NOAA will be responsible for compliance with the NMSA, National Environmental Policy Act, Administrative Procedure Act, and other applicable requirements.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

February 20, 2004

MEMORANDUM FOR: Craig D. MacDonald, Superintendent
Stellwagen Bank National Marine Sanctuary

FROM: Michael Weiss, Deputy Director
National Marine Sanctuary Program

SUBJECT: Fishing Questions Raised During the Stellwagen Bank National Marine Sanctuary Management Plan Review

This memo is intended to clarify some outstanding questions raised during the management plan review process with regard to the potential regulation of certain fishing activities in the Stellwagen Bank National Marine Sanctuary (SBNMS or Sanctuary).

1. Does the SBNMS intend to regulate certain fishing activities?

At this time the SBNMS has made no decision regarding the need to regulate any fishing activities. A decision will be made after reviewing the results of the working groups, SAC recommendations, and consultations with agency partners, particularly NOAA Fisheries and the relevant fishery management council. The SBNMS is currently involved in a statutorily required and public review process in which the current management plan is being reviewed and the adequacy of protection of all Sanctuary resources and qualities reassessed. It is certainly possible that through this process the working groups, Sanctuary Advisory Council and/or public might raise concerns that could lead to a determination that there is a need to regulate some aspects of fishing to protect certain sanctuary resources or qualities from damage or degradation. If this were to occur, SBNMS would have to amend its designation document to authorize the specific limited NMSA fishing regulation and would have to provide the relevant fishery management council the opportunity to draft such regulations. This entire process is extremely transparent and would not proceed without significant opportunities for public and constituent involvement, including the involvement of the commercial and recreational fishing communities.

2. Can the SBNMS currently regulate fishing activities?

No. Fishing is not an activity listed as subject to regulation in the SBNMS designation document. Therefore, it cannot be regulated without amending the designation document. Further, pursuant to the National Marine Sanctuaries Act (NMSA), the relevant fishery management council would be provided the opportunity to draft the SBNMS fishery regulations to achieve the desired resource protection objective. Any changes to the designation document would be narrowly constructed to address only the specific resource protection objective. The New England Fishery Management Council (NEFMC), NOAA Fisheries, and the fishing communities have been invited to work with the Sanctuary as the management plan working

groups are considering whether any management or regulatory changes are needed. Their input and expertise will be sought as the management plan review progresses, and especially as issues are considered that may have a bearing upon fishing activities.

3. Does the SBNMS have authority under the NMSA to regulate fishing activities?

Yes. Section 304(9) of the NMSA provides authority to issue regulations as may be necessary to protect the resources and qualities for which individual sanctuaries were designated. This would include regulations for certain fishing activities if determined necessary to protect sanctuary resources or qualities. The NMSA has specific requirements as to how any sanctuary fishing regulations are to be developed. Specifically, the NMSA requires NOAA to provide the relevant fishery management councils the opportunity to prepare draft sanctuary fishing regulations. In doing so, the fishery management council is to use as guidance the national standards of the Magnuson-Stevens Fishery Conservation and Management Act to the extent the standards are consistent and compatible with the goals and objectives of the sanctuary (see question #6). The scope of a sanctuary's regulatory authority is further defined in its designation document.

4. What is a designation document & how does it limit your ability to regulate activities?

At the time of designation of a sanctuary NOAA lists the activities that may be subject to regulation in the designation document and issues regulations addressing what activities will be regulated. Both the list of activities subject to regulation as well as the regulations themselves can be amended as long as NOAA follows the legal and administrative processes (e.g., the NMSA, National Environmental Policy Act and Administrative Procedure Act) required to do so. To change a designation document, NOAA must follow the applicable procedures and requirements for designating a sanctuary. This includes consulting with relevant federal and state agencies, and Congress, and providing opportunity for the public to give input (see question #6). Thus, to regulate fishing activities it must follow the rigorous legal and administrative processes to change a term of designation. Further, SBNMS must also provide the relevant fishery management council the opportunity to draft such sanctuary fishing regulations, as described in question #2.

5. In addition to direct sanctuary regulations, what other ways are available to regulate fishing in SBNMS?

In SBNMS's consultations with NOAA Fisheries and the relevant fishery management council, it could be jointly decided that the identified resource protection problem or goal could best be handled by the fishery management council. For example, as three of our California Sanctuaries have progressed through their joint management plan review process, the regulation of krill harvesting has been identified as a significant issue because of krill's importance as a forage species throughout the Pacific coastal region. Those sanctuaries are discussing with the Pacific Fishery Management Council (PFMC) staff whether the PFMC would consider preventing the take of krill under the Magnuson-Stevens Fishery Conservation and Management Act. The sanctuaries could also ask the PFMC to draft sanctuary regulations regarding krill, pursuant to the NMSA.

6. If the SBNMS decides that it is necessary to regulate certain fishing activities what steps would the sanctuary have to take in order to do that?

The SBNMS would not reach such a decision lightly or without first consulting with its partners. The management plan review process involves the Sanctuary Advisory Council, sanctuary users, and the public through working groups, including commercial and recreational fishing interests. The Sanctuary would also work early in the process with the relevant fishery management council and NOAA Fisheries. If toward the culmination of the management plan review process the SBNMS decided to move forward with a resource protection measure which would call for the regulation of certain fishing activities, it would need to amend the sanctuary's designation documents to list the specific fishing activity as subject to regulation. NOAA is further required to give the fishery management council the opportunity to prepare draft fishing regulations pursuant to section 304(a)(5) of the NMSA. The Council has 120 days to act upon the request by the SBNMS and will use as guidance the national standards of section 301(a) of the Magnuson-Stevens Act to the extent those standards are consistent and compatible with the goals and objectives of the sanctuary. If the draft regulations are found by NOAA to meet the goals and objectives of the sanctuary and the purposes and policies of the NMSA, they will be published as sanctuary regulations under the authority of the National Marine Sanctuaries Act.

The NMSA also states that if the Council declines to make a determination as to the need for fishing regulations in the Sanctuary, makes a determination that is rejected by NOAA, requests that NOAA prepare the draft regulations, or does not prepare the draft regulations in a timely manner, NOAA will prepare the fishing regulations. Regardless of whether the Council or NOAA drafts the sanctuary fishing regulations, NOAA will be responsible for compliance with the NMSA, National Environmental Policy Act, Administrative Procedure Act, and other applicable requirements.

Simultaneously, the Sanctuary would have to amend the designation document. When changing a term of designation NOAA follows the NMSA procedures for designation of a sanctuary, which are provided in sections 303 and 304 of the Act. Key steps in this process include—

- Making required determinations and considering factors, as listed in the NMSA
- Conducting required consultations with Congress, Federal, State, and local agencies, the appropriate Fishery Management Council, and other interested persons
- Preparing appropriate designation documents which include an environmental impact statement, resource assessments, maps, revised draft management plan with the proposed changes to the term(s) of designation, basis of determinations, and any proposed regulations
- Providing public notice and opportunity to comment on the proposed designation documents, including holding at least one public hearing
- Providing the public notice and the proposed designation documents to Congress and the Governor of any State in which the Sanctuary is located
- Publishing notice of the final designation documents and providing notice to Congress and the Governor
- Final changes to a term(s) of designation, and implementing regulations, shall take effect and become final after the close of a review period of 45 days of continuous session of Congress.

8.0 - ESSENTIAL FISH HABITAT STRATEGIC PLAN

Recognizing that the Council's Essential Fish Habitat Amendment is just the first step in the management of EFH, and that the Council has more to do to fulfill the intentions and mandates of the Sustainable Fisheries Act, the Council has developed this Strategic Plan. The EFH Strategic Plan explains how the Council will fulfill the regulatory requirement to review and revise the EFH components of its fishery management plans within five years, and also provides a context and structure within which the Council will work. This Strategic Plan addresses the processes and actions of the Council for a five year timeframe following implementation of the EFH Amendment. The Strategic Plan also describes how the Council intends to disseminate the information that results from the EFH process to the federal and state agencies with a direct or indirect role in the conservation and management of EFH, or whose actions or activities have the potential to adversely affect EFH. The Strategic Plan describes how the Council will implement the Magnuson-Stevens Act provision that authorizes the Council to comment to federal and state agencies on actions that may adversely impact the habitat, including EFH, of fishery resources under its authority, and requires the Council to comment on actions that would substantially impact the habitat, including EFH, of anadromous fishery resources under its authority. The Strategic Plan consists of a goal statement for the Council's habitat program, a set of objectives for the Council's habitat program, and a description of the processes that the Council intends to implement to achieve the stated objectives.

Goal: Improve the quality and increase the productivity of New England's fishery resources through implementation of the habitat management program.

Objectives:

1. Refine the EFH designations for all Council-managed species by incorporating increasingly detailed information regarding the relative abundance, growth, survival, and production rates associated with different habitat types, including nearshore and estuaries (e.g., Level 3 and 4 information).

2. Designate additional HAPC's, as appropriate, to focus habitat management on areas particularly vulnerable to degradation, important for multiple species or critical to a particularly important life stage.

3. Improve our understanding and predictive capabilities of the effects of fishing activities and non-fishing related activities on EFH.

4. Improve our understanding and predictive capabilities of potential measures to mitigate activities that adversely impact EFH.

5. Develop and implement measures to minimize, to the extent practicable, any adverse impacts associated with fishing activities on EFH.

6. Provide recommendations to federal, state and local agencies and organizations regarding proposed activities with the potential to degrade or eliminate EFH.

7. Improve our understanding and predictive capabilities of methods to restore and enhance productive fish habitat.

8. Develop and recommend to the appropriate authority measures to restore, conserve and enhance productive fish habitat.

9. Evaluate the Council's habitat program on a regular basis.

8.1 EFH REVIEW PROCESS

The regulatory text of the Interim Final Rule directs the Council and NMFS to periodically review the information in the EFH amendment and revise the EFH components of its fishery management plans if new information becomes available. The Interim Final Rule suggests that the schedule for this review should be based on an assessment of both the existing data and expectations of when new data will become available. Based on this guidance, the Council plans to conduct a complete review and update of EFH information and the EFH components of FMPs at least every five years. Rather than resubmitting an omnibus EFH amendment once every five years, however, the Council intends to implement the framework adjustment process described in this amendment and plans to "stagger" the revisions of the components of the EFH amendment as new or additional information becomes available.

The Council has reorganized its yearly schedule of Council meetings into a planned, topical, annual review cycle that allows for the most efficient review of new information and modifications of management. In April of each year, the Council will meet for two days to focus on habitat issues. At this meeting, the Council will review and consider the "Habitat Annual Review Report." This report to the Council will be developed by the EFH Technical Team and reviewed by the Habitat Committee prior to presentation to the Council. The report will include all new information related to the designations of EFH and HAPC, additional information on the effects of fishing activities, and an update on the status of the research and information needs identified by the Council. The Council will decide on a course of action based on the information provided in the report and direct the appropriate oversight committees to develop management measures necessary to protect HAPC and particularly vulnerable EFH. Depending on the issue and the relevant committee, proposed framework adjustment measures addressing EFH will be brought to the Council at either the July (herring), September (scallops), or November (groundfish and monkfish) meetings. Framework adjustments to modify the boundaries of EFH or HAPC could be brought to the Council by the Habitat Committee as early as the May Council meeting.

To support this process, the EFH Technical Team will meet on a regular basis throughout the year and will identify the information needed to prepare the annual report. The

Council will request that NMFS and other appropriate agencies provide the required habitat-related information in a timely manner. The EFH Technical Team will meet to discuss the information and develop recommendations to the Council regarding the information and suggested changes to the EFH and HAPC designations. The EFH Technical Team will also review any additional information available on activities that adversely impact EFH. Council staff will then develop the "Habitat Annual Review Report" and, following review by the EFH Technical Team and the Habitat Committee, submit the report to the Council for review and consideration. The annual review by the Council will focus on three areas: (a) EFH and HAPC designations; (b) identification of threats to EFH; and, (c) management measures to protect EFH.

8.1.1 EFH and HAPC Designations (Objectives 1 and 2):

In order to refine and improve the designations of EFH for all Council-managed species and to ensure that the appropriate areas are designated as HAPC's, the Council will work with NMFS and its other partners (state fishery agencies, state coastal zone management agencies, Stellwagen Bank National Marine Sanctuary, NOAA's National Ocean Service, National Undersea Research Center, etc.) to obtain and evaluate additional data sets (NMFS landings data, state inshore surveys, National Estuarine Research Reserve surveys, university research, power plant surveys, etc.). The Council will also work with the fishing industry to identify and evaluate additional information on important habitat areas. Using information from these various sources, the Council will work to refine the inshore EFH designations to a finer scale than the use of the ELMR salinity zones currently allows.

The Council will also consider the designation of HAPC's, as appropriate, based on the HAPC criteria described in the Interim Final Rule, and where the quantity or quality of a particular habitat type or area is directly linked to an ecological bottleneck for one or more species. The designation of HAPC's will extend, as appropriate, to areas or habitat types that are EFH for a vulnerable life stage of a significant number of Council-managed species or group of Council-managed species (i.e., flatfish, *Gadidae*, etc.). The Council may also participate in other activities focused on acquiring new and additional information necessary to meet the Council's EFH objectives. These activities may include workshops to develop the Council's priority research topics for improving EFH designations. The refinements of EFH and HAPC designations will depend to a large extent on the availability of the research and information proposed in the research and information needs section of the amendment.

8.1.2 Identification of Threats to EFH (Objective 3):

In order to better understand the adverse impacts of fishing and non-fishing related activities on EFH and to improve the Council's ability to predict threats to EFH, the Council will work with NMFS and its other partners (state fishery agencies, state coastal zone management agencies, Stellwagen Bank National Marine Sanctuary, NOAA's National Ocean Service, National Undersea Research Center, etc.) to obtain and evaluate the results of ongoing and future studies regarding the effects of various activities on EFH.

The Council may also participate in other activities focused on acquiring new and additional information necessary to meet the Council's EFH objectives. These activities may include workshops to develop the Council's priority research topics for identifying threats to EFH.

8.1.3 Management Measures to Protect EFH (Objectives 4 and 5):

The Council will work with NMFS and its industry advisors to develop and implement measures to minimize, to the extent practicable, the adverse impacts associated with fishing activities on EFH. The Council will also develop recommendations for other agencies (Mid-Atlantic Fishery Management Council, Atlantic States Marine Fisheries Commission, and state fishery agencies) to evaluate and minimize the effects on EFH of fishing activities under their jurisdiction.

8.1.4 Five-Year Plan (Objectives 1 - 5 and 9):

In year one (1999), it is not expected that much new information will be available to allow the Council to refine its EFH designations on a broad scale, but there may be additional information for Council consideration regarding some inshore areas, especially bays and estuaries. The Council may consider additional information regarding potential areas for HAPC designation. There also may be information for Council consideration regarding minimizing the adverse impacts to EFH or HAPC associated with certain types of fishing activity. The Council will implement any of these changes via the framework adjustment process.

In year two (2000), it is expected that the Council will review new and additional information with the goal of refining the EFH designations for several species, as well as considering information regarding minimizing the adverse impacts to EFH or HAPC associated with certain types of fishing activity. The specific species to be considered by the Council will remain indeterminate until the information becomes available.

In years three, four and five (2001 - 2003), the Council will review new and additional information with the goal of refining the EFH designations for the remaining species, as well as considering information regarding minimizing the adverse impacts to EFH or HAPC associated with certain types of fishing activity. During this time, the Council will also evaluate its habitat program and make changes to the program and this plan as appropriate.

8.2 CONSULTATION AND AGENCY RECOMMENDATIONS (OBJECTIVES 6, 7, AND 8):

The Magnuson-Stevens Act requires federal agencies to consult with NMFS regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect essential fish habitat. Upon approval of this EFH amendment by the Secretary of Commerce, federal agencies are required to complete this

consultation process. The Council is encouraged to establish procedures for reviewing federal and state actions that may adversely affect the EFH of any species managed under its authority, and the Council and NMFS will cooperate as closely as possible to identify actions that may adversely affect EFH, to develop comments and EFH conservation recommendations to federal and state agencies, and to provide EFH information to federal or state agencies.

The Council will fulfill its obligation under the Magnuson-Stevens Act regarding the EFH consultation process. When requested by the Regional Administrator, the Council will review the appropriate information and comment on activities that threaten EFH. The Council recognizes it has the authority to act independently, and there may be situations where the Council deems this necessary. In these cases, it will review the appropriate information and provide recommendations directly to the appropriate state or federal agencies. The Magnuson-Stevens Act requires that the Council review and comment on any activity which is likely to substantially affect the habitat of any anadromous fishery resource under its authority. In addition to Atlantic salmon, this includes species such as river herring, striped bass, and American shad. The Council plans to work closely with NMFS, U.S. Fish and Wildlife Service, the states, and the Atlantic States Marine Fisheries Commission to meet this obligation.

The Council and the NMFS Northeast Regional Office have developed an informal procedure for coordination in the review of federal agency actions that could adversely affect habitat. This is based on a procedure that has been in effect for several years between NMFS and the Mid-Atlantic Fishery Management Council (MAFMC) and has promoted successful collaboration on development projects of concern to both MAFMC and NMFS. Under this process, NMFS Habitat Conservation Division staff notify Council staff when NMFS learns of an action that could cause substantial adverse effects to the habitat of Council-managed species. NMFS reviews most actions that are authorized, funded, or undertaken by federal agencies in coastal and offshore waters, and federal agencies have been required to coordinate with NMFS on these projects under the Fish and Wildlife Coordination Act, so NMFS has an established mechanism for learning about projects that would adversely affect federally managed species.

Once Council staff are contacted by NMFS, they will request project-related documents from NMFS and may schedule a briefing on the activity at an upcoming Habitat Committee meeting. After the briefing, the Habitat Committee will consider adopting a motion for the Council to send a letter of concern to the appropriate parties. The Habitat Committee will then bring the issue to the full Council for approval. In the event that comment deadlines do not allow for the issue to be considered at a Committee and Council meeting, the Council Executive Director may send a letter of concern after coordination with the Habitat Committee chair and/or Council chair. To help NMFS provide information to the Council in the most efficient manner possible, the Council may work with NMFS to develop criteria to help NMFS identify the activities in which the Council is most interested. These criteria may take the form of an agreement with the NMFS Northeast Regional Office to promote coordination in the review of activities that may adversely affect EFH.

The Council will work with the appropriate federal, state, and local agencies and organizations to implement habitat conservation, restoration and enhancement measures and mitigate the effects of non-fishing related activities.

8.3 INFORMATION DISSEMINATION (OBJECTIVES 6 AND 8):

The Council will make every effort to provide up-to-date EFH information to all state and federal agencies whose actions or activities have the potential to adversely affect EFH. The Council plans to provide and explain the information in the EFH amendment (and future updates) to federal, state, and local agencies and organizations. To accomplish this, the Council will send copies of its EFH amendment to all federal and state agencies with a direct or indirect role in the conservation and management of EFH. The Council will also send letters to these agencies highlighting the habitat conservation, restoration, and enhancement recommendations of the Council to the agency. To ensure that the agencies understand the nature and purpose of the recommendations and the EFH designations, as well as to provide details on the nature of the consultation process, the Council and NMFS will visit each New England state and invite state and federal agencies to attend a meeting to present the relevant EFH information and recommendations as well as to answer questions and attempt to develop a working relationship with the agencies.

In order to make the information contained in the EFH amendment useful, accessible, and easy to understand by state and federal agencies and organizations, the Council will work with NMFS and other potential partners (i.e., National Ocean Service, NOAA's Coastal Services Center, Island Institute, etc.) to develop a CD-ROM based computer product that supports a complete desktop EFH information system. This product could include an interactive mapping capability, such as ArcView, to allow users to quickly and easily determine if particular area(s) are EFH, and for what species. This product would allow users to access quickly the information supporting the EFH designations and it could include the species reports and information on impacts, etc. The development of this product would be targeted at the state and federal agencies interested in reviewing projects for potential impacts to EFH, but it could also be useful to others as an information tool. The Council may also participate in public events (i.e., Maine Fishermen's Forum, Coastal Zone conferences, etc.) to promote the conservation and enhancement of EFH.

8.4 EFFECTIVENESS MONITORING (OBJECTIVE 9):

The NMFS Office of Habitat Conservation is currently developing a computerized tracking system for the EFH consultation process. The system is based on a relational database that will contain information on each federal or state agency action on which NMFS comments regarding impacts to EFH. NMFS staff will enter data such as the project name, location, type of action, agency authorizing or conducting the work, managed species affected, habitat types affected, date consultation was initiated, type of consultation, EFH conservation recommendations provided by NMFS, whether a Council

commented on the action, date of the federal action agency's response, and whether the action agency accepted all, some, or none of NMFS' recommendations. NMFS will use this information to monitor the EFH consultation workload as well as the responsiveness of action agencies to NMFS' recommendations to protect EFH. The system is based on Lotus Notes software, and will allow frequent updates of data entered at NMFS headquarters, Regional Offices, and field offices, so consultations can be tracked by region, coast wide, or nationally. The system will also allow queries to monitor consultations with certain agencies or those that involve specific species, types of actions, etc.

The Council will strive to assess the effectiveness of its habitat program, including relating EFH activities, to the extent possible, with improvements in fisheries. This will, by necessity, be limited to a qualitative assessment. Whatever the apparent effectiveness of the Council's habitat program may be, there will always be many other factors that might contribute to the observed effects.

APPENDIX EA.VI – Expanded Rationale for the Adoption of the "No Fishing" option under Activity (2.1) ***The sanctuary should work with the NEFMC and other appropriate agencies and stakeholders to set aside an area(s) within SBNMS that allows for research on topics including habitat recovery, biological succession and community ecology.***

The EA WG has recommended that an appropriate response for the Sanctuary is to develop research areas suitable for long-term monitoring, ecological research, and other types of research that will advance the mission of the Sanctuary Program.

The EA WG debated the characteristics of the protection that should be recommended for the research areas. It was decided that it might be necessary for the group to provide more than one option for the level of protection for the research areas. Since the recommendation for research areas came from the evaluation of the impacts to benthic habitat caused by mobile fishing gear, some on the EA WG felt that it would only be necessary to provide protection from mobile gear. However, based on the presentations of ongoing research in the sanctuary to the EA WG, as well as from discussion of the types of future research that should be served by sanctuary research areas, it seemed clear to others that more complete protection was warranted. The following is a recommendation for comprehensive regulation of human-induced impacts within sanctuary research areas.

Recommendation for Research Area Protection. Sanctuary areas designated for research require comprehensive protection from human impacts because these areas are intended for studies of ecological communities, ecological succession, and the organisms and processes that comprise the ecosystem. From the outset, there has been widespread agreement within the EA WG that a better understanding of marine ecosystems is needed, and this view is also strongly reflected within the scoping comments that the EA WG was convened to address. High quality ecological research demands that scientist be able to carry out long-term studies in areas where there is control over human impacts, so that the conditions under which the research is carried out are known to the extent possible. This point is supported by a number of examples that have been discussed by EA WG members, and by scientist who are currently conducting research in the sanctuary. The following are some specific examples of research functions that demand comprehensive protection.

Ecological monitoring. One of the critical functions for research areas is to provide places where effective monitoring of ecological conditions can be carried out without direct impact of human activity. This is essential because information from these areas can be used in comparison with information from areas that are open to impacts such as fishing. Without the *reference* data provided by the research areas, it will not be possible to distinguish between ecological changes that are caused by local impacts and those that are occurring due to influences that have nothing to do with local impacts. For example, if we were to observed declining abundance of some species of epi-benthic animal within a trawled area (e.g. sponges), we might ask if this is due to the effects of trawling (such a scenario would be consistent with the video observations presented to the EA WG by R. Smolowitz). However, there are other explanations for the hypothetical decline in sponges. The decline might be due to some change in environmental quality, a region-wide increase in water temperature, for example. With reference areas that are

protected from local impacts of human activity such as trawling, we can distinguish between these two different explanations. If the sponge decline within the protected area is comparable to that seen outside, we can rule out gear impacts as a the principal cause of this decline, and look at larger-scale impacts such as climate change. Well protected research areas are an essential tool for understanding the effects we are having on the ecosystem. They are valuable for investigating a specific question like the sponge question posed above, and they are also broadly important for determining differences in the ecological properties of areas used for various activities (e.g. fishing, aquaculture, pipelines) and areas that are not being used.

Studies of animal behavior. There are a number of research teams in the region carrying out studies aimed at learning more about the behavior of fishes and their role in regional ecology. Some of these studies involve placing tags on individual fish so that the animal's behavior can be tracked over a period of weeks or even years. For example, James Lindholm has been heading up a study for several years examining the behavior of cod in the Stellwagen Sanctuary (Lindholm addressed the EA WG 27 April 2004). The purpose of this research is to examine the movement patterns of fish. To carry out this work, underwater acoustic receivers need to be placed on the bottom, fish need to be captured with minimal harm, brought to the surface, surgically equipped with an acoustic signal generator, and then returned to the sea floor, all before the actual data acquisition begins. Studies to date have found that some cod remain very close to the original site of capture for months and, in a few cases, for over a year. This research would be seriously jeopardized if the bottom-mounted receivers were moved, or damaged, by bottom-tending gear, or lobster pots. Similarly, the work would be badly impacted if the tagged fish were caught soon after release. In this instance, capture by bottom trawl or by recreational hook and line would both seriously defeat the research. During discussion of these issues by the EA WG (27 April 2004), Luis Rivas described similar research he is doing with tagging yellow tail flounder. Luis pointed out that his research is also compromised when the tagged fish are caught, and supported the view that areas designed for research must have full protection.

Studies of benthic ecology and habitat recovery. Research areas will provide a vital opportunity for habitat recovery studies that meet a high scientific standard that has not previously been attained in the SBNMS area. Definitive ecological studies of the recovery of benthic communities in areas that have been impacted require that a substantial number of sites be examined, and that each is has an appropriate habitat- matched comparison site. For any given habitat type, one might study impact recovery using two sets of sea floor quadrants (e.g. 8 quadrants per set, each quadrant 2 x 2 km^2). One set (impacted) is subjected to an ongoing regime of fishing impact (e.g. in a fished area) and a second set that is under long-term protection within a research area. With such a design, one could examine recovery in the research area so long as impact was restricted, and compare the observed changes to the areas that continue to be fished. The comparison is essential, otherwise one would never know whether what appeared to be recovery (or lack of recovery) was due to fishing impact, or due to some other environmental change influencing the whole region (*c.f. ecological monitoring*, above). During the previous meeting of the EA WG (27 April 2004), the results of the *Seafloor Habitat Recovery and Monitoring Project* (SHRMP) were presented to the group by James Lindholm. As Lindholm described, the ability to draw firm conclusions from this study have been limited by the lack of control over impact within areas that are nominally protected (WGOMC - sliver), limitations on the ability to achieve adequate habitat-matched control sites

with replication, and uncertainty about the impacts in the fished areas. Establishing research areas that represent all habitat types and have comprehensive protection from impacts would provide the SHRMP project, and others like it, an opportunity to design experiments with a level of scientific rigor that is not currently available in the sanctuary region.

Analysis of trophic levels and ecosystem functions. The study of energy flow, predator-prey interactions, and food webs, is fundamental to the study of ecosystems. These trophic interactions include primary production by photosynthetic phytoplankton and bacteria, nutrient cycling by bacterial decomposition on the bottom, benthic invertebrates, bottom living predatory fishes, mid-water fishes and invertebrates, giant filter-feeding mammals (whales), and large predatory pelagic fishes such as tunas and sharks. Marine ecosystem research demands studies of all of these species, and their interactions, in areas where they are not being removed or impacted by human activities. This sort of ecosystem research requires that harvesting be excluded from research areas. Analyses of trophic interactions in the Gulf of Maine region suggest that major changes in the ecosystem have resulted from harvesting fishes over the past 50 years (presentation to WAWG by Jason Link and Kathy Lang).

Recommendations on impact reduction for research areas. For the reasons delineated here, it is recommended that the sanctuary research areas be afforded the highest possible protection from human impacts, otherwise the research goals of the areas will not be attained. Restrictions should include all fishing, recreational and commercial. Bottom and mid-water trawls should not be carried out in research areas. Both gear types can impact benthic habitat, and also disrupt ecological processes by removal of predators and prey. Static gear, traps, should also be kept out of the research areas. Traps can cause substantial habitat disruption, particularly during storms. Clearly it is not possible to eliminate all human impacts as we pollute the waters from distant sources and appear to be contributing to rapid climate change. Nevertheless, a good faith effort to eliminate all those impacts local to the sanctuary that would compromise research must be made.

Following the evaluation Alteration of Benthic Habitat by Fishing Activity, the EA WG developed a recommended action for addressing this form of alteration. The essence of this recommendation is that research areas be established as reference areas, and as areas where ecosystem research can be carried out. I am writing to provide additional input to the sanctuary concerning two critical details of this recommendation.

Intended uses of research areas.
In development of this recommendation for the SAC, it is important that guidance be provided on the type of research that is permissible in these research areas. This issue was discussed by the EA WG, and it was recognized that while we should not try to anticipate all the specific research question to be addressed, we should make it clear that the purpose of these areas is to allow long-term research that is consistent with the goals and objectives of the National Marine Sanctuary Program. This should include studies of marine ecosystem function, and long-term monitoring of ecological communities under conditions where human impacts are minimized. It was recommended that the Sanctuary Staff establish a science advisory committee that oversees the use of research areas, and insures that approved research activities are consistent with meeting the ecosystem protection obligations of the sanctuary. As it is not the mandate of the

sanctuary to play a primary role in resource extraction, it would not be appropriate to use these areas for fisheries management research, for research on fishing gear, or for experiments on techniques for deploying pipelines, for example.

Coordination of scientific research within the sanctuary.
With the creation of additional high quality opportunities for research in the sanctuary, the coordination of ongoing research will likely become increasingly challenging. The sanctuary will need to coordinate approved research programs in a fashion that insures (1) efficient uses of sanctuary research opportunities and (2) that there are not conflicts between research projects, such that one project compromises another. This will require considerable time on the part of qualified sanctuary staff who understand the ongoing research and who are capable of using GIS, and other tools, to plan for efficacious uses of the sanctuary for the best possible marine research. It is recommended that the sanctuary carefully evaluate current staffing in the context of growing research activity, and seek additional staffing to meet this important need. Additional resources, for vessel monitoring, may also be warranted.

NOAA Fisheries

National Marine Fisheries Service

NORTHEAST REGION

CURRENT BYCATCH PRIORITIES AND IMPLEMENTATION PLAN

Photo courtesy of NEFSC Photo Archive, www.nefsc.noaa.gov

This is a public, working document that will be revised in the future as additional bycatch minimization opportunities occur.

November 28, 2003

Northeast Region Current Bycatch Priorities and Implementation Plan - Summary

This is a public, working document that will be revised in the future as additional bycatch minimization opportunities occur.

Monitoring

Priorities for FY04:

- Provide updated quantitative estimates of bycatch by gear and fishery
- Increase observer coverage to address regional priorities
- Incorporate review of quantitative estimates of bycatch into SAW process

Priorities for FY05:

- Increase observer coverage to address regional priorities
- Pay for sea days to supplement existing data (if funded)
- Conduct database review to identify additional existing data sources (if funded)

Research

Priorities for FY04 and FY05:

- Gear modifications to reduce bycatch in regional priority fisheries
- Study of animal behavior as it relates to development of gear to reduce bycatch in regional priority fisheries
- Participate in URI Sea Grant project to establish a regional gear engineering working group

Management

Priorities for FY04 and FY05:

- Work with Councils and Commission to address bycatch in planned management actions, implementing bycatch management measures when appropriate**,** including measures that utilize results of recent or ongoing research
- Work with Councils and Commission to consider management alternatives that provide incentives to reduce bycatch within planned management actions

Education/Outreach

Priorities for FY04:

- Hold Regional Bycatch Workshop in June 2004 to review bycatch issues, and refine priorities and objectives with constituent participation
- Hire Outreach Coordinator (NERO) to conduct outreach, including bycatch-related outreach activities
- Establish positions of Bycatch Outreach Specialist and Bycatch Gear Specialist (NERO) to work with regional partners and constituents on bycatch issues, including working directly with other gear researchers on technical solutions (if funded)

Priorities for FY05:

- Establish Annual Bycatch Forum to allow members of the gear engineering working group, other researchers, industry members, and constituents to share information about recent bycatch research and identify potential avenues for future activities (if funded)

INTRODUCTION

This plan was developed by a Regional Bycatch Assessment Team (RBAT) composed of staff from the Northeast Regional Office (NERO), Northeast Fisheries Science Center (NEFSC), the New England and Mid-Atlantic Fishery Management Councils (Councils), the Atlantic States Marine Fisheries Commission (Commission), the Atlantic Coastal Cooperative Statistics Program (ACCSP), and Rhode Island Sea Grant (RBAT members are listed in Appendix A). In addition to being incorporated into management, the RBAT hopes that the activities outlined in this plan will be incorporated, as appropriate, into programs under the aegis of the Northeast Consortium and universities, including NOAA's Cooperative Marine Education and Research (CMER) programs.

The RBAT considered the fact that the consideration of bycatch of fish, marine mammals, sea turtles, and sea birds is but one aspect of fisheries management that must be considered by fishing industry members, managers, scientists, and conservation advocates. While the Magnuson-Stevens Act (MSA) National Standard 9 requires that, "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," it further prescribes that these same measures shall comport with nine other national standards and several other required provisions of the MSA. Consequently, though bycatch occasionally can be considered as a independent issue, it more often is one of many interrelated issues for which the fishery management councils develop management solutions. Therefore, bycatch solutions must be integrated into the broader management program. Actions taken under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) to reduce protected species interactions have the same complex biological, environmental, and social effects. When such actions are integrated into management, they can have multiple benefits. For example, the month-long closure of an area to sink gillnet fishing may address the multiple aims of reducing fishing mortality in the multispecies fishery, eliminating the incidental take of harbor porpoise, and addressing conflicts between different fishing gear types.

The approaches outlined in this plan reflect the fact that fishing restrictions can serve multiple purposes and have multiple impacts. Some measures can be developed and implemented that expressly reduce bycatch, such as the existing measures that established gear restricted areas to allow escapement of undersized scup or the measure that requires weak links in lobster pot gear to help whales breakaway when entangled. But approaches can also be outlined for use in the development of fishery management programs that will meet multiple objectives, including the reduction of bycatch. Existing management provisions related to bycatch are summarized in Table 1. Some directly address bycatch concerns, while others are recognized as indirectly reducing bycatch, generally by controlling fishing effort. The indirect measures illustrate the interrelationship of bycatch to the broader management program.

Evaluations of bycatch have been done on a fishing gear basis, in analyses conducted under the MMPA and ESA, and in the recent report of the National Working Group on Bycatch, "Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs." Such evaluations are inconsistent with the underlying regulatory structure for fishery management, in which management plans are developed on a species/stock basis; as are stock assessments, management advice and the data that underpin them. Therefore, in order to enact measures to address bycatch, the RBAT notes that management action may be required to modify management plans under the authority of several management entities including the Councils, the Commission and the National Marine Fisheries Service (NOAA Fisheries).

Table 1. Existing Management Measures to Address Bycatch

FISHERY	DIRECT MEASURES	INDIRECT MEASURES
Northeast multispecies	mesh size restrictions; pair-trawl prohibition; 5% regulated species bycatch cap when fishing outside of DAS; raised footrope trawl; prohibition on brush sweep; inshore restricted roller gear; MMPA: pingers on gillnets; neutrally buoyant groundlines in some areas; area/time closures	effort controls (limited entry, DAS); closure areas; cod and haddock landings limits
Northern shrimp	finfish excluder	seasonal closures
Whiting, small mesh multispecies	raised footrope trawl required seasonally	incentives for use of large mesh in return for increased trip limits; small incidental landings can be made by non-directed vessels to reduce regulatory discard
Monkfish	minimum mesh requirement; MMPA: pingers at certain times/areas; weak links; neutrally buoyant groundlines in specific areas; specific area/time closures; rolling closures for sea turtles from NC north to VA in spring	limited entry and DAS restrictions; trip limits; minimum fish sizes
Sea scallop	restriction on use of trawl gear to reduce bycatch small scallops; minimum ring size; minimum mesh requirement for twine top (8" in most areas; 10" in reopened areas)	limited entry and DAS restrictions; limited possession by open access vessels; 7-man crew restriction; small dredge program;
Summer flounder	minimum mesh requirement; ESA: TEDS required in NC/VA	Limited entry; commercial quota with fishery closure when attained
Scup	minimum mesh requirement; seasonal Gear Restricted Area to minimize bycatch of juvenile scup in small mesh gear; escape vents in pots	Limited entry; commercial quota with fishery closure when attained
Black sea bass	minimum mesh size; escape vents in pots	commercial quota with fishery closure when attained
Deepsea red crab	non-trap gear prohibited	commercial quota with fishery closure when attained
Atlantic salmon	no possession allowed	
Tilefish	gear restricted to longline in directed fishery	limited entry; commercial quota with fishery closure when attained
Surfclam & ocean quahog		ITQs
Maine mahogany quahog	gear restricted by State of Maine	commercial quota with fishery closure when attained
Atlantic herring		TACs by fishing area, directed fishery closure when attained
Ilex & Loligo squid, Atlantic mackerel, butterfish	minimum mesh size for Loligo	limited entry fishery; commercial quota with directed fishery closure when attained

Spiny dogfish	MMPA: pingers required at certain times/areas; weak links in all gear; neutrally buoyant groundlines in some areas; seasonal area closures	Trip limits preclude directed fishery in fishery closure when attained

MONITORING FY04

1. Data Analysis Project

During FY04, existing staff will update available data to provide quantitative estimates of bycatch by gear and by fishery for use in addressing bycatch issues. This analysis will also identify data gaps and outline sampling programs that could address those gaps. Analyses of information derived from the NOAA Fisheries Northeast Observer Program and from the Northeast Vessel Trip Report System are underway at the NEFSC. This work entails updated analyses of the magnitude of bycatch in major fishery sectors with emphasis on the otter trawl, gill net and scallop fleets. The precision of the estimates is also being determined. Information is currently updated through the second quarter of 2003. It is anticipated that analyses through 2003 will be available for the Bycatch Workshop scheduled for June 2004 (see Education/ Outreach, p. 14).

2. Increased Observer Coverage

In FY02, observer coverage was increased in the Northeast multispecies fishery. As a result of litigation, the NEFSC secured funding and increased the observer coverage in this fishery from <1% in trawl fisheries and 3-5% in gillnet fisheries to 5% in both. This coverage level is anticipated to continue at 5% as NOAA Fisheries has issued a Notice of Administrative Action noting that analysis at this level of coverage would provide sufficiently robust statistical data to evaluate bycatch and discards.

Further increases in observer coverage are necessary to characterize bycatch for many fisheries so that management solutions can be devised, and so that stock assessments can be improved (bycatch is a major component of mortality for many species) and so that an assessment of bycatch in longline fisheries can be made to determine whether or not a seabird bycatch problem exists. The National Working Group on Bycatch report examined the issue of bycatch monitoring programs on a national scale. The report, which identified high priority monitoring needs for ESA and MMPA species in the Northeast Region, has been used as the basis of initial recommendations for monitoring priorities in this plan. While the report did not examine fish bycatch issues in sufficient detail to be used directly in setting regional priorities, the RBAT determined that it would be appropriate to use the ESA/MMPA priorities because they include many of the commercial fisheries in which fish bycatch is also a concern. These priorities will be updated as new information becomes available, and will be reviewed at the Bycatch Workshop scheduled for June 2004, using the results of other initiatives in this plan.

In addition to these priorities, observer program priorities are developed by the NEFSC and fulfilled by the Northeast Fisheries Observer Program. A separate list of bycatch priorities is developed annually by ACCSP to identify high priority fisheries to receive funding for observer coverage.

ACCSP partners are asked each fall to outline projected needs two years into the future (i.e., the 2003 request asked for priorities for FY2005). Those requests are assembled for use at the annual meeting of the Bycatch Prioritization Committee, which occurs the following January/February. The Committee utilizes a bycatch prioritization matrix and the information submitted by the partners to develop a consensus on the top priorities for observer coverage. These priorities are used to allocate funds under an ACCSP Request for Proposals (RFP) issued the following May.

Table 2. Initial Monitoring Priorities

FISHERY	TARGET SPECIES	GEAR	BYCATCH SPECIES
New England gillnet	gadoids, flatfish, dogfish	demersal gillnet	harbor porpoise, large cetaceans
Mid-Atlantic gillnet	monkfish, dogfish	gillnet	harbor porpoise, bottlenose dolphin, pilot whale, common dolphin, sea turtles
Georges Bank, Mid-Atlantic scallop dredge	sea scallop	dredge	sea turtles
Mid-Atlantic small mesh otter trawl	squid, mackerel, butterfish	otter trawl	common dolphin, pilot whale
Atlantic trap/pot*	lobster, crab, black sea bass	pots or traps	Right whale, large cetaceans, leatherback turtles

*The National Working Group Report classified this gear as Lobster/crab trap. The RBAT expanded the definition to reflect the redesignation in the July 2003 List of Fisheries .

3. Establishment of a Process to Review/Update Quantitative Analyses

The existing Northeast Regional Stock Assessment Workshop (SAW) process will be used to produce the best available estimates of bycatch. The estimation of bycatch has been addressed by the SAW on two levels: as a regular component of stock assessments and as a general issue associated with analysis of observer data and estimation of discards. Although the focus would shift from discards of target species to bycatch of multiple species by various fisheries and gear groups, a peer-review of data analysis and methodology would be appropriate as a future SAW topic, presumably tasked to the Methods Working Group. Terms of reference for the SAW topic can include identification and prioritization of future research.

Once a data analysis and estimation protocol is approved by a benchmark SAW review, the methods

could be applied each year to update estimates of species bycatch by fishery, though not necessarily through the SAW process. SAW priorities are determined by the Northeast Regional Coordinating Council (NRCC), which is composed of the leadership of NERO, NEFSC, the Councils, and the Commission. If the NRCC determined that a new benchmark review was needed as a result of changes in the database or availability of new methods or technology, it would be scheduled for a SAW. Such benchmark SAW reviews may require a wide range of expertise, including experience with protected species and habitat. Depending on the scope of the updates and the frequency of benchmark reviews, such work will require funding and staff. An inventory of research recommendations made by past SAWs has been compiled and is available for use as benchmarks are prepared, with nearly 100 recommendations related to bycatch.

Quantitative estimates of marine mammal bycatch are reviewed by the Atlantic Scientific Review Group, through a process established under the MMPA. A similar process is being established for sea turtles.

MONITORING FY05

1. Increased Observer Coverage

Funding to provide increased observer coverage will be pursued for priority fisheries. The initial monitoring priorities identified in Table 2 will be updated as additional information becomes available in the future. The Bycatch Workshop scheduled for June 2004 will review the priorities using the results of other initiatives in this plan, and update the priorities with the involvement of Workshop participants.

2. Paying for Sea Days

The NEFSC Economic Branch is currently reviewing observer data related to vessel costs and identifying data gaps that require supplemental information to be collected from commercial vessels. The study will use funding to pay for sea days on appropriate commercial vessels in order to collect the necessary supplemental information. A similar approach (paying for sea days) could be used in FY05 for a separate study to collect bycatch information, if additional funding is available.

3. Database Review

If additional funding is available, funds should be allocated to conduct a database review. This review would identify and incorporate additional sources of data to profile bycatch in the region (the database equivalent of a literature review) Potential sources could include data collected by state researchers, data contained in protected species entanglement reports, and data from historic observer programs including those related to foreign fisheries joint venture activities. Anecdotal data sources should be incorporated in some way, at a minimum to identify possible bycatch issues that have not been

witnessed on observed trips. These could include Vessel Trip Reports, the NERO inhouse "Fathoms Report,"and potentially, discussions with industry members.

RESEARCH FY04 - FY05

1. Research Priorities

After several discussions, the RBAT recommends that the initial top priority for bycatch research in the Northeast Region should be gear modification and the study of animal behavior (fish, marine mammal, sea turtle, sea bird) as it relates to the development of gear. Such studies should focus on the priority fisheries identified in Table 2, though other regional prioritization activities may focus on a smaller set of bycatch priorities.

There are several processes in the Northeast Region that establish program priorities. The NRCC, described previously, meets twice a year to incorporate the Council and Commission plans for developing or revising fishery management programs into the broader regional context and establish priorities for stock assessment updates and other related work. It is also the appropriate body to establish priorities for data collections to address data gaps in the context of other regional fishery management issues, and to set priorities for other bycatch related activities as well. Research priorities for protected species will continue to be established by Marine Mammal Take Reduction Teams and the Sea Turtle Strategy Team.

There are several regional programs that allocate funds or fishing quota to support research, and establish their own research priorities. These include the Northeast Consortium; the New England Fishery Management Council's Research Steering Committee, which establishes priorities for research to be funded through the NOAA Fisheries Cooperative Research Partners Initiative and the research set-aside program established within the Sea Scallop FMP; the Mid-Atlantic Fishery Management Council's Research Set Aside Committee, which establishes the priorities for research to be funded by commercial quota specifically set aside for research; and the ACCSP, which establishes priorities through its Bycatch Prioritization Committee.

2. Gear Engineering Working Group

Rhode Island Sea Grant has received funding through the Saltonstall-Kennedy Program (S-K) to establish a regional gear engineering working group over an 18-month period. Staff from both the NEFSC and the NERO are involved in this activity, and will be available to continue to participate in the working group activities after the S-K project is completed. This working group is intended to establish a network of researchers who will share information, including training and educational material, through meetings and the internet; develop a resource sharing program (to share equipment such as cameras, scales, methods); and share research results. This working group will meet in June 2004 in conjunction with the Bycatch Forum outlined under Outreach/Education.

MANAGEMENT FY04 - FY05

16. Management Activities to Address Bycatch

The Councils will be working on amendments to several fishery management plans during FY04/FY05. While some amendments (those identified by an asterisk) will address concerns that have been raised about bycatch, all of these actions will be required to consider bycatch along with the other requirements of the MSA, MMPA and ESA. Some of these fisheries are also managed in state waters by the Commission under Interstate Fishery Management Plans (Atlantic herring, spiny dogfish, American lobster), and it is anticipated that those plans will also incorporate appropriate management measures to address bycatch as they are identified. Commission action to manage American lobster may require NOAA Fisheries action under the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA). NMFS staff from the NEFSC and NERO will participate in the Council processes to develop management alternatives for consideration; will review management actions for species interactions that require action under the MMPA or ESA; and will carry out management actions required for American lobster under ACFCMA. The following activities have been included in workplans for FY04 and FY05, though staffing levels may not be sufficient to allow all activities to be conducted within the timeframe:

*Sea Scallop and Multispecies Frameworks 16/39 to authorize sea scallop fishing in areas closed to conserve multispecies;

*Multispecies framework actions under Amendment 13, if approved, that would establish Special Area Access Programs (SAPs) to authorize fishing activities that result in low catches of species requiring conservation;

*Atlantic Herring Amendment 1 to evaluate a number of modifications to the management program including the possible establishment of limited entry;

Monkfish Amendment 2 to evaluate a number of modifications to the management program;

Whiting Amendment to evaluate a number of modifications to the management program including the possible establishment of limited entry;

Hagfish FMP, to consider establishing management for the Atlantic hagfish fishery, which is presently unmanaged;

*Skate FMP baseline review to determine if recent management actions in other fisheries have resulted in any impacts on skates that require management;

*Spiny dogfish Amendment 1 to evaluate a number of modifications to the management program including the possible establishment of limited entry;

*Atlantic mackerel, squid, butterfish Amendment 9 to consider permanently extending the *Illex* squid limited entry program and to evaluate bycatch and fishing gear impacts on Essential Fish Habitat;

Commission Addenda 2, 3, and 4 to the American Lobster IFMP, to establish management measures to meet area management goals; NOAA Fisheries actions under ACFCMA as appropriate.

It is hoped that the results of projects funded by NOAA Fisheries or supported through FMP research set-aside programs will produce results that will be used to develop measures to address

bycatch in the management actions outlined above. In addition, nearly all of the fishery management programs in the Northeast Region include a process for periodic review and adjustment of management measures through framework actions or annual specification processes, which may also incorporate the results of the research outlined below. Most of the projects below, which are recently completed or underway, were funded through the following NOAA Fisheries programs: Saltonstall-Kennedy (S-K), Marine Fisheries Initiative (MARFIN), Cooperative Research Partners Initiative (CRPI), National Fish and Wildlife Foundation/NMFS Mini-Grant Program (NFWF/NMFS), and internal NMFS programs (NMFS). In addition, some research was supported by FMP research set-aside programs (RSA).

Manomet Center for Conservation Studies, "Relating Fish Shape to Mesh Size: How Morphometric Variability Affects Trawl Net Selectivity in the Gulf of Maine." To collect morphometric measurements of key groundfish species during standard fishing operations on commercial fishing vessels in the Gulf of Maine. A simple model will be formulated to estimate the mesh size and configuration through which commercial fish species of any size will be most likely to escape. The model will enable managers and the fishing industry to predict potential retention rates of major commercial fish species for a range of mesh sizes and configurations. (S-K)

Massachusetts Division of Marine Fisheries, "Further Testing of Cod Avoiding Trawl Net Designs." To further verify the effectiveness of two cod-avoiding trawl net designs, the so-called "Ribas" and "Topless trawls," using larger versions of the designs and including night-time testing. (S-K)

New England Aquarium, "Juvenile Bycatch and Survival Assessment of Spiny Dogfish (*Squalus acanthias*) in a Western Atlantic Trawl Fishery." To conduct the first survivability study on elasmobranchs and more specifically, *Squalus acanthias*, that includes stress measurements. Investigate short term and long term survivorship following trawl exposure and discard. (S-K)

Manomet Center for Conservation Studies, "Development of Cod Excluder Devices for Northwest Atlantic Trawl Fisheries." To test the effectiveness of a new bycatch reduction device (Ex-It) in reducing the inadvertent catch of undersized fish in the northwest Atlantic. The study will focus primarily on retention of juvenile and undersized cod. This will be an international venture involving the Manomet Center for Conservation Sciences, Massachusetts Division of Marine Fisheries, Maine Department of Marine Resources, Canadian Department of Fisheries and Oceans, commercial fishermen, and industry input from Nordurnet, Iceland. Recommendations on the effectiveness of the bycatch reduction device will be made available to fisheries managers in both the USA and Canada. (S-K)

University of Rhode Island, "Effects of Increasing Mesh Size in the Multispecies Fisheries of New England Waters: Applied Research and Outreach." To conduct mesh size selectivity studies aboard a commercial fishing vessel and integrate the results of the study into yield-per-recruit (YPR) and spawning-stock biomass-per-recruit (SSBPR) models evaluating the effects of incrementally increasing mesh sizes. (S-K)

New England Aquarium, "Increasing Juvenile Cod Bycatch Survival in a Northwest Atlantic Longline Fishery." To: (1) augment the survival data already collected on juvenile cod bycatch caught

by demersal longlines, (2) quantify mitigated survival of juvenile cod bycatch caught by demersal longlines when treated by immersion in solutions of potassium chloride, (3) quantify the degree of physiological stress experienced by juvenile cod bycatch caught by demersal longlines through the analysis of biological parameters in the blood, and (4) continue to solicit advice from longline fishermen relative to increasing the survival of groundfish discards. (S-K)

New England Aquarium Corporation, "Increasing Survival of Juvenile Atlantic Cod (*Gadus morhua*) and Haddock (*Melanogrammus aeglefinus*) in the Northwest Atlantic Demersal Longline Fishery." To build upon the selectivity work already conducted and investigate how different hauling strategies might affect wound size and juvenile groundfish survivability. Preliminary survival statistics from current longline work suggest that survival of juvenile bycatch is correlated to hooking wound magnitude and that effective selectivity against juveniles can be accomplished using modified circle hooks. (S-K)

NOAA Fisheries, Northeast Fisheries Science Center and Manomet Center for Conservation Science, "*Loligo* gear modification study." To conduct a quantitative assessment of the effectiveness of a large-mesh cylinder in reducing scup bycatch in the small mesh fishery targeting *Loligo* squid. (MARFIN)

University of New Hampshire, "Soft Species Separation System for the New England Multispecies Fishery." (CRPI)

Manomet Center for Conservation Science, "A Collaborative Program to Assess Possible Temporal Access to Closed Area II: Targeting Yellowtail Flounder Without Significant Bycatch of Cod and Haddock." (CRPI)

Manomet Center for Conservation Science, F/V's North Star, Lady Jane, Christopher Andrew, "Improving the Selective Efficiency of Trawl Gear with Escape Windows and Visual Stimuli." (CRPI)

Captain John Raymond/Manomet Center for Conservation Science, "A Collaborative Program to test the use of a Cod/Haddock Separator Panel in Trawl Nets." (CRPI)

Manomet Center for Conservation Science partnering with the Gulf of Maine Aquarium, "Assessing the Bycatch of Groundfish in the Monkfish Fishery." (CRPI)

University of Rhode Island, F/V Grandville Davis, and RIDEM, "Characterization of Bycatch Reduction from Codend Mesh Size Increases in the Directed Scup Bottom Trawl Fishery." (CRPI)

F/V Ocean Reporter and Allen Michael and Associates, "Development of Video Techniques for Bycatch Reduction Studies." (CRPI)

Virginia Institute of Marine Science, "Industry Trials of a Modified Sea Scallop Dredge to Minimize the Catch of Sea Turtles." (RSA)

"Zap Link." To develop and test a device that serves as a releasable link on the ground lines of lobster trawls. The link will part if a whale catches the ground line in its mouth, but will still allow normal operations of trawls. (USFWF/NMFS)

"Glow-in-the-Dark Rope of Controllable Stiffness." To test the hypothesis that whales will detect and avoid glowing ropes, preventing entanglement in line that does not bend. (USFWF/NMFS)

"Investigation of Alternative Ground Lines." To replace lobster/black sea bass traps that use

ground lines with sinking and neutrally buoyant line to reduce entanglements in Management Area 5. Quarterly samples will be taken and workshops with industry will be conducted. (USFWF/NMFS)

"Lobster Gear Profile Separation Testing." To identify what part of the trap line profile separates, at what tension, and what portion remains with a series of gear tests. Twenty-four trials will be conducted using several gear combinations used to harvest lobster. (USFWF/NMFS)

"Using Microchip Technology to Identify Fishing Lines." To embed scanable microchips into various fishing lines to identify the fishery using the line responsible for the entanglement. (USFWF/NMFS)

"Design of Line Cutter to Prevent Entanglements." To develop a knotless line cutter and adapt it to other line tensions as required by other fisheries to prevent entanglements. (USFWF/NMFS)

"Ghost Gear Removal." To remove fishing gear debris to eliminate marine mammal entanglement on Cashes Ledge. A disposal system will be developed and an ongoing effort to ensure the area remains free of debris. (USFWF/NMFS)

State of Maine, "Maine Cooperative Management Plan for Large Whales and Sea Turtles." To maintain and expand Maine's sighting/surveillance and disentanglement networks, investigate and implement gear modifications and fishing strategies to reduce mortality of right whales and other large whales. (USFWF/NMFS)

Commonwealth of Massachusetts, "Massachusetts Right Whale Conservation Plan." To maintain and improve right whale programs in Massachusetts and undertake new initiatives for take reductions. The project will continue a well implemented survey off the Massachusetts coast. (USFWF/NMFS)

"Underwater Video Project." To study buoy line and ground line behaviors where the buoy lines and ground lines are constructed of various combinations of sink, float and neutrally buoyant line. (NMFS)

"Development of Non-Floating Line." To develop line that can be used in the fixed gear fisheries on all bottom types that is more abrasion resistant then non-floating lines currently being used. (NMFS)

"Development of a Float Line." To develop a line that has an 1,100 lb breaking strength that can be used by the gillnet fishery in the head rope of a net panel. (NMFS)

"Develop Sighting Skills." Outreach and education to develop fisher skills to sight and identify whales and communicate through the sightings call system to prevent the entanglement of sighted animals (NMFS).

The Councils have included bycatch priorities in their RFPs for research to be supported by upcoming FMP research set-aside programs. The New England Council's RFP for sea scallop projects for the fishing year that begins March 2004 seeks demonstration projects to identify ways to reduce discard mortality, and identifies the evaluation of gear to reduce sea turtle and groundfish bycatch as a high priority.

The Mid-Atlantic Council's RFP soliciting projects to be supported by research quota set asides of

summer flounder, scup, black sea bass, bluefish, *Loligo* squid, *Illex* squid, Atlantic mackerel, and/or butterfish for the fishing year that begins January 2005 solicits several types of projects to address bycatch, which are listed below.

–Studies of scallop gear modifications to reduce bycatch of summer flounder;

–Studies on incidental catch and discard mortality of dogfish in fisheries targeting other Mid-Atlantic species, with emphasis on gillnet, trawl, and hook-and-line gear;

--Summer flounder discard studies to distinguish regulatory discards from discards due to gear design;

--Discard studies in the *Loligo* and scup fisheries, including *Loligo* gear modifications to reduce bycatch of scup and other species;

--Improved estimates of recreational discards in the summer flounder, scup, black sea bass, and bluefish fisheries;

--Measures to decrease discards associated with increases in minimum fish size;

--Mesh selectivity studies for summer flounder, scup, squid, black sea bass and butterfish;

--Evaluation of pot gear escape vent sizes and shapes for black sea bass and scup;

--Estimation of mortality of black sea bass left in pots during the closed season;

--Studies of bluefish, summer flounder, scup, and black sea bass hooking mortality by size of fish;

--Data to better characterize length composition of summer flounder, scup, and black sea bass discards;

--Development of optimum sampling levels to estimate discards of summer flounder, scup, and black sea bass;

1. Consideration of Programs to Create Incentives to Reduce Bycatch

The RBAT recommends in this Plan that incentives should be considered to encourage harvesters to address bycatch. The RBAT is aware that management measures that establish harvest rights, such as Individual Transferable Quotas and harvest cooperatives, can also result in reduced bycatch. As an example, the ability to purchase or lease harvest shares can be used by harvesters to reduce their regulatory discards. As another example, harvesters joined by a contract in harvest cooperatives that fish under management programs that establish bycatch quotas for some species have demonstrated that they will share information to avoid bycatch in order to keep from attaining the bycatch quota, and having the directed fishery closed as a result. The RBAT recommends that managers should encourage consideration of such harvest rights arrangements to resolve bycatch as well as other management problems.

A recent management measure adopted by the New England Fishery Management Council has yet to be reviewed by NOAA Fisheries, but could provide an example of a measure that would provide incentives for reducing bycatch. The Council's proposed Amendment 13 to the Multispecies FMP

would require current fishing levels to be reduced for some stocks such as Georges Bank cod, while fishing could be increased for other species that are often caught on the same fishing trips, such as Georges Bank haddock. To address this problem, Amendment 13 would specify fishing days-at-sea (DAS) as Category A days and Category B days. The total number of A days would be calculated to result in a level of fishing effort that would achieve fishing mortality reduction targets for all multispecies stocks. The remaining B days could only be used in well-defined ways that would result in little or no bycatch of fish from the stocks that need the most protection. In order for harvesters to be able to utilize B days, it would be necessary to identify where and how they could utilize the B days without unacceptable bycatch. The Council expects that this measure would create a stronger incentive for harvesters to develop methods to avoid bycatch of species in need of conservation than would restrictive possession limits alone.

EDUCATION/OUTREACH FY04

1. Bycatch Workshop

Funding of $30,000-40,000 is requested for a Regional Bycatch Workshop to be held in June 2004, with participants from NOAA Fisheries, the Councils, the Commission, the ACCSP, Sea Grant Programs, the states, commercial and recreational fishing sectors, environmental organizations and academics. Also involved will be members of take reduction teams established to consider sea turtle and marine mammal issues. The participants will consider all aspects of the bycatch issues facing the Northeast Region including management aspects, research aspects, legal aspects including international relations, data issues, monitoring issues, and enforcement issues. The Workshop will use the Regional Bycatch Implementation Plan as the basis for gathering the views of our constituents and partners concerning relative priorities and specific objectives in the bycatch plan. The Workshop will result in a proceedings publication, presented as a working document so that it can be available in a timely manner. The Workshop will allow the Northeast Region to take a collaborative approach to the problem of addressing bycatch, and the plan may be modified as a result of views expressed by individual workshop participants. Taking a cooperative approach to this issue will ensure that NOAA Fisheries can move forward in a manner that is supported by our constituents

The current RBAT will serve as the Steering Committee for this Bycatch Workshop. Rhode Island Sea Grant has agreed to co-coordinate the Workshop because the staff fully understands the need for a collaborative effort to find solutions to the problem of bycatch. Other regional sea grant programs may also want to be involved. Because interest in the Workshop is likely to be high, this funding would include facilities costs for a large meeting space with breakout rooms for working meetings to focus on the specific topics identified below. In order to keep the working meetings manageable, direct participation in working meetings is likely to be limited to a group of panelists, with audience attendance and questions. The funding requested does not include travel costs for NOAA Fisheries employees.

The topical working meetings will allow individual constituents to identify their relative priorities and objectives in several areas. The topics, which may evolve further during development of the Workshop, currently include:

Legal Issues: e.g., clarifying the term "to the extent practicable;" identifying any bycatch issues that have an international aspect;

Data Issues: e.g., obtaining better discard data to improve stock assessments;

Monitoring Issues: e.g., developing appropriate sampling strategies;

Management Issues: e.g., establishing bycatch priorities that reflect the relative importance of fisheries in the region in multiple dimensions (biological, economic); reconciling gear-based information with species-based management programs; developing a process to incorporate research results into management; developing incentives for harvesters to avoid bycatch; and developing incentives for harvesters to accurately report bycatch;

Research Issues: e.g., coordinating regional research; improving the Exempted Fishing Permit process, sharing research results, maximizing available funds by avoiding duplicative experimental work;

Science Issues: e.g., identifying bycatch information critical to stock assessments;

Protected Species Issues: e.g., coordinating protected species bycatch work with fisheries bycatch work;

Enforcement Issues: e.g., developing bycatch strategies that can be enforced.

2. Outreach Coordinator

The Northeast Regional Office is currently recruiting for an Outreach Coordinator, who will, among other activities, work on the publicity for the Bycatch Workshop, and other bycatch related outreach activities as they are identified.

3. Outreach Staff for Bycatch

Funding is requested for two new positions in the Northeast Regional Office to focus on fishery bycatch issues. The first (Bycatch Outreach Specialist, Band II/III) would serve as a focal point to coordinate regional efforts to address bycatch. The second (Bycatch Gear Specialist, Band II/III) would focus on working with industry to develop gear solutions to bycatch problems. The gear specialist would work with constituents to develop new gear solutions, and would conduct education and outreach activities when new gears were developed and implemented.

EDUCATION/OUTREACH FY05

1. Annual Bycatch Forum

Annual funding of $8,000 is requested for FY2005 and beyond to support an annual Bycatch Forum.

This would be a smaller event than the FY04 Bycatch Workshop, and would be designed to review all of the bycatch-related work conducted over the year by NOAA Fisheries or any of the other interested parties in the region. The results of research projects funded by a wide range of sources in the region would be presented and reviewed, allowing information to be shared widely with harvesters, managers and researchers. Progress would be evaluated, results would be publicized, and problems would be debated.

This Bycatch Forum would become an annual event, in order to maximize the sharing of knowledge, build on successes, and move forward to solve bycatch problems. This would provide an annual opportunity for members of the Gear Research Working Group to share information, and for constituents to identify specific topics that could be addressed in bycatch research. In addition to allowing researchers and managers to share current data and research results, this would provide an opportunity for commercial and recreational harvesters to share their field observations, their ideas on bycatch reduction strategies and research initiatives, and their assessment of potential economic and social impacts associated with various bycatch reduction strategies. Environmental organizations would be provided with an opportunity to receive first hand information on the extent of the bycatch problem and progress being made to reduce it, as well as an opportunity to work with managers and harvesters in finding solutions.

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