

PROTECTED SPECIES AND NEW ENGLAND FISHERIES: AN OVERVIEW OF THE PROBLEM AND CONSERVATION STRATEGIES

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ABSTRACT - Protected species issues are an integral part of New England fishery management. Significant interactions of marine mammals and sea turtles with commercial fishing gear have been documented for many years. Statutes and regulations governing commercial fishery/protected species interactions provide for conservation and recovery of protected marine species. Some species of marine mammals, sea turtles, and fish are listed under the Endangered Species Act of 1973, and all marine mammals are managed under the Marine Mammal Protection Act of 1972. Both these statutes have provisions linking them to commercial fisheries and provide varied strategies for reaching conservation goals. Interactions of protected species with commercial fishing gear range from direct entanglement, capture, and disruption of normal behaviors, to adverse modification of critical habitats. For the foreseeable future of New England fisheries, it is likely that wherever protected species and fishing activity co-occur, interactions will continue. Management trends include increased stakeholder involvement, close coordination with fishery management, and emphasis on technological solutions to interaction problems.

PROTECTED MARINE SPECIES IN NEW ENGLAND

Marine Mammals

The marine mammal species protected under the Marine Mammal Protection Act of 1972, as amended (MMPA), include 153 stocks nationwide, of which 51 are classified as strategic, 31 are considered depleted, and 28 are listed under the Endangered Species Act of 1973, as amended (ESA). Population trends are available for only 30 stocks (due to insufficient long-term population data); of those, one is stable or increasing, four are declining, six are stable, and 19 are increasing (National Marine Fisheries Service (NMFS), unpublished data). Six marine mammal species present in New England waters are listed under the ESA: the north Atlantic right whale (*Eubalana glacialis*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), blue whale (*Balaenoptera musculus*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter macrocephalus*). Harbor porpoise (*Phocoena phocoena*) is currently on the candidate species list.

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Most of these animals are widely distributed in the western Atlantic, migrate over large distances, and are generally highly mobile. This makes predictability of potential interactions with commercial fishing gear difficult. For several species, recognition of distribution patterns between years has helped to manage potential adverse impacts. For example, right whales are plankton feeders and more coastal in distribution than many of the other species, making location patterns more predictable. Concentration areas for species such as humpback and fin whales have also been observed on an annual basis. However, these whales are feeding on highly mobile and annually variable schooling fish, making identification of critical habitat more elusive. Blue whales, sperm whales, and sei whales are the most pelagic of the six species and are more rare in New England coastal waters.

Non-endangered marine mammals, which include members of the orders Cetacea (dolphins, porpoises, and whales) and Pinnipedia (walrus, seals, and sea lions), exhibit similar distribution characteristics. Some species are more coastal [e.g. harbor seals (*Phoca vitulina*) and harbor porpoise (*Phocoena phocoena*)] and some are more pelagic in their distribution [e.g., white-sided dolphin (*Lagenorhynchus acutus*) and Atlantic spotted dolphin (*Stenella frontalis*)]. Making a generalization, it is safe to say that some marine mammal species, both endangered and non-endangered, are always present in the same areas inhabited by commercial fisheries.

Sea Turtles

All four species of sea turtles regularly seen in New England waters are ESA-listed; the Kemp's ridley (*Lepidochelys kempii*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*) sea turtles are listed as endangered, and the loggerhead (*Caretta caretta*) is currently listed as threatened. However, scientists have recently determined that the trend of the northern sub-population of loggerhead turtles may be showing a decline, and the population status may need to be revised (Turtle Expert Working Group 1998).

As with marine mammals, sea turtles are widely distributed in the western Atlantic and undergo long-distance migrations from the warm waters where nesting occurs in the south to northern feeding areas in New England. The hard-shelled turtles are from the family Cheloniidae, which includes the Kemp's ridley, green, and loggerhead sea turtles. They are found in New England from May or June, when waters reach approximately 11°C, through October, November, or December when they head south following warmer water. These turtles are susceptible to mortality from hypothermia, called "cold-stun," if the water temperature changes too rapidly or the turtles remain too long into fall in warmer, protected areas like Long Island Sound and Cape Cod Bay

(Morreale et al. 1992, Prescott 1982). The smaller turtles (e.g. Long Island Kemp's ridleys) are usually more coastal in distribution, with the larger loggerheads being found in the more pelagic areas of New England fishing grounds. Hard-shelled turtles in New England are somewhat opportunistic in feeding habits, preying primarily on crustaceans and molluscs but also taking fish.

Leatherbacks are from the family Dermochelyidae, characterized by a lack of hard scutes, reduced bone in carapace and plastron, and a leathery outside shell layer (Lutz and Musick 1996). In contrast to the Chelonid turtles, they are able to thermoregulate to some extent. Individuals can be found most of the year in northern waters as far north as Nova Scotia. They feed primarily on jellyfish and are mostly pelagic. However, they will opportunistically follow incursions of jellyfish into more coastal areas.

Stock assessments, like those available for marine mammals, are not available for sea turtles. It is extremely difficult to collect population information on sea turtles, and most of the abundance estimates are from nesting beaches, where females are visible and accessible. A workshop was held in 1998 to attempt to assess Kemp's ridley and loggerhead populations in the western North Atlantic (TEWG 1998). The NMFS selected a team of population biologists, sea turtle scientists, and life history specialists to examine the status of those populations. Data gaps prevented the Turtle Expert Working Group (TEWG) from developing complete age-specific assessments, but they were able to analyze population trends for these species. The south Florida sub-population of nesting female loggerheads is the largest and is stable, possibly increasing; as already mentioned the northern sub-population of loggerheads has declined since the 1980s and is unlikely to reach the recovery goal. Kemp's ridley sea turtle appears to be in the early stage of exponential expansion, again based on nesting females/number of nests. Similar work groups will be directed at the other sea turtle species in the future. However, data are even more limited for those species.

HISTORY OF COMMERCIAL FISHERY INTERACTIONS

Documented interactions of marine mammals and sea turtles occur in the following gear types: trawls, gillnets, longlines, pot gear, seines, weirs, and pound nets (NMFS sea sampling observer data, stranding data, state fishery data).

Particular gear types may be more of a problem for certain species than others, although there are also some types of gear that are of significant concern for all species. For example, trawl gear is primarily a problem for sea turtles and smaller non-endangered marine mammals, although there have been a limited number of large whale incidental

take records. Anchored and drift gillnet gear have by far the largest overall impact in terms of the largest number of species for which interaction results in serious injury and death. Leatherback sea turtles and large whales become entangled in lines associated with pot gear, also resulting in serious injury and death in some cases. Offshore pelagic longline gear takes thousands of sea turtles and non-endangered marine mammals each year in the western Atlantic alone (Johnson et al. 1998); many are released alive, but the rate of serious injury and death after release is largely unknown. Interaction with this gear ranges from snagging an appendage and entanglement in the leader, to swallowing the hook, where potential for long-term effects is more of a concern. In contrast, sea turtles are often found alive and well in pound net gear, although if large mesh is used in the leaders, they can become entangled and drown. Similarly, large whales have been documented alive and well in fish weirs.

Types of impacts to protected species interacting with fishing gear include entanglement/capture, where serious injury and mortality are common, to less direct impacts such as effects on prey dynamics or adverse modification of a critical habitat. For example, although fish-feeding whales are opportunistic as far as prey are concerned, herring are a common prey species for humpback whales in New England. If removals through a commercial fishery were too large, they could have ecosystem effects, reducing the amount of forage available to the whales. Another example might be if gillnet effort in Cape Cod Bay were so prolific that it actually prevented right whales from being able to physically use a critical foraging/nursery habitat.

THE REGULATORY ENVIRONMENT

ESA Conservation Strategies

ESA Section 4 provides criteria for listing endangered species, and the listing serves as a warning that human activities could cause impacts on species vulnerable to extirpation. Once listed, the primary ESA tool for managing protected species interactions in federal commercial fisheries is through the consultation provisions of Section 7 and, for state fisheries, the development of cooperative agreements through Section 6 and conservation plans through Section 10.

In New England, the consultation provision has been the most often used tool from the ESA kit. Section 7 requires that a federal agency engaged in, permitting, or funding any activity that occurs in an area where ESA-listed species are present, must evaluate potential impacts on those species. Once a determination is made that the activity may affect those species, the federal agency must consult with the US Fish and Wildlife Service (FWS) and the National Marine Fisheries Service

(NMFS) as appropriate. This consultation is to ensure that these activities do not jeopardize the continued existence of any listed species and provides for conservation and recovery actions aimed at minimizing the potential for impacts or at promoting species recovery. The final result of the process is a “biological opinion” issued by the NMFS or FWS that analyzes expected impacts, provides measures to minimize those impacts, and authorizes incidental takes (if appropriate). Under this provision, all fisheries conducted in federal waters (greater than 3 miles from shore) for which there is an associated federal fishery management plan (promulgated under the Magnuson-Stevens Fishery Conservation and Management Act of 1996) are reviewed for potential impacts to protected species. Since this section deals only with actions permitted, conducted, or funded by federal agencies, fisheries for which there is no federal fishery management plan would have to be dealt with through Section 10.

In New England, a jeopardy determination has been found only for certain fisheries interacting with the right whale. Due to severely restricted numbers, any serious injury or mortality in this population is cause for concern. NMFS relied largely on the Atlantic Large Whale Take Reduction Plan components, developed under the MMPA process described in the next section, to provide the reasonable and prudent alternatives for these fisheries.

Currently, incidental take allowances have been granted for sea turtles and shortnose sturgeon (*Acipenser brevirostrum*) in New England, but to date they have not been issued for any of the large whales. This is due to interaction between the MMPA and ESA; for endangered marine mammals, the agency must also show that the incidental taking constitutes a negligible impact on the marine mammal stock. Determinations that any takes of endangered large whales can meet the negligible impact criteria have not been made at the current time.

Alternatives and conservation measures that have been provided in “biological opinions” to date include items such as time-area closures, gear modifications, fishing method modifications, and outreach and education. They also usually include some level of monitoring, data analysis or research, and development suggestions. These changes recommended in the NMFS/FWS “biological opinion” can then be implemented through the fishery management process that developed the regulation implementing the FMP, or through separate ESA or MMPA regulation.

MMPA Conservation Strategies

In 1994, the Marine Mammal Protection Act was amended. As a result, marine mammal stocks needed to be classified as strategic if incidental take exceeded the potential biological removal level (PBR). PBR level was defined in the MMPA as the “maximum number of animals, not including natural mortalities, that may be removed from a

marine mammal stock while allowing that stock to reach or maintain its OSP (optimum sustainable population)" (16 U.S.C. 1362). Congress specified that PBR level would be calculated as the product of the minimum population estimate of the stock, one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size, and a recovery factor between 0.1 and 1.0 (16 U.S.C. 1362).

Take Reduction Teams (TRTs) and Take Reduction Plans (TRPs) were required for those stocks considered strategic, i.e., where interactions with commercial fisheries caused serious injury or mortality to the marine mammals. Secondary were instructions to develop and implement plans for fisheries that had a high level of mortality or serious injury across a number of marine mammal stocks. The amendments also set two separate goals. Within six months, the take reduction plan needed to provide a mechanism to reduce mortality and serious injury of marine mammals taken in commercial fishing to levels less than the PBR level for each strategic stock. The longer term goal was to reduce, within five years of its implementation, mortality and serious injury to insignificant levels approaching a zero mortality and serious injury rate. For the long-term goal, the plan would need to take into account the economics of the fishery, the availability of existing technology, and existing State or regional fishery management plans.

Four Take Reduction Teams were formed and convened on the East Coast based on the requirements of the 1994 amendments to the MMPA: Gulf of Maine Harbor Porpoise, Mid-Atlantic Harbor Porpoise, Atlantic Offshore Cetacean (AOC), and Atlantic Large Whale (ALW). Two final regulations and take reduction plans have been published, one that combined the Mid-Atlantic and Gulf of Maine harbor porpoise strategies into one Harbor Porpoise Take Reduction Plan (HPTRP) and one for the Atlantic Large Whale Take Reduction Plan (ALWTRP).

Describing what transpired during the take reduction team processes is outside the scope of this paper. The reports of team deliberations presented to the NMFS, developed by an independent facilitator, are available from the agency and the final regulations for harbor porpoise and large whales are available through the Federal Register (63 FR 66464, December 2, 1998; 64 FR 7529, February 16, 1999). However, what is of interest in looking at the future of New England fisheries are the strategies that the teams developed for reducing serious injury and mortality of marine mammals by commercial fisheries.

The HPTRP took two different approaches for New England (CT/RI border to ME) and the Mid-Atlantic (CT/RI border to NC), based on differences in the gillnet fisheries between the two regions. The plan focused on the Northeast multispecies sink gillnet fishery and the Mid-Atlantic gillnet fishery. In New England, the plan required: (1) a series of time-area closures that were very similar to those originally proposed

by the team and that were already in place through New England Fishery Management Council action under the Magnuson-Stevens Act, (2) the use of acoustic deterrent devices (“pingers”) over widespread areas and times, (3) mandatory training in the use of the pingers and the goals of the MMPA, (4) other outreach and education efforts, (5) research initiatives to evaluate the potential for other environmental effects of the use of pingers, and (6) extensive monitoring to evaluate plan effectiveness.

In the Mid-Atlantic, the major component of the plan focused on gear modifications which federal observer data suggested would result in fewer harbor porpoise interactions—these included a minimum twine size requirement, float-line length limit, and specifications on nets (tie-downs, net caps, net tagging) over all ocean waters of the Mid-Atlantic. In addition, there were three 20-30 day closures, monitoring, and outreach/education components.

The AOCTRT focused on pelagic longline and driftnet fisheries throughout the western Atlantic and considered both endangered large whales and offshore cetaceans. The general strategies of the AOCTRT’s draft plan consisted of increased observer coverage, coordination of fishery management measures, educational workshops and outreach, development of criteria for assessing marine mammal injuries, and research. Specific strategies for the longline fishery included limited entry, limits on the length of gear, reduction in maximum soak times, moving after one entanglement, development of guidelines for interactions and entanglements, and research on the potential for acoustic systems. Concurrent with the development of this plan, significant actions were underway through the fishery management system to develop a federal fishery management plan (FMP) that included the entire Atlantic pelagic fishery for swordfish, tuna, and sharks. Consistent with the trend to more closely link the fishery management system with protected species needs, the fishery management plan was drafted to include many of the recommendations from the AOCTRP.

The ALWTRP focused on pot and sink gillnet fisheries for the entire western Atlantic coast. The primary components of this plan included time/area closures, gear modifications, gear marking, gear research, expansion of the disentanglement network, expansion of the early warning system, outreach, education, and monitoring. This plan was particularly aimed at reducing risks to right whales. Besides the usual measures applied in the other plans as well (e.g. time-area closures), this plan focuses most heavily on development of viable gear modification options. Work conducted thus far includes items like manufacture of weak links, estimation of tractive forces of right whales, land testing of potential gillnet modifications, baleen tests for snagging on knots, splices, etc.; design of equipment to investigate loads on fishing gear, field testing of certain modifications, and buoy messenger systems. A gear advisory

group of experts was assembled to continue to pursue options and review and monitor works in progress. Also, novel to this plan is the emphasis on disentanglement capabilities to prevent serious injury and mortality from occurring if a whale is entangled, and on significant resource investment in aerial and shipboard surveys to provide mariners and fishermen with timely information on locations of right whales.

THE FUTURE OF NEW ENGLAND FISHERIES IN THE PROTECTED SPECIES EQUATION

Past experience has indicated that where protected species and certain types of fishing gear co-occur, interactions will also occur. However, a solution still seems within our reach. Early monitoring results on the harbor porpoise and large whale take reduction plans are positive. The future work in bycatch reduction will continue stakeholder involvement in development of effective and workable solutions. Cooperation and consultation between state and federal governments, academics, environmental organizations, commercial fishermen, and other interested parties is important. However, close coordination with fishery management also needs continued attention. Promoting marine mammal and sea turtle protection and recovery while allowing commercial fisheries to continue will require emphasis on technological solutions (gear modification), fishing method modifications, and outreach and education. Support for systems to provide real time information on protected species to mariners will continue. And finally, when interactions do occur, there will need to be an increased capacity to prevent them from resulting in serious injury or mortality.

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