

Massachusetts Division of Marine Fisheries Right Whale Conservation Program 2005 Projects and Accomplishments

Submitted to:

**National Marine Fisheries Service
National Fish and Wildlife Foundation
Massachusetts Environmental Trust**



Photo by Erin Burke

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by

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EXECUTIVE SUMMARY

The Massachusetts Division of Marine Fisheries (*MarineFisheries*) has executed their Right Whale Conservation Program for the eighth consecutive year. The purpose of the program is to protect right whales in Massachusetts state waters through research, management, and outreach efforts. In 2005, the program received funding from a number of sources including the National Fish and Wildlife Foundation, the National Marine Fisheries Service, and the Massachusetts Environmental Trust. Through these grants, we conducted a range of cooperative projects related to right whale conservation including aerial surveillance, habitat monitoring, acoustic monitoring, and fixed fishing gear research.

During spring and winter 2005, *MarineFisheries* and the Provincetown Center for Coastal Studies completed the eighth season of the Right Whale Surveillance and Habitat Monitoring program in Cape Cod Bay. Information collected throughout this program reveals seasonal trends in population demographics, habitat usage, and distribution and abundance patterns. *MarineFisheries* also continued to collaborate with Dr. Chris Clark from Cornell University to establish an acoustic monitoring system for right whales in Cape Cod Bay. These listening stations will permit managers to more efficiently monitor right whales and address potential threats by looking at their movement patterns in real-time and over a broader time scale. Another important project, conducted jointly with the Atlantic Offshore Lobstermen's Association, focuses on the development of durable non-buoyant groundline (lines connecting traps). After completing the machine-testing portion of this study and determining which lines performed best, the offshore lobster industry was supplied with samples of those lines for field-testing. In addition, *MarineFisheries* and AOLA are collaborating with a rope engineering company to evaluate the mechanics underlying rope failure. The Commonwealth also continues to establish pro-active, yet practical, regulations for fixed-gear fisheries in state waters to reduce the risk of entanglement of large whales. Effective on January 1, 2007, it shall be unlawful for any person to fish, store, or abandon any fixed gear in waters under jurisdiction of the Commonwealth with positively buoyant groundline.

All of the research, management, and education actions accomplished by the Commonwealth of Massachusetts are aimed at developing practical solutions to reduce human-caused mortality and injury of right whales. With the ultimate goal of co-existence between endangered marine mammals and maritime industries. In 2006, *MarineFisheries* will continue its efforts to conserve right whales in state waters, particularly through the development of an acoustic monitoring system and the development of a durable non-bouyant groundline for use in the lobster fishery. We are grateful to our funding sources for their support of our endeavors.

INTRODUCTION

This report summarizes the Massachusetts Division of Marine Fisheries (*Marine Fisheries*) 2005 North Atlantic Right Whale Conservation Program and its support of the federal Atlantic Large Whale Take Reduction Plan. The Right Whale Conservation Program (RWCP) has continued to broaden the scope of its efforts since 1996, when the Commonwealth of Massachusetts developed a plan to address the threats to North Atlantic right whales in state waters. The Commonwealth now has a comprehensive and cooperative program, supported by several funding sources, that is integrated with other jurisdictions and programs that have similar goals of protecting right whales. Thus, rather than providing separate reports to each funding agency on the various efforts that they supported, a comprehensive report is provided to encompass program efforts and accomplishments.

FUNDING SOURCES

Due to the scope of the program, funding for the 2005 calendar year was obtained from a variety of sources. These include the National Fish and Wildlife Foundation, National Marine Fisheries Service, and the Massachusetts Environmental Trust.

National Fish and Wildlife Foundation (NFWF)

The NFWF provided \$151,776 to support the Commonwealth's Right Whale Conservation Program (# 2003-0170-031). This included support for a collaborative effort with Cornell University's Bioacoustics Research Program (BRP), the International Fund for Animal Welfare (IFAW) and the Woods Hole Oceanographic Institute (WHOI) to provide additional real-time, passive, acoustic monitoring of right whales in CCB; the profiling of fixed-fishing gear; funding for a Protected Species Specialist to oversee the program; and outreach. Some of the NFWF-funded projects discussed in this report are multi-year investigations covering different grant cycles. Thus these projects will be identified by their grant number.

National Marine Fisheries Service (NMFS)

NMFS supported three separate projects in 2005 -- \$421,854 to fund the Right Whale Surveillance and Monitoring Program in Cape Cod Bay (CCB) and \$24,975 to support *Marine Fisheries* response to off-season aggregations of right whales in Massachusetts and Cape Cod Bays. Most of the funding from these two projects was awarded under contract to the Provincetown Center for Coastal Studies (PCCS). In addition, NMFS awarded \$24,950 to a joint *Marine Fisheries* and the Atlantic Offshore Lobstermen's Association study of the mechanics underlying the degradation of sinking groundline.

Massachusetts Environmental Trust (MET)

The Massachusetts Environmental Trust awarded \$38,000 to *Marine Fisheries* to tag basking sharks as surrogates to right whales in the hope of learning more about the right whales distribution patterns. The funding from MET was awarded in 2004, but the project was still ongoing in 2005. This report will provide a synopsis of the work accomplished through the end of 2005 for this project.

Projects and Accomplishments of the Right Whale Conservation Program

During the period January 1 – December 31, 2005 *Marine Fisheries* completed the following activities in implementation of the Right Whale Conservation Program:

1) RIGHT WHALE SURVEILLANCE AND HABITAT MONITORING

For the eighth consecutive year, *Marine Fisheries* conducted a surveillance and habitat monitoring program for North Atlantic Right Whales in Cape Cod Bay and adjacent waters from January 1 - May 15. This program was executed through a contract with the Provincetown Center for Coastal Studies (PCCS) and involves aerial and vessel-based surveillance, as well as habitat monitoring of right whale food resources. All right whale sightings were communicated to the NMFS Sightings Advisory System and the University of Rhode Island, home of the right whale distribution database. Photo documentation of right whales was sent to the New England Aquarium (NEAq), curators of the right whale photo-identification catalog. For the fourth year, near real-time habitat reports were combined with whale distribution data to forecast likelihood of right whale presence and residency in CCB. All aspects of the surveillance and monitoring program aid in the effective management of this highly endangered species. See report by Jaquet *et al* 2005 for complete details.

Aerial Surveillance in Cape Cod Bay

The program effectively monitored for the presence of right whales in Cape Cod Bay and adjacent state waters during winter and spring months. Right whale photo-documentation obtained from aerial surveys was used to reveal seasonal trends in population demographics, habitat usage, and distribution and abundance patterns.

During the 2005 season, PCCS observers completed 39 aerial surveys, totaling 175 hours of flight time over Cape Cod Bay and adjacent waters. Right whales were observed in Cape Cod Bay for 86 days, from January 30 through April 26. This period of occupation is slightly shorter than in 2004 (n=90 days), although in 2004 zooplankton counts were substantially higher than in 2005 (by a factor of two). In 2005, 45 individual right whales visited CCB and their average individual residency time was 13 days. Both these estimates are lower than the average for previous field seasons. Based on data from 1998-2004, the average number of right whales present was 60 individuals and the average individual residency time was 21 days. The shorter residency time in 2005 was likely related to the low zooplankton density throughout the season. 10 mother and calf pairs were sighted in CCB and adjacent waters during the 2005 season. The residency time of mother and calf pairs was substantially longer than that of single males. This result was consistent with that of previous years (1998-2004) suggesting that CCB is an important nursery area and that the habitat is more intensively used by females than by males (Jaquet *et al.* 2005).



Figure 1. Aerial photo of right whale feeding (PCCS).

Right whale abundance patterns were similar to previous years. The number of right whales increased slowly from late January to late March, peaked from late March through late April, and dropped off to zero at the end of April, characterized by an abrupt “en masse” departure of right whales from Cape Cod Bay. The acoustic buoy listening system in Cape Cod Bay confirmed this departure through call detections. Breaks in the sighting history of individually identified whales over the course of the season suggest that some animals periodically leave the bay for short periods, perhaps traveling to adjacent areas beyond detection by this aerial survey. Almost half of the individuals that were seen within CCB have been observed there during only 1 year of the project (1998-2005), suggesting that for many individuals there is little site fidelity for CCB (Jaquet *et al.* 2005).

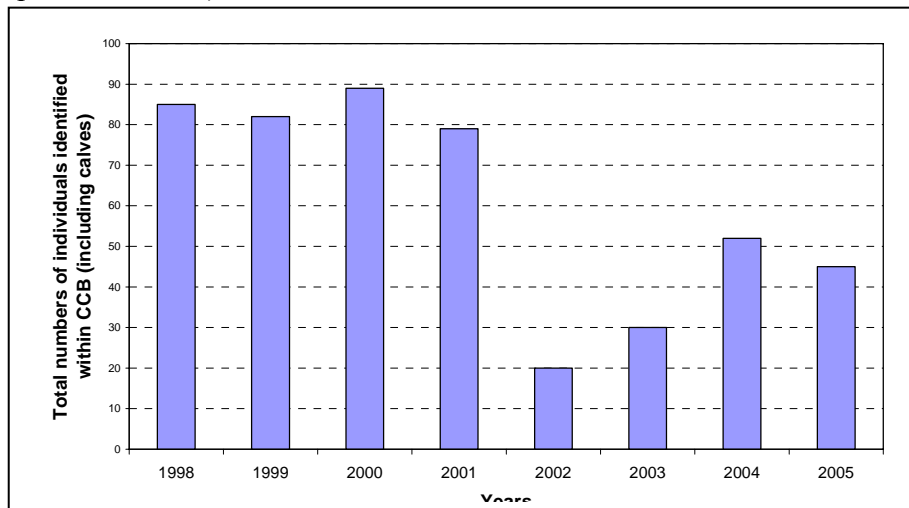


Figure 2. Total number of individual right whales identified within CCB each year (PCCS data).

The pattern of slow increase, peak in numbers and “en masse” departure at the end of April is consistent with that observed in all previous years of the study. Although this pattern roughly mimics the rise and subsequent fall of zooplankton density, the latter cannot fully explain whale movements (Jaquet *et al.* 2005). Right whales usually leave Cape Cod Bay before zooplankton densities fall below feeding threshold levels ($\sim 3,750$ org/m³) (Mayo *et al.* 2004). Similarly, in

2005, the decline in zooplankton density happened slightly after the departure of whales. This suggests that the decline in copepod concentration in CCB is not the only factor which triggers the departure of whales and it is possible that, in late April and early May, the presence of higher food resources in adjacent habitats (likely Great South Channel) makes it more optimal for right whales to leave CCB despite sufficient forage still available in the Bay (Jaquet *et al.* 2005).

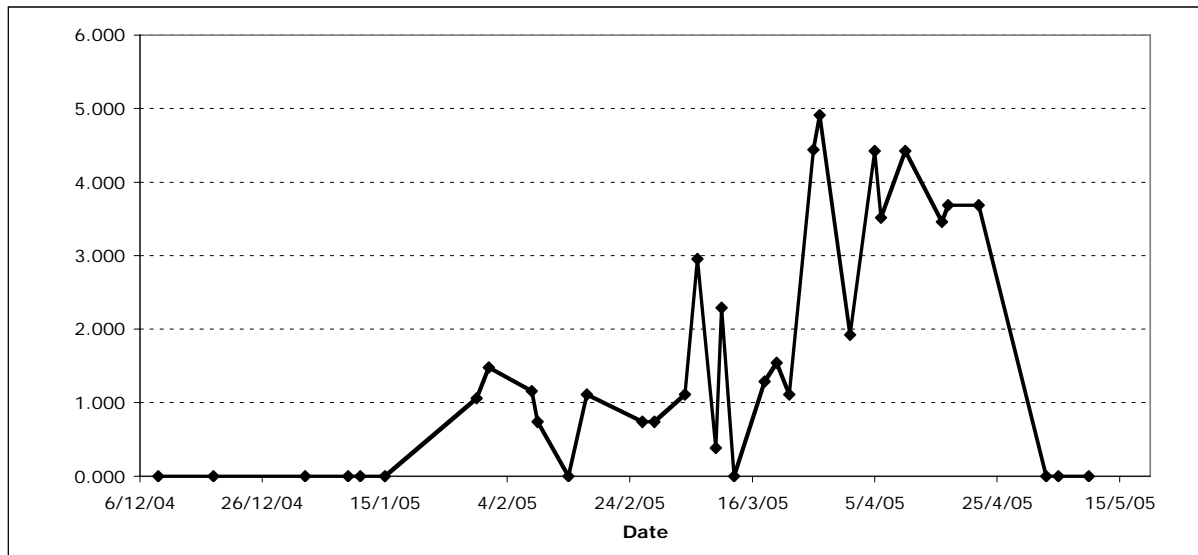


Figure 3. Number of individual right whales identified within CCB in 2005 per 100 nautical miles of aerial survey effort (PCCS data).

The results of the 2005 surveillance continue to reveal that Cape Cod Bay is an important habitat for right whales during winter and early spring, and that this habitat is especially important for single females and mother/calf pairs.

Habitat Monitoring in Cape Cod Bay

In addition to aerial surveys, *Marine Fisheries* contracts PCCS to conduct habitat monitoring of Cape Cod Bay from January through mid May, during the time right whales typically frequent the Bay. This monitoring explores the association between the spatial-temporal distribution of right whales and zooplankton, their main prey species. It also examines the biotic and abiotic habitat variables that affect zooplankton density, useful for developing a predictive model of right whale movements based on prey resources. A crucial product of the habitat monitoring program are the cruise assessments, which provide near real-time reports about zooplankton and right whale distribution. All of this provides management agencies with a better understanding of whale location and potential overlap with human activities such as fishing and shipping. The CCS Habitat Monitoring report, as well as the near real-time cruise reports are published in Jaquet *et al.* 2005.



Figure 4. PCCS researchers emptying plankton net (PCCS).

In 2005, PCCS conducted physical and biological oceanographic sampling of the Bay during 22 cruises, between Jan 5 and May 14, 2005, totaling over 170 hours at sea. Sampling took place aboard the *R/V Shearwater*. The vessel is equipped with oceanographic and biological sampling equipment including a CTD (conductivity, temperature, and depth) profiler, plankton nets, a vertical plankton pump, and beginning in 2005, an Optical Plankton Counter contributed by *Marine Fisheries*. Zooplankton samples were collected at eight fixed stations in Cape Cod Bay, as well as in the vicinity of whales, using both horizontal and oblique tows taken with a standard 333-micrometer mesh conical net, 30 or 60 cm in diameter. Vertical samples were obtained from a pump sampler deployed in the CTD frame. A total of 434 zooplankton samples were collected from surface tows, oblique tows, and vertical pump casts (Jaquet *et al.* 2005).

Consistent with previous years, low initial zooplankton densities increased slowly during the months of February and March to reach highest values in April, then dropped off quickly and remained low through the end of sampling on May 14. However, results from all zooplankton sampling methods showed 2005 as a year of substantially lower zooplankton densities than many prior years. In addition, no individual station or quadrant showed mean seasonal densities that were measurably higher or lower than the bay-wide average. This relatively uniform distribution of zooplankton in the bay is not a typical annual occurrence (Jaquet *et al.* 2005). Generally, areas of higher zooplankton density are associated with a higher rate of right whale sightings. During the 2005 season, while the average zooplankton density was rather uniform throughout the bay, whale distribution was discreetly clumped in the eastern and southern portion of the bay. The long-held view that the zooplankton resource in the eastern two-thirds of the bay is a controlling factor of whale presence is supported by these comparisons. However, the data from 2005 also show that the zooplankton sampling methods do not fully capture the controlling influence of the food resource, failing to fully represent the apparent importance of deep layers (1-3 meters above the substrate) of plankton on the aggregation of whales (Jaquet *et al.* 2005).

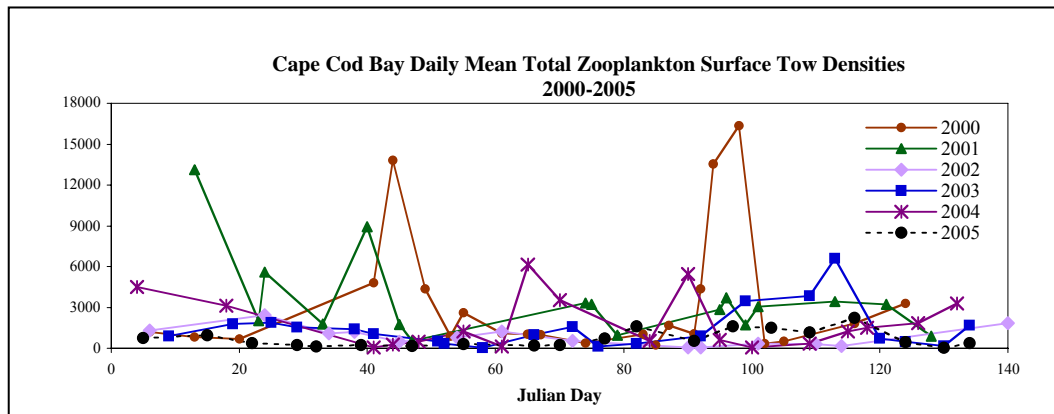


Figure 5. Daily mean surface layer zooplankton densities in Cape Cod Bay 2000-2005 (CCS data). (Julian Day 0 represents the first day of the year).

The 2005 season was an important trial period for the Optical Plankton Counter (OPC). PCCS and *Marine Fisheries* staff hoped to integrate the device into the existing zooplankton sampling and assessment methods. The OPC sampling method, in conjunction with other oceanographic sensors, will yield greater sampling resolution, in a more readily accessible and interpretable format for managers. However, many unforeseen difficulties arose during the trial season. Problems with software, equipment configuration, and data stream communication greatly limited the ability of researchers to fully utilize the OPC as a sampling tool. Despite the setbacks, the OPC was deployed on-station during every habitat cruise after March 18 and results showed the potential of these instruments to detect temporal and spatial trends on a fine scale.

Acoustic Detection and Monitoring of Right Whales in Cape Cod Bay (#2003-0170-031)

Marine Fisheries has collaborated with Dr. Chris Clark of Cornell University's Bio-acoustic Research Program (BRP) since 2003 to monitor right whales in Cape Cod Bay using passive acoustic detection. In Cape Cod Bay, a strong correlation has been shown between right whale sightings from aerial surveillance and acoustic detections by archival pop-up buoys.

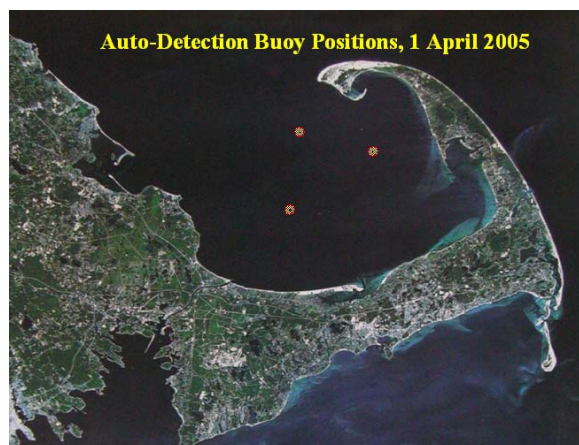


Figure 6. Location of real-time listening buoys in Cape Cod Bay.

In 2004 and 2005, *MarineFisheries* assisted Dr. Clark in developing and deploying a real-time acoustic listening system in Cape Cod Bay. Scientists at Cornell, Woods Hole Oceanographic Institution and International Fund for Animal Welfare developed and built moored buoys installed with electronics and software that continuously analyze sounds from an attached hydrophone. These devices will improve the ability of the Right Whale Conservation Program to detect the presence of right whales -- year-round, in real-time, and independent of weather conditions that impede aerial sighting success. The buoys will assist in reducing ship strikes by providing acoustic coverage of the high-use areas in Cape Cod Bay canal, especially at the west end near the Canal and the approaches to Provincetown. In addition, the buoys may help improve efficiency of the Right Whale Conservation Program. If right whales are not heard in CCB, then *MarineFisheries* and PCCS may opt to fly in the Bay or divert flights to other known or suspected right whale habitats, thus increasing coverage and photo-ID opportunities.

Another key component of this project is the development of a public-access website. This website will alert maritime industry users, scientists, and managers to the presence and spatial-temporal distribution of right whales in Cape Cod Bay, based on vocalizations detected by the buoys. Real-time knowledge of right whale locations will aid in the reduction of ship strikes.



Figure 7. Real-time passive acoustic listening buoy off Provincetown.

On October 29, 2004, three real-time, auto-detection buoys were deployed in Cape Cod Bay and one to the east of the Truro highlands. NFWF provided *MarineFisheries* funding to support two of the CCB real-time buoys. The other buoys are funded by NMFS Right Whale Grant Program. Woods Hole Oceanographic Institute researchers carried out maintenance on the CCB units. Unfortunately, the real-time buoys failed in January due to extreme weather conditions; freezing temperatures, ice build-up, and strong winds. On April 1, the three buoys in CCB were replaced and continued to operate until May 31, 2005 when irregular transmissions started to occur due to exhausted batteries and operational hardware. During the month of April, the buoys detected right whale calls inside Cape Cod Bay, until around April 15, after which the frequency of calls dropped off, limited only to calls detected off Truro, on the backside of the Cape.

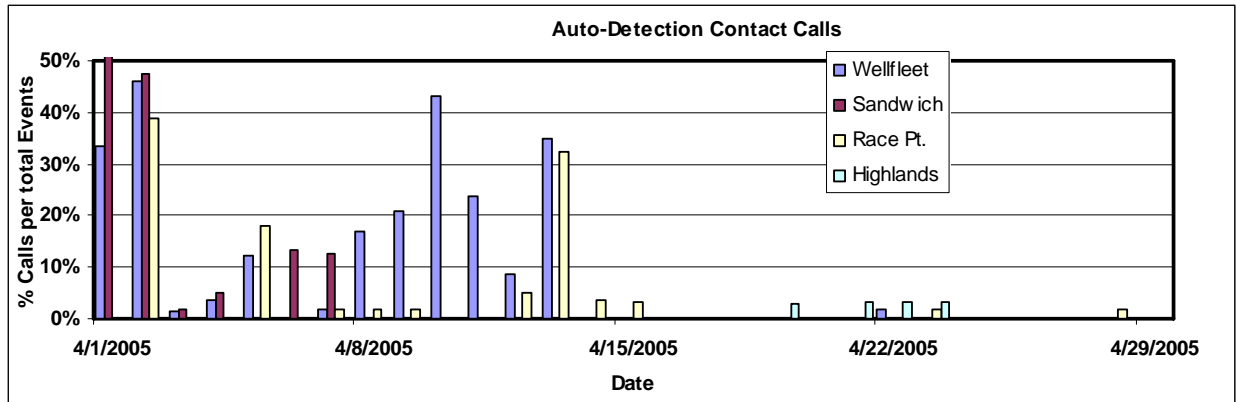


Figure 8. Location and date of detected contact calls during April 2005 (Cornell University data).

In response to the operational problems encountered during deployment in late winter/spring 2005, the hardware and battery systems of all four buoys were serviced and upgraded by Cornell's Bio-Acoustics Lab in fall/early winter 2005. These modifications are designed to improve operation and longevity of the acoustic recording systems.

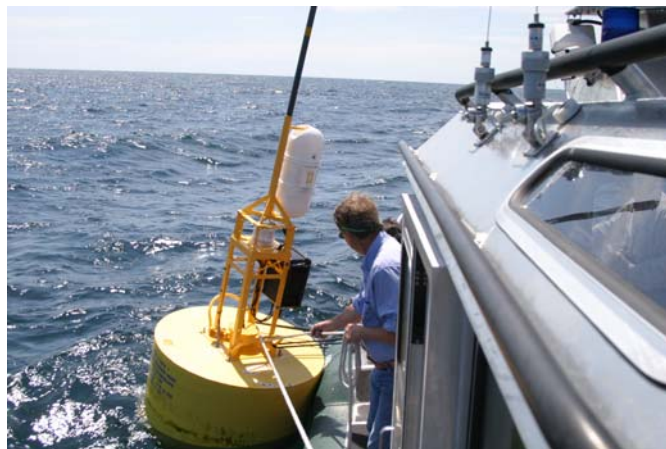


Figure 9. Massachusetts Environmental Police, *MarineFisheries*, and Chris Clark servicing buoy (July 2005).

Dr. Clark and Cornell University continue to work on their interactive website as a means to provide daily reports, and hope to have the website fully operational in mid-January 2006. To date, the Bio-Acoustics Lab has implemented most of the software that allows public users to access and interact with the vocalizations database via the internet. After the buoys are operational, adjustments will be made to this software throughout spring 2006 as feedback is received from users. *MarineFisheries* has requested and been awarded funds by NFWF in 2006 to continue to support the development of a real-time listening system and the interactive website.

Locating potential right whale habitat by tagging basking sharks

In 2004, *Marine Fisheries* tested an innovative method for identifying potential right whale habitat. *Marine Fisheries* biologist Greg Skomal, in collaboration with researchers at the University of New England, received funding from the Massachusetts Environmental Trust to tag basking sharks. Basking sharks and right whales both feed on zooplankton, and are often foraging in the same areas during summer/fall. This study hopes to answer questions about the enigmatic distribution of right whales during late fall and winter months when most whales are unaccounted for by gathering telemetry information about large-scale basking shark movement patterns. In addition, valuable information is gathered about basking sharks life history and distribution.

PAT tags (pop-up archival transmitting tags) were used to collect temperature, depth, and light level data at specific time intervals. After a predetermined length of time, the tags detach from the animal, float to the surface, and transmit recorded data to an Argos satellite, which relays them to the researcher. The tag not only provides the location of the animal at the time of the pop-up, but also enables the re-creation of the shark's movements based on physical data including temperature, depth, and light level. In September 2004, two basking sharks were tagged approximately 40 miles east of Nantucket. The tags detached on schedule in January 2005 and began transmitting data. One shark traveled to Jacksonville, Florida, where it spent most of its time near the surface. It is interesting to note that the area off Jacksonville, Florida is Right Whale Critical Habitat. The other shark traveled to an area between Jamaica and Haiti where it spent most of its time at depths in excess of 1,600 feet. Both sharks, despite their different locations, preferred to stay in waters of 55-66 °F.

In 2005, 17 other PAT tags were deployed. Some of these tags have yet to transmit, despite passing their pre-determined detachment period. *Marine Fisheries* and University of New England are investigating issues related to the potential failure of these tags. However, 12 other tags are scheduled to detach over the months of January, February, April, and June of 2006. *Marine Fisheries* and University of New England researchers are hopeful that these devices will reveal exciting information about basking sharks providing potential clues about right whale habitat.

Monitoring off-season aggregations of right whales in Massachusetts state waters

In the summer of 2005, *Marine Fisheries* received a small grant from NMFS to monitor off-season aggregations of right whales in Massachusetts state and adjacent waters. Right whales typically inhabit state waters during late winter and early spring. However, it is not uncommon for right whales to occasionally reside in the Stellwagen Bank area, as well as Massachusetts Bay and Cape Cod Bay in the summer months. Because this is an active boating and fishing season, risk to right whales from vessel strike and entanglement in fishing gear is elevated. Managing around right whales requires knowledge of their distribution and forecast of their likely residency. Federal and state managers need to improve their real-time knowledge of right whale aggregations and the local risks associated with their discrete locations.

Due to the 500 yard rule, most whale watch companies are able to report the presence of right

whales, but unable to photograph them sufficiently for management purposes. Under this grant, *Marine Fisheries* biologists will respond to off-season aggregations of right whales in Massachusetts and adjacent federal waters during the summer/fall months when maritime activity is high in local waters and risk of human interactions proportionally greater. Project personnel will attempt to coordinate sightings information from whale watch companies and other researchers to determine right whale counts and locations of sightings. *Marine Fisheries* will dispatch teams when available to survey areas where right whales were reported. If aggregations of feeding right whales are found, plankton sampling may be conducted to determine if whales are likely to remain in the area due to high densities of preferred prey. On-scene monitoring of aggregations will be requested of appropriate agencies. *Marine Fisheries* will consult and coordinate all responses with NOAA Fisheries to determine the appropriateness of any responses to a particular event.

In July of 2005, whale watch vessels reported seeing a number of right whales in the Stellwagen Bank and Massachusetts Bay areas. Based on these repeated sightings, NMFS established a Dynamic Area Management zone (DAM) in this area. While the DAM is in place, lobster trap/pot and anchored sink gillnet gear fishermen must comply with gear restrictions designed to reduce the risk of fishery interaction with right whales. *Marine Fisheries* and PCCS responded to this off-season aggregation by photographing one of the mother/calf pairs in the area and conducting zooplankton tows near where the whales were feeding to gauge the extent of the forage resource and the potential residency time. Our plankton tows revealed dense patches of copepods about 10 meters below the surface. The mother, identified by PCCS staff as Slash, and her calf were spotted repeatedly by local whale watch vessels.



Figure 9. Copepod sample collected on July 29, 2005 in vicinity of Slash and calf.

2) ANALYZING ROPE FAILURE IN NON-BUOYANT GROUNDLINE

Lobstermen traditionally use floating groundline to connect their traps on the ocean floor. Line that floats off the bottom reduces hang-downs, line-fouling, and rope degradation caused by contact with the seafloor. However, line that floats off the bottom also creates more obstacles in the water column for large whales, increasing the risk of entanglement. For this reason, many scientists and management agencies have advocated the use of non-buoyant groundline to reduce the profile in the water column and thus reduce the risk of entanglement to large whales, particularly the North Atlantic right whale. In the federal Seasonal Area Management (SAM) and Dynamic Area Management (DAM) zones, all groundlines must be made entirely of sinking

or neutrally buoyant line. In Cape Cod Bay, sinking groundline or neutrally buoyant groundline is required year-round. Nevertheless, non-buoyant groundline has its drawbacks. Fishermen have pointed out that this type of line is more expensive, causes more hang-downs, and the integrity of the line breaks down faster due to abrasion from the substrate. And they have found the lifespan of non-buoyant groundlines to be unacceptably short. The premature failure of non-buoyant groundline appears to be caused by sediment embedded in the line fibers, which occurs when groundline lies on the sea bottom and then sediment is ground into the rope by the hauling equipment when traps are pulled to the surface under strain.

Using a simulator to test groundline durability on sand bottom (#1999-0110-013)

Since 2003, *Marine Fisheries* and the Atlantic Offshore Fishing Association (AOLA) have engaged in a cooperative study with the cordage industry, fishermen, and NMFS on a multi-year study to develop an “optimal” non-buoyant line for use by the offshore lobster industry. For the lobster industry, optimal lines are those that do not degrade due to substrate abrasion, are strong enough to withstand hauling loads, and are not substantially more expensive than currently used rope products. However, it would take years to field test the various brands of non-buoyant groundline on the market in order to determine which line functions best in the offshore lobster fishery. In response to those claims, *Marine Fisheries* and AOLA built a line-testing machine to simulate the wear and tear that lobster groundlines experience in the field. Test runs were performed on the machine to determine what load strength, cycle speed, and test duration were needed to approximate the wear experienced the field. The line-testing machine is comprised of a 16” hauler working against an 11” diameter drum to simulate the hauling of line under load. The line then drops into a 12-foot long basin of sand and water in a relaxed state to simulate line laying on the sea floor. After the line is cycled through the machine, it is tension-tested in order to quantify the impact of the wear on hauling strength.

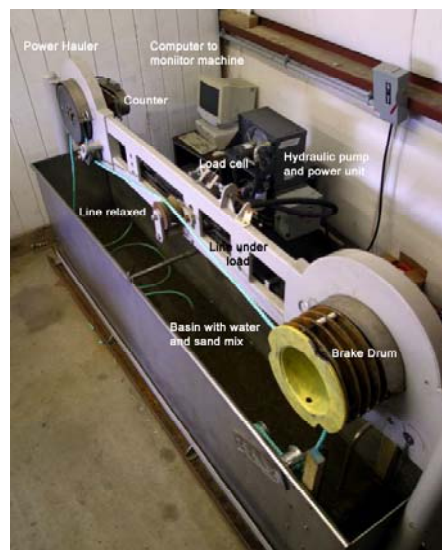


Figure 10. Line testing machine

The laboratory testing phase of the project was completed in July 2005. Ten lines provided by seven different manufacturers/ distributors were successfully tested on the line-testing machine.

Wide variability was found in the characteristics and performance of currently available ropes. Lines that were considered to have performed the best were those that exhibited the least wear and loss in breaking strength. The final report on this phase of the project is now available on-line at: http://www.mass.gov/dfwele/dmf/programsandprojects/nfwf_report_on_aola_study.pdf. Groundline that performed best on the machine were distributed to the offshore lobster industry for field-testing in fall 2005. The field-component of the study will continue throughout the remainder of 2005 and 2006.

Microscopic analysis of the causes of rope failure

After completing the machine-testing of lines in the aforementioned study, *Marine Fisheries* and AOLA took the next step toward understanding exactly *how* and *why* line degraded, by initiating a project to explore the mechanics underlying rope failure. They sought the assistance of Hank McKenna, President of Tension Technologies Inc, a rope testing and engineering firm. Hank has served as an advisor to several large rope manufacturers and fiber producers, consulted to several offshore contractors, designed barge and supply boat moorings and riser protection systems, and conducted many accident investigations involving rope failure.



Figure 11. Dissection of rope strands and yarns

Samples of the lines that performed best on the machine were sent to the Tension Technology facility in Scotland. In their analysis, Tension Technology will visually and microscopically examine wear on the ropes to identify different types of damage. This will aid them in understanding the causes of wear and the differences in rope construction that contribute to it. They will also determine the strength of tested and untested specimens by performing whole rope and yarn tests. Finally, they will examine the presence of sediment in ropes tested on the machine and consider a test to quantify sediment density. These investigations may also identify specific components of the lobster trap hauling system that contribute to line wear in the field. With this analysis *Marine Fisheries* and AOLA hope to look at the characteristics of line degradation for the purpose of improving rope design and increasing the serviceability of non-buoyant groundline. We believe that a systematic engineering analysis will be instrumental in guiding efforts to improve the construction of non-buoyant groundlines.

3) ACTIONS TO ADDRESS THE THREAT OF WHALE ENTANGLEMENT IN FISHING GEAR

Fixed-gear management in Massachusetts state waters

The Commonwealth continues to establish pro-active, yet practical, regulations for fixed-gear fisheries in state waters to reduce the risk of entanglement of large whales. Since 2004, the use of floating groundline has been prohibited year-round in the lobster fishery in Cape Cod Bay. In Cape Cod Bay Critical Habitat from January 1 – May 15, all groundline must be negatively buoyant and all buoylines must be comprised of negatively buoyant line, except the bottom 1/3 of the length of the line. In state waters other than the CCBCH, all lobster fishermen must comply with at least one of the following gear restrictions: 1) all buoys must be attached to surface lines by a 600 lb weaklink, 2) all buoylines composed entirely of sinking line, and 3) all groundlines must be composed entirely of negatively buoyant line. More detail on Massachusetts regulations related to protection of North Atlantic right whales can be found within the Code of Massachusetts Regulations (322 CMR 12:00).

<http://www.mass.gov/dfwele/dmf/commercialfishing/cmr.htm>

In 2005, the Commonwealth continued to pursue ways to broaden the use of non-buoyant groundlines in the pot fishery throughout state waters. In October 2005, a regulatory proposal was put forth to prohibit the use of floating groundline between lobster traps in all state waters year-round. This rule will minimize entanglements of all large whales found in Commonwealth waters. This proposed regulation was approved by the Massachusetts Marine Fisheries Advisory Commission. Effective on January 1, 2007, it shall be unlawful for any person to fish, store, or abandon any fixed gear in waters under jurisdiction of the Commonwealth with positively buoyant groundline.

Profiling the dynamic character of fixed-gear groundlines (#2003-0170-014)

The spatial overlap of whales and fishing gear is directly related to the risk of entanglement for whales. To minimize that risk, it is necessary to understand two key features related to this overlap: 1) where is the fishing gear and 2) where are the whales. This project seeks to address the question of where fishing gear is located in the water column. In 2004, *Marine Fisheries* received funding from NFWF to attach pressure sensors to fixed gear in order to document the profile of lines in the water column. These pressure sensors, DST Milli loggers by Star-Oddi are referred to as mini-loggers. These devices have permitted *Marine Fisheries* to calculate the height of floating groundline off the bottom, under various gear configurations and environmental conditions, over an extended period of time.



Figure 12. Mini-logger and protective covering.

During 2004, 28 mini-loggers have been deployed for over 315 days in 49 different sets (27 inshore; 22 offshore). The loggers confirmed that there is a large degree of variation in the groundline profile depending on gear configuration and environmental conditions, such as sea state, tidal current, and depth. On average, floating groundline rise 7 feet off the bottom in inshore sets and 13 feet off the bottom in offshore sets. A wide range of groundline heights were observed. Inshore floating groundlines heights range from 0 to 21 feet off the bottom, while offshore ranges from 0 to 45 feet.

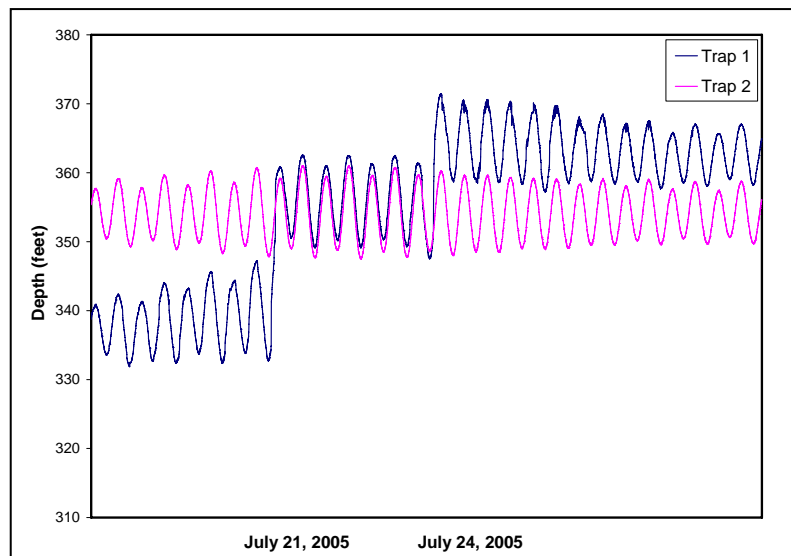


Figure 13. Logger data showing two traps on a lobster trawl – notice one trap “walking” downhill. (Cyclical oscillations are tidal-driven changes in depth)

In the spring of 2005, *Marine Fisheries* staff sent programmed loggers to colleagues in Rhode Island and Maine for use in profiling the dynamics of fixed-gear in those areas. The loggers were then deployed on lobster trawls before being returned to us for analysis. The examination of this data is in progress. The information gathered by the loggers over the entire course of this project provided crucial insight into the dynamic nature of fixed gear over time. In the end, we

have a better understanding and more precise view of gear profiles in the water column and the potential threat of entanglement they pose to large whales. A technical report is currently being prepared about this project.

Profiling the dive pattern and orientation of right whales (#2003-0170-014)

The spatial overlap between fishing gear and whales is directly related to the risk of entanglement. The distribution of whales on the horizontal plane has been studied using sightings data, telemetry, and acoustic monitoring. However, whale distribution in the vertical plane -- the water column -- is less well known. Typically, information about this dimension has relied indirectly on mapping of the food resource and directly on telemetry data gathered from tagged whales. By pinpointing how whale behavior overlaps with fishing gear in the water column, we can identify the gear configurations that are the greatest risk of entanglement. Dr. Mark Baumgartner from Woods Hole Oceanographic Institution has been using suction cup tags on right whales to profile their use of the water column. These tags document the dive profile and spatial orientation of the whale, including pitch, roll and yaw (angle). This information is uploaded into a software program which provides 4-D data imaging, giving researchers a unique perspective on how the whales are moving underwater.

In 2004 *Marine Fisheries* received funding to help Dr. Baumgartner cover the cost of vessel charters used in the tagging cruises. These tagging events are heavily dependent on good weather conditions and whale presence. The tagging work from this grant was scheduled for completion in fall 2005; however this work will continue in spring 2006.

Scale Modeling of Fixed-Gear Buoyline Configurations

In 2004, *Marine Fisheries* used scale models of fixed fishing gear to compare, quantify, and investigate buoyline profiles in order to address the entanglement threat they may pose to large whales. The results showed that buoyline configurations and scope affected buoyline profiles, and that different current loads also affected profile. A technical report was completed on for project in March 2005. *Marine Fisheries* received funding from NFWF to continue this scaled modeling study in 2006. We will examine how changes in scope of the buoyline will affect the profile and the potential risk of entanglement to whales. This work will continue at the flume tank at Memorial University, St. Johns, Newfoundland.



Figure 14. 1:10 scaled model with A3 polyball and 100% sinkline.

Buy-back program for floating groundline

Marine Fisheries collaborated with the International Fund for Animal Welfare (IFAW) and the Massachusetts Lobstermen's Association (MLA) in the first-ever lobster gear replacement program. The project sought to address the problem of whale entanglements through an innovative partnership with commercial lobstermen to provide them with financial assistance to replace floating groundline with non-buoyant, "whale-safe" alternative. Sinking line is heavier than floating line and more expensive, making the cost of switching over a considerable financial burden for fishermen. The estimated total cost of replacing floating ground lines for all eligible Massachusetts inshore lobstermen was \$1.4 million. The project, funded by a NFWF grant to IFAW, provided fishermen with vouchers covering 75% of the change-over costs.



Figure 15. A fisherman and Erin Heskett (IFAW) pictured with returned floating line in Sept 2004

For six days in September 2004, gear exchanges were carried out from Gloucester to Sandwich. A final exchange took place in January and March 2005 to accommodate lobstermen who were unable to exchange their rope during the September events. Overall, 270 fishermen participated in the buy-back program by turning in 300,000 pounds of rope. *Marine Fisheries* staff contributed support to this program by performing mailings, designing databases, inputting and compiling data, and providing advice and logistical support. In January 2005, IFAW contracted with Conigliaro Industries to handle the collection and recycling of the rope collected during the exchange events. IFAW and *Marine Fisheries* believe that most inshore lobstermen in Massachusetts, who were still fishing with floating line, have switched to sinking groundline thanks to this highly successful project benefiting both fishermen and large whales.

Support of the Atlantic Large Whale Disentanglement Network

The Right Whale Conservation Program continues to support the efforts of the Disentanglement Network. Erin Burke, the *Marine Fisheries*' Protected Species Specialist, is a Level 2 Network member, trained to actively assist with the location and documentation of entanglements. In spring 2006, she will begin an apprenticeship to obtain Level 3 status, authorizing her to attach tags and give hands-on assistance during simple entanglements. The Massachusetts Office of Law Enforcement (OLE) has offered to assist disentanglement efforts by providing on-the-water support to respond to reports of entangled whales and transport rescue team members.

4) OUTREACH, PUBLIC EDUCATION, AND TRAINING

Throughout 2005 *Marine Fisheries*' staff continued ongoing public education efforts regarding the Right Whale Conservation Program by meeting with industry groups, fielding calls, and lecturing in public forums. *Marine Fisheries*' staff attended various fishermen's meetings, trade shows, and conservation meetings promoting the Conservation Plan. Dan McKiernan, the Deputy Director, is a member of the Atlantic Large Whale Take Reduction Team (ALWTRT). During 2005, Dan McKiernan and the Protected Species Specialist attended numerous meetings related to large whale conservation and fishery interaction. Prior to leaving the Protected Species Specialist position in July 2005, Ed Lyman attended many of these meetings and presented information about projects related to the RWCP. In December 2005, Erin Burke and Ed Lyman attended the Society for Marine Mammalogy Biennial Conference in San Diego, CA. They presented a poster on the projects and accomplishments of the Commonwealth's Right Whale Conservation Program. During the summer and fall of 2005, Erin Burke received training in *Marine Fisheries* lobster sampling protocols and right whale photo documentation and cataloguing procedures. Outreach efforts are listed in Attachment E.

5) ACTION PLAN AND FUNDING SOURCES FOR 2006

The Commonwealth, along with its contractor PCCS are working to improve upon the 2005 Right Whale Surveillance and Habitat Monitoring Program. For the 2006 season, *Marine Fisheries* and PCCS have been awarded \$390,919 by NMFS to support the aerial surveillance and habitat monitoring of Cape Cod Bay. NMFS also awarded funding to *Marine Fisheries* in late 2005 to support two projects in the coming fiscal year. They provided \$24,975 to support *Marine Fisheries* response to off-season aggregations of right whales in Massachusetts and Cape Cod Bays, as well as \$24,950 to a joint *Marine Fisheries* and Atlantic Offshore Lobstermen's Association study of the mechanics underlying the degradation of sinking groundline.

Marine Fisheries has received \$187,590 from NFWF for the Right Whale Conservation Program in 2006 to continue support of the Protected Species Specialist, outreach program, gear modification work, and collaborations with Cornell University on passive acoustics. This funding will support real-time buoy maintenance and web-based dissemination of right whale detections from the real-time passive acoustic listening buoys. In addition, the Right Whale Conservation Program will continue collaborating with the Atlantic Offshore Lobstermen's Association to finish research into the development of an optimal line for the offshore lobster industry. The remaining funds will go towards project related to the configuration of buoylines and a fixed-gear compliance program. Training and outreach will continue to be a priority for the Right Whale Conservation Program. In 2006, Erin Burke, the Protected Species Specialist, will receive training in aircraft ditch procedures and participate in a Disentanglement Network apprenticeship to obtain Level 3 status.

Marine Fisheries will also work with Dr, Mark Baumgartner in 2006 to quantify the use of the water column by right whales in order to identify the gear types and components which may pose the greatest risk of entanglement to the North Atlantic right whale.

References

Jaquet et al. 2005. Surveillance, Monitoring and Management of North Atlantic Right Whales in Cape Cod Bay and Adjacent Waters in 2005. Final report submitted to the Division of Marine Fisheries, Commonwealth of Massachusetts, Boston, MA. October 2005

Mayo et al. 2004. Surveillance, Monitoring and Management of North Atlantic Right Whales in Cape Cod Bay and Adjacent Waters in 2004. Final report submitted to the Division of Marine Fisheries, Commonwealth of Massachusetts, Boston, MA. December 2004.

List of Attachments

- | | |
|---------------------|--|
| Attachment A | Code of Massachusetts Regulations (322 CMR 12.00) regarding fishing gear regulations in Cape Cod Bay related to right whales. |
| Attachment B | Advisories and notices posted by Commonwealth regarding Cape Cod Bay Critical Habitat and right whales. |
| Attachment C | Commercial Fisheries News article and DMF newsletter. |
| Attachment D | Outline of outreach efforts. |

ATTACHMENT A

Regulations as of December 31, 2005. Note: changes approved for 2007 not included (e.g. state-wide prohibition on floating groundline.

Code of Massachusetts Regulations 322 CMR 12.00: Northern right whales

Section

12.01: Purpose

12.02: Definitions

12.03: Surface Floating Line Ban

12.04: Inshore Lobster Technology List

12.05: Critical Habitat and Adjacent Waters Gear Restrictions during January 1 through April 30

12.06: Critical Habitat Restrictions during May through December

12.07: Cape Cod Bay Restrictions Year-round

12.08: Gillnet Breakaway Requirements

12.09: Buffer Zone

12.10: Harassment and Harm

12.11: Entanglement Reporting

12.12: Exceptions

12.13: Permit for Surface or Drifting Gillnets

12.14: Critical Habitat Map

12.01 Purpose

The northern right whale is the rarest of the world's great whales. Despite international protection by the International Whaling Commission established pursuant to the 1946 International Convention for the Regulation of Whaling and national protection afforded by the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973 the northern right whale is listed as endangered and its population remains dangerously low in the Atlantic.

In response to this threat the Massachusetts Legislature passed a Resolve in 1985 requesting the Department of Fisheries, Wildlife and Environmental Law Enforcement to study the right whale in Massachusetts waters and make recommendations for its conservation. That study recommended, among other measures, a 500 yard buffer zone between right whales and vessels within Massachusetts waters.

The purpose of 322 CMR 12.00 is to:

(1) implement the 500 yard buffer zone recommendation and, in addition, prohibit activities of vessels that affect right whales within Massachusetts waters. 322 CMR 12.00 exempts vessels with federal or state Right Whale scientific study permits and commercial fishing vessels in the act of hauling back or towing gear. In addition, 322 CMR 12.00 applies only to the territorial and inland waters of the Commonwealth.

(2) minimize the risk of right whale entanglement in Cape Cod Bay, especially in the Critical Habitat, during the period of right whale high use, January 1 through April 30 -- the period of most right whale sightings in Massachusetts waters.

12.00

12.02 Definitions

For the purposes of 322 CMR 12.00:

(1) Bottom or Sink Gillnet means a gillnet, anchored or otherwise, that is designed to be, capable of being, or is fished on or near the bottom in the lower third of the water column.

(2) Buffer Zone means an area outward from a right whale a distance of 500 yards in all directions.

(3) Cape Cod Bay means the area that encompasses the state waters portion of the Cape Cod Bay Critical Habitat plus an additional area to the west of the Critical Habitat south of a line that runs east and west at 42 [degrees] 05' and that terminates at the Brant Rock shoreline in the town of Marshfield.

(4) Critical Habitat means those waters in Cape Cod Bay under the jurisdiction of the Commonwealth that fall within the federally designated critical habitat area listed in the federal Right Whale Recovery Plan and found in 322 CMR 12.10.

- (5) Double means a two pot string with a single line attached.
- (6) Fixed Fishing Gear means any bottom or sink gillnets or pots that are set on the ocean bottom or in the water column and are usually connected to lines that extend to the water's surface.
- (7) Gillnet means anchored, or surface or drifting vertical walls of webbing, buoyed on top and weighted at the bottom, designed to capture fish by entanglement, gilling, or wedging.
- (8) Groundlines means the lines connecting pots on a pot trawl.
- (9) Harass means to approach, pursue, chase, follow, interfere with, observe, threaten, harm in any fashion, turn in any manner to intercept or attempt to engage in any such conduct.
- (10) Negatively Buoyant Line means line that has a specific gravity greater than that of seawater, 1.03, and does not float up in the water column.
- (11) Pot means any lobster or fish trap placed on the ocean bottom.
- (12) Pot Trawls or Strings means single pots tied together in a series and buoyed at both ends.
- (13) Right Whale means that species of marine mammal known as *Eubalaena (Balaena) glacialis*.
- (14) Single Pots means individual pots buoyed at the surface.
- (15) To Abandon means to knowingly leave fixed gear in the Critical Habitat during January 1 through April 30 that fails to comply with the gear restrictions in 322 CMR 12.05.
- (16) To Fish means to use, set, maintain, leave in the water or haul gillnets or pots to harvest, catch, or take any species of fish or lobster.
- (17) To Store means to leave fixed gear in the water and fail to haul it for more than 30 days.
- (18) Vessel means any waterborn craft.
- (19) Weak Buoy Link means a breakable section or device that will part when subjected to 500 lbs. or less of pull pressure and after parting, will result in a knot-less end, no thicker than the diameter of the line, the so-called "bitter end" to prevent lodging in whale baleen.

12.00

12.03 Surface Floating Line Ban

It shall be unlawful for fishermen to fish, store, or abandon fixed fishing gear with lines floating at the water's surface.

12.00

12.04 Inshore Lobster Technology List

Any lobster pots fished in waters of the Commonwealth must be rigged with at least one of the configurations defined in 322 CMR 12.04(1) through (3).

- (1) All buoy lines attached to the buoy with a weak link of 600 lbs. breaking strength;
- (2) All buoy lines composed entirely of negatively buoyant line;
- (3) Groundlines composed of negatively buoyant line.

12.00

12.05 Critical Habitat and Adjacent Waters Gear Restrictions during January 1 through May 15

(1) Seasonal Gillnet Closure. It is unlawful to fish, store, or abandon gillnets in Critical Habitat and in waters of Cape Cod Bay west of the Critical Habitat south of 42 [degrees] during the period January 1 through May 15. 322 CMR 12.04 may be amended in a future rulemaking, with notice and opportunity for public comment, if gillnet specifications are developed and demonstrated that will minimize risk of entanglement to right whales

(2) Single Pots and Pot Trawls in Critical Habitat. To minimize the number of vertical buoy lines during the period January 1 through May 15, in the Critical Habitat, fishermen may fish them in either multiple pot trawls of four pots or more with vertical buoy lines on each end or may set doubles.

It is unlawful to fish, store, or abandon:

- (a) (a) single pots, or
- (b) a trawl with less than four pots with vertical lines on the first and last pot of the trawl.
- (c) a trawl with four or more pots having other than a single vertical line attached to the first and last pot of the trawl.
- (d) a double with more than one vertical buoy line.

(3) Break-away Buoy Lines Fitted with Weak Buoy Links in Critical Habitat. During January 1 through May 15, all buoy lines attached to trawls or doubles shall be equipped with a Weak Buoy Link along the buoy line. A list of DMF approved weak-buoy links is available from DMF and furnished to fishermen upon request.

(4) Line Restrictions in Critical Habitat

(a) During the period January 1 through May 15, it shall be unlawful to fish lobster pot strings in Critical Habitat unless all ground lines in a trawl are negatively buoyant line.

(b) All buoy lines are comprised of negatively buoyant line except the bottom portion of the line which may be a section of floating line, not to exceed 1/3 of overall length of the buoy line.

(5) Special Marking Scheme for Fixed Gear in Critical Habitat. During January 1 through May 15 lobster-gear fished in Critical Habitat shall be marked in accordance with 322 CMR 4.13(3)(d).

(6) Modifications. The Director may amend by emergency authority the gear time and area restrictions in response to changes in right whale migrations and distributions. The Director may suspend the fixed gear rules if whales depart the Bay early in the season. If at least three full surveys of Cape Cod Bay are successfully completed after April 1 yielding no right whale sightings, and if corroborating evidence supports whales' departure from the Critical Habitat, the Director may suspend the fixed gear restrictions beginning on April 21 or thereafter.

(7) Experimental Fishery Permits for Gear Testing. The Director may issue experimental fishery permits to authorize a person to fish fixed gear that does not conform with the specifications set in 322 CMR 12.03 for the purposes of developing and testing new gear designs to minimize risk of right whale entanglement in Critical Habitat.

12.00

12.06 Critical Habitat Restrictions during May through December

(1) Groundline Restrictions for 2003 and beyond. During the period May 1 through December 31, it shall be unlawful to fish pot trawls in Critical Habitat unless all ground lines in a trawl are negatively buoyant line.

(2) Additional Closures. The Director may amend by emergency authority the areas and time restrictions to fixed fishing gear, based on verifiable reports of right whale occurrences.

12.00

12.07 Cape Cod Bay Restrictions Year-round

Prohibition on Floating Groundline for 2004 and beyond. For 2004 and beyond, during the period January 1 through December 31, it shall be unlawful to fish pot trawls in Cape Cod Bay as defined in 322 CMR 12.02 unless all ground lines are comprised of negatively buoyant line.

12.00

12.08 Gillnet Breakaway Requirements

It is unlawful to fish any gillnet in any waters under the jurisdiction of the Commonwealth unless the net is rigged with the following breakaway features:

- (1) Knot-less weak link at the buoy with a breaking strength of 600 lbs.
- (2) Weak links with a breaking strength of up to 1,100 lbs. are installed in the float rope between net panels.
- (3) Anchoring system for the gillnets must be comprised of one of the following on each end:
 - (a) dead weights weighing at least 50 lbs.
 - (b) anchors with the holding power of at least 22 lbs. Danforth anchor.
 - (c) lead-line weighing at least 100 lb. per 300 ft. for each net panel in the string.

12.00

12.09 Buffer Zone

Except as otherwise provided for in 322 CMR 12.08, it is unlawful:

- (1) for any vessel to enter a right whale buffer zone,
- (2) for any vessel to approach or intercept a right whale within a buffer zone;
- (3) for any vessel not to depart immediately from a buffer zone, or;
- (4) for any commercial fishing vessel which has completed a haul back, a tow of its gear or otherwise completed its fishing operation and is no longer at anchor not to depart immediately from a buffer zone;

12.00

12.10 Harassment and Harm

It is unlawful for any vessel to harass or to harm any right whale at any time or place.

12.00

12.11 Entanglement Reporting

It is unlawful for any commercial or recreational vessel to fail to report the entanglement of a right whale in its gear or lines.

12.00

12.12 Exceptions

(1) Federal Permit. Any person issued a permit from any federal department, agency or instrumentality having authority to issue permits for the scientific research, observation, or management of the right whale, may conduct the activity authorized by such permit.

(2) State Permit. Any person issued a permit in accordance with 322 CMR 7.01(4)(d) for the scientific research,

observation, or management of the right whale may conduct the activity authorized by such permit.

(3) Commercial Fishing. Commercial fishing vessels in the act of hauling back, towing gear or engaged in fishing operations at anchor within a buffer zone created by the surfacing of a right whale, may complete the haul, tow or fishing operation provided it does so with a minimum of disruption to the right whale, hauls, tows or conducts its fishing operation in a direction away from the right whale, and departs from the buffer zone immediately after the haul, tow or fishing operation. In no event may 322 CMR 12.08(3) be construed to authorize a commercial fishing vessel to begin to haul, tow or conduct its fishing operation in or into a buffer zone.

(4) Disentanglement.

(a) To assist federally approved disentanglement efforts for northern right whales, any vessel that reports to the National Marine Fisheries Service, the Division of Environmental Law Enforcement, the Coast Guard, or to designees of those agencies, that it has sighted an entangled right whale may operate in the buffer zone to assist those agencies in locating and tracking the whale if requested to do so by those agencies.

(b) Any vessel operating in the buffer zone under 322 CMR 12.08(4) shall:

1. operate so as to minimize disruption to the right whale, and
2. immediately depart the buffer zone once the disentanglement effort begins, or when requested to do so by the agencies or their designees.

(c) When conducting activities within the scope of 322 CMR 12.08(4), vessels shall make every effort to comply with 322 CMR 12.00.

12.00

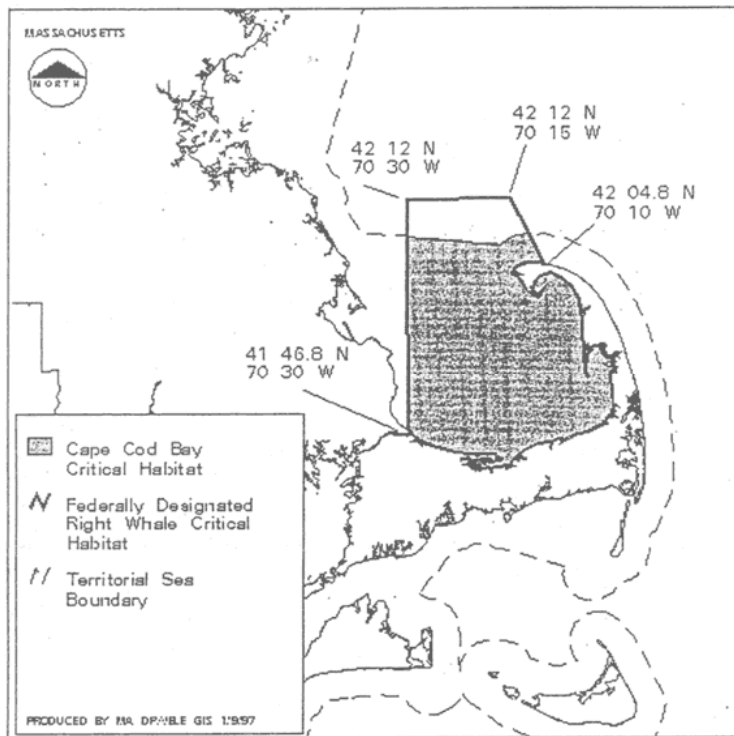
12.13 Permit for Surface or Drifting Gillnets

It is unlawful for any fisherman to fish, store or abandon, surface or drifting gillnets in waters under the jurisdiction of the Commonwealth without a regulated fishery permit issued in accordance with 322 CMR 7.01(4)(a).

12.00

12.14 Critical Habitat Map

The following map depicts the Cape Cod Bay Critical Habitat and its coordinates.



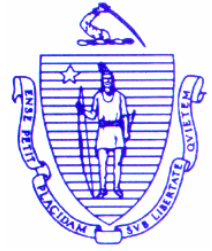
Attachment B

Advisories and notices posted by Commonwealth regarding Cape Cod Bay Critical Habitat and right whales.



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FOR IMMEDIATE RELEASE:
May 10, 2005

CONTACT:
Division of Marine Fisheries
Dan McKiernan (617) 626-1536 or
Ed Lyman (978) 282-0308 x 157

Center for Coastal Studies
Dr. Charles (Stormy) Mayo (508) 487-3623

RIGHT WHALE AGGREGATION DEPARTS CAPE COD BAY – ADVISORY LIFTED

Recent survey and monitoring activity by the Commonwealth's Right Whale Conservation Program has determined that the large aggregation of right whales observed in Cape Cod Bay (CCB) over the last several weeks have departed. Plankton densities measured by the Center for Coastal Studies (CCS) Habitat Monitoring Program also indicate a great decline in the right whales' food resource suggesting that right whale aggregations are not likely to return in the near future. With the departure of these animals the state is lifting the April 13th advisory warning mariners operating in Cape Cod Bay to be on the lookout for this highly endangered species. *Marine Fisheries* would like to thank fishermen and other mariners for their assistance and compliance with measures to protect this highly endangered animal.

During the last several weeks an aggregation of right whales, including at least four mother/calf pairs have been monitored in CCB by the Commonwealth's Right Whale Monitoring Program, a combination of habitat monitoring, aerial surveys, and real-time passive acoustic monitoring. The presence of these especially vulnerable mother/ calf pairs feeding on a rich food resource in the Bay resulted in the state taking action to protect this highly endangered species. Scientists believe feeding right whales may be oblivious to their surroundings, and thus vulnerable to vessel traffic. Ship strikes, believed to be the primary cause of human-induced mortality in right whales, have attributed to four right whale deaths along the U.S. East Coast over the last year. Of additional concern was the number of mother and calves documented in the Bay. Right whales calves are only 15 – 20 feet long this time of year and can be especially difficult to spot.

The Right Whale Conservation Program is a cooperative effort between *Marine Fisheries*, CCS, and Cornell University's Bio-acoustic Research Program to study and protect right whales in Cape Cod Bay. Use of vessel/aerial-based surveillance, passive acoustic monitoring, and forecasting of right whale presence through habitat analysis has resulted in the most comprehensive conservation program throughout the species' range. CCS has conducted bay-wide whale surveys two to three times per week in Cape Cod Bay and adjacent waters since mid-December. A cooperative venture between Cornell University and *Marine Fisheries* that uses real-time passive acoustic buoys has been listening for right whale vocalizations in the Bay since

November of 2004. Hydrophones mounted on the buoys detect right whales through their vocalizations that are then reported in updates every few hours using cell phone technology.

The National Marine Fisheries Service (NOAA Fisheries) issues warnings to mariners and others via the Northern Right Whale Sighting Advisory System (SAS). Advisories regarding Cape Cod Bay and surrounding waters can be viewed at the NOAA Fisheries Northeast Region web site (<http://www.nero.noaa.gov/ro/doc/whale.htm>) and are broadcast over NOAA weather radio ([http:// 205.156.54.206/nwr/](http://205.156.54.206/nwr/)).

For more information, visit the *Marine Fisheries* website at <http://www.mass.gov/marinefisheries> or the Center for Coastal Studies at www.coastalstudies.org.

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September 23, 2005
Marine Fisheries Advisory

NOTICE OF PUBLIC HEARINGS
SCHEDULED FOR OCTOBER 24 & 25, 2005

Under the provisions of M.G.L. Ch 30A and pursuant to the authority found in M.G.L. Ch. 130 ss. 17, 17A, 80, 100A and 104, Division of Marine Fisheries (DMF) and the Marine Fisheries Advisory Commission (MFAC) have scheduled hearings on the following regulatory proposals:

1. DMF proposal to make owner-operator requirements consistent for all fish pot fishery permit holders (322 CMR 6.12 & 7.09);
2. DMF proposal to amend dealer reporting requirements by replacing requirement to weight fish at time of purchase with requirement to label and number containers used per species (322 CMR 6.20 & 7.07);
4. DMF proposal to amend current escape vent specifications for the scup and black sea bass pot fisheries (322 CMR 6.12) in compliance with the interstate plan by requiring:
 - i. At least two escape vents in the parlor section of the pot;
 - ii. An increase in the minimum size of circular escape vents for pots used to harvest black sea bass from 2 3/8" to 2 1/2" (pots used in the scup fishery would retain the status quo 3.1" circular escape vent minimum size);
3. DMF proposal to enact remaining portions of the ASMFC-approved effort control plan in the Outer Cape lobster fishery, including:
 - i. prohibit lobster fishing with traps from January through March (322 CMR 6.02);
 - ii. allocate traps to qualified SCUBA divers (322 CMR 6.13 & 7.03); and
 - iii. take comments on a proposal to eliminate the Area 1/Outer Cape overlap zone (322 CMR 6.33).
5. DMF proposal to prohibit the use of floating groundline between pots/traps in all of state waters year-round to reduce entanglement risk for large whales (322 CMR 12.00);
6. DMF proposal to prohibit the harvest of cod from a portion of Massachusetts Bay as a conservation measure during late fall /early winter months (322 CMR 8.15);
7. DMF proposal to prohibit the take of river herring from all waters under jurisdiction of the Commonwealth and to prohibit the use of river herring as bait (322 CMR 6.17);
8. DMF proposal to amend season-specific trip limits and to reserve half of the winter quota to the late fall period (Nov. – Dec.) in the commercial summer flounder (fluke) fishery (322 CMR 6.22);
9. DMF proposal to establish a formal declaratory process to allow for in-season adjustments of winter-time commercial possession limits of scup to complement federal adjustments (322 CMR 6.28).

- 10. DMF proposal to clarify the daily commercial and recreational possession limits for Tautog by replacing reference to “at any one time” with “per 24-hour day” (322 CMR 8.06);**
- 11. DMF proposal to repeal state regulations for billfish. The fishery is primarily conducted in federal waters and managed under federal rules (322 CMR 6.11);**
- 12. Take comments on recent emergency action to restrict shellfish landings due to biotoxin contamination (322 CMR 6.38).**

Two public hearings have been scheduled:

Monday, October 24, 2005 (7PM) at the Annisquam River Marine Fisheries Stations (30 Emerson Ave., Gloucester) &

Tuesday, October 25, 2005 (7PM) at the Plymouth Harbor Radisson Hotel (180 Water St., Plymouth)

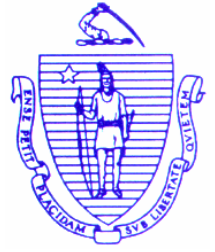
Comments received by e-mail (marinefisheries@state.ma.us), fax (617.626.1509), or mail (251 Causeway St., Suite 400; Boston, MA 02114) will be accepted until 5PM on Friday, October 28, 2005.

Contact DMF for draft regulations and further details or visit our website at www.mass.gov/marinefisheries.



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November 14, 2005
Marine Fisheries Advisory

MASSACHUSETTS MARINE FISHERIES ADVISORY COMMISSION
APPROVES NEW REGULATIONS –
December Cod Conservation Zone & Moratorium on River Herring Fishery

At a November 9, 2005 business meeting, the Marine Fisheries Advisory Commission (MFAC) approved several Division of Marine Fisheries (*Marine Fisheries*) proposals including a two-year seasonal cod prohibition in a portion of Massachusetts Bay and a three-year moratorium on the harvest, possession, and sale of river herring. Other approved actions impact rules governing dealer reporting, fish pot escape vent sizes, Outer Cape Cod lobster trap haul-out period, ban on the use of floating groundline, winter-period commercial summer flounder (fluke) trip limits, procedures to amend commercial scup trip limits, tautog possession limits, billfish regulations, and procedures to close shellfish areas due to biotoxins. Details on each of approved regulatory changes are provided below.

No action was taken on the public petition to eliminate the commercial lobster Area 1/Outer Cape overlap zone. Additionally, the MFAC voted to delay action pending further discussion on the *Marine Fisheries* proposal to require all fish pot permit holders be owner/operators and the proposal to allocate eligible SCUBA divers in the Outer Cape lobster fishery an Individual Trap Allocation commensurate with fishing history.

Regulatory Actions Approved by MFAC:

1) Mass. Bay Cod Conservation Zone Established during December – January 15 for two years (322 CMR 8.15):



To protect predictable aggregations of cod, a portion of Mass. Bay has been designated a Cod Conservation Zone. The harvest of cod by any person from waters under the jurisdiction of the Commonwealth north of latitude 42° 20' and south of 42° 30' latitude will be prohibited during the period December 1 through January 15. With the exception of lobster traps and drags for scallops and sea urchins, it will also be unlawful for any person to fish, set, or abandon any gear capable of harvesting cod in this Cod Conservation Zone during the restricted season.

This prohibition shall apply to all gillnets, otter trawls, mid-water trawls, seines, and all hook-and-line gears including longlines, rod-and-reel, and handlines. This seasonal prohibition shall remain in effect through January 16, 2007.

2) Three-Year River Herring Moratorium on Harvest, Possession, & Sale (322 CMR 6.17):

In response to recent drastic declines of many river herring spawning runs, the harvest, possession or sale of river herring in the Commonwealth or in the waters under the jurisdiction of the Commonwealth by any person is prohibited through 2008. To accommodate the bait harvesting fisheries, the MFAC approved a slight tolerance (up to 5%, by count, of a batch of fish may be comprised of river herring species).

3) Dealer Reporting Requirements (322 CMR 6.20 & 7.07):

To accommodate seafood dealers accepting fish at ports distant from their processing facilities, the dealer reporting requirements were amended to relax the requirement that fish be weighed upon landing. Although weighing of fish will still be encouraged, dealer reporting requirements will mandate that dealers label and record the number of containers of fish purchased. Effective January 1, 2006, all labels and records must include the number of containers per species, date, time, fishermen's name, and fishermen's DMF ID number.

4) Fish Pot Escape Vent Specifications (322 CMR 6.12):

In compliance with the Interstate plan, the MFAC approved the following specifications for all fish pots fished in waters under the jurisdiction of the Commonwealth:

- i. at least two escape vents in the parlor section of the pot; and
- ii. an increase in the minimum size of circular escape vents for pots used to harvest black sea bass from 2 3/8" to 2 1/2" (pots used in the scup fishery would retain the status quo 3.1" circular escape vent minimum size).

These measures will not go into effect until the next fishing year on January 1, 2007.

5) Outer Cape Lobster Trap Haul-out Period (322 CMR 6.02):

Beginning in 2006, fishing for lobster with traps is prohibited in the Outer Cape LCMA from January 15th through March 15th. Fishermen are required to remove all lobster traps from waters of the Outer Cape LCMA as defined in 322 CMR 6.33 during this closed period. This measure is a part of the effort control plan for the Outer Cape lobster fishery approved by the Atlantic States Marine Fisheries Commission.

6) Prohibition on the Use of Floating Groundline (322 CMR 12.00):

Effective next fishing year on January 1, 2007, it shall be unlawful for any person to fish, store, or abandon any fixed fishing gear in waters under the jurisdiction of the Commonwealth with positively buoyant groundline (lines connecting traps in a string). Any recreational or commercial fishermen using fixed gear will be required to use neutrally or negatively buoyant groundline. Neutrally and negatively buoyant groundline is defined as line that has a specific gravity greater than that of seawater, 1.03, and does not float up in the water column.

7) Commercial Summer Flounder (Fluke) Trip Limits (322 CMR 6.22)

The MFAC approved sub-dividing the winter-period fluke quota to better manage harvest within the 70/30 summer/winter quota split. Effective January 1, 2006, the following are the approved periods and their associated possession limits:

- i. **Winter I period** (January 1 - April 22) would begin at a 2,500 lb daily trip limit and reduce to a 100-lb. trip limit when 10% or more of the annual quota has been reached. This is the current trip limit and trigger for the current January – April "winter" period.
- ii. **Summer period** (April 23 - October 31) would be essentially unchanged and begin during the squid season (April 23rd through June 9th) at a 100-lb daily trip limit then increase on June 10th to a 300 (nets)/200 (hooks) lb. daily trip limit. When the

summer period landings reaches 70% of the annual quota, the fishery would be closed until November 1.

- iii. **Winter II period** (November 1 - December 31) would begin on November 1st designed to consume the balance of the quota. Daily trip limit will be 2,000 lb. until 100% of the annual quota is reached at which point the landing and possession of fluke would be prohibited.

8) Declaration of Commercial Scup Specifications during the Winter I & II Periods (322 CMR 6.28):

To allow for more efficient and timely trip limit changes in line with ASMFC/Federal approved rules, the MFAC approved the use of a declaratory process to set rules governing the manner and times of taking scup, the legal size limits, and the numbers and/or quantities of scup to be taken during the Winter I (January – April) and Winter II (November – December) commercial scup fishery periods. Prior to implementing annual specifications, *Marine Fisheries* will hold a two-week comment period. Notices of final annual specifications will be provided in the *Massachusetts Register*, local newspaper, *Marine Fisheries* email Listserv and posted on the *Marine Fisheries* website (www.mass.gov/marinefisheries). *Marine Fisheries* will begin utilizing the declaratory process to set annual specifications on January 1, 2006.

9) Commercial and Recreational Tautog Possession Limits (322 CMR 8.06):

Effective January, 1, 2006, the MFAC approved clarifying the commercial and recreational possession limits for Tautog by establishing both the 40-fish commercial possession limit and 3-fish recreational limit **as possession limits per 24-hour day.**

10) Repeal of State Billfish Rules (322 CMR 6.11):

Effective January 1, 2006, all rules governing the harvest of billfish in state waters will be repealed. These state rules had been implemented at a time when there were no federal rules. However, federal rules are now in existence and effectively manage the primarily federal waters fisheries. Although the harvest of billfish in state waters is uncommon, federal rules will apply for all fishing activity in state and federal waters. Consult the National Marine Fisheries Service for permitting and reporting requirements (www.nmfs.noaa.gov/sfa/hms).

11) Shellfish Harvest & Landing Restrictions Due to Marine Biotoxins (322 CMR 6.11)

This action allows *Marine Fisheries* to restrict shellfish harvest and landings from all waters under the jurisdiction of the Commonwealth as necessitated by the presence of marine biotoxins. In addition to closures enacted within waters under the jurisdiction of the Commonwealth, the Director may restrict the taking of certain shellfish species and the landing of those products by any vessel registered under the laws of the Commonwealth from areas determined to contain levels of toxic phytoplankton, including waters within the Exclusive Economic Zone, that may place the public health at risk from consumption of shellfish products. This action shall take effect on January 1, 2006.

The recent red-tide event in Massachusetts affected the Commonwealth on an unprecedented scale. In the past red-tide has primarily been limited to near-shore waters where the Commonwealth can act in conjunction with local officials to restrict harvest and landing of shellfish due to the presence of marine biotoxins as needed. The spread of red-tide offshore beyond town waters necessitated emergency action to enable *Marine Fisheries* to fully restrict shellfish landings and harvest to protect public health.

For further information please visit our website at www.mass.gov/marinefisheries.

ATTACHMENT C

NEWS ARTICLES

2005 Saltwater Sport Fishing Guide Now Available!

The Massachusetts Division of Marine Fisheries has produced this year's edition of our Saltwater Sport Fishing Guide (SFG). As in previous years, the guide contains current information on boat-launch sites, tackle shops, charter and party boats, fish profiles, and fishing tournaments to assist you in enjoying our spectacular array of fishing opportunities from shore or by boat. The guide has a long successful history; it has been a traditional publication of our agency for over 20 years.

Designed to provide basic information about the Commonwealth's recreational fishing opportunities, the Sport Fishing Guide is a useful tool for the novice or visiting angler to become acquainted with what Massachusetts has to offer, although many long-time resident anglers call for it regularly.

Please contact one of our offices for a copy of the Guide, or you can download a copy from our website (www.mass.gov/marinefisheries). Those interested in listing their business in the next SFG should contact John Chisholm at 508.910.6329 or John.Chisholm@state.ma.us.

Massachusetts Saltwater Recreational Fishing Guide



Photo courtesy of Randy Sigler

Marine Fisheries

Brooke Miles with her winning 35 lb. 6 Oz. Cod.

Photo courtesy of the Miles family

Proposed Federal Whale Rules on the Horizon ...



Draft Environmental Impact Statement details new whale-safe gear proposals

After two years of preparation, NOAA Fisheries has revealed new proposals to reduce entanglements of large whales. Hearings are scheduled in Massachusetts in late March. With the help of the Atlantic Large Whale Take Reduction Team, these proposed amendments are intended to reduce mortalities and serious injuries to right, humpback, fin and minke whales in U.S. waters.

These changes would revise the federal Take Reduction Plan, a plan that dates back to 1997 and includes regulatory and non-regulatory programs, including gear modifications, time-area closures, expanded disentanglement efforts, extensive outreach efforts in key areas, gear research, and an expanded right whale surveillance. *Marine Fisheries* has played a prominent role in development of the federal plan since it was based largely on the state's own Conservation plan that was developed in 1996.

Fishermen should pay close attention to these proposed amendments since the Marine Mammal Protection Act rules affect **all** commercial fishermen fishing in both state and federal waters – even those who do not have a federal permit. While the Commonwealth could be more restrictive than federal whale protection rules, it can't be less restrictive. The scheduled hearings are designed to take comments on the Draft Environmental Impact Statement, a stunningly comprehensive 783 page document that presents six alternatives (status quo and 5 new scenarios).

The most substantive change proposed is the requirement by 2008 that lobstermen and gillnetters use "non-buoyant" (sinking groundline) in broad areas where floating line is allowed now. Massachusetts lobstermen in Cape Cod Bay have already switched over to sinking line in 2001, and many of the non-Cape Cod Bay lobstermen recently have replaced their line capitalizing on the "floating line buyback" spear-headed by the International Fund for Animal Welfare (IFAW) this past winter. The most contentious debate is expected regarding how far the floating line prohibition extends. Will it extend throughout the U.S. range of the right whale from Maine to Florida? And are there logical areas (inshore or very deep offshore waters) to exempt where large whales are not expected to occur?

These proposals could eliminate the so-called DAM closures. For the past four years lobstermen and gillnetters have been required to remove their gear – on short notice – from areas and during times that three or more right whales were seen aggregated. These closures have been unpredictable and disruptive but were considered the best way to allow fishermen flexibility to continue fishing while dodging requirements to modify their gear. Finally, proposals may extend current gear restrictions beyond lobster gear and gillnets to include other similar gears, such as hagfish pot, fish pot, crab pot, and conch pot.

- Monday, March 28, 2005 Plymouth, MA (6 - 9 PM)
Radisson Hotel - Plymouth Harbor
180 Water Street, Plymouth, MA 02360
- Thursday, March 31, 2005 - Gloucester, MA (6 - 9 PM)
Massachusetts Division of Marine Fisheries
30 Emerson Avenue, Gloucester, MA 01930

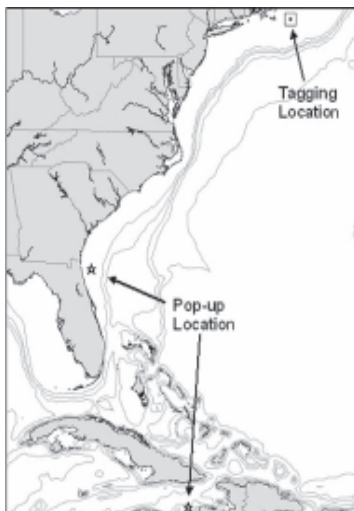
Basking Shark Tagging Update

In the last issue of *DMF News*, *Marine Fisheries* reported on a novel method for improving knowledge of endangered North Atlantic right whale (*Eubalaena glacialis*) movements and habitat use (see *Basking Sharks May Help Identify Unknown Right Whale Habitats* in *DMF News*, Second Quarter - Third Quarter 2004). *Marine Fisheries* biologists in collaboration with researchers Stephan Zeeman and Erin Estrada of the University of New England (UNE) are tagging basking sharks, *Cetorhinus maximus*, with high technology pop-up archival tags.

Basking sharks are often found in aggregations with right whales, feeding on the same dense patches of planktonic copepods, and it is likely that they exhibit the same seasonal movement patterns as the North Atlantic right whale. The multifaceted study, funded with a grant from the Massachusetts Environmental Trust, hopes to shed light on important questions of biology, distribution, migration, and essential habitat for both species and preliminary data is in.

Pop-up Archival Transmitting (PAT) tags used in this study collect temperature, depth, and light level data at user-defined intervals. At a time pre-programmed by the researcher, tags detach from the animal and float to the surface where data relays through an Argos satellite to the researcher. Tags not only provide fixed locations of animals at the time of pop-up, but researchers may also re-create dynamic movements of the shark based on light level data. In late September 2004, UNE and *Marine Fisheries* biologists tagged two basking sharks approximately 40 nautical miles east of Nantucket Island. The tags were applied by harpooner Captain Bill Chaprales from the F/V Ezydazit with the assistance of his spotter pilot Tim (Wilderness Dave) Voorheis.

On January 31, 2005, the tags detached from the sharks as scheduled, floated to the surface, and began transmitting four months of data. The recovered tags, despite being attached on sharks within four nautical miles of each other back in September, were found in January very far apart. One of the sharks traveled 870 nautical miles SW, about 30 nautical miles east of Jacksonville, FL where it spent most of its time in the surface waters. The other shark traveled over 1,400 miles SSE to an area between the Caribbean islands of Haiti and Jamaica. This latter shark is the first known record of this species in the Caribbean. Remarkably, this shark spent most of its time at depths in excess of 1,600 feet while in this area.



Over 1,400 miles separated one tagging site and pop-up location.

Map by Greg Skomal

It appears that the depth of these sharks is highly correlated with water temperature because both sharks preferred to remain in water that was 55-66°F, regardless of the location.

The early results from these two tags are both intriguing and encouraging. It appears that the deep waters of the Caribbean may be newly discovered over-wintering habitat of the basking shark. Will these data provide new insights into unknown winter migration patterns of the right whale? *Marine Fisheries'* efforts have just begun and the team is looking to tag another group of animals in 2005. We'll keep you posted.

by Gregory Skomal

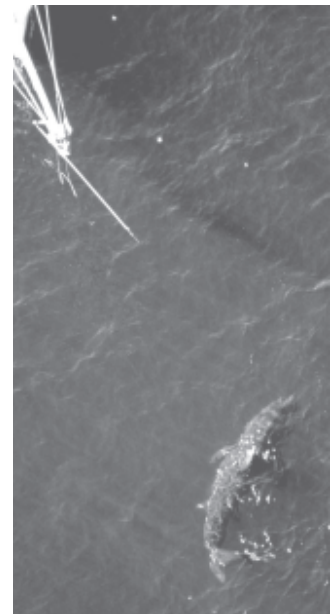


Photo courtesy of Tim Voorheis

Cpt. Chaprales (on prow) uses harpoon to tag basking shark.

DMF Reviews Fishery Impacts of Proposed Cape Wind Farm

Projected to occupy 24 square miles of Nantucket Sound, the Cape Wind Energy Project would result in the construction and operation of 130 wind turbine generators on Horseshoe Shoal. The proposed alternative energy project continues to be under the local and even national spotlight, as a wide range of constituents from area residents, environmental groups, and industry representatives add to the discussion surrounding state and federal permitting reviews.

The Army Corps of Engineers, the federal agency with lead jurisdiction, released a Draft Environmental Impact Statement (DEIS) in November of 2004, which also served as the Draft Environmental Impact Report (DEIR) for the necessary state MEPA review. In keeping with *Marine Fisheries'* mission to manage and protect the Commonwealth's marine resources, staff biologists reviewed the Cape Wind DEIS/DEIR to evaluate its potential impacts and provided comments to the Corps and Secretary of Environmental Affairs.

Nantucket Sound provides very important feeding, spawning, and/or nursery grounds for many species of finfish and invertebrates, including bluefish, striped bass, scup, summer flounder, winter flounder, black sea bass, tautog, squid, and whelks. Further, historic migration patterns suggest that spawning and juvenile development activities in the Sound may impact abundance levels for some species as far down as the mid-Atlantic. Commercial and recreational fishing in Nantucket Sound provides significant revenue to the local economy and is an integral, indeed traditional, part of life in many Cape Cod and Island towns.

As a result of our review, *Marine Fisheries* is concerned about the possibility of significant impacts to fisheries resources, habitat, and harvest activities in Nantucket Sound. *Marine Fisheries* has recommended that applicants provide additional information to effectively evaluate potential

ATTACHMENT D

OUTREACH EFFORTS OF THE RIGHT WHALE CONSERVATION PROGRAM

Date	Event	Location	Topic
2/3-2/5	MLA Annual Meeting	Hyannis, MA	Booth and poster on DMF gear work
4/25-4/27	ALWTRT Meeting	Baltimore, MD	Presented on mini-logger project
	Entanglement and Gear Modification Workshop	Durham, NH	Presented
9/21-9/22	Low-profile Groundline Workshop	NH and ME	Attended
9/23-9/26	Visit to New England Aquarium field station	Lubec, ME	Intro to right whale photo-ID and catalogue.
10/25	DMF Public Hearing on proposed rule	Gloucester, MA	Proposed rule to ban floating groundline
11/2-11/3	Right Whale Consortium Meeting	New Bedford, MA	Attended
11/4	Acoustics Workshop	New Bedford, MA	Attended
12/11-12/17	Society for Marine Mammalogy conference	San Diego, CA	Oral presentation on mini-logger project Present poster on state's right whale plan