ENVIRONMENTAL ASSESSMENT

of the

INTERIM FINAL RULE

amending the

ATLANTIC LARGE WHALE

TAKE REDUCTION PLAN

OCTOBER 2000

National Marine Fisheries Service
National Oceanic and Atmospheric Administration
DEPARTMENT OF COMMERCE

Prepared by: NMFS, Northeast Region
Draft EA: October 19, 2000
Final EA: DEC 6

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1.0 INTRODUCTION

Pursuant to Section 118 of the Marine Mammal Protection Act (MMPA), the National Marine Fisheries Service (NMFS) convened a team of stakeholders in 1996 to develop a plan for reducing the incidental by-catch of large whales in four commercial fisheries along the Atlantic coast. The group, called the Atlantic Large Whale Take Reduction Team (Team), consists of representatives from the fishing industry, the New England and Mid-Atlantic fishery management councils, state and federal resource management agencies, the scientific community, and conservation organizations. The immediate goal of the Team was to draft a plan to reduce the incidental take of the four primary large whale species that interact with fisheries – the northern right whale (Eubalaena glacialis), humpback whale (Megaptera novaeangliae), fin whale (Balaenoptera physalus), and minke whale (Balaenoptera acutorostrata) -- to a level less than the potential biological removal level (PBR) within six months of implementation of the Team's plan.

Following the Team's initial set of meetings, the NMFS developed a proposed Atlantic Large Whale Take Reduction Plan (ALWTRP) published on April 7, 1997 (62 FR 16519), which was later modified as an Interim Final Rule on July 22, 1997 (62 FR 39157), and finalized on February 16, 1999 (64 FR 7529). The main tools of the ALWTRP include the basic prohibitions on killing or injuring whales as well as a combination of broad gear modifications and time-area closures, which are being supplemented by progressive gear research, expanded disentanglement efforts, and extensive outreach efforts in key areas.

NMFS reconvened the Team on February 22-24, 2000, to review the ALWTRP. The Team looked for measures that could be broadly instituted to supplement the existing time-area closures that are being applied to right whale critical habitat. The Team's recommendations were for NMFS to add certain gear requirements for the Northeast lobster and anchored gill net fisheries including:

- weak links on all buoy lines with specific breaking strengths for each gear type;
- weak links in the float-line of each gillnet net panel;
- gillnet anchoring systems;
- a prohibition for nearshore lobster fisheries on the use of single lobster traps;
- no more than one buoy line on all lobster trawls up to and including five trap trawls; and
- the reinstatement of gear marking for these gear types.

The Team also recommended that these gear modifications be implemented as soon as possible.

2.0 PURPOSE AND NEED

On February 16, 1999, NMFS published a final rule (64FR 7529) that modified a previous Interim Final Rule dated July 22, 1997, and implemented the ALWTRP as required under Section 118 of the MMPA. The final rule included a combination of broad gear modifications and time-area closures. The full Team met on February 22-24, 2000, to determine how to adjust the current Plan to further reduce the possibility of entanglement of large whales, primarily the right whale, in lobster and gillnet gear. The Team was informed of the sense of urgency in this task given the continued entanglement of right whales and the death of a right whale in 1999, that the population is declining.

There was a general understanding from available entanglement data that right whales may encounter fixed gear anywhere. Therefore, the Team looked for measures that could be broadly implemented, to supplement the existing time-area closures that are being applied to right whale critical habitats. Following discussion on various alternative actions, the Team recommended that the existing requirement for fishermen to use gear modifications from the Lobster and Gillnet Gear Technology Lists be replaced with specific gear modifications that, with data from the last three years of NMFS gear research, have been demonstrated to be cost effective and operationally acceptable to the fishermen, and have a reasonable chance of providing additional entanglement risk reduction for large whales. The Team agreed that the likelihood of right whale movements through State waters was low enough to not require additional

regulations at this time. Therefore, State water lobstermen will continue to use one option from the Lobster Gear Technology List.

The Team then split into Northeast, Mid-Atlantic, and Southeast Sub-groups to discuss the remaining issues on the initial agenda, which included; (1) Mid-Atlantic and Southeast US gear modifications, (2) the need for additional closures or other dynamic risk reduction scheme that may be set up to address right whale concentrations in areas of high gear use outside the existing time/area closures, and (3) development of long-term goals and contingencies for the ALWTRP. The Southeast and Mid-Atlantic Sub-groups met in August 2000 and will provide their recommendations for item 1 (above) to the full Team for approval. The Northeast Sub-group met in April and May and provided NMFS with specific recommendations that, if implemented as soon as possible, would provide significant reduction in the threat of entanglement to all large whales, specifically the Northern right whale.

Since the Mid-Atlantic and Southeast Sub-group recommendations for gillnet gear were delayed, we are only implementing recommendations for Northeast gillnet gear and for lobster gear in the Northeast and Mid-Atlantic. We have chosen to implement these actions in an interim final rule in order to provide additional protection for large whales, particularly the North Atlantic right whale, as soon as possible. The other Mid-Atlantic and Southeast Sub-group recommendations will be included in the next rule.

The next rule, which will be a proposed rule, NMFS will consider (1) the comments received from this interim final rule, (2) the recommendations of the Southeast and Mid-Atlantic Sub-groups, (3) the recommendations from the Northeast Sub-group on dynamic risk reduction, (4) recommendations for advanced gear modifications recommended by the Team at their February meeting, and (5) other measures as necessary to meet MMPA goals.

2.1 BACKGROUND

The complete background for the ALWTRP is found in Section 2.1 of the Environmental Assessment (EA) published on July 15, 1997 (NMFS 1997). The following background section is in reference to the specific actions to modify the gear requirements for Northeast lobster and gillnet fishermen.

The February 1999 final rule implements the regulatory tools of the ALWTRP which included a combination of broad gear modifications and time-area closures. However, the regulatory portion of the ALWTRP is supplemented by progressive gear research, expanded disentanglement efforts, extensive outreach efforts in key areas, and an expanded right whale surveillance program to supplement the new Mandatory Ship Reporting System.

The fixed gear fisheries covered by the ALWTRP include the Northeast sink gillnet fishery, the mid-Atlantic coastal gillnet fishery, the lobster trap/pot fishery, and the Southeastern Atlantic shark gillnet fishery. However, the Team recommended that certain gear requirements be added only for the lobster trap, sink, and\or anchored gillnet fisheries primarily in New England, to provide significant reduction in the threat of entanglement to all large whales, specifically the Northern right whale.

3.0 ALTERNATIVES

Several alternatives were considered that would reduce the threat of serious injury or mortality resulting from encounters with fixed gear in the Northeast waters. In general, the three methods by which gear modification strategies are applied to fixed gear are: (1) weak links in surface components of fixed gear, (2) weak links in bottom components of fixed gear, and (3) reduced fixed gear placed in the water column. The Team utilized the NMFS gear research results and ongoing research reports extensively to develop its consensus recommendations, which were the basis for development of the Preferred Alternative (PA)

and the Non-Preferred Alternatives (NPAs) described below. The Team will continue to utilize these data to develop the best approach to utilizing these strategies to reach the large whale take reduction goals. The Alternatives considered in the previous Environmental Assessment (NMFS 1997) for the 1997 Final Rule ranged from No Action to Closed areas, as the proposed actions considered were not limited in scope. However, the ALWTRT considered the existing area closures to be adequate at this point, and had limited the discussion of additional measures to gear measures. Therefore, the Alternatives for this Environmental Assessment range from No Action to the Buoy Line Removal and Floating Bottom Line Reduction alternative that is understood to be the most whale-safe gear modification currently envisioned. The NMFS will be preparing a Proposed Final Rule in the near future that will once again take into account the full range of take reduction alternatives similar to what was done in 1997.

3.1 NO ACTION

The No Action alternative would leave in place the existing Final Rule regulations that have been required since November 1997. These regulations include the seasonal area closures and the use of one or two of the options from the Lobster and Gillnet Technology Lists. Vessels fishing in the Stellwagen Bank/Jeffreys Ledge Restricted Area, the Cape Cod Bay Critical Habitat (CCBCH) and the Great South Channel Critical Habitat (GSCCH) areas have to choose two gear modifications from the lobster gear technology list and all other areas have to choose one gear modification.

The following items are on the 1997 lobster gear technology list:

1. all buoy lines 7/16 inches in diameter or less;
2. all buoys attached to the buoy line with a weak link having a maximum tensile strength of 1100 pounds;
3. gear set in offshore lobster areas only, all buoys attached to the buoy line with weak link having a maximum tensile strength of 3780 pounds;
4. gear set in offshore lobster areas only, all buoys attached to the buoy line by a section of rope no more than 3/4 the diameter of the buoy line;
5. all buoy lines composed entirely of sinking line, and
6. all ground lines are made of sinking line.

Although the options list contains gear modifications that address all three of the general strategies mentioned above, allowing fishermen to choose only one or two of the options did not provide the level of entanglement risk reduction needed in areas where right whales and gear coexist.

3.2 PREFERRED ALTERNATIVE

This interim final rule would modify the final rule published on February 16, 1999 (64 FR 7529). Changes would only be made to the gear requirements for the lobster and gillnet fisheries in the Northeast segment of the ALWTRP. Therefore, Section 3.1 to 3.5, and 3.7 of the Environmental Assessment published on July 15, 1997, (NMFS 1997) remain unchanged. Because the changes to the final rule were agreed to by the Team, which consists of all the interested parties on the issue, NMFS plans to issue the rule as an interim final rule to provide rapid implementation of these important gear measures. Comments on the Interim Final Rule received from the general public would be addressed in a final rule to be developed during the winter of 2000-2001. The interim final rule will become effective on January 1, 2001.

The following proposed actions are in addition to the existing broad area closures of right whale critical habitat (CCB, GSC, and Southeast U.S. in the winter and spring):

1. Gear requirements for the Inshore Nearshore Lobster Waters (State water lobster fisheries of Maine (ME), New Hampshire (NH), Massachusetts (MA), and Rhode Island (RI) would remain unchanged.

2. Nearshore and offshore lobster waters would be redefined to be consistent with the American Lobster Fisheries Area designations (Areas 1 through 5, and the Outer Cape Management Area)

3. New gear requirements for lobster fisheries in the Northern Nearshore Lobster Waters (Areas 1,2, and the Outer Cape Management Area) would be:
    i. Knotless weak links at the buoy with a breaking strength of 600 lb or less.
    ii. Multiple trap trawls only - single trap trawls would not be allowed.
    iii. Limit of one buoy line on all trawls up to and including five traps.
    iv. Gear marking midway on the buoy line.

4. New gear requirements for lobster fisheries in the Offshore Lobster Waters (Area 3 and the Area 2/3 Overlap) would be:
    i. Knotless weak links at the buoy with a breaking strength of 3780 lb or less.
    ii. Gear marking midway on the buoy line.

5. The Gillnet Gear Technology List would be eliminated for sink gillnet fisheries in the Northeast gillnet Waters (East of 72°30'W Long.). New gear requirements would be:
    i. Knotless weak link at the buoy with a breaking strength no greater than 1,100 lb.
    ii. Weak links placed in the headrope (floatline) at the center of each net panel.
    iii. Net strings that contain 20 net panels or less must be anchored with one of three optional anchoring systems.
    iv. Gear marking midway on the buoy line.

6. The Lobster Gear Technology List would be changed to reduce the breaking strength for the buoy weak link option to 600 lb or less, and require it to be knotless.

In addition, fishermen are encouraged to maintain their buoy lines to be as knot-free as possible, and the use of splices is encouraged in lieu of knots.

3.2.1 NORTHEAST LOBSTER FISHERIES

The closure of the GSC right whale critical habitat area to lobster gear from April 1 to June 30, and existing gear restrictions in place for lobster gear in the CCB right whale critical habitat from January 1 to May 15 would remain in place as defined in the previous EA (NMFS 1997).

The Team recommended that the ALWTRP measures be applied within recognized lobster management areas for consistency. Therefore, proposed actions would establish the following four lobster areas:
1. The "Northern Inshore State Lobster Waters" would include the state-water portion of Management Areas 1 and 2 in the American Lobster Fishery regulations, which include the state water portion of the CCB right whale critical habitat area described in the previous EA (NMFS 1997).
2. The "Northern Nearshore Lobster Waters" which includes the Federal portion of Management Area 1, Area 2, and the Outer Cape Management Area described in the American Lobster Fishery regulations. The Federal portion of the CCB right t whale critical habitat area and the Stellwagen-Jeffreys Ledge area described in the previous EA (NMFS 1997), are included in this area.
3. The "Southern Nearshore Lobster Waters" which are similar to the Southern Inshore Lobster Waters described in the previous EA (NMFS 1997). However this area would be redefined to include Management Areas 4 and 5 in the American Lobster Fishery regulations.
4. The "Offshore Lobster Waters" are similar to the Offshore Lobster Area described in the previous EA (NMFS 1997), and includes Management Area 3 and the Area 2/3 Overlap described in the American Lobster Fishery regulations. The GSC right whale critical habitat area is included in this area.

The existing general restrictions prohibiting floating line at the surface and wet storage of gear would be retained for all areas. In addition fishermen would be encouraged to maintain the buoy lines as knot-free as possible, with splices preferable to knots.

3.2.1.1 Northern Inshore Lobster Waters

The proposed action would establish an area called the "Northern Inshore Lobster Waters" to include the state-water portions of Management Areas 1 and 2 in the American Lobster Fishery regulations (64 FR 68228, December 6, 1999) not otherwise included in the right whale critical habitat. This area would not include the portions of RI waters that are currently exempted from the ALWTRP regulations. The proposed action would require that state-water vessels comply with the Lobster Gear Take Reduction Technology List requirement from the final rule (one option), with the following exceptions: (1) the buoy line weak link option is changed to decrease the maximum breaking strength from 1100 lbs (489.8 kg) to 600 lbs (272.4 kg), and (2) buoy line weak links must break to produce a knotless end. No gear marking is proposed for lobster trap gear in the Northern Inshore Lobster Waters at this time. This essentially represents a status quo situation for the inshore lobster fishermen unless they were using an 1,100 lb weak link, in which case they would have to either modify the weak link or choose another option.

3.2.1.2 Northern Nearshore Lobster Waters

The proposed action would establish the "Northern Nearshore Lobster Waters" to encompass the federal-water portion of Management Area 1, Area 2, and the Outer Cape Lobster Management Area as defined in the lobster fishery management plan. This area would include the Federal portion of the CCB right whale critical habitat area and the Stellwagen Bank/Jeffreys Ledge Restricted Area that was described in the previous EA (NMFS 1997).

For reduction of entanglement risk from lobster trap gear set in the Northern Nearshore Lobster Waters, the proposed action would replace the gear technology list options (one option required) with mandatory modifications. Specific requirements would include the following: (1) breaking strength of the weak link at the buoy would be reduced from 1100 lb (498.8 kg) to 600 lbs (272.4 kg); (2) the weak link would be required to break to produce a knotless end; (3) single traps would be prohibited; and (4) multiple-trap trawls with two to five traps could only have one buoy line. For monitoring purposes, the proposed action will require marking of all vertical lines midway in the water column with a red mark.

Requiring this new set of gear modifications in areas where whales may not be concentrated, but are likely to be transiting, would significantly reduce the risk of serious injury/mortality to these animals due to entanglement in lobster trap gear.

3.2.1.3 Southern Nearshore Lobster Waters

The proposed action would change the name of the area designated as "Southern Inshore Lobster Waters" in the final rule to "Southern Nearshore Lobster Waters Area" and revise the boundaries for consistency with the American Lobster Fishery regulations. The Southern Nearshore Lobster Waters would encompass both the state- and federal-water portions of American Lobster Fishery Management Areas 4 and 5, excluding the waters currently exempted from regulation under the ALWTRP.

The proposed action would reduce the entanglement risk in this area through the gear technology list modification described above. Thus, lobster trap gear set in this area would need to comply with one option from the technology list contained in this interim final rule. For monitoring purposes, the proposed action would require marking of buoy lines of lobster trap gear set in this area with an orange mark midway along the length of the buoy line.

3.2.1.4 Offshore Lobster Waters

The proposed action would designate the "Offshore Lobster Waters" to encompass both the area represented by the American Lobster Fishery Offshore Management Area 3 and the Area 2/3 Overlap. This area would include the GSC Restricted Lobster Area defined in the previous EA (NMFS 1997).

The existing final rule required that lobster trap gear set in this area comply with one option from the technology list. The proposed action would make the following changes for entanglement risk reduction in this area: (1) the 3780 lb (1714.3 kg) buoy line weak link would be mandatory, and (2) the weak link would need to break to produce a knotless end. NMFS gear research is using load cells to test actual strain on offshore gear with the intent to lower the breaking strength of the buoy line weak link if possible. Results of ongoing ocean-testing are expected in late 2000. For monitoring purposes, the proposed action would require that buoy lines be marked with a black marking midway along the buoy line.

3.2.2 NORTHEAST GILLNET FISHERIES

The closure of the GSC right whale critical habitat area to gillnet gear from April 1 to June 30, and the closure of the CCB right whale critical habitat to gillnet gear from December 1 to May 15 would remain in place as defined in the previous EA (NMFS 1997).

The proposed action would require that the ALWTRP measures be applied within the existing Northeast gillnet management areas.

3.2.2.1 Northeast Gillnet Waters

The proposed action would designate the Northeast Gillnet Waters Area, previously described as the "Other Northeast Waters Area" in the final rule, to encompass those waters of the Northeast Region (ME through and including VA) not otherwise identified as exempted waters. This area would include the CCB Restricted Area, GSC Restricted Gillnet Area, GSC Sliver Restricted Area, and Stellwagen Bank/Jeffreys Ledge Restricted Area that are described in the existing regulations and the July 1997 EA (NMFS 1997). The proposed action would reduce entanglement risk by replacing the technology list strategy from the final rule (one option required) with mandatory gear modifications. The new requirements for anchored gillnet gear set in this area would include the following: (1) knotless buoy line weak links with a breaking strength no greater than 1100 lb (498.8 kg); (2) net panel weak links, with a breaking strength no greater than 1100 lb (498.8 kg), placed in the center of the headrope section on each net panel; and (3) for strings of 20 or fewer nets, each end of the string would have to be anchored with either an anchor with the holding power of a 22 lb (10.0 kg) Danforth-style anchor, dead weights weighing at least 50 lb (22.7 kg), or a lead line weighing at least 100 lb (45.4 kg) per 300 feet (91.4 m). For monitoring purposes, the proposed action would require that all anchored gillnet buoy lines set in this area be marked with a green marking midway in the water column.

The weak link breaking strength would be the same as that which was specified for both the buoy line and net panel weak link options in the technology list in the final rule. NMFS gear research is conducting stress load testing to be completed by the end of 2000, with the intent of lowering the maximum weak link breaking strength if possible. The placement of the net panel weak link at the center of each panel, as would be required in the proposed action, is a change from the final rule, which required that the weak link be placed between net panels.

3.3 FULL WEAK LINKS AND FLOATING BOTTOM LINE REDUCTION

The Full Weak Links and Bottom Line Reduction alternative would combine the Proposed Action requirements for weak links at the surface of fixed gear with requirements for bottom weak links and the reduction of floating gear at the bottom as well.

Bottom weak links were identified by the Team as an additional method to reduce the likelihood of large whales becoming entangled in significant amounts of gear that would increase the threat of serious injury or death from the encounter. Animals encountering a buoy line near the bottom may become entangled in the working gear before the weak link at the buoy can break away to facilitate the animal's release. However, weak links at the bottom of the buoy line make it difficult to haul the gear safely without the weak

link failing and resulting in lost gear. The NMFS gear research effort has identified several bottom weak link concepts that are currently being tested, but have not yet been developed to the operational testing stage.

Floating bottom line can become an entanglement threat when groundline running between traps in lobster trawls or gillnet anchor line floats up off the bottom causing buoyant arcs of line to be suspended in the water column. NMFS gear research program has investigated the use of sinking line in trawl groundline and gillnet anchorline. Although sinking line can be used in soft or smooth bottom areas, it chafes in hard rock or cobble bottom, and quickly weakens and breaks. The gear research program has shifted to development of a neutrally buoyant line which is being extensively tested within the Gulf of ME at this time. Although initial tests are positive, a full season of testing will need to be completed before we have adequate results on its operational effectiveness.

3.4 BUOY LINE REMOVAL AND FLOATING BOTTOM LINE REDUCTION

The Buoy line Removal and Floating Bottom line Reduction alternative would eliminate the need for weak links at the surface and bottom while maximizing the reduction of fixed gear in the water column.

Complete removal of buoy line and reduction of floating bottom line is recognized as the most "whale safe" technique for utilization of fixed gear. NMFS gear research has investigated the feasibility of acoustical release devices that would release buoys from the bottom when the fisherman is ready to haul the gear. However, the cost for these devices is high making them not economically feasible for widespread use. NMFS is also investigating the use of galvanic tie-downs. These devices would hold buoy lines at the bottom until the corrodible metal ties weaken and release the buoy. These devices, which can be preset to release the buoys at measurable intervals, are currently being tested, but have not yet been developed to the operational stage.

One of the major drawbacks to removal of buoy lines is that other fishermen will not know where gear has been set, and gear conflicts with both fixed and mobile gear are likely to result in lost and/or damaged gear. Therefore, this option may only be feasible in areas where other gear cannot be set or can be strictly controlled.

4.0 AFFECTED ENVIRONMENT

The affected environment was discussed in detail in Section 6.0 of the EA published on July 15, 1997 (NMFS 1997). The physical area affected by this action is the Northeast Region of the East Coast from ME to North Carolina (NC), although the specific areas affected by the action are the Northeast Lobster and Gillnet waters described in Sections 3.1.1 and 3.1.2 above. The biological resources potentially affected by this action are also described in detail in the EA published on July 15, 1997 (NMFS 1997), and updates are provided in Section 5.1 below. The main goal of the ALWTRP is to reduce serious injury and mortality of large whales. The proposed action was developed to accomplish that goal by reducing the threat of injury to large whales from entanglement in fixed fishing gear. Therefore, the general effect of this action to large whales (the primary marine resource affected by this action) should be beneficial.

4.1 STATUS OF THE LARGE WHALES

The status of the large whales is discussed in detail in Section 2.2 of the EA published on July 15, 1997 (NMFS 1997). The following is provided as an update of that section.

The information in this section is from the 2000 Marine Mammal Stock Assessments (Waring et al., 2000), and from 1998 and 1999 entanglement reports compiled by NMFS. The detailed reports for

entanglements up to 1998 are contained in the 2000 Stock Assessment Reports (SAR). Summaries of the 1998, 1999, and 2000 entanglements are provided below for each species. Additional information about the population biology and human-caused sources of mortalities and serious injuries is included in the 2000 Marine Mammal Stock Assessment Reports are available from NMFS at their internet web page (www.nefsc.nmfs.gov/psb/assesspdfs.htm).

4.1.1 North Atlantic Right Whale

The northern right whale is the rarest of all large cetaceans and one of the most endangered species in the world. The western North Atlantic population is estimated at 291 animals (Kraus et al., 2000) and is unlikely to be significantly higher. A recent International Whaling Commission (IWC) workshop on the status and trends in this population (IWC, 2000) concluded that survival has declined. Due to the decline in survival, evidenced by the decline in calving rates and increase in calving interval, the PBR level for this population has been set to zero.

Approximately one-third of all known right whale mortalities are caused by human activities (Kraus, 1990). Further, the small population size and low annual reproductive rate suggest that human sources of mortality may have a greater effect on population growth rates of the right whale than on those of other whales. The principal factors retarding growth of the population are believed to be ship strikes and entanglement in fishing gear (IWC, 2000).

For the period 1994 through 1998, the total human-caused mortality and serious injury to right whales is estimated at 1.4 incidents per year. Of this figure, 0.8 incident per year is attributed to entanglements and 0.6 to ship strikes. Note that some injuries or mortalities may go undetected, particularly those that occur offshore. Therefore, the estimates above should be considered minimum estimates.

In 1998, four right whales were reported entangled. On July 12, two right whales were found trapped in a weir near Grand Manan Island, Canada and were released 2 days later without apparent harm. Another right whale was seen entangled in rope of unidentified origin on August 15 near Miriigan Island in the Gulf of St. Lawrence. The whale was too active to approach safely to disentangle it, and appeared to free itself of most of the gear.

One right whale was entangled twice (and actually disentangled three times) in CCB, in 1998. The whale had first been seen entangled in 1997 in the Bay of Fundy. On July 24, 1998, the whale was seen near Dennis, MA (CCB), where most, but not all of the gear it had been carrying from the 1997 entanglement was removed. NMFS has not been able to identify the type of gear responsible for this 1997 entanglement. The same whale was seen again near Provincetown, MA, on September 12 with a lobster buoy line through its mouth, and the gear was removed. The same whale was seen again 2 days later (September 14) near Barnstable, MA, where it had picked up additional lobster gear which was also removed by the NMFS-supported disentanglement team. At last report, the whale was swimming freely but still had a thin line in its mouth from the 1997 entanglement, which is now believed to represent a serious injury to that animal as it may interfere with its ability to feed.

In 1999, six right whales were reported entangled. The gear was completely removed from one animal, and most of the gear was removed from two others. Although some gear was removed from a fourth animal, it ultimately died from the entanglement. The last two animals were sighted offshore (one in the US and one in Canada) but could not be relocated.

A total of five confirmed right whale entanglements have been sighted in the Gulf of ME (both in U.S. and Canada) so far in 2000. One whale was completely disentangled, one whale is not a candidate for rescue due to its minor entanglement and one whale remains entangled and requires further assessment. The disentanglement team was unable to respond to two entangled right whales. One is an unidentified right whale, sighted and lost by aerial survey in the Bay of Fundy, Canada. The other was sighted by aerial survey too far offshore on two occasions. This whale has been determined to have a minor entanglement.

Details of these events are available from the Northeast Region or from the Protected Resources Division of the Northeast Region website (www.wh.whoi.edu/ro/doc/nero.html).

4.1.2 Humpback Whale

The best estimate of abundance for North Atlantic humpback whales is 10,600 (Smith et al., 1998). The minimum population estimate for this stock is 10,019 (Waring et al., in prep). Within this population, the humpback whales in the Gulf of ME constitute a distinct, relatively small, feeding stock. However, it is not genetically distinct from other sub-populations in the western North Atlantic, which are treated as a single stock for the purposes of the Plan and the estimation of PBR. For purposes of the current stock assessment, the maximum net productivity rate for western North Atlantic humpback whales is assumed to be 0.065 (Barlow and Clapham, 1997). The PBR level for this stock is 32.6 humpback whales per year.

For the period 1994 through 1998, the total estimated human-caused mortality and serious injury to humpback whales in U.S. waters is estimated as 3.65 per year. This is derived from three components: (1) Entanglements that have been reported by NMFS observers equate to 0.25 per year, (2) additional fishery interaction records make up another 2.4 per year, and (3) vessel collision records which account for the remaining 1.0 per year

In 1998, twelve humpback whales were reported entangled. One whale died in gillnet gear off NC before the fisherman could remove the gear, and another was found dead on the beach with clear evidence of entanglement on its flukes. The gear was completely removed from four animals, and most of the gear was removed from one other. Three animals were not resighted and two were involved in minimal entanglements for which no disentanglement attempt was deemed necessary.

Nine humpbacks were reported entangled in 1999. One whale was found dead on the beach with clear evidence of entanglement. Gear was completely removed from three animals and most of the gear was removed from another whale. The Canadian disentanglement team attempted to disentangle a humpback in the Bay of Fundy but was unsuccessful. No attempt was made to disentangle two animals as they were deemed to be minimal entanglements. One entangled humpback was found while all disentanglement teams were involved in a right whale event, and could not be relocated once the teams were free.

A total of eleven confirmed reports of entangled humpback whales were received in 2000. Three were not located by responders as no one was able to stand by. Two were too far off-shore for response. Two are at large and not assessed. One is at large and is assessed as a not life threatening entanglement. Two were found and, although disentanglement was not possible, the animals were later seen free of gear. One was successfully disentangled by the Network.

Details of these events are available from the Northeast Region contact or from the Protected Resources Division of the Northeast Region website (www.wh.whoi.edu/ro/doc/nero.html).

4.1.3 Fin Whale

The best available estimate of abundance for the western North Atlantic fin whale is 2,200, which is considered conservative (Waring et al., in prep). The minimum population estimate is 1,803 (ibid.). For purposes of the current stock assessment, the maximum net productivity rate for fin whales is assumed to be 0.04. The PBR for this stock is 3.6.

Entanglements of fin whales are rarely documented. Serious injuries or mortalities due to entanglements of fin whales are considered to occur at an insignificant level approaching zero mortality and serious injury rate (Waring et al., in prep). A review of 26 records of stranded or floating (dead or injured) fin whales for the period of 1992 through 1996 showed that three had formerly been entangled in fishing gear. Two of these had net or rope marks on the body, and one had line through the mouth and around the tail. Two fin whales were reported entangled in 1998; one was not resighted and the other was a floating carcass

found off Digby, Nova Scotia, Canada with netting through the mouth and around the tail flukes. Three fin whales were reported entangled in 1999, all in Canada. Disentanglement attempts were made by the Canadian team on two; one was successfully disentangled, the other was not. The third animal was not resighted. There have been no reports of entangled fin whales so far in 2000.

4.1.4 Minke Whale

Minke whales off the eastern coast of the U.S. are considered to be part of the Canadian east coast population, which inhabits the area from the eastern half of Davis Strait south to the Gulf of Mexico. The best estimate of the population is 3,810 (Waring et al., in prep.), which is considered conservative. The minimum population estimate for Canadian east coast minke whales is 3,097 (ibid.). The current and maximum net productivity rates are not known, but the maximum rate is assumed to be 0.04. The PBR for this stock of minke whales is 31. A total of 4 confirmed minke whales were reported entangled in 2000. Three minke whales were lost by the reporting vessels before Network response was made. One was successfully disentangled by the disentanglement team.

5.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

The biological resources potentially affected by this action are described in detail in the EA published on July 15, 1997 (NMFS, 1997). The main goal of the ALWTRP is to reduce serious injury and mortality of large whales. This proposed action was developed to accomplish that goal by reducing the threat of injury to large whales from entanglement in fixed fishing gear. Therefore, the general effect of this action to large whales (the primary marine resource affected by this action) should be beneficial. Other species known to be affected by fixed gear are, of course, the fish species for which the gear is targeted. The environmental affects of the gear on targeted species are contained in the EAs for their FMP's. Leatherback sea turtles are known to become entangled in lobster buoy lines. However, the entanglement mechanism is similar to what happens with large whales. Therefore, the environmental consequences of each alternative will be similar to that for large whales.

The human environment affected by this action are those lobster and gillnet fishermen who operate in the areas described in Section 3.2 above. The impacts of the initial ALWTRP on those fishermen is described in Section 7.2.1, 7.2.2, and 7.2.3 of the EA published on July 15, 1997 (NMFS 1997), and the impacts of the alternatives are described in this section and in Section 6.0 and 7.0 below.

5.1 NO ACTION

Existing regulations include seasonal area closures for the three right whale Critical Habitat areas, and required use of one or two of the options from the Lobster and Gillnet Technology Lists. Vessels fishing in the Stellwagen Bank/Jeffreys Ledge Restricted Area, the CCBCH and the GSCCH areas had to choose two gear modifications from the lobster gear technology list and all other areas had to choose one gear modification.

The items on the gear technology lists contain recommended gear modifications that provide a range of protection to whales. However, allowing fishermen to choose only one or two of the options does not provide the level of entanglement risk reduction needed in areas where right whales and gear coexist.

As noted in the Biological Opinion(BO) for the original interim final rule (July 15, 1997), the reinitiation determinations for the Final Rule (February 3, 1999), and the EA prepared for this interim final rule, whales are still becoming entangled in fixed fishing gear under the existing final rule, especially right whales, where one died in 1999 from an entanglement in gillnet gear. Therefore, the Team looked for measures that could be broadly applied to supplement the existing time-area closures and recommended that, with the exception of state water lobster traps, the existing Lobster and Gillnet Gear Technology Lists be

replaced with specific gear modifications that, with data from the last three years of NMFS gear research, have proven to have a reasonable chance of providing a higher level of entanglement risk reduction for large whales. The Team will continue to utilize these data to develop the best approach to utilizing these strategies to reach the large whale take reduction goals. NMFS is implementing the Team's recommendation in this proposed action.

5.2 PREFERRED ALTERNATIVE

The specific gear measures of the proposed action are described below with a description of how they are designed to reduce the threat of entanglement by large marine organisms.

5.2.1 Buoy Line Weak Links

The weak link at the buoy is intended to increase the likelihood that a line sliding through a whale's mouth will break away quickly at the buoy before the whale begins to thrash and become more entangled. This is also expected to reduce risk in cases where a whale encounters the gear and gets line wrapped around an appendage at a point close to the buoy, which addresses one of the three strategies for gear modification discussed by the Team (see Section 4.0).

The 1100 lb (489.8 kg) breaking strength in the 1997 rule was recommended by the Gear Advisory Group (GAG) at their original meeting in June 1997 as a "best available practice" which could be used in the gear technology lists. The decrease in the buoy line weak link breaking strength for nearshore lobster trap gear to 600 lb (272.4 kg) in the proposed action is based on information collected by the ALWTRP gear research program which suggests that the 1100 lb (489.8 kg) breaking strength required in the previous rule is higher than necessary for the nearshore lobster fishery.

The required breaking strength of 3780 lb (1714.3 kg) for the offshore lobster buoy line weak links in the proposed action is the same as that specified in the Lobster Take Reduction Technology List in the final rule. This option on the technology list was developed based on a recommendation from the GAG at its June 1997 meeting to use 0.5 in (1.27 cm) polypropylene line, which has a breaking strength of approximately 3780 lb (1714.3 kg). Initial testing conducted by NMFS suggests that this breaking strength can be lowered for these gear types. However, the Team requested further testing for extreme conditions. In response to the Team's request, NMFS is conducting further testing to investigate loads encountered in offshore gear to determine if lower breaking strength may be safely used.

The required breaking strength in the proposed action of 1100 lb (498.9 kg) for the anchored gillnet gear buoy line weak links is the same as that specified in the Gillnet Take Reduction Technology List in the final rule. This option on the technology list was developed based on a recommendation from the GAG at its June 1997 meeting. The NMFS gear research staff is conducting further investigation for gillnet weak links along with the offshore lobster testing mentioned above.

The NMFS gear research staff have tested various types of buoy line weak links and provided fishermen with a list of tested devices for use in the proposed action that include swivels, plastic weak links, rope of appropriate diameter, hog rings, and rope stapled to a buoy stick. They will continue to test any device fishermen claim will work as a weak link and provide them with feedback on whether the breaking strength is in compliance with current ALWTRP regulations.

Buoy line weak links would be required by the proposed action to be knotless when the weak link fails because a weak link that breaks but leaves a knot or other obstruction at the end of the line leading down to the gear would have reduced effectiveness. A knot or piece of a broken link could become lodged in the whale's baleen or around an appendage of a whale or any other large marine organism such as leatherback sea turtles and prevent the line from slipping through either the baleen or appendage. Observations of right whale jaw anatomy suggest that even a bare line would be difficult to pull through a

whale's mouth when the jaw is clamped shut. Testing on baleen obtained from stranded whale carcasses has shown that knots hinder the passage of line through the baleen.

Requiring a knotless buoy line for all gillnet and lobster trap gear set in the federal waters from RI to ME will significantly increase the probability that a large whale can survive an encounter with buoy lines rigged in this fashion.

5.2.2 Knotless Buoy Line

Although the Team initially recommended requiring knot-free buoy lines, it changed to recommending a voluntary measure because fishermen frequently need to repair and re-tie buoy lines at sea. The knot-free buoy line concept is similar to the breakaway buoy concept, where the objective is to keep knots from hanging up in a whale's baleen or around an appendage and preventing the line from sliding out. In addition to the proposed action, NMFS would recommend the use of splices wherever possible because splices do not increase entanglement threat. However, connecting lines using a splice is not practicable while gear is being hauled, so splicing, if used at all, is usually done on land during seasonal overhaul or as new gear is added. Although concepts for devices to join lines quickly at sea have been proposed, none are yet developed.

As noted in the economic analysis in Section 6.0 below, many (approximately 50%) of the fishermen currently use splices in the middle of their buoy and anchor lines to avoid the weakening affect of knots. Encouraging fishermen to use splices wherever possible will reenforce this practice. Reducing knots in the middle of lines appears to be a good practice, but when it comes to possible effects to large whales, the fact that a knot reduces the breaking strength by at least 50% means that knots in the middle of lines may not increase the threat of serious injury from an encounter with these lines.

5.2.3 Gillnet Panel Weak Links And Anchoring System

The proposed action would require weak links in the center of each 50-fathom (300 ft = 91.4 m) net panel floatline (headrope) that are expected to break when a whale exerts pressure in opposition to the resistance provided by the anchoring system and weight of the gear. The weak link would allow the floatline to part and unravel from the net mesh when a whale encounters any section of the gear. The net mesh would then be free of the stronger floatline and a large whale would have a better chance of breaking free of the weaker monofilament mesh.

The net panel weak link requirement that would be contained in the proposed action specifies a breaking strength of no more than 1100 lb (498.8 kg). This breaking strength is a significant reduction from the floatline strength typically used in sink gillnet gear, which ranges from 1700 lb (771.8 kg) to 2500 lb (1135 kg). However, the use of weak links is not expected to hinder retrieval of the gear, as gillnetters would be able to haul their gear by the lead line and the full-strength bridles between net panels.

The anchoring requirement in the proposed action is intended to create sufficient resistance to allow the net panel weak links to break when at least 1100 lb (498.8 kg) of pressure is exerted by a whale on net strings of 20 or fewer net panels. The specified anchoring system would only be required for net strings of 20 or fewer nets because NMFS gear research has shown that, for strings of greater than 20 net panels, the 1100 lb (498.8 kg) force necessary to break the weak link is reached solely by the weight and resistance of the gear itself, rendering additional resistance from anchors unnecessary.

In the proposed action, the net panel weak links would be required in the center of each net panel floatline, rather than between net panels as was specified for the gillnet technology list option in the final rule. NMFS proposes to change the placement of the net panel weak links because a weak link placed at the bridle might cause a failure at a point in the gear which is critical for safe hauling of the gear and for reducing the chance of losing gear. Furthermore, in cases where a whale hits the gear near a weak link in the floatline, a breaking point within that floatline would maximize the chance for the whale to break away

from the net as soon as possible, before becoming entangled in the mesh itself. Once a whale becomes entangled in the mesh itself, there is a greater chance that other parts of the gear including the heavier lines will contribute to the seriousness of the entanglement.

Requiring gillnet panel weak links and anchoring systems for all gillnet gear set in the federal waters from RI to ME will significantly increase the probability that a large whale can survive an encounter with gillnets rigged in this fashion.

5.2.4 Single Traps And Multiple-trap Trawls

The proposed action would prohibit single pots in federal waters and require that trap trawls of up to and including five traps have only one buoy line. The Team recommended this measure as a reasonable means of reducing vertical lines in nearshore waters where large whale movements predominantly occur in the summer and fall months. This measure would require lobster trap vessels operators who decide to continue fishing in federal waters to reconfigure the gear into multiple-trap trawls, thereby reducing the number of buoy lines in the water. The reduction in buoy lines would reduce the entanglement risk represented by buoy lines.

5.2.5 Gear Marking

NMFS had suspended the gear marking system from the February 1999 rule until November 1, 2000. The system provided in the 1999 rule involved two-part color markings (one for fishery and one for area) placed in two places on each buoy line but did not provide individual vessel identification. NMFS agreed to the Team's request to suspend the gear marking requirements in the final rule to allow further investigation of alternative systems which would provide identification of individual vessels and would preferably be less complex. Individual identification is still preferred to maximize information on when and where gear was set as well as to provide a description of the modification in use. However, although many of the state and federal fishery management plans currently require marking of buoys and/or traps with individual vessel identification, it has proven difficult to find a marking material that can be placed on lines without intertering with fishing operations or creating a safety hazard.

The Team had originally discussed the need to mark gear in such a way that there would be enough markings on the buoy lines and groundlines that the sections of line likely to be found on a whale would be marked with individual vessel identification. However, at the February 2000 meeting, the Team recognized that a marking system extensive enough to meet those requirements had not yet been developed. Therefore, the Team recommended, and the proposed action would require, a simpler system involving a one-color marking placed in one location, midway on each buoy line for all lobster trap gear (except lobster trap gear in state-waters) and for Northeast anchored gillnet gear. The one-color marking would indicate both area and gear type, where previously a two-color code was required. For example, lobster trap gear set in the Northern Nearshore Lobster Waters would be required to have a red mark, and, by contrast, lobster trap gear in the Southern Nearshore Lobster Waters would be required to have an orange mark.

The NMFS gear research program has provided suggested options for marking or affixing the gear marking color code that include dye, paint, thin colored line whipped around the buoy line or woven through it, thin colored plastic, or heat shrink tubing. The EA (NMFS, 1997) prepared for the first interim final rule contained a full analysis of gear marking. The proposed action requires one mark instead of two, thus reducing any adverse impact identified in NMFS, 1997.

5.3 FULL WEAK LINKS AND FLOATING BOTTOM LINE REDUCTION

The use of bottom weak links and floating bottom lines were identified by the Team as an additional method to reduce the likelihood of large whales becoming entangled in significant amounts of gear that would increase the threat of serious injury or death from the encounter.

Animals encountering a buoy line near the bottom may become entangled in the working gear before the weak link at the buoy can break away to facilitate the animal's release. However, weak links at the bottom of the buoy line make it difficult to haul the gear safely without the weak link failing and resulting in lost gear. The NMFS gear research effort has identified several bottom weak link concepts that are currently being tested, but have not yet been developed to the operational testing stage.

Floating bottom line can become an entanglement threat when groundline running between traps in lobster trawls, or gillnet anchor line floats up off the bottom causing buoyant arcs of line to be suspended in the water column. NMFS gear research program has investigated the use of sinking line in trawl groundline and gillnet anchorline. Although sinking line can be used in soft or smooth bottom areas, it chafes in hard rock or cobble bottom, and quickly weakens and breaks. The gear research program has shifted to development of a neutrally buoyant line which is being extensively tested within the Gulf of ME at this time. Although initial tests are positive, the full season of testing will need to be completed before we have adequate results on its operational effectiveness.

Requiring bottom weak links and reducing floating bottom lines will provide an additional reduction in threat of serious entanglement from an encounter with the bottom sections of fixed gear. However, the fact that these gear modifications have not yet been developed (bottom weak link) and adequately tested (neutrally buoyant rope), makes it impractical to require for all fixed gear at this time.

5.4 BUOY LINE REMOVAL AND FLOATING BOTTOM LINE REDUCTION

The Buoy line Removal and Floating Bottom line Reduction alternative would eliminate the need for weak links at the surface and bottom while maximizing the reduction of fixed gear in the water column.

Complete removal of buoy line and reduction of floating bottom line is recognized as the most "whale safe" technique for utilization of fixed gear. NMFS gear research has investigated the feasibility of acoustical release devices that would release buoys from the bottom when the fisherman is ready to haul the gear. However, the cost for these devices is high making them not economically feasible for widespread use. NMFS is also investigating the use of galvanic tie-downs. These devices would hold buoy lines at the bottom until the corrodible metal ties weaken and release the buoy. These devices, which can be preset to release the buoys at measurable intervals, are currently being tested, but have not yet been developed to the operational stage.

One of the major drawbacks to removal of buoy lines is that other fishermen will not know where gear has been set, and gear conflicts with both fixed and mobile gear are likely to result in lost and/or damaged gear. Therefore, this option may only be feasible in areas where other gear cannot be set or can be strictly controlled.

The high cost and operational issues of gear conflict that are associated with this alternative make it a NPA for broad implementation throughout the Northeast at this time.

6.0 REGULATORY COSTS OF LOBSTER AND GILLNET GEAR MODIFICATIONS

This is an extension of an earlier economic analysis presented in the EA and Regulatory Impact Review of the ALWTRP and Implementing Regulations (NMFS, 1997). The lobster and gillnet fleet are affected by this regulation. The present analysis has redefined fishing areas to be compatible to the lobster fisheries management plan, and includes additional gear modifications which represent the first of a two-tiered series of gear modifications requirements recommended by the Team at their meeting on February 22-24, 2000. The following four alternatives are evaluated: 1) Status Quo (1997 Plan); 2) the Preferred Alternative (PA), and two additional "Non-Preferred" alternatives (NPAs)3) Full Weak Links and Floating

Bottom Line Reduction (NPA1) and 4) Buoy Line Removal and Floating Bottom Line Reduction (NPA2). The Interim Final Rule published in July 1997 is being used as the Status Quo for this analysis as the economic analysis conducted in NMFS, 1997 is the last base from which current cost data can be compared. The detailed economic analysis of the alternatives for the lobster fleet and gillnet fleet are in sections 6.1 and 6.2 respectively.

The total lower bound costs to the lobster industry under the proposed 2000 PA, NPA1 and NPA2 plan are $191K, $11,662K, and $133,589K, respectively (Table 1)[1]. The total upper bound costs to the lobster industry are $539K, $28,280K, and $349,018K for the 2000 PA, NPA1, and NPA2 plan, respectively. The total cost to the gillnet industry under the 2000 PA, NPA1, and NPA2 plan is $109K, $451K, and $9,361K, respectively. A point estimate was derived for the gillnet fleet.

The total lower bound costs the lobster and gillnet industry under the proposed 2000 PA, NPA1, and NPA2 are $300K, $12,112K, and $142,950K, respectively (Table 1). The total upper bound costs to both fleets are $648K, $28,731K, and $358,380K for the proposed 2000 PA, NPA1, and NPA2, respectively. A detailed analysis follows with supporting tables for the lobster fleet (Tables 3- 17) and gillnet fleet (Tables 18-31).

Gear modifications were implemented under the 1997 Interim Final Rule (62 FR 39157, July 22, 1997) for the lobster and gillnet fleet. At this point in time, the total lower and upper bound costs to the lobster fleet for the 1997 PA plan are $129K and $276K, respectively, and the total cost to the gillnet fleet is $0.3K (Table 2).

Combining the lobster fleet and gillnet fleet gear modification costs, the total lower and upper bound costs that have been incurred under the 1997 PA plan are at $129K and $276K, respectively. Assuming the proposed 2000 PA plan is implemented, the total lower bound one time cost of the gear modifications under the 1997 PA plan and the proposed 2000 PA plan to the lobster and gillnet fleet is $429K, and the upper bound is $924K (Table 2).

7.0 SMALL ENTITY IMPACT ON LOBSTER AND GILLNET FISHERIES

The following constitutes a Regulatory Flexibility Analysis (RFA) for the lobster and gillnet fleet. The cost of large whale take mitigation on individual entities in the lobster and gillnet fleet are presented. This section analyzes the total cost of PA gear modifications to the lobster fleet and gillnet fleet for four alternatives. Gear modifications in the 1997 Interim Final Rule (62 FR 39157, July 22, 1997) have been implemented. Fishermen were required to choose one or two gear modifications from the gear technology list. In this plan, a few of the gear modifications on the gear technology list in 1997 are mandatory in 2000. Therefore, some vessels may have chosen gear modifications in 1997 that are mandatory in 2000, and some vessels may have to make gear changes to comply with the mandatory gear requirements in 2000.

Gear conversion costs for 1997 plan and the PA will be presented for the following reasons. First, gear conversions by area and year will be presented so double counting will be eliminated. That is, if an area converted in 1997, they will not have a conversion cost in 2000. Second, fishing areas have been redefined, and new estimates of vessels and gear are presented; therefore, 1997 estimates are updated. Third, a total cost of gear modifications for 1997 and 2000 will be presented which represents the first time costs of gear modifications have been computed since the ALWTRP has been implemented.

The cost to the lobster fleet and gillnet fleet are presented separately. Within each fleet analysis there are two types of comparisons. First, the PA is compared to the Status Quo and two NPA plans. The Status Quo plan represents no change since the 1997 plan. Second, in the summary section the cumulative cost

[1] The cost estimates in Table 1 and Table 2 do not included annual gear replacement costs, however, gear replacement costs have been estimated and are presented in the summary sections of 7.1 and 7.2.

of the Team plan is presented. The cumulative cost is the one time cost of gear modifications implemented under the 1997 PA plan (62 FR 39157, July 22, 1997) and the proposed 2000 PA plan.

7.1 LOBSTER FLEET

The lobster fleet is affected by State and Federal lobster fishery management plans and the ALWTRP). The lobster gear modifications analyzed here are to protect right whales as described under the MMPA of 1972 and the Endangered Species Act (ESA). These gear modifications are additional restrictions imposed upon the American lobster fishery.

Lobster Management
A Final Environmental Impact Statement (FEIS) and Final Rule implementing the federal American Lobster Fishery regulations were published in the Federal Register on May 28, 1999 (64 FR 29026) and December 6 (64 FR 68228), respectively. The Final Rule transferred current regulations for management of the lobster fishery under the Fisheries Management and Conservation Act (FCMA) (50 CFR Part 649) to the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) (50 CFR Part 697), and implemented new measures consistent with the Atlantic States Marine Fisheries Commission's (ASMFC) plan to end overfishing. These new measures include: extension of the current moratorium on new entrants into the Exclusive Economic Zone (EEZ) fishery; designation of lobster management areas; near-shore and off-shore area trap limits; a 5-inch maximum carapace size in the Gulf of ME; trap size restrictions; a trap escape vent size increase; trap tag requirements; and an annual specification of additional management measures necessary to end overfishing and rebuild the American lobster stock. This rule met the Commission's request for NMFS to implement EEZ regulations compatible with the interstate fisheries management plans for lobster, and is consistent with the National Standards of the FCMA which must be met when implementing Federal regulations under the ACFCMA.

A Notice of Intent to prepare an Environmental Impact Statement (EIS) was subsequently published in the Federal Register on December 10, 1999 (64 FR 679227) to inform the public that NMFS would soon evaluate the Commissions's August 1999 recommendations for modification of American lobster fishery regulations in the EEZ, with emphasis on the use of historical participation, rather than fixed trap limits, as a basis for restricting trap harvest of lobster in the offshore EEZ (Area 3), as well as in the nearshore EEZ areas between New York (NY) and NC (Areas 4 and 5). This rule has not received public comment yet.

Atlantic Large Whale Take Reduction Plan in 2000
This Interim Final Rule has redefined fishing areas to be compatible with the current American Lobster Fishery Management Plan. In addition, the EEZ Nearshore Fisheries Management Areas 1 and 2 (LCMA1 and LCMA2) have been divided further into northern inshore state lobster waters and northern nearshore lobster waters.

In the 1997 ALWTRP and the PA, the CCBCH area is open to fishing from May 16 to December 31. The presence of right whales is highest from January 1 to May 15, and the CCBCH area is closed to gillnet fishing during this time period. The 1997 ALWTRP allows lobster trap vessels to fish in the CCBCH during this period if they use sinking line on their buoy and ground lines, weak links at the buoy, and follow restrictions on the number traps and buoy lines per trawl. This rule remains in the PA. It is assumed that fishermen convert their gear to fish during the closed time period. The GSCCH is open to fishing from July 1 to March 31. No lobster trap fishing is allowed in the GSCCH from April 1 to June 30. That is, no additional gear modifications allow a lobster vessel to fish during the closed period in the GSCCH, as seen in the CCBCH area. These closures have been in place prior to this regulation. Therefore, there are no additional revenue losses under the PA, NPA1 or NPA2 plans.

An estimate of the number of lobster vessels and gear will be presented next, followed by an evaluation of the PA and two NPA's. Finally, a summary section will present all alternatives from the PA, an estimate of

replacement costs, and an estimate of the one time cost of gear modifications from 1997 ALWTRP and the PA.

7.1.1 Estimation Of Lobster Vessels And Gear

To estimate the number of lobster vessels and the amount of gear used, data from the following databases were used: 1) the Northeast Fisheries Science Center (NEFSC) Dealer Data; 2) the NMFS Permit Data, 3) the NEFSC Vessel Trip Reporting (VTR) logbook; and 4) lobster trap tag data provided by individual states (ME, NH, MA, RI)[2] and the Northeast Regional Office (Gloucester, MA)[3].

Vessels that held a federal lobster permit in 1999 were tracked in the 1999 Dealer and 1999 VTR logbooks to determine the number of vessels which have reported fishing activity. The permit number and vessel hull identification were used to estimate the number of active vessels and gear. Approximately 20% of the federal lobster permit holders showed fishing activity.[4] Due to these results on reported fishing activity, an estimate of actual fishing effort was not possible. The estimate of the number of vessels presented here is therefore an estimate of the maximum number of vessels according to any federal or state database. The estimate includes vessels that hold a federal and/or state permit, but may not be actively harvesting lobsters.

Vessels holding a state and/or federal lobster permit were tracked across databases identified above in years 1999 and 2000. Specifically 1999 Dealer and VTR data were used. Vessels fishing with lobster pots on at least one trip were included. Federal and state permit data were from 2000. The result of tracking lobster vessels across these databases indicates there are 7,539 lobster vessels[5] potentially fishing between ME and NC (Bisack, in prep).

Two estimates of the number of lobster traps are presented. Total lobster traps in an area would be the product of the number of vessels and the number of traps per vessel. The lower bound estimate of total lobster traps is based on the average number of traps hauled back per trip according to the VTR logbook. The upper bound estimate is based on the number of traps that are allowed to be fished according to the American Lobster Fisheries Management Plan (ALFMP).

The lobster fleet now has to purchase federal and state lobster trap tags according the ALFMP. Under the Memorandum of Understanding between NMFS and the states, individual vessel data on the number of lobster trap tags sold was available. The independent estimate of the number of federal and state lobster trap tags sold lies between the lower and upper bound estimate of the number of lobster traps (Table 3). If individuals fish with all their trap tags purchased, this suggests more gear is being fished than the VTR logbook shows. In contrast, if individuals purchase more lobster trap tags than they fish, the lower bound estimate has potential to be a true estimate of lobster traps fished.

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[2] The state of Massachusetts also provided landings data by month and area for state permitted vessels. States south of RI do not yet participate in the lobster trap tag program, and they reported that only a few state permitted lobster vessels exist since lobster landings are small relative to northern states such as Maine.

[3] There is a "Memorandum of Understanding" between NMFS and the state of Maine, New Hampshire, Massachusetts, and Rhode Island for sharing of fisheries data.

[4] Specifically, 15%, 22%, 22%, and 42% of lobster fishing activity is reported for Maine, New Hampshire, Massachusetts and Rhode Island, respectively.

[5] An individual vessel is also referred to as a "firm".

To estimate the cost of lobster gear modifications, the number of traps must be converted to a new unit called a trawl. A trawl is composed of several lobster traps. The number of traps per trawl is assumed to be 40 for all offshore areas and 15[6] for other areas. For all areas, the total minimum and maximum number of trap trawls is 436,620 and 1,436,979, respectively (Table 4).

7.1.2 Preferred Alternative

Description
In 1997 under the ALWTRP, vessels fishing in Stellwagen Bank/Jeffrey's Ledge (SB/JL), CCBCH and the GSCCH Restricted Areas had to choose two gear modifications from the lobster gear technology list and all other areas had to choose one gear modification.

The following items were on the 1997 lobster gear technology list: 1) all buoy lines 7/16 inches in diameter or less; 2) all buoys attached to the buoy line with a weak link having a maximum tensile strength of 1100 pounds; 3) for gear set in offshore lobster areas only, all buoys attached to the buoy line with weak link having a maximum tensile strength of 3780 pounds; 4) for gear set in offshore lobster areas only, all buoys attached to the buoy line by a section of rope no more than 3/4 the diameter of the buoy line; 5) all buoy lines composed entirely of sinking line and 6) all ground lines are made of sinking line. It is assumed that all areas except the offshore area use 7/16 inch diameter line and therefore conform to one choice on the gear technology list in 1997.

The PA proposes weak links at the buoy line and markings midway on the buoy line to be mandatory. They are to be as knotless as possible. Seven types of weak links are available and being used with various material costs, labor requirements (time to install), and maximum breaking strength (Table 5)[7]. If a weak link is not knotless, NMFS gear experts assume 50% of the gear is spliced (i.e. knotless) and 50% of the gear is tied with knots. If a weak link is tied with a knot under the 1997 ALWTRP, there is only a cost of labor associated with splicing in the PA.

Gear marking requirements were reduced from 2 marks per buoy line in 1997 to 1 mark per buoy line in 2000. In the PA, all areas except the northern inshore area are required to mark their gear. Gear modifications under the 1997 ALWTRP and PA by area are in Table 6.

Total Cost
In 2000, the lower and upper bound one time industry cost to modify the gear in all areas under the PA is $0.19M and $0.54M, respectively (Table 7A and 7B). The PA's cost per firm (lower bound) ranges from $64.42 (southern offshore area) to $180.06 (SB/JL) as seen in Table 8A. The upper bound cost per firm for the PA ranges between $310.05 and $474.13 (Table 8B).

In 1997, the lower and upper bound one time industry cost to modify the gear in all areas under the ALWTRP is $0.16M and $0.33M[8], respectively (Table 7A and 7B). The 1997 total lower bound cost per firm ranges between $61.02 (southern off-shore area) and $5,467.68 (CCBCH closure). The high cost to CCBCH is due to sinking line required in all buoy and ground lines (Table 8A) during a closed time period. The 1997 total upper bound cost per firm ranges between $77.48 (CCBCH open area) and $13,096.24 (CCBCH closed area). In 1997, the cost was highest in the SB/JL area as a result of more firms

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[6] Four members of the Team were asked what the average number of traps per trawl are in the nearshore waters. The average traps per trawl reported was 15 traps.

[7] Data contained in Table 5 were supplied by gear specialists (NMFS Regional Office, Gloucester, MA) based on their experience in the field.

[8] The total cost includes the cost of the gear marking requirement in the 1997 ALWTRP, however, it was not implemented.

converting their gear (Table 4) and firms using the more expensive plastic swivel (Table 5) as a weak link. The computational details of these costs are presented next.

The costs per firm are comprised of material and labor costs. The unit material cost and labor required to install weak links are in Table 5. The average manufacturing wage rate in New England reported by the US Bureau of Labor Statistics is $13.58 and was used in this analysis. Trap trawls with 5 or less traps use only one buoy line, and trawls with more than 5 traps are assumed to use 2 buoy lines. Each buoy line must have a weak link attached.

The total lower bound industry cost of weak links under the PA is $127.8K (Table 7A and Table 9B). The lower bound cost of materials to the individual firm in the northern nearshore area is $35.47 (2 buoy lines per trawl x (266/15) trap trawls x $1) and the lower bound cost of labor is $80.27(2 buoy lines per trawl x (266/15) trawls x (10/60) hours of work per weak link x $13.58 hourly rate) (Table 9B). The total cost of materials and labor to the firm is $115.74 ($35.47+$80.27) and the total cost to the industry for weak links at the buoy is $78.3 K ($115.74 x 676.8 vessels), and the total upper bound cost to the firm is $348.09 and the industry cost is $235.6K, in the northern nearshore area. Costs for all other areas are in Table 9A and Table 9B.

In 2000, the firm's lower bound cost of attaching weak links ranges between $42.32 (southern offshore) and $118.30 (SB/JL) (Table 9B). In cases where weak links were tied in1997, only a labor cost was applied for splicing weak links in 2000 (SB/JL area). Splicing time is ten minutes. The 1997 lower bound material and labor cost for attaching weak links for a firm range between $32.35 (CCBCH closure) and $248.96 (SB/JL) (Table 9A). The 1997 upper bound material and labor cost of attaching weak links for a firm ranges between $77.48 (CCBCH area) to $508.09 SB/JL area) (Table 9A). In 2000, the firms' upper bound cost ranges between $203.70 and $348.09.

The total industry cost of whipping one mark midway into the buoy line under the PA is $63.2K (Table 7A and Table 10). NMFS gear experts assume vessels use whipping to mark their lines rather than one of the other options. The material cost is $0.05 per whip and the estimated time to whip the line is 5 minutes per whip. The lower bound cost of materials to the individual firm in the northern nearshore area is $1.77 (2 buoy lines per trawl x (266/15) trap trawls x $0.05) and the cost of labor is $40.91 (2 buoy lines per trawl x (266/15) trap trawls x (5/60) hours of labor per whip x $13.58 hourly rate) (Table 10). The total lower bound (LB) cost to the firm for whipping one mark on the buoy line is $41.91 ($1.77+$40.91) and the total industry cost is $28.4K ($41.91 x 676.8 vessels) in the northern nearshore area. The total upper bound cost to the firm and industry for whipping marks in their buoy lines is $126.04 and $85.3K, respectively. Costs for all other areas are in Table 10.

Under the PA the lower bound cost of whipping one mark on the buoy line for the firm ranges between $40.02 (southern nearshore area) and $61.76 (SB/JL area) (Table 10). The upper bound cost for a firm ranges between $106.35 and $126.04.

The cost of sinking line was assessed for buoy lines and ground lines for the firm and industry. The length of the buoy line was based on the average depth observed in the NEFSC observer program in an area (Table 4) times 1.5 to allow for slack in the line for tides and currents. The material cost is $0.10 per foot. For ground lines, the distance between traps is assumed to be180 feet for offshore trawls and 120 feet for all other areas. Therefore, a fifteen trap trawl would require 2,700 feet of sinking line at ten cents a foot. Labor is divided into time it takes to rig the buoy to the line (10 minutes) and time it takes to measure out 100 feet of line (2 minutes). Material and labor costs for all areas are included in Table 10, since sinking line is required in all areas (except northern inshore) in the third alternative plan. However, only CCBCH in the closed time period required sinking line under the PA.

The total lower bound industry cost of sinking line under the 1997 ALWTRP is $6.2K for buoy lines (Table 7 and Table 11A). The lower bound cost of materials to the firm for sinking line in the buoy for the closed CCBCH area is $1,095.52 (2 buoy lines x 164 feet deep x 1.5 slack x (334/15) trap trawls x $0.10), and

the labor cost to attach the buoy to the line is $100.79 (2 buoy lines x (334/15) trap trawls x (10/60) hours of labor per buoy line x $13.58 hourly rate), and the cost of measuring out the buoy line is $49.59 (2 buoy lines x 164 feet deep x 1.5 slack x (334/15) trap trawls x (2/60)/100 hours to measure each 100 feet x 13.58 hourly rate) (Table 11). The total labor cost to the firm is $150.38 ($100.79 + $49.59) in the closed CCBCH area. Finally the total lower bound cost of labor and materials for attaching sinking line to the buoy is $1,245.90 ($1,095.52 + $150.38) and the total industry cost is $6.2K ($1,245.90 x 5 vessels) for the closed CCBCH area. The total upper bound cost for using sinking line in the buoy line for the firm and industry in the CCBCH area is $2,984.20 and $14.9K, respectively.

The lower bound industry cost for using sinking line in the ground lines under the 1997 ALWTRP is $12.9K (Table 7 and Table 11B). The lower bound cost of materials to the firm for sinking line in the buoy for the closed CCBCH area is $4,008.00 (334 traps x 120 feet of line per trap x $0.10) and the labor cost of measuring out the ground line is $181.43 (334 traps x 120 feet of line per trap x (2/60) x (1/100) hours per 100 feet of line x $13.58 hourly rate) (Table 11). The total lower bound cost of materials and labor to the firm is $4,189.43 ($4,008.00 + 181.43) and the lower bound cost to the industry is $20.9K ($4,189.43 x 5 vessels) for the CCBCH area. The total upper bound cost to the firm and industry for using sinking line in ground lines is $10,034.56 and $50.2K, respectively. Costs of all other areas are included in Table 11A and Table 11B.

7.1.3 Non-Preferred Alternative 1 (NPA1)

The NPA1 plan includes the PA plus the use of sinking line on all buoy and ground lines (Table 11) and a weak link attached at the bottom of the buoy line. The northern inshore waters are exempt from this requirement. The only "off-the-shelf" item that could be suggested is the "thwartable weak link". The estimated cost of materials is expected to come down to $25 per unit, and it is assumed that installation is ten minutes of labor per weak link[9].

The total lower bound cost to the industry for the NPA 1 plan is $11.7 M and the total upper bound cost is $28.3 M (Table 12A). The lower bound cost per firm ranges between $4,634 (southern nearshore) to $20,049(northern offshore) (Table 12B). The upper bound cost per firm ranges from between $14,596 and $31,458 (Table 12B).

The total lower bound industry cost for attaching weak links at the bottom of the buoy line is $1,620K (Table 12). The lower bound cost of materials to the firm in the northern nearshore area is $886.67 (2 buoy lines x (266/15) trap trawls x $25) and the labor cost is $80.27 (2 buoy lines x (266/15) trap trawls x (10/60) hours of labor per weak link x $13.58 hourly rate) (Table 13). The total lower bound cost to the firm is $966.94 ($886.67+$80.27) and the industry cost is $654.4K ($966.94 x 676.8 vessels) in the northern nearshore area. The total upper bound cost to the firm and industry in the northern nearshore area is $2,908.09 and $1,968K, respectively. Costs for all other areas are in Table 13.

7.1.4 Non-Preferred Alternative 2 (NPA2)

The NPA2 plan requires all vertical lines to be removed from the water column and sinking line used for all ground lines. The only "off-the-shelf" item to remove vertical lines is an acoustical release device. The unit material cost is $2000 per device.[9] If two buoy lines are used in a trawl, two acoustical devices would be needed. A retrieving device would be on the vessel and is estimated to cost $4000.[9] Labor costs of implementing these acoustical devices were not included. Alternative 4 would therefore include the acoustical device, the retrieving device on the vessel, and sinking line for the ground lines of all trawls.

[9] Data were supplied by gear specialists (NMFS Regional Office, Gloucester, MA) based on their experience in the field.

The total lower bound cost to the industry is $134.0 M and the upper bound is $349.8 M (Table 14). The total lower bound cost per firm ranges between $41,000 (southern offshore) and $109,000 (SB/JL) (Table 15).

The lower bound cost of materials to a firm in the northern nearshore area is $75,000. This includes the cost of the retrieving device on the vessel for $4,000 and the cost of the acoustical release devices for $70,933 (2 buoy lines x (266/15) trap trawls x $2000). The total lower and upper bound industry cost is $50.7K ($74,933 x 677 vessels) and $147.1K, respectively, for the northern nearshore area. Costs for all other areas are in Table 15.

7.1.5 Summary

In the PA, the total lower bound costs of the PA, the NPA1 and NPA2 plan are $0.2M, $12.3M, and $134.0M, and the total upper bound costs are $0.5M, $29.6M, and $349.8M, respectively (Table 16). If 20% of the gear requires replacement annually, the total lower bound cost is increased by $0.04M, $2.4M, and $26.7M and the upper bound replacement cost is $0.1M, $5.7M, and $69.8M for the PA, NPA1 and NPA 2 plans, respectively (Table 17).

There is a one time cost of gear modifications associated with the in 1997 ALWTRP and the PA. The total lower bound industry cost of the1997 ALWTRP is $123K (Table 7A) with a present value of $129K[10] (Table 2), and the total upper bound industry cost is $265K (Table 7B) with a present value of $276. Therefore, the total lower bound industry cost to for the 1997 ALWTRP and the PA is $320K and the upper bound cost is $815K (Table 2).

7.2 GILLNET FLEET

The gillnet fleet is primarily affected by the New England multi-species FMP, the Harbor Porpoise Take Reduction Plan (HPTRP), the Dogfish FMP, the Monkfish FMP, and the ALWTRP. The gear modifications analyzed here are additional restrictions imposed on the gillnet fleet.

Gillnet Management
Under the multi-species plan, gillnet vessels are subject to days at sea limits, mesh size restrictions, seasonal and year-round closures, minimum fish sizes and trip limits. The ALWTRP would add further costs to these vessels because they would need to modify their gear further. However, there would be no further reductions in revenue because the vessels are not being prohibited from fishing in any areas. If a vessel could not afford the gear modifications, then they would likely have to leave the fishery. However, the economic analysis shows the modification costs for the PA are likely to be low.

Gillnetters under the HPTRP are subject to seasonal closures and gear modifications. Closures for harbor porpoise exist that are additional to the seasonal closures defined under the multi-species plan (Gulf of ME rolling closure areas, the year round western Gulf of ME area closure) and areas designed for right whale protection (CCBCH and GSCCH). In addition to closures, gillnetters must attach acoustical deterrents such as a pingers to their gear to avoid the bycatch of harbor porpoise if they choose to fish in certain areas.

The dogfish plan effectively eliminated directed fishing for dogfish in federal waters. Gillnet vessels which fish for dogfish in federal waters and have no other alternatives will likely go out of business, or leave the

[10] Gear markings in the 1997 ALWTRP were not implemented and therefore there is no cost incurred by the lobster industry for gear markings in 1997.

fishery and go elsewhere. This will occur regardless of whether the gear modifications under the PA are implemented.

Atlantic Large Whale Take Reduction Plan
In the PA, the following large areas are defined for gillnet measures: 1) other northeast areas; 2) GSCCH area; 3) CCBCH; and 4) Stellwagen Bank and Jeffrey's Ledge area. In the analysis presented here, the other northeast area has been subdivided into a northern nearshore and northern offshore area, as defined under the lobster FMP. This allows a distinction between offshore and nearshore fishing trips.

In the 1997 ALWTRP and PA, The CCBCH area is closed to fishing with gillnet gear from January 1 to May 15, and is open from May 16 to December 31. The GSCCH, with the exception of the Sliver area, is closed to gillnet fishing from April 1 to June 30, and open from July1 to March 31. These closures have been in place prior to this regulation. Therefore, there are no additional revenue losses due to these closures under the PA, NPA1 or NPA2 plans.

7.2.1 Estimation Of Gillnet Vessels And Gear
The following sources of data were used to estimate the number of active gillnet vessels and the amount of gear used: 1) the NEFSC Dealer Data; 2) the NEFSC Vessel Trip Reporting (VTR) logbook; and 3) the NEFSC Sea Sampling (SS) data. The VTR logbook is mandatory for the gillnet fleet if they operate under the New England multi-species FMP. Therefore, the number of active gillnet vessels is estimated.

The federal permit number and vessel hull identification were used to estimate the number of active gillnet vessels in the NEFSC VTR logbook and Dealer data. Only the NEFSC VTR logbook contains the location of fishing trips. If a vessel fished at least one trip with gillnet gear they were included. Vessels that were in NEFSC Dealer data but not in NEFSC VTR data were prorated to an area according to the VTR logbook data. This proration was performed at the state level. The estimated number of active gillnet vessels in 1999 fishing in the northeast region is 310 (Bisack, in prep).

Total gear fished is the product of the number of vessels and the amount of gear fished per vessel. A gillnet vessel fishes strings which consist of several nets. One net is typically 300 feet long. Therefore, one string with 10 nets would be 3000 feet long. The 1999 SS data was used to estimate the average number of nets per string, the average strings per trip and the average depth fished by area. Based on 323 SS trips in the northern nearshore area, vessels fish an average 10.3 nets (300 feet per net) per string and 4.8 strings per trip (Table 18). The total number of strings fished by the industry in the northern nearshore area would be 1,027 strings (4.8 strings x 214 vessels). The statistics for all other areas are in Table 18.

7.2.2 Preferred Alternative (PA)

In 1997 under the ALWTRP, vessels fishing in SB/JL, CCBCH and GSCCH areas had to choose two gear modifications from the gillnet gear technology list, and all other areas had to choose one.

The following items were on the 1997 gear technology list: 1) all buoy lines 7/16 inches in diameter or less; 2) all buoys attached to the buoy line with a weak link having a maximum tensile strength of 1100 pounds; 3) gear anchored with the holding power of a 22 pound Danforth-type anchor at each end; 4) gear anchored with a 50 pound dead weight at each end; 5) nets attached to a lead line weighing 100 pounds or more per 300 feet; 6) weak links with a maximum tensile breaking strength of 1100 pounds between net panels along the float rope; and 7) all buoy lines composed entirely of sinking line.

The PA proposes weak links be attached to the buoy line, weak links at the center headrope of each net (or 50 fathom panel), an additional anchoring system, and markings midway on the buoy line to be mandatory. They are to be as knotless as possible. The type of weak links available and being used with various material costs, labor requirements (time to install), and maximum tensile strength are in Table 5. If a weak link is not knotless, it is assume that 50% of the gear is spliced (i.e. knotless) and 50% of the

gear is tied with knots. If a weak link is tied with a knot under the 1997 ALWTRP, there is only a cost of labor associated with splicing the weak link under the PA.

Gear marking requirements were reduced from 2 marks per buoy line in 1997 to 1 mark per buoy line in 2000. In the PA, gillnet vessels area required to mark their gear in all areas. Gear modifications for the 1997 ALWTRP and the PA by area are in Table 19. We assume the sink gillnet fleet has already met the anchoring requirement based on observed 1999 SS data, indicating 91% of the observed trips had an anchor of 22 pounds or more.

In 2000, the PA's total cost to the gillnet industry is $109.1K for all areas (Table 20). The cost per firm ranges between $179.68 (SB/JL area) to $737.61 (northern offshore area) (Table 21). In 1997, the PA's total cost to the gillnet industry was $9.8K for all areas and the cost per firm ranged between $18.43 (SB/JL area) to $22.69 (northern nearshore area). [11] The computational details of these costs are presented next.

The costs per firm are comprised of material and labor costs. The unit material cost and time required to install weak links are in Table 5. The average manufacturing wage rate in New England reported by the U.S. Bureau of Labor Statistics is $13.58 per hour and was used in this analysis.

In the PA, weak links attached to the buoy line cost the gillnet industry $12.8K (Table 20 and Table 22). There are 2 buoy lines per string. The material cost for buoy lines per firm is two times the average number of strings per firm (Table 18) times the cost of the weak link (Table 5). In northern nearshore area, material costs per firm are $9.60 (4.8 strings x 2 buoy line x $1 per weak link) (Table 22). It requires ten minutes of labor to attach the weak link to the buoy line. In the northern inshore area, labor costs per firm are $21.73 (4.8 strings x 2 buoy lines x (10/60)hours worked per weak line x $13.58 hourly rate). The total cost to the firm in the northern nearshore area is $31.33 ($9.60 + $21.73) to install weak links and the industry cost is $6,704 ($31.33 x 214). The cost of attaching weak links at the buoy for all other areas are in Table 22.

The total cost to the industry under the PA for placing weak links at the center headrope of each net is $91.6K (Table 20 and Table 23). The number of nets per firm is the product of the average strings per vessel times the average nets fished per string (Table 18). The material cost for a vessel in the nearshore area is $49.44 (4.8 strings x 10.3 nets/string x $1)(Table 23). The vessels labor cost is $111.90 (4.8 strings x 10.3 nets/string x (10/60) hours worked per weak link x $13.58 hourly rate). The total cost to attach weak links to nets to the firm in the northern nearshore area is $161.34 ($49.44 + $111.90), and the industry cost is $34,527 ($161.34 x 214 vessels). Costs for all other areas are in Table 23.

The gear marking requirements in the PA cost the northeast gillnet industry $4.7K (Table 20 and Table 24). It is assumed a vessel will whip a mark on the buoy line at a material cost of $0.05 per whip and the time to whip is 5 minutes. The material cost to the firm in the northern nearshore area is $0.48 (4.8 strings x 2 buoy lines x $0.05), and the labor cost is $10.86 (4.8 strings x 2 buoy lines x (5/60) hours of work x $13.58 hourly rate) (Table 24). In the northern nearshore area the total gear marking cost to the firm is $11.34 ($0.48+$10.86), and the total industry cost is $2,428 ($11.34 x 214 vessels). Costs for all other areas are in Table 24.

7.2.3 Non-Preferred Alternative 1 (NPA 1)

The NPA 1 plan includes the PA plus sinking line be used in all buoy and anchor lines, and weak links attached at the bottom of the buoy line. The only "off-the-shelf" item that could be suggested is the

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[11] The gear marking requirements in the 1997 ALWTRP were not implemented and therefore this cost is over-estimated.

"thwartable weak link". The cost of this weak link is expected to drop to $25 per unit[12]. It is assumed that installation time is ten minutes per weak link.

The total cost to the northeast gillnet industry in 2000 for the NPA 1 plan for all areas is $532.0K which includes $190.7K for the PA and an additional $341.3K for the additional gear modifications (Table 25A). The cost per gillnet firm ranges from $759.41 (CCBCH in open period) to $2,998.61 (northern offshore area) (Table 25B).

The total industry cost of attaching a weak link on the bottom of the buoy line is $108.9K (Table 25A and Table 26). In the northern nearshore area, the material cost per firm is $240.00 (4.8 strings x 2 buoy lines x $25), and the labor cost per firm is $21.73 (4.8 strings x 2 buoy lines x (10/60) hours of work per weak link x $13.58 hourly rate) (Table 26). The total cost to the firm and industry in the northern nearshore area is $261.73 ($240.00 + $21.73) and $56,010 ($251.73 x 214 vessels), respectively. Costs for all other areas are in Table 26.

The total industry cost of using sinking line in the buoy line is $190.7K (Table 25 and Table 27A). The material cost of sinking line is $0.10 per foot. Labor cost is subdivided into ten minutes to attach the buoy to the line and two minutes to measure out one hundred feet of line. In the northern nearshore area, the material cost per firm is $254.88 (4.8 strings x 2 buoy lines x 177 feet of depth x 1.5 adjustment for slack x $0.10 per foot), and the labor cost per firm is $33.27 (4.8 strings x 2 buoy lines x (10/60) hours to attach to buoy x $13.58 hourly rate + 4.8 strings x 2 buoy lines x 177 feet of depth x 1.5 for slack x (2/60)/100 hours to measure out 100 feet of line x $13.58 hourly rate). The total cost to the firm is $288.15 ($254.88 + $33.27) and to the industry the total cost is $61,663 ($288.15 x 214 vessels) in the northern nearshore area. The length of the anchor line is assumed to be 100 feet and there are 2 anchor lines per string. The method of estimating the cost of using sinking line in the anchor line is the same as sinking line in the buoy line (Table 27B). Costs for all other areas are in Table 27A and Table 27B.

7.2.4 Non-Preferred Alternative 2 (NPA 2)

The NPA 2 includes an acoustical release device for each buoy line, a receiving device on the vessel to retrieve the acoustical release device, sinking line on the anchor line, and weak links in the center of the headrope for each net (or 50 fathom panel). The weak links on the net and the anchor line made of sinking line are part of the PA and are included in the NPA2 plan. The use of sinking line on the buoy line and gear marking requirements are eliminated with the use of the acoustical release device.

The total cost to the northeast gillnet industry in 2000 for this NPA plan for all areas is $9,361.0K (Table 28). The cost per gillnet firm ranges from $19,843 (SB/JL area) to $47,666 (northern offshore area) (Table 28).

The total industry cost of using acoustical release devices is $9,227.7 K for all areas(Table 29). Each string of gear requires 2 acoustical release devices at a material cost of $2,000 each, and each vessel requires one receiving device to retrieve the gear at a cost of $4,000[13]. In the northern nearshore area the total material cost to a firm is $23,200 (2 acoustical release devices x 4.8 strings x $2,000 + $4,000) (Table 29). Labor costs were not included. The total cost to the industry is $4,964.8K ($23,200x214 vessels) in the northern nearshore area. Costs for all other areas are in Table 29.

7.2.5 Summary

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[12] Material and labor data were supplied by gear specialists (NMFS Regional Office, Gloucester, MA) based on their experience in the field.

[13] Material costs were supplied by gear specialists (NMFS Regional Office, Gloucester, MA) based on their experience in the field.

In the PA, the total costs to the gillnet industry for the PA, NPA1 and NPA2 are $109.1K, $450.5K, and 9,361.0K, respectively (Table 30). If 20% of the gear requires replacement annually, the total cost is increased by $21.8K, $90.1K, and $1,872.2K for the PA, NPA1, and NPA2, respectively (Table 31).

The one time cost of gear modifications to the gillnet fleet for the 1997 ALWTRP is $0.30K (Table 20) and the present value is $0.31K. The gear marking requirements under the 1997 ALWTRP were not implemented and therefore they are not included here. The total industry cost is $109.4K for both the 1997 ALWTRP and PA (Table 2). This consists of a one time cost of $0.3K in 1997 and $109.1K in 2000.

8.0 APPLICABLE LAW

8.1 EXECUTIVE ORDER 12866

Net National benefit is measured through economic surpluses, consumer and producer surplus. The proposed action will provide for the protection of large whales through implementation of gear modifications to the lobster and gillnet fisheries. Within this setting, consumer surplus is associated with the value of whales and the consumer surplus associated with seafood products supplied by the lobster and gillnet fisheries. The value of whale protection is comprised of non-consumptive use and non-use values. Non-consumptive use value is associated with activities such as whale watching while non-use value is associated with the satisfaction that people derive from knowing that whales exist. Producer surplus is associated with the economic profit earned by businesses engaged in the lobster and gillnet fisheries as well as that earned by businesses providing transportation services to individuals that want to view whales.

When comparing a regulatory action to the status quo or "no action" alternative, it is the change in net National benefit that becomes the focal point of analysis. Given the finding that the status quo alternative does not afford adequate protection, the consumer surplus (non-consumptive use and non-use value) associated with improved whale protection will be superior to that of the status quo. Further, regulatory alternatives that afford higher protection will yield higher benefits. However, the relative magnitude of protection provided by the regulatory alternatives is not known at this time and given the fact that entanglement is not the only source of mortality the likelihood that right whale stocks will recover even under the most extreme action is unknown. Thus, consumer surplus for right whale protection may be assumed to be equivalent for all alternatives. Similarly, the producer surplus associated with businesses providing whale watching services will be the same for all regulatory alternatives and will be superior to that of the status quo.

Both consumer surplus and producer surplus for seafood products supplied by the lobster and gillnet fisheries will be affected by the whale protection measures. These effects will manifest themselves through the proposed gear modification costs. The gear modifications will increase harvesting costs which will result in a reduction in quantities supplied to seafood markets and higher prices to consumers. The magnitude of these changes and how the surpluses will be redistributed between consumers and producers will depend on the slopes of the respective supply and demand functions. In any case, as long as demand functions are downward sloping and supply functions are upward sloping, there is always a loss in economic surplus when regulatory costs are imposed. However, this loss in economic surplus will be minimized by selecting the least costly regulatory alternative.

Since each of the regulatory alternatives achieve the same level of right whale protection benefits net National benefit will be maximized through selection of the least cost gear modifications.

8.2 National Environmental Policy Act

NMFS prepared an EA (NMFS 1997) on the interim final rule on July 15, 1997, and its findings applied to the February 16, 1999 final rule, as well. This action would add required gear measures to portions of that final rule. Although this action falls within the scope of alternatives of that EA (NMFS 1997) and the

environmental consequences described in that action, NMFS has prepared this document as an environmental assessment for this action with a finding of no significant impact.

8.3 Endangered Species Act

A BO on the ALWTRP was completed on July 15, 1997. That BO concluded that implementation of the ALWTRP and continued operation of fisheries conducted under the American Lobster and Northeast Multispecies fishery management plans (FMP), and southeastern shark gillnet component of the Shark FMP, as modified by the ALWTRP, may adversely affect, but are not likely to jeopardize the continued existence of any listed species of large whales or sea turtles under NMFS jurisdiction. The February 16, 1999, final rule was determined not to change the basis for that BO. This action also does not change the basis for that BO.

8.4 Marine Mammal Protection Act

The changes to the implementation of the ALWTRP made by this rule are being carried out pursuant to Section 118 of the MMPA.

8.5 Coastal Zone Management Act

This rule does not change the determination that the ALWTRP will be implemented in a manner that is consistent to the maximum extent practicable with the approved coastal management programs of the Atlantic states.

8.6 REGULATORY FLEXIBILITY ACT

This rule is exempt from the Regulatory Flexibility Act because it was not subject to prior notice and comment.

8.7 PAPERWORK REDUCTION ACT

This rule reinstates the requirement for gear marking in the Northeast lobster and gillnet fisheries that was included in the final rule published on February 16, 1999. The gear marking provision was suspended on December 30, 1999. The reinstated gear marking is essentially the same as the final rule, which complied with the provisions of the Paperwork Reduction Act, and has been approved by OMB under control number 0648-0364. Public reporting burden for marking fishing gear is estimated to average .6 minutes per line. This estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with any collection of information subject to the requirements of the P.A., unless that collection of information displays a currently valid OMB Control Number.

8.8 EXECUTIVE ORDER 12612

This notice does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under E.O. 12612.

8.9 ESSENTIAL FISH HABITAT

Essential fish habitats (ECH) have been identified for the species managed by the Lobster Fishery Management Plan (FMP) and the Northeast Multispecies FMP. The gear modifications to be implemented by this action will not change the basis for the ECH determinations made for those FMP's,

and will not have an adverse effect on ECH for those species. Therefore, an ECH consultation is not required.

8.10 ADMINISTRATIVE PROCEDURE ACT

This notice is promulgated in compliance with all procedural requirements established by the Administrative Procedure Act.

9.0 FINDING OF NO SIGNIFICANT IMPACT

I find that this action, which will add certain gear requirements for the Northeast lobster and anchored gill net fisheries, is not likely to have a significant impact on the human environment.

NMFS prepared an EA (NMFS 1997) on the interim final rule on July 15, 1997, and its findings applied to the February 16, 1999 final rule, as well. This action includes a requirement for weak links on all buoy lines with specific breaking strengths for lobster and gillnet gear; a requirement to add weak links in the float-line of each gillnet net panel; a specific requirement for gillnet anchoring systems; a prohibition for nearshore lobster fisheries on the use of single lobster traps and a one buoy line restriction on all lobster trawls up to and including five trap trawls; and the reinstatement of gear marking for these gear types. NMFS has prepared this document as an Environmental Assessment for this action. None of the alternatives are likely to significantly affect the quality of the human environment, and the preparation of an EIS for the proposed action is not required by Section 102(2)(c) of the NEPA or its implementing regulations.

William T. Hogarth — 12-6-00

William T. Hogarth
Deputy Assistant Administrator
National Marine Fisheries Service

Date

10.0 TABLES

Table 1.

Total Cost of Alternatives (In $1000's)
Total lower bound (LB) and upper bound (UP) costs to the lobster fleet and gillnet fleet for the Preferred Alternative (PA) and the Non-Preferred Alternative 1 (NPA1) and 2 (NPA2) plans.

	LB (in $1000's)			UP (in $1000's)		
	Lobster Fleet	Gillnet Fleet [1]	Total	Lobster Fleet	Gillnet Fleet [1]	Total
PA	191	109	300	539	109	648
NPA1	11,762	451	12,213	28,280	451	28,731
NPA2	133,589	9,361	142,950	349,019	9,361	358,380

[1] A point estimate was developed for the gillnet fleet and therefore the LB and UP costs are the same.

Table 2.

Current ALWTRP Costs (In $100's)
Total lower bound (LB) and upper bound (UP) costs to the lobster and gillnet fleet for the 1997 ALWTRP and the PA

	LB (in $1000's)			UP (in $1000's)		
	Lobster	Gillnet	Total	Lobster	Gillnet	Total
1997	129	0.3	129	276	0.3	276
2000	191	109	300	539	109	648
Grand Total	320	109	429	815	109	924

Table 3.

Total lobster trap tags sold by state and a lower bound (LB) and upper bound (UP) estimate of the number of lobster traps

	Tags Sold	Estimate of Total Traps LB	UP
ME	1,754,084	1,181,791	3,869,600
NH	141,367	85,916	270,000
MA	790,199	442,293	1,257,335
RI	261,165	200,600	585,400

Table 4.

Lobster Fleet Characteristics

Average depth fished, estimated of the number of lobster vessels, lower bound (LB) and upper bound (UP) estimate of traps fished per vessel, assumed traps per trawl, and LB and UP estimated total number of trawls by area.

		Average Depth [1]	Vessels	Traps/Firm LB	UP	Traps per Trawl	Total Trawls LB	UP
N. Inshore		100	5982	240	800	2 and 15 [2]	406,776	1,355,920
N.Nearshore		177	677	266	800	15	12,002	36,097
N. Offshore		419	172	854	1800	40	3,670	7,735
GSCCH	open	306	3	854	1800	40	61	128
	close	179	0	854	1800	40	0	0
CCBCH	open	144	160	279	800	15	2,976	8,533
	close	164	5	334	800	15	111	267
SB/JL		241	255	392	800	15	6,675	13,623
S.Nearshore		56	222	254	800	15	3,759	11,840
S. Offshore		336	63	374	1800	40	589	2,835
			7539				436,620	1,436,979

[1] Average depth was estimated from NEFSC's 1999 observer data.

[2] Following Wilson (1997), it is assumed that 50% of trap trawls are pairs and 50% are multiple trap trawls (15 traps)

Table 5.

Weak Link Options

Material cost (per unit), knotless (Yes/No), labor time to install, and maximum tensile strength

	Weak Links	Materials ($)	Knotless [2]	Labor (min)	Max Tensile
1	Plastic Swivel	2.50	No	10	1100 lbs
2	Plastic Weak Link	0.50	Yes	5	1100 lbs
3	Hog Ring	0.50	Yes	1	1100 lbs
4	Anderson Weak Link	2.50	No	1	1100 lbs
5	Shrink Wrap	1.00	Yes	5	1100 lbs
6	Rope of Appropriate Diameter	1.00 [1]	No	10	3780 lbs
7	Retie strands [3]	0	No	1	3780 lbs

[1] Using parachute chord at a cost of $1 per foot.

[2] "No" assumes 50% use splices (i.e. knotless) and 50% use knots. All offshore gear is assumed spliced.

[3] "Retie strands" means unraveling the three rope strands and retying the buoy with only two strands.

Table 6.

Assumed Lobster Fishery Gear Modification Use Under the1997 ALWTRP and the PA

Columns include: number of options currently required from the gear technology list (# Tech List), vessels currently use 7/16 inch line option, type of weak link (WL) used, sinking line used, and gear marking (2 marks in 1997 and 1 mark in PA) using line whips. NOTE - 'x' indicates the option is required.

		1997 ALWTRP (Status Quo)					2000 PA	
		# Tech List	Use 7/16"	WL Used [1]	Sinking Line	Gear Mark 2 Whips	WL Used [1]	Gear Mark 1 Whip
N.Inshore			yes					
N.Nearshore			yes				6	x
N.Offshore		1	no	6				x
GSCCH	open	2	yes	6		x		x
	close	2						
CCBCH	open	2	yes	3				
	close	2	yes	3	x			
SB/JL		2	yes	1		x	L [2]	x
S.Nearshore			yes				6	x
S.Offshore		1	no	6				x

[1] Current weak link being used as defined in Table 1

[2] Only labor (L) for splicing is applied.

Table 7.

Lobster Industry Gear Modification Cost Estimates

Lower bound (LB) and upper bound (UP) costs for weak links (WL) at the buoy, sinking line (SL) on the buoy line (BL) and ground line, and buoy line gear marks (2 whips and 1 whip) by area and plan

Table 7A. Preferred Alternative LB (in $1)

		1997 ALWTRP [1]					2000 PA		
		WL at Buoy	SL on BL	SL on Ground	Gear Mark 2 Whips	Total Industry	WL at Buoy	Gear Mark 1 Whip	Total Industry
N.Inshore	2 trap								
	15 trap								
N.Nearshore							78,336	28,366	106,702
N.Offshore		23,951				23,951	8,306	8,673	16,979
GSCCH	open	397			288	685	138	144	282
	close								
CCBCH	open	4,323				4,323			
	close	162	6,230	20,947		27,339			
SB/JL		63,594			31,552	95,146	15,109	15,776	30,885
S.Nearshore							24,535	8,884	33,419
S.Offshore		3,845				3,845	1,333	1,392	2,725
Total		96,272	6,230	20,947	31,840	155,285	127,757	63,235	190,992

Table 7B. Preferred Alternative UP (in $1)

		1997 ALWTRP					2000 Plan		
		WL at Buoy	SL on BL	SL on Ground	Gear Mark 2 Whips	Total Industry	WL at Buoy	Gear Mark 1 Whip	Total Industry
N.Inshore	2 trap								
	15 trap								
N.Nearshore							235,596	85,310	320,906
N.Offshore		50,483				50,483	17,507	18,280	35,787
GSCCH	open	837			606	1,443	290	303	593
	close								
CCBCH	open								
	close	387	1,4921	50,173		65,481			
SB/JL		129,785			64,393	194,178	30,834	32,196	63,030
S.Nearshore		77,276					77,276	27,982	105,258
S.Offshore		18,503				18,503	6,417	6,700	13,117
Total		277,271	1,4921	50,173	64,999	330,088	367,920	170,772	538,691

[1] The 1997 dollars are not converted to 2000 dollars

Table 8.

Individual Lobster Firm Gear Modification Cost Estimates

Lower bound (LB) and upper bound (UP) costs for weak links (WL) at the buoy, sinking line (SL) on the buoy line (BL) and ground line, and buoy line gear marks (2 whips and 1 whip) by area and plan

Table 8A. Preferred Alternative LB (in $1)

		1997					2000		
		WL at Buoy	SL on BL	SL on Ground	Gear Mark 2 Whips	Total Industry	WL at Buoy	Gear Mark 1 Whip	Total Cost
N.Inshore	2 trap								
	15 trap								
N.Nearshore							115.74	41.91	157.65
N.Offshore		139.34				139.34	96.64	50.46	147.10
GSCCH	open	139.34			100.91	240.26	96.64	50.46	147.10
	close								
CCBCH	open	27.02				27.02			
	close	32.35	1245.90	4189.43		5467.68			
SB/JL		248.96			123.52	372.49	118.30	61.76	180.06
S.Nearshore							110.52	40.02	150.54
S.Offshore		61.02				61.02	42.32	22.10	64.42

Table 8B. Preferred Alternative UP (in $1)

		1997					2000		
		WL at Buoy	SL on BL	SL on Ground	Gear Mark 2 Whips	Total Industry	WL at Buoy	Gear Mark 1 Whip	Total Cost
N.Inshore	2 trap								
	15 trap								
N.Nearshore							348.09	126.04	474.13
N.Offshore		293.70				293.70	203.70	106.35	310.05
GSCCH	open	293.70			212.70	506.40	203.70	106.35	310.05
	close								
CCBCH	open	77.48				77.48			
	close	77.48	2984.20	10034.56		13096.24			
SB/JL		508.09			252.09	760.18	241.42	126.04	367.47
S.Nearshore							348.09	126.04	474.13
S.Offshore		293.70				293.70	203.70	106.35	310.05

Table 9.

Buoy Weak Link Costs to Lobster Industry
Lower bound (LB) and upper bound (UP) materials and labor costs to install buoy weak links under the 1997 ALWTRP and the PA

Weak Links at the Buoy Line (In $1)

Table 9A. 1997 ALWTRP

		LB				UP			
		Material	Firm Labor	Total	Industry Total	Material	Firm Labor	Total	Industry Total
N.Inshore	2 trap								
	15 trap								
N.Nearshore									
N.Offshore		42.70	96.64	139.34	23,951	90.00	203.70	293.70	50,483
GSCCH	open	42.70	96.64	139.34	397	90.00	203.70	293.70	837
	close								
CCBCH	open	18.60	8.42	27.02	4,323	53.33	24.14	77.48	
	close	22.27	10.08	32.35	162	53.33	24.14	77.48	387
SB/JL		130.67	118.30	248.96	63,594	266.67	241.42	508.09	129,785
S.Nearshore									77,276
S.Offshore		18.70	42.32	61.02	3,845	90.00	203.70	293.70	18,503
1997 Total					96,272				277,271

Table 9B. 2000 PA

		LB				UP			
		Material	Firm Labor	Total	Industry Total	Material	Firm Labor	Total	Industry Total
N.Inshore	2 trap								
	15 trap								
N.Nearshore		35.47	80.27	115.74	78,336	106.67	241.42	348.09	235,596
N.Offshore			96.64	96.64	8,306		203.70	203.70	17,507
GSCCH	open		96.64	96.64	138		203.70	203.70	290
	close								
CCBCH	open								
	close								
SB/JL			118.30	118.30	15,109		241.42	241.42	30,834
S.Nearshore		33.87	76.65	110.52	24,535	106.67	241.42	348.09	77,276
S.Offshore			42.32	42.32	1,333		203.70	203.70	6,417
2000 Total					127,757				367,920

Table 10.

Gear Mark Costs to Lobster Industry

Lower bound (LB) and upper bound (UP) materials and labor costs for gear marking (1 whip) to the individual lobster firm and industry by area.

1 Whip per Buoy Line (in $1)									
		LB				UP			
		Materials	Firm Labor	Total	Industry Total	Materials	Firm Labor	Total	Industry Total
N.Inshore									
N.Nearshore		1.77	40.14	41.91	28,366	5.33	120.71	126.04	85,310
N.Offshore		2.14	48.32	50.46	8,673	4.50	101.85	106.35	18,280
GSCCH	open	2.14	48.32	50.46	144	4.50	101.85	106.35	303
	close								
CCBCH	open	1.86	42.10	43.96	7,033	5.33	120.71	126.04	20,167
	close	2.23	50.40	52.62	263	5.33	120.71	126.04	630
SB/JL		2.61	59.15	61.76	15,776	5.33	120.71	126.04	32,196
S.Nearshore		1.69	38.33	40.02	8,884	5.33	120.71	126.04	27,982
S.Offshore		0.94	21.16	22.10	1,392	4.50	101.85	106.35	6,700

Table 11.

Sinking Line Costs to Lobster Industry

Lower bound (LB) and upper bound (UP) materials and labor costs to install sinking buoy and ground lines to the individual lobster firm and industry for all areas.

Table 11A. Sinking Line on Buoy (in $1)

		LB				UP			
		Material	Firm Labor	Total	Industry Total	Material	Firm Labor	Total	Industry Total
N.Inshore									
N.Nearshore		941.64	122.90	1064.54	720,508	2832.00	369.62	3201.62	2,166,943
N.Offshore		2683.70	218.13	2901.82	498,785	5656.50	459.75	6116.25	1,051,303
GSCCH	open	1959.93	185.36	2145.29	6,112	4131.00	390.70	4521.70	12,883
	close								
CCBCH	open	803.52	120.57	924.09	147,854	2304.00	345.72	2649.72	423,955
	close	1095.52	150.38	1245.90	6,230	2624.00	360.20	2984.20	14,921
SB/JL		1889.44	203.83	2093.27	534,697	3856.00	415.97	4271.97	1,091,218
S.Nearshore		284.48	89.53	374.01	83,030	896.00	281.98	1177.98	261,512
S.Offshore		942.48	84.99	1027.47	64,730	4536.00	409.03	4945.03	311,537

Table 11B. Sinking Line on Ground (in $1)

		LB				UP			
		Material	Firm Labor	Total	Industry Total	Material	Firm Labor	Total	Industry Total
N.Inshore									
N.Nearshore		3192.00	144.49	3336.49	2,258229	9600.00	434.56	10034.56	6,791,666
N.Offshore		15372.00	463.89	15835.89	2,721981	21600.00	977.76	22577.76	3,880,819
GSCCH	open	15372.00	463.89	15838.89	45117	21600.00	977.76	22577.76	64,325
	close								
CCBCH	open	3348.00	151.55	3499.55	559928	9600.00	434.56	10034.56	1,605,530
	close	4008.00	181.43	4189.43	20947	9600.00	434.56	10034.56	50,173
SB/JL		4704.00	212.93	4916.93	1255965	9600.00	434.56	10034.56	2,563,194
S.Nearshore		3048.00	137.97	3185.97	707286	9600.00	434.56	10034.56	2,227,672
S.Offshore		6732.00	203.16	6935.16	436915	21600.00	977.76	22577.76	1,422,399

Table 12.

Non-Preferred Alternative 1 Costs to Lobster Industry

Lower bound (LB) and upper bound (UP) total industry (Table 12A) and individual firm (Table 12B) costs to the lobster fleet for the non-preferred alternative 1 (NPA1) plan by area. NPA1 includes the PA plus sinking line (SL) on buoy and ground lines, and a bottom weak link (WL) on the buoy line.

Table 12A Industry Cost of NPA 1 (in $1000's)

		LB					UP				
		PA	SL on Buoy	SL on Ground	WL on Bottom	Industry Total	PA	SL on Buoy	SL on Ground	WL on Bottom	Industry Total
N.Inshore											
N.Nearshore		106.7	721	2,258	654	3,633	320.9	2,167	6,792	1,968	10,927
N.Offshore		17.0	499	2,722	200	3,421	35.8	1,051	3,881	422	5,354
GSCCH	open	0.3	6	45	3	54	0.6	13	64	7	84
	close										0
CCBCH	open		148	560	162	870		424	1,606	465	2,495
	close										
SB/JL		30.9	535	1,256	364	2,155	63.0	1,091	2,563	743	4,397
											0
S.Nearshore		33.4	83	707	205	995	105.3	262	2,228	646	3,135
S.Offshore		2.7	65	437	32	534	13.1	312	1,422	155	1,888
Total		191.0	2,056	7,985	1,621	11,662	538.7	5,319	18,556	4,405	28,281

Table 12B Firm's Cost of NPA 1 (in $1)

		LB					UP				
		PA	SL on Buoy	SL on Ground	WL on Bottom	Firm Total	PA	SL on Buoy	SL on Ground	WL on Bottom	Firm Total
N.Inshore											
N.Nearshore		158	1,065	3,337	967	5,527	474	3,202	10,035	2,908	16,619
N.Offshore		147	2,902	15,836	1,164	20,049	310	6,116	22,578	2,454	31,458
GSCCH	open	147	2,145	15,839	1,164	19,295	310	4,522	22,578	2,454	29,864
	close										
CCBCH	open		924	3,500	1,014	5,438		2,650	10,035	2,908	15,593
	close										
SB/JL		180	2,093	4,917	1,425	8,615	368	4,272	10,035	2,908	17,583
S.Nearshore		151	374	3,186	923	4,634	474	1,178	10,035	2,909	14,596
S.Offshore		64	1,028	6,935	510	8,537	310	4,945	22,578	2,454	30,287

Table 13.

Buoy Line Bottom Weak Link Costs to Lobster Industry

Lower bound (LB) and upper bound (UP) materials and labor costs to install buoy line bottom weak links to the individual lobster firm and industry by area.

Weak Link at Bottom of Buoy Line (in $1)								
		LB				UP			
		Material	Firm Labor	Total	Industry Total	Material	Firm Labor	Total	Industry Total
N.Inshore									
N.Nearshore		886.67	80.27	966.94	654,451	2666.67	241.42	2908.09	1,968,275
N.Offshore		1067.50	96.64	1164.14	200,101	2250.00	203.70	2453.70	421,759
GSCCH	open	1067.50	96.64	1164.14	3,317	2250.00	203.70	2453.70	6,991
	close								
CCBCH	open	930.00	84.20	1014.20	162,271	2666.67	241.42	2908.09	465,294
	close	1113.33	100.79	1214.13	6,071	2666.67	241.42	2908.09	14,540
SB/JL		1306.67	118.30	1424.96	363,988	2666.67	241.42	2908.09	742,833
S.Nearshore		846.67	76.65	923.32	204,977	2666.67	241.42	2908.09	645,596
S.Offshore		467.50	42.32	509.82	32,119	2250.00	203.70	2453.70	154,583

Table 14.

Non-Preferred Alternative 2 Costs to Lobster Industry

Lower bound (LB) and upper bound (UP) total industry costs to the lobster industry for the non-preferred alternative 2 (NPA2) plan by area.

NPA2 includes sinking line (SL) on the ground line, and an acoustical release device

NPA2 (in $1000's)							
		LB			UP		
		SL on Ground	Acoustic Release	Industry Total	SL on Ground	Acoustic Release	Industry Total
N.Inshore							
N.Nearshore		2,258	50,717	52,975	6,792	147,097	153,889
N.Offshore		2,722	15,367	18,089	3,881	31,627	35,508
GSCCH	open	45	255	300	64	524	588
	close						
CCBCH	open	560	12,544	13,104	1,606	34,773	36,379
	close		465	465		1,087	1,087
SB/JL		1,256	27,723	28,979	2,563	55,515	58,078
S.Nearshore		707	15,925	16,632	2,228	48,248	50,476
S.Offshore		437	2,608	3,045	1,422	11,592	13,014
Total		7,985	125,604	133,589	18,556	330,463	349,019

Table 15.

Acoustical Release Costs to Lobster Industry

Lower bound (LB) and upper bound (UP) costs for an acoustical release device (materials only) for the individual lobster firm and industry by area.

Acoustic Release (in $1000's)					
		LB		UP	
		Firm Material	Industry Total	Firm Material	Industry Total
N.Inshore					
N.Nearshore		75	50,717	217	147,097
N.Offshore		89	15,367	184	31,627
GSCCH	open	89	255	184	524
	close				
CCBCH	open	78	12,544	217	34,773
	close	93	465	217	1,087
SB/JL		109 4	27,723	217	55,515
S.Nearshore		72	15,925	217	48,248
S.Offshore		41	2,608	184	11,592

Table 16.

Total Alternative Costs to the Lobster Industry

Lower bound (LB) and upper bound (UP) total costs to the lobster industry for the preferred alternative (PA), and the non-preferred alternatives 1 (NPA1) and 2 (NPA2) by area.

Industry cost of the PA, NPA1 and NPA2 plan (in $1000's)							
		LB			UP		
		PA	NPA1	NPA2	PA	NPA1	NPA2
N.Inshore							
N.Nearshore		107	3,633	52,975	321	10927	153,889
N.Offshore		17	3,421	18,089	36	5,354	35,508
GSCCH	open	0	54	300	1	84	588
	close						
CCBCH	open		870	13,104		2,495	36,379
	close			465			1,087
SB/JL		31	2,255	28,979	63	4,397	58,078
S.Nearshore		33	995	16,632	105	3,135	50,476
S.Offshore		3	534	3,045	13	1,888	13,014
Total		191	11,762	133,589	539	28,280	349,019

Table 17.

Total Replacement Costs for the Lobster Industry
Lower bound (LB) and upper bound (UP) total replacement costs
for the preferred alternative (PA), and the non-preferred alternatives 1 (NPA1) and 2 (NPA2).

Replacement Costs (in $1000's)							
		LB			UP		
		PA	NPA1	NPA2	PA	NPA1	NPA2
N.Inshore							
N.Nearshore		21	727	10,595	64	2,185	30,778
N.Offshore		3	684	3,618	7	1,071	7,102
GSCCH	open		11	60		17	118
	close						
CCBCH	open		174	2,621		499	7,276
	close			93			217
SB/JL		6	451	5,796	13	879	11,616
S.Nearshore		7	199	3,326	21	627	10,095
S.Offshore		1	107	609	3	378	2,603
Total		38	2,352	26,718	108	5,656	69,804

Table 18.

Gillnet Fleet Characteristics
Total number of sink gillnet vessels, number of observed fishing trips, average number of nets per string, average net length (feet), average depth (feet) and average strings per 1999 trip by area.

		Total Number of Vessels	SS Data				
			Observer Trips	Average			
				Nets	Net Length	Depth	Strings
N.Nearshore		214	323	10.3	300	177	4.8
N.Offshore		86	45	18.4	300	419	10.7
GSCCH	open	2	27	9.1	300	306	7.8
CCBCH	open	2	50	10.8	354	144	4.6
	close	0	2	12.7	300	164	3.0
SB/JL		6	62	12.7	310	241	3.9
Total		310	507				

Table 19.

Assumed Gillnet Gear Modification Use Under the 1997 ALWTRP and the PA

Columns include: number of options currently required from the gear technology list (# Tech List), vessels currently use 7/16 inch line option, type of weak link (WL) used, gear marking (2 marks in 1997 and 1 mark in PA) using line whips, and weak links on net panels. NOTE - 'x' indicates the option is required.

		1997 ALWTRP (Status Quo)				2000 PA		
		# Tech List [1]	Use 7/16"	WL used [1]	Gear Mark 2 Whips	Gear Mark 1 Whip	WL used [1]	WL in net panel [1]
N.Nearshore			yes		x	x	6	6
N.Offshore		1	yes		x	x	6	6
GSCCH	open	2	yes	6	x	x	L[2]	6
CCBCH	open	2	yes	6			L	6
SB/JL		2	yes	6	x	x	L	6

[1] Current weak link being used as identified in Table 1

[2] Only labor (L) for splicing is applied.

Table 20.

Gillnet Industry Gear Modification Cost Estimates for PA

Costs to the gillnet fleet for buoy weak links (WL) on the buoy line (BL), whipping 2 marks and 1 mark on each buoy line, and weak links on each net, by area and plan.

		Preferred Alternative (in $1)						
		1997 ALWTRP			2000 PA			
		WL at Buoy	Two Gear Marks	Total Costs	WL at Buoy	One Gear Mark	WL in Net Panel	Total Costs
N.Nearshore			4,855	4,855	6,704	2,428	34,527	43,658
N.Offshore			4,349	4,349	6,006	2,175	55,254	63,434
GSCCH	open	102	74	176	35	37	463	535
CCBCH	open	60	43	104	21	22	324	367
SB/JL		160	116	275	55	58	1,013	1,126
Total		321	9,437	9,759	12,821	4,719	91,581	109,121

Table 21.

Preferred Alternative (PA) Costs to Gillnet Individual Firm

Cost of PA to individual gillnet firm by area and plan for: attaching: buoy weak links (WL), gear marking (1 mark in 1997 ALWTRP and 2 marks in PA) and weak links in each net panel.

		Preferred Alternative (in $1)						
		1997 ALWTRP			2000 PA			
		WL at Buoy	Two Gear Marks	Total Costs	WL at Buoy	One Gear Mark	WL in Net Panel	Total Costs
N.Nearshore			22.69	22.69	161.34	11.34	31.33	204.01
N.Offshore			50.58	50.58	642.49	25.29	69.84	737.61
GSCCH	open	50.91	36.87	87.78	231.63	18.43	17.65	267.72
CCBCH	open	30.02	21.74	51.77	162.12	10.87	10.41	183.41
SB/JL		25.45	18.43	43.89	161.63	9.22	8.83	179.68

Table 22.

Buoy Weak Link Materials and Labor Costs to Individual Gillnet Firm and Industry by Area and Alternative.

Weak link at the buoy (in $1)								
		1997 ALWTRP				2000 PA			
		Material	Firm Labor	Total	Industry Total	Material	Firm Labor	Total	Industry Total
N.Nearshore						9.60	21.73	31.33	6,704
N.Offshore						21.40	48.44	69.84	6,006
GSCCH	open	15.60	35.31	50.91	102		35.31	35.31	35
CCBCH	open	9.20	20.82	30.02	60		20.82	20.82	21
SB/JL		7.80	17.65	25.45	160		17.65	17.65	55
Total					321				12,821

Table 23.

Net Panel Weak Link Materials and Labor Costs to Individual Gillnet Firm and Industry by Area

Weak Links on the Nets (in $1)					
		Material	Firm Labor	Total	Industry Total
N.Nearshore		49.44	111.90	161.34	34,527
N.Offshore		196.88	445.61	642.49	55,254
GSCCH	open	70.98	160.65	231.63	463
CCBCH	open	49.68	112.44	162.12	324
SB/JL		49.53	112.10	161.63	1,013
Total					91,581

Table 24.

Gear Marking (One Whip) Materials and Labor Costs to Individual Gillnet Firm and Industry by Area

Gear Mark (1 Whip) per Buoy Line (in $1)					
		Material	Firm Labor	Total	Industry Total
N.Nearshore		0.48	10.86	11.34	2,428
N.Offshore		1.07	24.22	25.29	2,175
GSCCH	open	0.78	17.65	18.43	37
CCBCH	open	0.46	10.41	10.87	22
SB/JL		0.39	8.83	9.22	58
Total					4,719

Table 25.

Non-Preferred Alternative 1 Costs to the Gillnet Industry

Total cost to the gillnet industry and individual firm for NPA1 by area that includes the PA plus sinking line (SL) on the buoy and anchor lines, and bottom weak links on buoy line.

Table 25A NPA 1 - Industry (in $1)							
		PA	SL on Buoy Line	SL on Anchor Line	Bottom Weak Link Weak Link	Industry Total w/out PA	Total Cost NPA 1
N.Nearshore		43,658	61,663	21,474	56,010	139,147	182,805
N.Offshore		63,434	125,071	19,237	50,175	194,483	257,927
GSCCH	open	535	1,568	326	851	2,744	3,279
CCBCH	open	367	457	192	502	1,151	1,518
SB/JL		1,126	1,958	511	1,333	3,802	4,927
Total		109,121	190,716	41,741	108,870	341,327	532,043

Table 25B NPA 1 - Firm (in $1)							
		PA	SL on Buoy Line	SL on Anchor Line	Bottom Weak Link	Industry Total w/out PA	Total Cost NPA 1
N.Nearshore		204.01	288	100	262	650	854.01
N.Offshore		737.61	1,454	224	583	2,261	2998.61
GSCCH	open	267.72	784	163	425	1,372	1639.72
CCBCH	open	183.41	229	96	251	576	759.41
SB/JL		179.68	312	82	213	607	786.69

Table 26.

Bottom Weak Link Materials and Labor Costs to Individual Gillnet Firm and Industry by Area

Weak Links at the Bottom of the Buoy Line (in $1)					
		Material	Firm Labor	Total	Industry Total
N.Nearshore		240.00	21.73	261.73	56,010
N.Offshore		535.00	48.44	583.44	50,175
GSCCH	open	390.00	35.31	425.31	851
CCBCH	open	230.00	20.82	250.82	502
SB/JL		195.00	17.65	212.65	1,333
Total					108,870

Table 27.

Sinking Buoy and Anchor Line Materials and Labor Costs to Individual Gillnet Firm and Industry by Area

Sinking Line on Buoy Line (in $1)					
		Material	Firm Labor	Total	Industry Total
N.Nearshore		254.88	33.27	288.15	61,663
N.Offshore		1344.99	109.32	1454.31	125,071
GSCCH	open	716.04	67.72	783.76	1,568
CCBCH	open	198.72	29.82	228.54	457
SB/JL		281.97	30.42	312.39	1,958
Total					190,716
Sinking Line on Anchor Line (in $1)					
		Material	Firm Labor	Total	Industry Total
N.Nearshore		96.00	4.35	100.35	21,474
N.Offshore		214.00	9.69	223.69	19,237
GSCCH	open	156.00	7.06	163.06	326
CCBCH	open	92.00	4.16	96.16	192
SB/JL		78.00	3.53	81.53	511
Total					41,741

Table 28.

Non-Preferred Alternative 2 Costs to the Gillnet Industry

Total cost to the gillnet industry for Non-Preferred Alternative 2 by area.
NPA2 includes two acoustical release devices for each string and a receiving device for the vessel, sinking line (SL) on the anchor line, and weak links (WL) in the net panels.

NPA 2 (in $1)						
		Firm				Industry
		Acoustical Release	SL on Anchor Line	WL on Nets	Total Cost	Total Cost
N.Nearshore		23,200	100	161	23,462	5,020,800
N.Offshore		46,800	224	642	47,666	4,099,291
GSCCH	open	35,200	163	232	35,595	71,189
CCBCH	open	22,400	96	162	22,658	45,317
SB/JL		19,600	82	162	19,843	124,383
Total						9,360,980

Table 29.

Acoustical Device Costs to Individual Gillnet Firm and Industry by Area
Two devices per string and one receiving device for the vessel.

Acoustical Release (in $1)			
		Firm Material	Industry
N.Nearshore		23,200	4,964,800
N.Offshore		46,800	4,024,800
GSCCH	open	35,200	70,400
CCBCH	open	22,400	44,800
SB/JL		19,600	122,859
Total			9,227,659

Table 30.

Total cost to the gillnet industry for all options including the preferred alternative (PA), the non-preferred alternative 1 (NPA 1) and alternative 2 (NPA 2) by area.

		PA	NPA 1	NPA 2
N.Nearshore		43,658	182,805	5,020,800
N.Offshore		63,434	257,927	4,099,291
GSCCH	open	535	3,279	71,189
CCBCH	open	367	1,518	45,317
SB/JL		1,126	4,927	124,383
Total		109,120	450,456	9,360,980

Table 31.

Total Replacement costs for Gillnet Industry
Replacement costs for the preferred alternative (PA), and the non-preferred alternatives 1 (NPA 1) and 2 (NPA 2) by area

		PA	NPA 1	NPA 2
N.Nearshore		8,732	36,561	1,004,160
N.Offshore		12,687	51,585	819,858
GSCCH	open	107	656	14,238
CCBCH	open	73	304	9,063
SB/JL		225	985	24,877
Total		21,824	90,091	1,872,196

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