

Final Draft
**Gulf of Maine/Bay of Fundy
Harbor Porpoise Take Reduction Team
Take Reduction Plan**

August 7, 1996

A consensus document negotiated by:

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Executive Summary

At the invitation of the National Marine Fisheries Service, (NMFS), the Gulf of Maine/Bay of Fundy Harbor Porpoise Take Reduction Team (TRT) met between February and July of 1996 to develop a management plan to reduce incidental take of harbor porpoise. The TRT reached agreement on the Management Plan, which is described herein. This plan only focuses on harbor porpoise interaction in the U.S. portion of the Gulf of Maine and briefly addresses harbor porpoise bycatch in Canada. The plan builds on closures already instituted by the New England Fishery Management Council (NEFMC) and introduces the use of acoustical devices (pingers). The plan provides for a bycatch of 376 harbor porpoise in the U.S. portion of the Gulf of Maine, a level below the current bycatch level of 403 harbor porpoise prescribed by a strategic stock assessment. This bycatch level is expected to change to 488 when the strategic stock assessment is updated in Spring 1997.

Core Management Plan

The Core Management Plan recommends a combination of pinger use and time/area closures, as well as conducting research on the effect of pinger use on harbor porpoise and the marine habitat. Consensus on the core management plan is contingent on the following: 1) That this regime is recommended only for year one; 2) That an Experiment be conducted on pinger effectiveness in the Mid-Coast area to reduce harbor porpoise bycatch in the spring and that the Experiment be conducted based on another similar experiment conducted in 1994; and 3) That research on the effects of pingers on harbor porpoise, and other marine life, be conducted at the same time, and that research on potential harbor porpoise habituation be initiated.

Implementation Measures

This section prescribes how the plan is to be conducted, including: 1) Cooperation between fishermen and researchers in estimating gillnet fleet effort in year one, 2) Pinger use (and the rationale behind their use), 3) Outreach, training and certification activities that need to be conducted along with the use of pingers, 4) Recommendations to address Canadian bycatch, 5) Enforcement of the Core Management Plan, 6) Coordination with bycatch reduction efforts in the Mid-Atlantic region, 7) TRT expectations regarding when the Team will be reconvened by NMFS and what will be discussed, and 8) Possible recommendations for the state gillnet fishery and bait gillnet fishery.

Data Collection and Management

This section recommends changes that are needed in data management and collection; including new methodologies for stock assessments, bycatch estimates, fishing effort, designs for pinger research to assure that the pinger experiment results are widely accepted, and identification of the need for investment of gear technology research and development to further reduce bycatch.

Consensus was not easily reached. Each section of the core management agreement is interrelated and should not be read independently since the different sections combined satisfy the concerns of the TRT members. In agreeing to this management plan the TRT assumes that the Team will be convened in month 7 of the plan implementation to review months 1-6 of the plan, and then again in month 13 to review the first year, with subsequent meetings as appropriate.

The TRT assumes that as new information comes to light about the New England gillnet fisheries effort, harbor porpoise abundance, and bycatch, adjustments to management actions prescribed herein could be necessary.

Gulf of Maine/Bay of Fundy Harbor Porpoise Take Reduction Team Plan

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I. Introduction

This plan is recommended by the Gulf of Maine/Bay of Fundy (GME) Harbor Porpoise Take Reduction Team (TRT) regarding how to reduce incidental take of the GME harbor porpoise. Harbor porpoises (*Phocoena phocoena*) are small porpoises that occur in coastal waters throughout cold, temperate waters of the northern hemisphere. Harbor porpoises can incidentally entangle in gillnets. Concern has arisen about the GME population and incidental catch (or bycatch). This plan is the TRT's best attempt to reconcile the need to reduce bycatch with the least economic impact on the fishery. The ideas in this plan would not have been possible without the dedication and hundreds of volunteer hours of the team members listed below:

Erik Anderson, New Hampshire Commercial Fishermen's Association;
Janice Comeau Anderson, Massachusetts Netter's Association;
Jennifer Atkinson, Conservation Law Foundation;
Jeannette Bubar, Maine Gillnetters' Association;
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Paul Cohan, Cape Ann Gillnetters' Association;
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Chris Finlayson, Maine Department of Marine Resources;
Patricia Fiorelli, New England Fishery Management Council;
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David Laist, Marine Mammal Commission;
Robert MacKinnon, Massachusetts Netters' Association;
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Michael Payne, NMFS Office of Protected Resources;
Andrew Read, Duke University;
Ron Smolowitz, Coonamessett Farm;
Terry Stockwell, Maine Gillnetters' Association;
April Valliere, Rhode Island Division of Fish and Wildlife;
David Wiley, Whale and Dolphin Conservation Society & International Wildlife Coalition;
John Williamson, New Hampshire Commercial Fishermen's Association;
Nina Young, Center for Marine Conservation;
Sharon Young, The Humane Society of the United States; and

Observer

Jeremy Conway, Canadian Department of Fisheries and Oceans.

II. Background

A. Purpose and Goal of the Harbor Porpoise Take Reduction Plan

As a result of the 1994 amendments to the Marine Mammal Protection Act (MMPA), the National Marine Fisheries Service (NMFS) is required to convene take reduction teams to address the incidental take, or bycatch, of marine mammals that exceeds what is believed to be allowable to maintain an optimum sustainable population. The law charges these teams, made up of representatives of those groups potentially most affected by the plan, with:

- 1) Making recommendations to immediately reduce bycatch to potential biological removal levels; and
- 2) Making recommendations on ways to reduce the bycatch to insignificant levels within five years of the formation of the team.

The history of conservation measures undertaken up to the time of the formation of the TRT provides a context for deliberations of the GME Harbor Porpoise Take Reduction Team. Some of these events are described briefly below.

B. Status of the GME Harbor Porpoise Population under the Endangered Species Act.

In 1991 the NMFS announced its intent to review the status of harbor porpoise populations in U.S. waters for possible listing as threatened or endangered under the Endangered Species Act (ESA). Section 4(a)(1) of the Act sets forth five criteria to consider in listing decisions: (a) Present or threatened destruction, modification, or curtailment of its habitat or range; (b) Over-utilization for commercial, recreational, scientific, or educational purposes; (c) Disease or predation; (d) Inadequacy of existing regulatory mechanisms; or (e) Other natural or manmade factors affecting its continued existence.

At about the same time NMFS was in the process of applying these criteria to U.S. harbor porpoise populations, the Sierra Club Legal Defense Fund on behalf of the International Wildlife Coalition and 12 other organizations submitted a petition to the NMFS (September 18, 1991) asking that the GME harbor porpoise population be listed as threatened (56 FR 65044).¹ In response to the petition and after considering results of its

¹ The population estimates used in the petition ranged from approximately 3,000 - 15,000 (estimates from Gaskin, et al. 1985; Kraus, Gilbert and Prescott, 1983). The estimates vary widely for a variety of reasons, including but not limited to interannual variability, difficulty in knowing where to survey for a highly active migratory species, and variations in survey techniques and methods to estimate confidence limits. Some comments received by the NMFS on the petition noted that the estimates used in the petition likely underestimated true population abundance level. During July and August 1991, NMFS conducted sighting surveys in the offshore waters of the GME/lower Bay of Fundy/Southern Scotian Shelf (Palka 1992), and GME inshore waters (Read and Kraus 1992). After extensive analysis of these surveys it is believed that

research, the NMFS published a proposed rule (58 FR 3108-2120) on January 7, 1993 to list the GME harbor porpoise population as threatened under the ESA. In its preamble to the proposed rule, the NMFS concluded, based on the best available information, that the harbor porpoises found seasonally in the Gulf of Maine and Bay of Fundy constituted a separate population, and that the bycatch of harbor porpoise in this fishery was unsustainable. However, some members of the TRT question whether the population is separate. A final decision on the proposal to list GME harbor porpoise as threatened was subsequently deferred by the NMFS.

C. Major Actions to Reduce Harbor Porpoise Bycatch

In 1989 fishermen, environmentalists and scientists formed the *Harbor Porpoise Working Group*, the purpose of which was to “define the extent of the problem and identify solutions pertaining to harbor porpoise and commercial fisheries interactions in the Gulf of Maine, and more specifically, to reduce the incidental take of harbor porpoise in gillnets while minimizing impacts on the fishery.”

Given concern about the levels of incidental take from the GME harbor porpoise population, the NMFS asked the New England Fishery Management Council (NEFMC) in October 1992 to develop a plan for reducing harbor porpoise bycatch in the New England sink gillnet fishery. The NEFMC agreed, and began developing adjustments to the Multispecies Fishery Management Plan (FMP) under which New England groundfish gillnet fishing was managed.

As part of Amendment 5 to the Multispecies FMP, the council proposed a four-year program to reduce annually the harbor porpoise bycatch off New England to a level not to exceed two percent of the estimated GME harbor porpoise population size. To achieve this goal, the Council recommended phasing in time-area closures to sink gillnet gear, such that take levels would be reduced by 20% each year over the four-year period. The NEFMC adopted rules to implement first-year closure recommendations on 25 May 1994 (FR 26972-2698).

In the fall of 1994, the NMFS authorized and provided support for a cooperative experiment by New England gillnet fishermen and scientists.² Building on work in previous years, the experiment sought to evaluate the effectiveness of acoustic deterrents devices or “pingers” attached to gillnets to prevent entanglement of harbor porpoise. The experiment was conducted in Mid-Coast closed area off the New Hampshire-Massachusetts border. This experiment was important not only for the scientific results, but also for the precedent it set for collaboration between fishermen, researchers and

average abundance estimates produced from the 1991 survey, 45,000 (95% confidence interval : 23,000 - 80,000), is considered the **best estimate** of the GME harbor porpoise population. (Propose rule listing harbor porpoise are endangered **50 CFR Part 227**). As noted in Section II.D. unpublished 1995 stock assessments appear to show abundance at 74,000 animals.

² Kraus, Read, Anderson, Baldwin, Soslow, Spradlin, and Williamson.

scientists to address how to reduce bycatch in the GME fishery. Based on a comparison of bycatch rates in nets equipped with active and inactive alarms, it was concluded that pingers substantially reduced bycatch rates during the trial. While 25 porpoises were caught in 423 hauls of nets equipped with inactive pingers, only 2 porpoises were caught in 421 hauls of nets with working pingers.

In the summer of 1995, the NMFS advised the Council that, based on results of its sea sampling program, harbor porpoise bycatch rates had increased in 1994 despite the new time-area gillnet fishing closures for the fall of 1994. The increased rate occurred before the fall area closure and from bycatch that occurred in waters that are adjacent to the closure area. Based on this information, the Council recommended expanding both the time and area of the fall closure around Jeffrey's Ledge. The NMFS adopted a rule to do so on October 30, 1995 (60 FR 57207-57211).

D. Formation of the Harbor Porpoise Take Reduction Team

As required by the 1994 MMPA amendments, NMFS is required to prepare stock assessments for all marine mammal populations in U.S. waters. Each assessment includes an estimate of population size, maximum net productivity, the number of animals killed and seriously injured by commercial fisheries and other human activities, and the "potential biological removal" level (PBR) that the stock can safely support. If human-related mortality exceeds the stock's estimated PBR level, or the stock is listed as endangered or threatened, or is declining and is likely to be listed as such under the Endangered Species Act, the 1994 amendments require that the stock be designated as strategic subject to special management efforts. The team conducting these assessments includes a panel of scientists, researchers, and with some representation from the fishing industry.

In August 1994 the NMFS published draft marine mammal stock assessments for public review and it published final assessments in August 1995. The final stock assessment for GME harbor porpoises estimated the size of the population to be 47,500 porpoises, (with a minimum population estimate of 40,297 animals); the MNP (maximum net productivity) 4% per year; the average mortality and serious injury rate in commercial fisheries to be about 2,100 to 2,350 porpoises per year (with an estimated annual average of 1,876 porpoises taken off New England between 1989 and 1993); and the PBR level to be 403 porpoises per year. Note that while these are the published stock assessments, and are accepted by the Scientific Review Group, some members of the TRT believe these numbers to be inaccurate. Given these bycatch and PBR levels, the NMFS classified GME harbor porpoise as a strategic stock.

The stock assessments are to be updated periodically and, although (as of this writing) an update has not been published, NMFS representatives reported at the Harbor Porpoise Take Reduction Team meeting (June) that results from the 1995 harbor porpoise population survey indicate that the current best estimate of population size for GME

harbor porpoises based on pooled estimates '91, '92, '95 is slightly larger (i.e., 54,300 porpoises) than that cited in the 1995 stock assessment. The unpublished 1995 estimates appear to show abundance to be 74,000.³ The Team was told that based on the pooled estimate of 54,300 the PBR would likely increase to 480-488 porpoises per year. The TRT was also told by a NMFS representative (June) that the annual mortality estimate for the harbor porpoise in this fishery was 2,348, which is greater than the mortality listed in the 1995 stock assessment. There was considerable debate among TRT members about the bycatch estimates and methodology used to determine the estimates.

NMFS convened this GME Harbor Porpoise TRT in early 1996 with the assistance of a neutral mediator in accordance with the 1994 MMPA amendments to develop a plan to reduce the incidental take of harbor porpoise in sink gillnets to the PBR level (403).

The TRT was charged with developing a plan six months from its inception. If the TRT cannot reach consensus in that time, the Secretary of Commerce is charged with developing the plan. If the TRT submits a plan, the NMFS Administrator has 60 days, after submittal of the plan, for review and publication in the *Federal Register*. If the Administrator changes the TRT's plan, the Administrator must note in the *Federal Register* what changes were made and why. A 90 day public comment period is to be provided for reviewing the proposed plan, and 60 days after the comment period ends NMFS is charged with publishing a final plan and final implementing regulations. Thereafter, as long as the take of harbor porpoise exceeds the PBR level the team will meet every six months to monitor implementation of the plan. (See Section IV. A).

Given the proportion of incidental take in the New England sink gillnet fishery for groundfish and uncertainty about involved fisheries south of New England, NMFS decided to limit the geographic scope of this take team to bycatch occurring off New England's coast. NMFS expects to convene another team to address the situation in the mid-Atlantic area.

According to the purpose statement agreed to by TRT members:

" The immediate goal of the Gulf of Maine/Bay of Fundy harbor porpoise Take Reduction Team is to develop a take reduction plan directed at reducing within six months of its implementation the incidental mortality or serious injury of Gulf of Maine harbor porpoise incidentally taken in the course of commercial fishing operations to levels less than the potential biological removal level. "

In selecting among means to meet this charge, the team agreed to consider those methods that:

- a. Allocate bycatch reduction equitably;*

³ Based on report from NMFS staff at April 2, 1996 TRT meeting.

- b. Are measurable and easily monitored;*
- c. Are practical for the fishing industry;*
- d. Coordinate with those rules and regulations designed to regulate fishing effort that would also achieve our goals;*
- e. Include research and management recommendations;*
- f. Minimize economic impact; and*
- g. Minimize impacts on marine habitat.*

E. Harbor Porpoise Natural History and Historic Bycatch Information⁴

E.1 Natural History

Harbor porpoises are found concentrated during the summer in the northern GME/southern Bay of Fundy region, usually in waters less than 100 fathoms deep. During fall and spring, harbor porpoises are more widely dispersed from New York to Maine, in much lower densities. Occurrence is known only from a relatively sparse record of sightings and strandings principally between New York and North Carolina.⁵ No specific narrow migratory corridors have been documented.

The GME population addressed by the GME/Bay of Fundy Harbor Porpoise Take Reduction Team includes all harbor porpoise whose range extends throughout waters of eastern North America from and including the Bay of Fundy, Nova Scotia and south to North Carolina. However, as mentioned earlier, this TRT was charged with addressing only the geographic area from the Canadian/U.S. Boundary in the north to the southern New England area off Rhode Island to the south. The mid-Atlantic area will be addressed by another team at a later date.

To develop information on the size of the GME harbor porpoise population, NMFS has conducted three population surveys in summer months when the population is concentrated principally in the Bay of Fundy and Gulf of Maine. Three surveys were conducted in the summers of 1991, 1992, and 1995 and, by pooling the results of all three, NMFS scientists have estimated the size of the GME harbor population to be 54,300 animals (C.V. =14%).

E.2 Background on Bycatch

All TRT members recognized that there has been incidental take of harbor porpoise in GME gillnet fisheries for a number of years. However, for different reasons, some members of the TRT did not agree with the strategic stock assessments, population abundance estimates and/or numerical harbor porpoise bycatch estimates. The TRT members elected to not let the disagreement on these numbers impede development of

⁴ This section is based primarily on the information in 50 CFR Part 227, Docket Number 921232-2332.

⁵ From a NMFS draft description of harbor porpoise and fisheries associated with bycatch.

this plan and in the interest of moving the discussion forward, the TRT used information available from NMFS. The TRT did agree that bycatch estimates could be improved. This plan includes recommendations for data collection and management herein. (Section IV. C.)

Between 1983 and 1988 NMFS provided early reports regarding the incidental take of harbor porpoise and other marine mammals. To determine the extent of harbor porpoise bycatch by the sink gillnet fishery in the GME, NMFS initiated an observer program through Manomet Bird Observatory, Plymouth, MA. Data collected between August 1989 and July 1990 and reported to a NMFS/International Whaling Commission workshop indicated that the rate of harbor porpoise bycatch in the gillnet fishery was large relative to available estimates of harbor porpoise abundance in the GME. The best estimates of the average annual bycatch of harbor porpoise in the entire GME gillnet fishery ranges between a low of 1,200 in 1992 and a high of 2,900 in 1990.⁶ Some members of the TRT commented that these early population and bycatch estimates were based on outdated population abundance information in combination with low sea sample data. Based on these numbers, NMFS estimates the minimum bycatch of the New England GME population at approximately 2 to 4% of the best estimate of the harbor porpoise abundance number. The population is subject to additional kills in Canada and south of Cape Cod.

The Harbor Porpoise TRT has been presented with bycatch data in the Bay of Fundy/Gulf of Maine area that shows a pattern of harbor porpoise bycatch that shifts geographically from season to season with variability among years. However, in general it appears that a significant amount of bycatch in the Gulf of Maine has occurred in the "mid-coast" area from northeast Massachusetts to southern Maine around a topographic feature called Jeffrey's Ledge sometime between September to December and again in spring between March and May. There have been additional take in the "northeast" area off the central and northern coast of Maine from June to September. However, in recent years, bycatch in the northeast (downeast) area has declined substantially as fishing effort in the area has diminished. Lower bycatch levels also occurred in Massachusetts Bay in March and April and south of Cape Cod in the spring.

Harbor porpoise are limited in their capacity for population increase and are unlikely to sustain even moderate levels of incidental mortality.⁷ Harbor porpoise is one of the shortest-living of all cetaceans, with a maximum longevity of 12-15 years. Sexual maturity is reached at ages 4 to 6 after which females usually bear a calf each year. The best available estimate of maximum net productivity for harbor porpoise in the GME is 4%. At greater levels of incidental take, it is believed that the population will likely decline. Therefore, assuming MNP values of 4% per year indicate a porpoise population

⁶ Based on 1990-1994 data provided by Wood's Hole Science Center to the Harbor Porpoise TRT, May 22-23, 1996 and NOAA technical memo to R. Schmitten from K. Bisack.

⁷ From Potential rates of increase of a harbor porpoise (*Phocoena phocoena*) population subjected to incidental mortality in commercial fisheries, T. H. Woodley and A. J. Read, published in Canadian Journal Fish Aquatic Species, 1991.

that could sustain a level of incidental take no greater than 2% of the population estimate. NMFS believes that annual human-induced mortality exceeding this value for other species of small cetaceans is unsustainable. The best available information at the time of the proposed ESA listing indicated that the bycatch of the GME population of harbor porpoise had to be reduced by more than 50% to be sustained by the present GME population. (See discussion II.C.)

III. Description of the Gulf of Maine/Bay of Fundy Sink Gillnet Fishery⁸

A gillnet is an upright barrier of monofilament netting in which the fish are caught in the meshes of the net. Fish, of a size for which the net is designed, swimming into the net can pass only part way through a single mesh, thereby becoming “gilled.” Various mesh sizes are used depending upon the species and size of the fish to be caught. Gillnets can be suspended at the surface, in midwater or close to the bottom by controlling the number of buoy lines, the size and number of floats on the top or cork line and the weights on the lead line. The New England coastal gillnet fishery sets nets on the bottom, where they are fixed by anchors. These nets are known as sink gillnets and are primarily used to catch groundfish (cod, haddock, hake, pollock and flounders), monkfish, and dogfish. This TRT focused on the sink gillnet fishery that comprises 99% of the fishery in New England.

Gillnetting is a traditional New England fishery, originally introduced in 1880 and changed since then. Because of the nature of this small boat/owner-operated fishery, gillnetting has provided employment in New England. In addition to captains and crew, the fishery also provides employment for support services and support infrastructure of the industry through dealers, gear manufacturers, net makers, dock workers, truck drivers, fuel companies, fish processors, etc. Because vessels are small owner-operated boats, they remain cost effective and the fishery has remained an important contributor to many New England coastal communities.

The gillnet fishery has undergone fluctuations since its inception. The gillnet fishery had a resurgence in the early 1970’s and 1980’s primarily due to the introduction of monofilament netting. Partly as a result of restrictions to conserve cod and other groundfish, many gillnet vessels have now switched to targeting monkfish and dogfish. The New England fishery today consists of about 300 boats but may decline with implementation of new fishery regulations.

The fishery consists of mostly small vessels, (about 30-50 feet or 10-17 meters in length), that operate from numerous ports throughout New England. Gillnets are a “passive” gear, (nets do not actively pursue any target species but let the fish come to the gear). Many vessels leave their nets in the water around the clock and some vessels attempt to haul them on a daily basis as weather permits. Soak time variabilities exist within the fishery depending on the target species. Other vessels, such as those targeting flounder may use multiple day sets to accomplish the need for longer soak time. Most gillnetter vessels fish close to shore, but a few fish farther out from shore, making trips lasting from two to eight days, hauling their nets on a daily basis throughout each trip. These vessels bring their nets back with them at the end of the trip. Some vessels enter

⁸ Note: Fishermen on the TRT wrote “New England Gillnetter’s Statement on Socio-Economic and Environmental Benefits of the Sink-Gillnet Fishery.” Appendix A of this document reflects the thoughts of fishermen and was not modified by the TRT.

and exit the gillnet fishery on a seasonal basis and pursue other fisheries when not gillnetting. For example switching from groundfish to monkfish or dogfish, which are also caught with gillnets, or to lobster which are taken using traps.

A vessel may fish between 40 and 200 nets depending on target species. Nets are 50 fathoms (91.5 meters) long and are tied together in strings of 1-30 nets; the highest portion of the net may extend nearly four meters above the seabed. Generally the inshore fishery is conducted about 45 miles from shore and the offshore fishery 45 miles and beyond. However, the distance from shore differs by area.

While the sink gillnet fishery generally has a low bycatch of non-target fish species, the fishery interacts with harbor porpoise and to a lesser extent with other marine mammals and birds. Bycatch of harbor porpoise was sufficiently high to categorize the multispecies sink gillnet fishery in the GME and adjacent waters as a Category I fishery under section 114 of the Marine Mammal Protection Act (MMPA). Under the 1988 amendments to the MMPA a Category I fishery involves “frequent incidental takes of marine mammals.”

IV. Proposed Management Plan and Rationale

After four two-day meetings and one one-day meeting, the TRT developed the following core management plan. This plan incorporates the NEFMC harbor porpoise groundfish closures as of August 7, 1996. Upon changes to Amendment 7 that would shift groundfish closure that don't coincide with TRT recommendations, the TRT requests that NMFS reconvene the TRT to consider modification of its plan.

A. Proposed Core Management Plan

Northeast (Downeast)

August 15 - September 13 Closed*

Mid-Coast

January

Closed

March 1 - May 15

Closed with 45 day

Pinger Experiment that would occur between April 1 - May 15. (The NEFMC closure is March 25 - April 25)*

September 15 - October 31

Use pingers*

November 1 - December 31

Closed

Mass Bay

February 1 - 28

Use pingers

March 1 - 30

Closed*

April 1 - 30

Use pingers

South Cape Cod

February 1 - 28

Use pingers

March 1 - 30

Closed*

April 1 - 30

Use pingers

“*” denotes NEFMC Harbor Porpoise and groundfish closure as of August 7, 1996.

Agreement is contingent on the following actions:

- The TRT meets in month 7 of the plan's implementation: This recommendation is for year *one* of the Take Reduction Plan. An evaluation of the entire effectiveness of actions will be undertaken by the TRT for the first 6 months in month 7 of plan implementation with a rolling evaluation by the TRT thereafter. (For example at the 6-month evaluation an evaluation of pinger effectiveness in the South of Cape Cod region should be conducted).

- An Experiment will be conducted in Spring 1997 in the Mid-Coast area: (For more detailed description of experiment design considerations, please see Data Management and Research section, herein B.4.1 and C.)
 - The experiment will last a maximum of 45 days with a cap of 70 porpoises. If 70 harbor porpoises are caught the experiment closes down.
 - Observer coverage is expected to be 100% for the experiment.
 - The 1994 model will be used for the experiment.
 - The process for who is involved in the experiment will be public.

- Research effects of pingers on harbor porpoise: Research will be conducted in the Mid-Coast area during September 15 - October 31 pinger use timeframe to begin to address: habituation and displacement of harbor porpoise; whether there are other affects on other marine life, specifically how the take rate of porpoise changes in relation to continued pinger use (i.e., habituation) and whether harbor porpoise are displaced by the use of pingers. This research will complement research Kraus et al is conducting in summer (1996) surveys of displacement.

The core management recommendation weights equally the spring experiment and fall pinger research and development in the mid-coast area. To provide incentive to all participants to assure that this research is conducted the TRT agreed that:

- In order to consider expanded use of pingers by time/area beyond that described in the plan, NMFS shall conduct the spring Mid-Coast Experiment and a displacement study, as well as develop and initiate habituation study methods.

Bycatch resulting from this core management proposal is expected to be approximately 376 animals. This plan would reduce estimated take this first year from an average take over 2,000 (for 1990-1994). This reduction (meets) the goal of PBR 403 animals and allows for expected bycatch of harbor porpoise in Canada and the mid-Atlantic region that are not under jurisdiction of this TRT. As mentioned earlier it is expected that as a result of strategic stock assessment to be published Spring 1997, PBR will likely increase to 488.

B. Implementation

B.1 Background

The success of the TRP depends on effective implementation of the core management proposal. The cornerstone of effective implementation of bycatch mitigation measures requires outreach, training, and participation of the entire gillnet fleet, and a

commitment by government agencies to monitor and enforce the plan. Implementation will also require concurrent research that can begin to answer the many questions surrounding the long term effect and efficacy of the use of acoustic deterrents. In addition, the continued long-term success of the TRP will require data gathering to assess the annual performance of the management plan and permit adaptive management and further refinement of the TRP to meet the goals and objectives of the MMPA and the TRP. This section provides the TRT's recommendation for implementing the plan. The subsequent section (C) recommends specific data management, research methodologies and protocols.

B.2 Census Of The Gillnet Fleet

Cooperation and coordination between regulators and fishermen will help all parties achieve long-term compliance with harbor porpoise bycatch mitigation measures. Fishermen can be helpful in determining effort. As a result of declining groundfish resources, new fisheries management regulations and harbor porpoise regulations the size and make-up of the Gulf of Maine fleet is in flux. Documenting shifts in numbers of vessels either in or out of the fishery is needed. To address this the TRT has identified that:

- Accurate estimates of the number of vessels that switch between gear-types seasonally need to be determined;
- The respective vessels' contribution to gillnet effort is needed to help determine bycatch; and
- Essential to our ability to monitor and to extrapolate total bycatch from observed effort is a reliable measure of gillnet effort overall to replace the weigh-out system now used by NMFS. A system is preferred that uses nets as the measure of effort versus the current landings weighout process.

Therefore, the TRT recommends that NMFS, in conjunction with the gillnet industry, undertake efforts to augment traditional effort information with the data needs identified above. This could aid conservation, management and outreach to the industry. The TRT also recommends the following:

- Conduct a fleet-wide census, of the gillnet fleet by fishing port to ascertain the: number of vessels actively fishing, season, type, and amount of gear fished, target species, and statistical areas fished.
- Undertake, as part of the fleet-wide census, interviews with fishermen to gather the fishing effort data stated above, identify contact people in each port, and assemble a phone and mailing list of fishermen for purposes of public outreach and training; and
- As technology becomes more sophisticated, investigate options for developing and feasibility of either a dock-side interview system or a computer automated or call-in system to augment the weigh out system with the goal of achieving a "real-time" measure of fishing effort from which to extrapolate total bycatch including a system that ensures reliability of industry reporting.

B.3 Use of Acoustic Deterrents “Pingers”

B.3.1 Description of Pinger Use in Core Management Plan

The Core Management plan recommends the use of acoustic alarms, a.k.a. “pingers” in experimental and routine fishery settings to augment closures as a means of reducing harbor porpoise bycatch to levels below PBR. In addition, there are several research recommendations coupled with the plan that are aimed at determining the effectiveness of pingers in time and areas where they have not been used, where previous results are inconclusive, or to investigate porpoise habituation and displacement behavior.

The team chose to use pingers judiciously by assigning them to months which bracket the peak bycatch (closed) periods for all but one of the four management areas. The recommendation not to use pingers in year one of the TRP downeast in the summer is based on the relatively small proportion of the total bycatch which occurs here, and the desire to minimize the amount of time that porpoise are exposed to continuous pinger use.

Based on bycatch rates derived from previous field trials, including the 1994 fall experiment in the mid-coast region, the team assigned pinger effectiveness levels to the different times and areas outlined in the plan. The following rates are presented as multipliers which were applied to a four year, (1990 - 1994) annual average bycatch level for each of the four management areas. The multipliers for pinger use effectiveness in the four management areas are:

- **Northeast**
 (Downeast) - No pinger use (na)
- **Mid-coast⁹ - Sept/Oct: (0.10)**
- **Massachusetts Bay - Feb/April: (0.50)**
- **South of Cape Cod - Feb/April (0.50)**

Based on this approach the team used a model to estimate bycatch. The total bycatch reduction estimated for each time and area is presented in Table 1 on the following page:

⁹ Pingers will be used as part of the Spring Mid-Coast Experiment, however, a multiplier was not assumed during the Experiment.

	Midcoast ¹⁰	Mass Bay*	Northeast (Downeast)	South Cape Cod	Effective bycatch [out of average over '90-'94]
	statistical area	statistical area	statistical area	statistical area	
	513	514	511/512	537/539	
Jan	0	6	0	0	6
Feb	0	26	0	0	26
Mar	0	0	0	0	0
Apr	70 ¹¹	26	0	11	107
May	0	3	5	35	44
Jun	12	0	23	0	35
Jul	0	0	28	0	28
Aug	8	0	10	0	17
Sep	26	0	51	0	76
Oct	16	12	8	0	36
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Bycatch expected	131	74	124	46¹²	376
ASSUMED PINGER AND CLOSURE EFFECTIVENESS RATES					
Jan	0.00	1.00 ¹³	1.00	1.00	
Feb	1.00	0.50	1.00	0.50	
Mar	0.00	0.00	1.00	0.00	
Apr	0.00	0.50	1.00	0.50	
May	0.00	0.50	1.00	1.00	
Jun	1.00	1.00	1.00	1.00	
Jul	1.00	1.00	1.00	1.00	
Aug	1.00	1.00	0.25	1.00	
Sep	0.10	0.10	0.25	1.00	
Oct	0.10	0.10	1.00	1.00	
Nov	0.00	0.00	1.00	1.00	
Dec	0.00	0.00	1.00	1.00	

*Mid-Coast closure includes northern most portion of Section 514.

¹⁰ Mid-Coast closure includes northern most portion of area 514.

¹¹ The #70 assumes a cap of 70 harbor porpoise will be allowed to be caught, accounting for control and non-control nets.

¹² Includes '92-'94 data only for this area.

¹³ 1.00 means pingers are assumed to have no reduction in bycatch; .50 means 50% reduction; .25 means 75% reduction; and .10 mean 90% reduction.

B.4 Outreach, Training, and Certification Programs

The success of the core management proposal relies, in part, on effective pinger use to reduce harbor porpoise bycatch, (including use of the most effective pingers). Fishermen have demonstrated, through experimental fisheries, that segments of the fishing industry can use pingers effectively. Any success in these experimental fisheries is largely because the fishermen took responsibility, organized, and established procedures to facilitate pinger maintenance, communication, and data collection. The TRT believes that similar approaches are absolutely necessary to achieve the expected bycatch reduction through the proper use and maintenance of pingers as a bycatch mitigation measure.

Therefore, the TRT recommends that there be certification of all fishermen wishing to participate in a pinger fishery. As a part of this certification:

- Each vessel owner and fishermen who wishes to use pingers must participate in a pinger certification program. (Such certification program could be conducted cooperatively by National Marine Fisheries Service and members of the Take Reduction Team *and established cooperatives* at the following New England harbors: Stonington, ME; Boothbay Harbor, ME; Portland, ME; Portsmouth, NH; Hampton/Seabrook, NH; Newburyport, MA; Gloucester, MA; Scituate, MA; Chatham, MA; New Bedford, MA; Tiverton, RI; and Point Judith, RI).
- The Certification Program should:
 - Inform fishermen of the reporting requirements under the MMPA; and
 - Introduce fishermen to the proper use of pingers, the experiences of fishermen who have worked with the technology, and the necessary deployment and maintenance procedures; and
 - Inform fishermen of the ~~intent~~, mechanisms, and requirements of the Take Reduction Plan ~~and~~ implementing regulation; and
 - Invite further development of voluntary measures and incentives to effectively implement the Take Reduction Plan and implementing regulations.
- Upon completion of the Certification Program NMFS would issue a certificate to either the vessel owner or fishermen. As a requirement for issuance of a authorization to take marine mammals under Section 118 of the MMPA, the vessel owner should submit with his/her annual registration a copy of the certificate issued in conjunction with the Certification Program. An authorization (and decal) under the MMPA should not be issued until such time as the vessel owners provide documentary evidence s/he has completed the Certification Program.

- NMFS on an annual basis should publish a report on the number of certified vessels.
- The TRT recommends that NMFS establish, as a requirement of participating in a fishery where pingers are used, specifications for pinger use and maintenance. Criteria could include the following:
 - Approval of pinger model, make, and operational characteristics such as frequency, harmonics, loudness, repetition rate, and pulse length; and
 - Willingness to take an observer when requested to do so; and
 - Willingness to allow authorized officers to test pingers; and
 - Submission of weekly trip reports, marine mammal take reports within 48 hours, and other required information; and
 - Adherence to minimum standards for performance/failure rates (e.g. for enforcement purposes the minimum percentage of operational pingers on a string).
- The TRT also recommends and encourages where possible that the fishing industry develop -- programs/cooperatives -- or use existing cooperatives such as the Portsmouth Fishermen's Co-op -- to assist in outreach to the fishing community, maintenance of pingers, and operational characteristics of pingers.

B.5 Canadian Takes of Harbor Porpoise in the Bay of Fundy

B.5.1 Background

Harbor porpoise are taken in gillnet and weir fisheries in the Bay of Fundy. Bycatch in gillnet fisheries in Canadian waters of the lower Bay of Fundy during the mid-1980's was reported to be in excess of 900 animals. In the past three years Canada has embarked on a rigorous bycatch **reduction program** which has seen a 90% decline in the bycatch of harbor porpoise in the lower Bay of Fundy, 424 (SE: 202-648) in 1993 and 101 (95% CI: 80-122) in 1994 (Trippel et al 1995). Initial and unpublished figures put the incidental take for 1995 at approximately 50 animals due to a fishery closure of the Bay of Fundy to gillnetting. The measures by Canada have included the use of net alarms or "pinger," effort limitations (fishermen are limited to 1050 fathoms of net), education of fishermen, and as high as 60% observer coverage on gillnet vessels willing to carry observers. In 1996 it is anticipated that observer coverage will be 80% in conjunction with a "pinger experimental fishery."

The Committee on the Status of Endangered Wildlife in Canada considers the GME/Bay of Fundy harbor porpoise to be threatened with extinction.

Canada has finalized a Harbor Porpoise Conservation Strategy for the Bay of Fundy (HPCS). The plan has two goals. The first is "to reduce the take to below a level which compromises a sustainable population taking into consideration ecological variability." The strategy states that total mortality is not to exceed two percent of the total population of harbor porpoise. Therefore, the management measures of the HPCS recommend that Canadian take levels should not exceed the 1994 level of 110 animals. The second goal of the strategy is, once the first goal has been realized, to eventually "remove the classification of the harbor porpoise from that of 'Threatened'." According to the strategy, once this level is reached and after consultations with the fishing industry the gillnet fishery will be closed in the areas that have been deemed to be most responsible for the incidental take.

The United States and Canada have developed an effective mechanism for collaboration and communication between the two nations. It is anticipated that Canada and the United State will continue to work to reduce harbor porpoise bycatch. To that end the TRT provides the following recommendations.

B.5.2 Recommendations

(The United States and Canada have developed an effective mechanism for collaboration and communication between the two nations. Should either party deem that deliberations or collaboration is **not obtaining the mutually agreed upon goals of conservation measures** then either party can request to convene a meeting of the TRT including NMFS and DFO to address the outstanding or controversial issues.) Once the Take Reduction Plan (TRP) is in draft form and open to public comment, NMFS should initiate consultations with the Canadian Department of Fisheries and Oceans to:

- Obtain comments on the TRP to ensure wherever feasible and possible while recognizing the different management and regulatory limitations of each county, take reduction policies that are compatible and complimentary;
- Urge Canada to develop a complimentary plan or amend its existing HPCS to be consistent with the Gulf of Maine/Bay of Fundy TRP and consider mandating a lower level of take than the current level of 110;
- Review regularly the progress of both the HPCS and the TRP by NMFS and the DFO and representatives of the TRT to evaluate the effectiveness of both the HPCS and the TRP;
- Institute a remedy option if needed; and
- Outline a timetable for meetings between NMFS officials and representatives of the TRT and DFO and representatives of the Harbor Porpoise Advisory Team to review new population and bycatch estimates and the progress made under the HPCS and the TRP.

B.6 Enforcement

Because this plan requires certification in pinger use in order for fishermen to obtain authorization to take marine mammals; and because it designates certain areas as pinger use only, as a means of reducing bycatch, enforcement of its provisions is necessary to prevent lack of compliance from undermining the core management plan. The TRT recommends that NMFS pursue discussions with appropriate agencies to assure that enforcement of the components of the TRP is given a high priority. Further, the TRT recommends that in consideration of any enforcement action to be developed that NMFS and other federal agencies provide the TRT and other interested parties the opportunity to review and comment on enforcement guidelines.

B.7 Takes of Harbor Porpoise in the Mid-Atlantic Region

B.7.1 Background

Harbor Porpoise are taken by gillnet fisheries in state and federal waters in the Mid-Atlantic region of the United States. NMFS is currently attempting to quantify bycatch through an observer program in that region. States that are members of the Atlantic States Marine Fisheries Commission have been encouraged to document interactions between state fisheries and federally protected species such as the harbor porpoise.

The Commonwealth of Virginia has provided fishermen in its waters with pingers as a means of addressing takes of harbor porpoise. No experiments have been designed to monitor efficacy or effects of pinger use in this region.

Harbor porpoise taken in this region are part of the same stock covered under the jurisdiction of the Harbor Porpoise TRT. The total PBR (403) animals must be allocated to all fisheries interacting with this stock. For this reason, this TRT constructed a plan that will likely result in bycatch in the New England region that would be below PBR. NMFS is expected to convene a Mid-Atlantic Team to address bycatch in the mid-Atlantic. Coordination of the two Teams and continuity and consistency between the two TRP's will be essential to ensure fair allocation of bycatch reductions and to minimize ecosystem and economic impacts.

There are a number of boats that fish in both the New England fishery and in Mid-Atlantic region as well. Most of these boats are targeting dogfish, which are not currently covered under groundfish effort reduction plans. The transient nature of these vessels affects effort and bycatch in both areas, and at the present time, is not well understood.

B.7.2 Recommendations

The TRT recommends that:

- There be overlapping membership between the Harbor Porpoise TRT and the Mid-Atlantic TRT to maximize communication and to help ensure coordination;
- Data on bycatch and effort in both regions should be shared with each of the TRTs; and
- Effort should be made to document the number of boats fishing in both the New England and the Mid-Atlantic region.

B.8 Rolling Evaluation of the TRP

B.8.1 Background

As a part of its concern with an adaptive management approach, the TRT agreed that there should be a biannual evaluation of the progress of the TRP toward reaching the PBR and other goals of the MMPA. The first evaluation will occur 7 months after the TRP becomes a final rule. This evaluation will assess the progress during the first 6 months of implementation. A second evaluation, which will assess the progress during the second 6 months of implementation, will occur in the 13th month. These evaluations will examine whether the expected reductions in bycatch of harbor porpoise have occurred. They will also examine any research undertaken in conjunction with the TRP and research on whether there are or are not impacts on the marine environment. If the levels of reduction in bycatch have not met expectations or if other developments warrant, the TRT may choose to recommend modification of the TRP as a result of the evaluation. For the TRT to assess the effect of the TRP on bycatch of harbor porpoise, current data on bycatch must be made available to the Team.

B.8.2 Recommendations

The TRT recommends that prior to each of the evaluations, NMFS provide the TRT with at least the following:

- An analysis of bycatch rates and total estimated bycatch for each statistical area during the six month period prior to the meeting to evaluate progress (as part of this, the TRT will also need information on estimates of effort in each statistical area and final publication of the 1996 - 1997 Marine Mammal stock assessments.);
- Information, where available, of estimates of Canadian and Mid-Atlantic bycatch;
- An estimate of the number of vessels registered in the fishery as well as the number of vessels with exemption certificates that have been issued pursuant to

the training program in pinger use. This information will allow an estimate of compliance; and

- A summary of compliance with the TRP recommendations and the implementing regulations.

B.9 State Gillnet Fishery and Bait Gillnet Fishery

B.9.1 Background and Recommendation on State Gillnet Fishery

Vessels engaged in state only gillnet fisheries, or using gillnets to capture bait, are not enrolled in the federal observer program for monitoring marine mammal bycatch. Therefore, the size of the fisheries, and the degree to which they may interact with porpoises is unknown. Additionally, any incidental kill by these fisheries is not included in bycatch estimates. This may be problematic, as these fisheries operate in a manner that could be expected to take porpoises, and often occur at times and in areas where the potential for interaction is high. These vessels may not be included in any data base or registration program, making it difficult to identify and monitor them, if necessary, or to supply them with regulatory information.

Some TRT members noted that these are vessels engaged in fisheries using gillnet-type gear. Tuna fishermen prefer live bait, often herring or mackerel. In the Gulf of Maine, tuna fishermen characteristically search for schools of bait using echo sounder technology. Once a bait school has been located, a 50 to 100 foot, small mesh (~3 inch monofilament) net is dropped into the school. The net is anchored to, but not necessarily on, the bottom. Because the captured fish are desired live, soak time is minimal, usually 15 to 30 minutes. Nets are usually, but not always, tended.

Because this fishery is specifically directed at harbor porpoise prey (e.g. schools of herring), there could be interaction potential. However, the small mesh and short soak times may reduce the potential for entanglement. The most likely times of interaction would be in the Northeast area during the summer, and the Mid-Coast area during the late summer and fall.

Acknowledging that there may be concerns associated with state only gillnet fisheries and recognizing that the TRT did not have time to address this issue the TRT recommends:

- That at the next scheduled TRT meeting information on this fishery be provided and issues be discussed.

B.9.2 Background and Recommendation Bait Gillnet Fishery

Addressing the possibility that new gillnet fisheries could be introduced into harbor porpoise closed areas the TRT recommended that:

- Other than bait nets, there will be no other gillnets in any harbor porpoise closure areas except as provided in this TRP.

C. Data Collection and Management Recommendations

C.1 Background

In the course of examining data on population abundance, bycatch estimates, fishing effort, and pinger usage the TRT identified the need for new or additional research, adjustments to the existing data collection methods, and changes to database management and reporting.

C.2 Stock Assessments

Section 117(c)(1)(A) requires that stock assessments be reviewed and if necessary revised at least annually for strategic stocks. The TRT concurs with this requirement and, in addition, recommends that NMFS undertake the following:

- Complete the data analysis from the 1995 harbor porpoise abundance survey, calculate a 1995 abundance estimate, and revise the pooled abundance estimates to include 1995 estimates for harbor porpoise;
- Using the revised abundance estimate recalculate the minimum population estimate (N_{min}) and the Potential Biological Removal level (PBR) prior to 1996-1997 marine mammal stock assessments;
- Conduct harbor porpoise abundance surveys at least every three years and not more than every two years;
- Expand the survey boundaries in areas of high harbor porpoise density; and
- Conduct studies to elucidate the relationship between the harbor porpoise migration route, salinity, water temperature, and other oceanographic variables.

C.3 Bycatch Estimates

Bycatch rates are calculated based on the number of harbor porpoise (observed) killed in sea sampled hauls divided by the number of sampled hauls. Since the bycatch rate is calculated from data obtained by observers working aboard fishing vessels, it is important that observed vessels be representative of the fleet, and that sampled trips on particular vessels be representative of that vessel's normal fishing practices. If such assumptions are

not met, bycatch rates and estimates of total catch will be compromised. Therefore, it is important that NMFS assure the reliability of the sea sampling (observer) program.

Total bycatch is estimated by multiplying a bycatch rate by the total effort for the entire fishery. The total effort is determined by aggregating landing weigh out reports according to port of call and calculating the estimated number of weighout hauls by multiplying the tonnage in the weighout data by the sea sample hauls per sea sample tonnage.

The TRT generally agrees that dealer weighout data and fishery logs have significant variations that can affect the total bycatch estimation calculation.. For example, logs may be incomplete, or the use of weighout data as a basis for extrapolation to bycatch levels do not take the heterogeneity of fishing success into account or rates may not be accurate due to misinformation about the number of active gillnetting boats. Moreover, the TRT unanimously agrees that more timely bycatch estimates would allow it to improve management advice. Therefore, the overall goal of the following recommendations is to create greater confidence in the bycatch estimate and move toward a "real time" data reporting format for bycatch estimates by refining the data reporting and collection system, improving the data used to calculate bycatch rate and total bycatch, and streamlining the calculation of bycatch rate and total bycatch.

As regards reporting, the TRT recommends that:

- Within one year of implementation of the TRP, NMFS, and the NEFMC in conjunction with the fishing industry, environmental organizations, and TRT members, review reporting requirements under the MMPA and the FCMA and complete measures to consolidate, simplify, and revise these reporting requirements and the manner in which the data are reported (e.g. logbooks); In conducting this review NMFS should investigate mechanisms to automate the existing system, modify log forms to facilitate data entry by an automated or computerized data processing system, consider separate reporting logs or requirements for gillnet fishermen, and determine what data are necessary on the reporting forms to ensure the accurate effective reporting of gillnet fishing effort and marine mammal bycatch; and
- An analysis of the observer program to assess the reliability and the validity of various assumptions pertaining to calculations based on data generated from the program.

In addition to improving the data used to calculate bycatch rate and total bycatch, the TRT recommends that NMFS undertake the following:

- Work with fishermen on the TRT who have been analyzing various data base lists to improve estimates of effort of the gillnet fleet;

- Calculate bycatch rates based upon on-watch (dedicated) observations and net days and make determination as to whether this method significantly changes or improves the accuracy of the bycatch rate or estimate;
- Calculate bycatch rates and total bycatch by management area and month to fine tune pinger use and closure strategies; (management areas need to be consistently defined the same, (consistently use the same parameters e.g. Area 514, 515 or Mass Bay, South of Cape Cod, Northern Gulf of Maine, etc.);
- Allocate observer coverage to match harbor porpoise management areas and strategies and conduct a power analysis to calculate the level of observer coverage needed to obtain more precise estimates of bycatch by time and area; and
- Investigate stratification schemes to account for different types of effort, on target species, different gear depths, and pingered fishing effort.

C.4 Fishing Effort

The TRT acknowledges that it is critical to have reliable estimates of fishing effort in order to accurately estimate porpoise bycatch. Obtaining estimates of fishing effort requires knowing the number of vessels actively fishing in the gillnet fishery, identifying a appropriate measure or unit of effort, and assessing the influence of different kinds of gillnet fishing (e.g. tie down versus stand up gear) on fishing effort determinations and bycatch.

To that end the TRT recommends that NMFS undertake the following during the first two years of the TRP:

- In conjunction with the MMPA registration program, develop and conduct a certification program for those fishermen who elect to use pingers (see Implementation section herein for details and discussion);
- With the input of the TRT, investigate and identify various measures a unit of gillnet fishing effort to more reliably measure the rate of harbor porpoise take;
- Once NMFS identifies potentially reliable unit(s) of fishing effort, engage in an overlapping period of data collection using the present and proposed units, conduct an analysis to compare both (all) methods for validity, and back check harbor porpoise bycatch estimates made with the old methods; and
- If NMFS selects a method other than the existing weigh out system, establish a transition period, and calculation methods or correction factors to ensure compatibility with existing data; and

- Investigate through a formal, systematic study the difference in bycatch rates of various gillnet fishing gear including tie down vs. stand up gear, mesh sizes, fishing depth and submarine terrain.

C.5 Pinger Research Needs:

The core of the TRT plan establishes "pinger use" areas (See Section B.3.1 herein). The use of pingers necessitates that NMFS continue to examine, among other things, pinger performance and effects regarding harbor porpoise bycatch, operational considerations and reliability, and whether there are or are not impacts on the marine environment. The operational components of pinger use are discussed in the Implementation Section. However, a number of questions about design of pinger experiments and effectiveness of pingers were raised during the TRT discussion. This section addresses recommended design considerations and questions that need to be addressed regarding pinger effectiveness.

C.5.1 Design Considerations for a Spring Pinger Experiment

To ensure that the results of the spring pinger experiment are consistent with prior work, the TRT recommends duplicating at least the following design parameters. These are adopted from the successful 1994 Pinger experiment.

- Prior to the initiation of field trials in spring 1997, the research team should conduct an analysis of the statistical power required to detect a significant reduction in the reduction of porpoise mortality using acoustic alarms. This analysis should be constrained by the mortality cap (70 animals) placed on the experiment. The analysis should consider the following sources of variation: (i) bycatch rates of harbor porpoises using data from previous years in the same area and season; and (ii) various potential reductions in the bycatch rate due to the use of acoustic alarms.
- Industry and NMFS should determine the number of vessels participating in the experiment. Note that the more vessels that participate, the greater the probability of reaching the mortality cap (and closing the experiment). Fishermen should agree to restrict their gear and fishing practices to certain design constraints, particularly string length, soak time, mesh size and tie-down characteristics. These design specifications should be decided by industry, but all participants must agree to the experimental conditions in order to participate in the experiment. (The number of observers available may limit the number of vessels that can participate).
- Each vessel should carry an observer that has been provided by the Manomet Observatory under contract to NMFS. Observers should be rotated from vessel to vessel throughout the course of the experiment and collect data on

the number of porpoises captured, the location, water depth and configuration of each string of nets, the duration of soak time, and other appropriate observations. Fishermen should estimate the weight of each species of fish caught in a string and report whether or not any of the target fish species in a string have been damaged by seal predation.

- Two types of alarms should be used in the experiment. Both types should be outwardly identical, but one (active alarm) should produce an acoustic alarm and the other (control alarm) should be silent. Active devices should be equipped with a switch that triggers the alarm upon complete immersion in salt water. The acoustic characteristics of active alarms should be the same as those used in the 1994 experiment. Each alarm should be coded with a number that allows researchers to track battery life, losses, malfunctions, and the identity of alarms in the vicinity of porpoise by-catches.
- Alarms should be attached to the head rope of gill net strings at the end of each string and at each bridle, where individual nets are attached to each other. Each string should be equipped with either a set of active alarms or a set of control alarms. The choice of active or control alarms for each string should be made with a coin toss. **Observers** should carry a new set of dry alarms aboard the vessel each **day** and **replace** the alarms on strings of nets as they are retrieved. **All alarms should be changed** on a string each time it is retrieved. Neither the observers **nor the fishermen** should know which alarms were active or which were controls **before** the string was set.
- To maintain the double blind feature of the experiment, alarms should be tested and dried by the coordinator each time they return to shore, to eliminate the potential for **sporadic** triggering of active alarms. The coordinator should **rotate sets of** alarms so that no fishermen will see the same set of numbered **alarms during** any month of the experiment. Fishermen and observers **should** attempt to retrieve all entangled porpoises; these carcasses should be brought back to shore and examined in detailed necropsies in Woods Hole Oceanographic Institute, including examination of stomach contents.

C.5.2 Effectiveness of Pingers

The objectives of research into the effectiveness of pingers and the environmental/habitat effects of pinger use are to investigate a) the effectiveness of pingers at different times/seasons and locations, b) the spatial/audible distance of pinger signals under various environmental settings (e.g. acoustic mapping) c) whether harbor porpoise habituate to pingers or are excluded from essential habitat with continued pinger use and d) whether other species of marine life are negatively affected by the use of pingers. To

address these variables over the course of the TRP implementation the TRT recommends the following studies.

- Within the first year of the plan NMFS should develop and begin to undertake both short- and long- term studies to investigate harbor porpoise behavior around pingers, habitat exclusion, and habituation as well as surveys to note differential distribution of harbor porpoise near pinger use areas/experiments to assess displacement. Such studies may employ the use of theodolites near-shore to investigate habitat exclusion and enhanced observer monitoring programs to assess habituation based on bycatch rates. It was generally accepted that habituation concerns would require long term analysis.
- By the second year of the TRP, NMFS should establish a research program to determine ambient noise level and baselines within each of the management areas. The program will also examine soundfields around pinger gillnets, variability by season, location, and oceanographic conditions so NMFS may determine appropriate sound-source levels for pingers in various areas.
- At the end of the second year of the TRP, NMFS should develop studies to be conducted in the third year to investigate the effects of pinger sounds on non-target species, with priority given to threatened and endangered species, and distribution of primary prey species. Research should take care to distinguish between the effect of pingers on primary prey species and the rapidly developing fishery in New England for herring and mackerel.

C.6 Gear Technology Research and Development

A part of reducing bycatch will be development of new fishing technologies. The TRT recommends that:

- NMFS join with gear technologists and fishermen to develop new gillnet fishing gear to further reduce interaction of harbor porpoise and the sink gillnet fishery.

V. Conclusion

After extensive negotiation, the TRT was able to develop recommendations herein that achieve the purpose of the TRT. The TRT members expect NMFS to adopt this plan and take each of the recommendations seriously so that when the TRT is reconvened in month 7 of implementation of the plan, the TRT can move forward productively and efficiently.

VI. Appendices

- A. Socioeconomic and Environmental Benefits of Sink Gillnet Fishery:
Provided by the Gillnet Fishermen on the Harbor Porpoise Take
Reduction Team**

- B. References**

**Socioeconomic and Environmental Benefits of Sink Gillnet Fishery:
Provided by the Gillnet Fishermen on the Harbor Porpoise Take
Reduction Team**

(This document was not discussed by the TRT and is not a consensus document.)

The Northeast sink gillnet fishery is a fixed gear, passive, ocean floor fishery with many important economical and environmental benefits. It should not be related or confused with the high seas driftnet fishery or the unregulated small mesh gillnet fishery of Southern California. Environmental benefits include its passive impact on bottom habitat (as well as protection of that habitat), fish size and species selectivity, low bycatch, little juvenile retention, low discard mortality and fuel efficiency. Because of its fixed gear nature, it is easily managed and regulated. Gillnetters consistently land a very high quality fish product, employing large numbers of workers, both deck hands and support service workers. The sink gillnet is the most widely used gear type worldwide. Its existence as an important, environmentally sound and economically viable fishery must be preserved.

IMPORTANT ECONOMIC AND SOCIOECONOMIC CONSIDERATIONS

Because of the nature of this small boat/owner operated fishery, gillnetting will always provide employment for many, not just a few. Traditionally, the gillnet fleet has consisted of small boat/owner operated vessels (average size approximately 45') employing 2-4 deck hands. Harvesting of groundfish and, in states other than Maine, crustaceans, by gillnet has always been a manually intense means of fishing which does not lend itself to substitution by automation for that labor intensiveness. For this reason, sink gillnetting will always offer high employment capabilities within the industry and the community. In addition to captains and crew, the fishery also provides employment for support services and infrastructure of the industry through dealers, gear manufacturers, net makers, dock workers, truck drivers, fuel companies, fish processors, etc. Even though the small boat segment of the New England fleet comprises the majority of users throughout the region, it accounts for the smallest portion of total pounds landed. The nature of gillnetter vessels as owner operated small boats allows them to remain cost effective, economically viable and community oriented. The gillnet fishery is an integral component of the make-up of the industry and should be valued as one of the many small, micro-enterprises of New England. It remains an essential part of the priceless fabric of many coastal communities.

IMPORTANT ENVIRONMENTAL CONSIDERATIONS

Most importantly, in light of declining groundfish stocks and habitat degradation, acceptance of the gillnet fishery as environmentally important is essential to sound management and environmental policy. Gillnet fishermen have taken an active role in helping to develop sound measures to preserve fish populations, marine mammals, and habitat in the management process.

Size and Species Selectivity - An extremely important factor in examining the environmental merits of the gillnet fishery is its ability to be size and species selective. There can be no doubt that the sink gillnet fishery of the Northeast is a highly selective gear type on the targeted species it pursues and the size of fish caught in the net. This can be substantiated by the fishermen in the industry themselves and supported by the data that has been accumulated by the NEFSC through the observer program.

Size Selectivity - Gillnetters fish with nets with mesh sizes from 6" to 12" and some larger. There is no other gear type presently in the multispecies fishery of the Northeast that uses mesh beyond the minimum requirements. Even six inch mesh consistently lands fish larger than minimum size requires (for example, few scrod cod are landed in 6" mesh nets - market size and larger cod are the rule). This translates into a fishery that consistently harvests fish well beyond the minimum length requirements, leaving bycatch of sublegal fish and juvenile mortality at a minimum.

Species Selectivity - Gillnetting, by nature, is a species directed fishery. Its selectivity by species can be manipulated by mesh size and by different gear rigging practices. Different mesh sizes lend themselves to different species and sub-species of fish (for example, monkfish require 10" mesh or larger, haddock - 5 3/4" and cod - 6" - 7" mesh). Differences in rigging might include tie downs or foam core for targeting flounder.

Bycatch - Bycatch of unintended target species and wasteful discard practices are of escalating concern in fishery management. The sink gillnet fishery has a proven record minimizing these bycatch concerns in terms of the groundfish fishery, according to observer data. An important consideration for gillnetting is that fish and shellfish have the potential chance of being returned live to the ocean again and that **juvenile bycatch is almost nonexistent**. Closer working of this data need to be done and will eventually prove gillnetting as an important fishery in encouraging fish stocks to rebound. Eliminating wasteful juvenile mortality and encouraging clean fishing practices is essential and achievable by gillnetting.

Interaction with harbor porpoise has long been a recognized area for improvement in the sink gillnet fishery. Northeast sink gillnet fishermen have been meeting in an ad-hoc group with environmentalists, conservationists, and scientists for over five years to solve this problem. They have proven themselves as environmentally responsible in an age of great waste in the fisheries and are recognized for their unique and continuing efforts.

Bottom Habitat Preservation - As a passive, fixed gear, strings of gillnets rest near the bottom causing no habitat degradation. They do not destroy or disturb important ocean floor ecosystems. As well as being "habitat friendly" gillnets also serve as a protection to sensitive areas that, in their absence, would be subject to mobile gear towing on a regular basis.

Fuel Efficiency - The fishery has great value in its low energy use versus harvest production per unit of effort. Boats steam only to haul their nets and home again. This, naturally, is valuable in a world of diminishing energy resources and will become more prevalent as a factor in the future as fuel resources continue to decline.

Easily Managed - Because of its small boat, fixed gear nature, it lends itself to ease in management and enforcement of regulations. Amount of nets fished and mesh size provide the tools important to managing this fixed gear and should be recognized as the proper way to manage this specific fishery.

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