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Lobstermen Gear-up with Whale-safe Lines

Federal grant subsidizes replacement line

For six days in September, Massachusetts inshore lobstermen lined up with truck-loads of used floating line for disposal, as they switched over to "sinking" line to avoid whale entanglements. This first-ever gear replacement project was organized by the International Fund for Animal Welfare (IFAW), Massachusetts Lobstermen's Association (MLA), and *Marine Fisheries* to help alleviate the financial burden for fishermen who are complying with whale-safe gear mandates of federal and state regulations. The project commenced in Sandwich Harbor on Monday, September 20th, with

supporters Senator Edward Kennedy and Congressman Bill Delahunt, who shepherded the funding initiative through Congress, in attendance.

Since last year, lobstermen throughout Cape Cod Bay have been required to fish sinking groundlines year-round. Past *Marine Fisheries* studies have demonstrated the risk of buoyant lobster groundlines that can arc up to 15-20 feet above the ocean floor creating a gauntlet of potentially entangling lines in the water column. But the financial burden of replacing floating line with sinking line is substantial. Because floating line is lighter, it costs much less



Photo by Dan McKiernan

Ceremonial check for \$660,000 presented to project partners at Sandwich Marina. From left to right: Fred O'Reagan (IFAW Chief Executive), Senator Edward M. Kennedy, MLA Vice President Gary Ostrom, Congressman Bill Delahunt, and DFG Commissioner David Peters.



Photo by Ed Lyman

Erin Heskett (right) of IFAW at the Gloucester state fish pier assisted one of the many commercial lobstermen in the gear exchange program. IFAW continues to raise funds to meet the grant's match requirement. For more information visit IFAW.org or contact Erin at 508 644-2192.

per foot, and because it is in the water column, away from the abrasive ocean floor - it lasts much longer. According to MLA's Vice President, Gary Ostrom, "the line costs twice as much but lasts half as long." Fishing sinking line is a financial hardship for many fishermen, but at this time, when concern for endangered species supercedes all other issues, its use is imperative.

Beyond Cape Cod Bay, many fishermen are following suit, replacing floating line with sinking line to avoid the consequences of short-notice federal closures around right whale aggregations. Called "DAM," for Dynamic Area Management, these federal actions are temporary closures of surrounding waters to any lobster traps rigged with floating groundline. Numerous DAMs have affected waters adjacent to Cape Ann and Stellwagen Bank in the past few years.

The project was federally funded through the National Fish & Wildlife Foundation by NOAA Fisheries. Under the terms of the grant, federal funds account for half the project's cost. The remaining 50% comes from IFAW fundraising (20%), the fishermen (25%), and participating rope dealers (5%). In short, lobstermen will be able to buy replacement line for 25 cents on the dollar.

Over 1,000 coastal lobstermen who fished in 2002 or 2003 were invited to participate in the program, and over 300 responded. These fishermen account for most of the traps fished in state waters. Each fisherman's grant was scaled to the number of traps they reported fished. For example,

lobstermen who fished the maximum allowed (800 traps) were eligible for a voucher totaling \$4,200, and required to turn in at least 1,100 lbs. of floating line. By completion of the project this winter, all Massachusetts coastal lobstermen will have the opportunity to purchase whale-safe groundlines with unprecedented government support.

Congratulations to the commercial lobstermen and MLA for leading the way on this critical conservation issue. And credit to IFAW, an internationally-renowned conservation group, that has demonstrated a willingness and capability to address challenges without relying on distracting and often misguided lawsuits that have been too common in right whale conservation for the past decade.

by Dan McKiernan, Deputy Director



Photo courtesy of SaltWater Sportsman

Rip Cunningham Appointed to New England Council

On June 16th the U.S. Department of Commerce announced appointments to the New England Fishery Management Council (NEFMC), including Colin "Rip" Cunningham to an at-large seat representing Massachusetts. Mr. Cunningham is nationally recognized as a strong recreational fisheries advocate and conservationist. He is Editor-At-Large of the world's largest recreational fishing publication, *Salt Water Sportsman*, and has many years of experience working with fisheries management issues on both a national and international basis. As a 14-year member of the Massachusetts Marine Fisheries Advisory Commission, Mr. Cunningham brings a strong background on local fisheries management issues to the table.

Governor Romney earlier in the year had provided Senior Administrators at NOAA Fisheries and the Secretary of Commerce with recommendations for the two at-large seats that would be vacated in early August. No seats obligatory to Massachusetts were due to expire this year. Mr. Cunningham joins fellow Massachusetts representatives Thomas Hill, John Pappalardo, and Rodney Avila.

Rip replaces former Massachusetts at-large member Mark Amorello. Mark provided strong leadership on the Council having chaired the joint NEFMC/Mid-Atlantic Fishery Management Council Dogfish Committee, Enforcement Committee, and Sea Scallops Committee. *Marine Fisheries* thanks Mr. Amorello for his commitment and effort.

Monitoring the Sounds of the Sea

Bio-Acoustics may provide a new tool to protect right whales

For eight years running, *Marine Fisheries'* Right Whale Surveillance and Monitoring Program in Cape Cod Bay has become known as the best, most comprehensive right whale research and conservation program conducted throughout the animal's range. Planes fly, research vessels sail, plankton nets are towed, data analyzed, warnings to ships sent out, and fishermen modify their gear. Now *Marine Fisheries* plans to listen.

For four and a half months (January – May 15) we know which whales are in the bay, their health, and reproductive status, what they are feeding on, where they are moving from and to, and whether they are likely to stay in the Bay based on the food resource found there. All of which are important for managing the population. We've learned more in the last eight years about right whales in the bay than ever before.

One major weakness in regard to protecting right whales is the dependency of vessel-based and aerial-based surveillance on favorable conditions to visually sight right whales. In foul weather (wind, rain, snow, fog, darkness), which is quite common in Cape Cod Bay in the late winter and early spring, research teams are unable to get out, and even if they do, whales may be difficult to see under such conditions.



Photo by Ed Lyman

Buoy near Provincetown will eavesdrop on whales, and cell phone technology is used to send results "real time" to shore. Project funding comes from NOAA Fisheries and Mass. Environmental Trust.

thus far in Cape Cod Bay by Dr. Christopher Clark of Cornell University's Bioacoustics Research Program (BRP), and Dr. Doug Gillespie of the International Fund for Animal Welfare (IFAW). Dr. Clark and other scientist have shown that acoustic monitors can be used effectively to detect vocalizing right whales.

For the past four winters, Clark and his bioacoustics team have been monitoring right whale sounds using autonomous recording units (ARUs) better known as "pop-ups." These units include a 17" sphere, protected by a plastic shell that houses a computer, batteries and an underwater microphone, or hydrophone. The pop-ups rested on the ocean floor archiving whale calls only to be retrieved after several months of listening. Clark has shown a close correlation between the number of calls and right whales seen by the surveillance team.

This basic research success is now about to expand and go on-line 24-7 through the combined application of cell-phone technology and engineering know-how supported by a broad coalition of scientists, fishery managers, and fishermen. Over the next few months, a network of moored buoys, designed and constructed by engineers from Cornell University and Woods Hole Oceanographic Institution, will be strategically deployed in waters around Cape Cod. This "listening" network will automatically monitor for right whale calls and provide daily reports via the Internet on the number of right whale calls detected. Moreover, when a whale call is detected by more than two buoys, triangulation techniques will pinpoint the calling whale's location, revealing distribution of whales within the bay.

Each buoy carries an auto-detection module consisting of an electronic hardware/software package that automatically identifies, stores, and transmits daily detections of right whale sound by cell phone to computers at Cornell University. Each day, validated detection data will be automatically entered into a Website that will provide researchers and managers with valuable data summaries.

Another benefit of this enhanced passive monitoring will be the more efficient use of surveillance resources in-season. If the surveillance team is confident that whales are not



Photo by Ed Lyman

WHOI Buoy expert Will Ostrom (left) guides the buoy overboard, while Cornell's Tom Calupca (center) and Dr. Chris Clark assist.

Thus, the program is hindered by surveillance gaps that leave right whales undetected for many weeks at a time.

The National Marine Fisheries Service manages an elaborate Sightings Advisory System (SAS) to warn mariners about right whale presence by broadcasting all reliable sightings of right whales to mariners. But such a system is only as good as the frequency and reliability of the sighting data put into it. Under the current system there are times when mariners are not warned when whales are in vulnerable areas such as harbors or shipping lanes, and times when warnings continue after whales have left the area. Moreover, if constituents know the sightings data are old and unreliable, confidence in the system inevitably declines.

A Novel Approach

Now we have an opportunity to make a great program better. Rather than look for right whales once or twice per week (at best), we hope to track them audibly through passive acoustic monitoring, 24 hours per day and 7 days per week. The outlook looks promising based on research conducted

residing in Cape Cod Bay, then the plane can be diverted to other known or suspected right whale habitats, increasing coverage and photo-id opportunities.

Two buoys will be placed to address ship strike potential at the east entrance of the Cape Cod Canal and the northern end of the bay on the approach to Provincetown. Cape Cod Bay is a "natural laboratory" for this technology. Next year, additional real-time buoys will be deployed in offshore habitats, transferring data back to Cornell via satellite. Eventually, buoys may be deployed all along the east coast to help further protect this critically endangered whale.

Impact on Fishermen

Because lobster gear fished in the bay is the most regulated and "whale-safe" of any area in the U.S. or Canada, new fishing rules will not be enacted as a consequence of getting more and better information on right whale presence. Cape Cod Bay lobstermen already are mandated to fish lines that lie on the ocean floor connecting traps, and buoy lines rigged with low strength breakaways (600 lbs.). Federal and state regulators have recognized the conservation efforts of Cape Cod Bay lobstermen by allowing them to continue fishing year-round in the midst of whales.

During the months of May-December when the Surveillance Program is not active, this technology will give us better ability to detect the presence of whales in the bay. These months are active for fishermen, as well as commercial shipping, activities that all pose a risk to whales from vessel strikes.

Fishermen will be able to stay more informed about whale presence and, help serve as Cape Cod Bay "stewards" by promoting responsible vessel operation and fishing practices around right whales to less-informed mariners. *Marine Fisheries* urges everyone on the water to contribute to protecting this highly endangered whale that is a common visitor to our waters.

by Dan McKiernan, Deputy Director

Marine Fisheries Comings & Goings

Comings

As a result of the \$5-million Hubline Mitigation & Restoration Project being run by *Marine Fisheries'* Bruce Estrella, five new biologists and two technicians will join the ranks of the Division. Operating out of *Marine Fisheries'* South Shore Office, **Alison Leschen** and **Ross Kessler** will lead the Eel Grass Restoration Project in their respective positions as Aquatic Biologists II and I. **Alison** holds a masters in Marine Sciences from Boston University's Marine Program, where she conducted studies on Atlantic horseshoe crab populations and eelgrass restoration. **Ross** graduated from the University of Massachusetts - Dartmouth with a BS in Marine Biology. Since graduation, he has provided technical assistance to UMass-Dartmouth School for Marine Science and Technology's Cooperative Trawl, Cod Tagging, and Yellowtail Tagging projects. **Kate Taylor**, who previously worked on anadromous fish projects, was relocated from the Gloucester Office to Pocasset to serve as a seasonal contract Fisheries Technician on the Eelgrass Restoration Project.

Tracy Pugh (Aquatic Biologist I) and **Steve Voss** (Technician) will work on the Ventless Trap Survey led by *Marine Fisheries'* Bob Glenn. The survey will help to evaluate lobster abundance and size structure on the impacted HubLine pathway relative to non-impacted areas throughout Massachusetts Bay while taking into consideration the effects of depth and bottom sediment type. **Tracy** has been working with *Marine Fisheries'* Phil Brady on anadromous fisheries including contributions to the recent state-wide survey of

anadromous fishways. **Steve** graduated from Plymouth State College in New Hampshire with a BA in Environmental Studies and has worked with *Marine Fisheries* over the last year under Bruce Estrella as a seasonal Fisheries Technician.

The Sediments Restoration portion of the HubLine Mitigation & Restoration Program will include **Julie Barber** as Aquatic Biologist II and **David Chosid** as our new Aquatic Biologist I. One of the goals of this project is to enhance important crustacean and finfish habitat in Massachusetts Bay, including Boston Harbor. A recent masters graduate of the University of Rhode Island, **Julie** has conducted research on sea otter foraging effects in Glacier Bay, Alaska. During her year as an Our World-Underwater Scholarship Society Rolex Scholar, **Julie** worked at several international labs conducting marine research both above and below water. Another University of Rhode Island graduate, **David** obtained his Masters in Fishery Science for work with codend selectivity and YPR in New England groundfisheries. Previously, **David** conducted stock assessments for the New Jersey Department of Environmental Protection and for DeAlteris Associates, Inc.

Jim Fair, whom many will remember as *Marine Fisheries'* recently retired Deputy Director, will return to the agency to help delineate the Commonwealth's shellfish habitat. Since his retirement from service with the Division, **Jim** has provided fisheries consulting services to the Cape Cod Commercial Hook Fishermen's Association on a Northeast Cod Tagging Program funded through a NMFS Cooperative Research Grant. **Jim** also contributed his expertise to *Marine Fisheries* when drafting marine aquaculture regulations that would facilitate development of a marine aquaculture industry while protecting marine habitats and native species.

Earlier this year, **Cecil French** was appointed to be the new coordinator of *Marine Fisheries'* Licensing Office in Boston. Previously, Cecil had been working with the Department of Fish & Game on its electronic licensing program SPORT (Statewide Point-of-Sale Outdoor Recreation Transaction).

Welcome aboard!

Goings

Chief of *Marine Fisheries'* Conservation Engineering Program, **Thomas Moth-Poulsen**, departed on September 1 for Rome, Italy and his new position as the Fishing Gear Specialist for the Food & Agriculture Organization (FAO). FAO is an organization of the United Nations and represents a neutral forum where all nations meet as equals to negotiate agreements and debate policy. **Thomas'** work will be within the FAO's Code of Conduct for Responsible Fisheries.

Buon giorno.



Photo by Michael Pol

Thomas Moth-Poulsen (left) discussing a new net design.

Basking Sharks May Help Identify Unknown Right Whale Habitats

Marine Fisheries shark and whale experts collaborate in tagging study

With a grant from the Massachusetts Environmental Trust, *Marine Fisheries* biologists are tagging basking sharks in an attempt to locate aggregations of right whales and their habitat during elusive fall and winter months. While the basking shark is not an endangered species, it is listed by NOAA Fisheries as federally prohibited, with very little known about its ecology and movement patterns. Notwithstanding our hope to learn more about right whales, valuable information should also be gleaned about basking sharks.

The study is deploying state of the art technology known as Pop-up Archival Transmitting (PAT) tags that collect temperature, depth, and light level data at user-defined time intervals. After a length of time predetermined by the researcher, 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 light level data collected by the tag. A pilot study conducted by *Marine Fisheries* in September 2001 proved the feasibility of using this technology on the basking shark and clearly showed the shark's preferred habitat during a 71-day track period.

On Friday, September 24, two basking sharks (*Cetorhinus maximus*) were successfully tagged with the assistance of University of New England researchers. These tags are programmed to collect environmental readings every 30 seconds and will release in mid-winter on January 31, 2005. The sharks' positions at this time will be revealed along with data revealing its habitat use.

Marine Fisheries researchers will use these data in attempting a novel method for identifying movements and habitat use of the endangered North Atlantic right whale (*Eubalaena glacialis*). Despite being completely different species, the basking shark and the right whale share remarkable similarities in their seasonal habitat preferences. This ecological overlap affords scientists and managers a unique opportunity to increase their knowledge of right whale movements without potentially harming or harassing the endangered right whale species. Right whales are also known to vigorously cast-off expensive tracking equipment, which the sharks better tolerate.

Both species are planktivorous, generally feeding heavily on dense concentrations of small crab-like animals called copepods. This ecological link results in typical sightings of both species feeding in the same areas. During the spring and summer, the distribution of the right whale coincides with that of the basking shark from southern New England to Nova Scotia. However, the late autumn and early winter habitat of both these federally protected species remains unknown.

While North Atlantic right whales have been known to range widely, research has shown that there are five major feeding areas substantially congregated in and around Massachusetts coastal waters. These are Cape Cod and Massachusetts Bays, the Great South Channel, the Bay of Fundy, and the Scotian Shelf. Yet, approximately one third of the total right whale population is never seen in these areas, attesting to the presence of at least one other area that is not yet documented. Between 1998 and 2000, most of the calves born off the southern United States were from females that do not frequent known feeding areas. It is critical to know where right whales feed, since it influences their distribution, general health and breeding success. Identification of such

Photo by Ed Lyman



A basking shark grazing its meal of minute zooplankton.

areas is recognized as a priority in the federal Right Whale Recovery Plan.

Because right whales require dense zooplankton patches, primarily composed of copepods to feed effectively, these patches could be used to identify feeding habitat and predict right whale presence. While broad areas have been characterized as right whale habitat seasonally, the ability to detect plankton patches over a broad expanse of ocean is extremely difficult. No remote or cost effective means yet exists. In fact, it has been determined that it is actually easier to let the right whale lead you to these patches rather than vice versa.

Previous attempts at right whale tracking have been stymied by the short duration that tags remain on the whales. Moreover, some veterinarians have concerns regarding the invasive effects of implanting tags into these critically endangered animals. Yet, tags remain a stellar method for elucidating right whale movements; some of the more revealing migration tracks have come from satellite tags affixed by the Center for Coastal Studies Disentanglement Team to the end of trailing gear (lines) on entangled whales to help track the animal between disentanglement attempts. This indirect tagging method should address concerns without compromising such a robust source of information for researchers.

Where will the tags pop up on January 31st? The suspected direction is south and offshore, but we may be surprised. What are we to suspect about the habitat where they pop up, might these be right whale wintering grounds? Stay tuned until February.

by Gregory Skomal, Shark Specialist and Ed Lyman, Protected Species Specialist



Greg Skomal attempts to tag a basking shark. Project funded by the Mass. Environmental Trust. Photo: D. McKiernan.



Visiting Great White Puts *Marine Fisheries* to the Test

1,700 lb. shark protected and freed from shallow Naushon embayment



Photo by Ed Lyman

For almost two weeks the waters off Cape Cod attracted international attention as *Marine Fisheries* grappled with a wayward great white shark that entered a coastal inlet and apparently wouldn't find its way out. This awesome fish, not only provided a rare scientific opportunity, but was the center of an extraordinary event that captured the public's attention like none other in the history of the agency. The public's fascination with sharks - and this shark- created a public safety dilemma when operators of small craft attempted to approach, touch and even catch the fish.

Close encounters with such an elusive animal are rare. *Marine Fisheries* gets numerous false reports from the public about predatory sharks nearshore. Most reports of large dorsal fins turn out to be an ocean sunfish, or the benign plankton-eating basking sharks. However, this recent shark report came from a reliable source, sportfish charter captain J.C. Burke who sighted the fish near Hadley Harbor, a small inlet in the Elizabethan Chain Islands.

The shark was swimming in a secluded embayment measuring approximately 1,200 feet in length and from 100 to 300 feet across. Depth averages about 18-20 feet in the center of the channel. Reports from island locals indicated that the shark had first been seen at about 5:00 P.M. on Tuesday, September 21. It was not until Thursday, September 23 that *Marine Fisheries'* shark specialist, Greg Skomal, encountered the shark and confirmed that it was indeed a great white (*Carcharodon carcharias*). With the help of NOAA Fisheries scientists, it was estimated to be a 14 foot long female at 1,750 lbs, and about 14-16 years old. Although the occurrence of a white shark in Massachusetts waters is not unusual, they generally remain elusive and tend to be more common in deeper waters. The multi-day occurrence of this shark in a shallow Massachusetts estuary was an extraordinary event.

This species is protected by a federal prohibition on harvest. At the time of the initial sighting, there were no complementary state rules on white sharks but Director Diodati took immediate action and enacted an emergency rule to prohibit anyone from taking - or attempting to take - white sharks, an action taken to protect the public as much as this awesome fish.

In the western North Atlantic, the life history of the great white shark is poorly understood. Little is known of its movement patterns, seasonal distribution, and habitat preferences. Greg capitalized on a research opportunity by attaching a specialized electronic tag to the base of the dorsal fin. This high-tech tag records depth, temperature, and light

level data. Although these tags are sometimes referred to as satellite tags, they do not report real-time information on the position of the animal being studied. Instead, the tag collects and archives data, and then pops off the animal on a pre-programmed date and transmits the data to a satellite, relaying the information to the researcher. Temperature and depth data will provide important information on the shark's habitat preferences, while light level data will allow researchers to re-create movements of the shark prior to the tag's detachment. Although these tags have been deployed successfully to study large tunas and basking sharks (see related article on page 3), they had never been used on white sharks in the Atlantic.

After tagging, *Marine Fisheries* biologists monitored the shark on a daily basis, visually checking the animal's health with underwater cameras and noting its movements within the constricted range of the embayment. The on-scene team of experts convened by *Marine Fisheries* included NOAA Fisheries shark specialists, Center for Coastal Studies scientists involved with strandings and disentanglements, and a visiting great white shark expert from Western Australia. All concluded the shark would be too powerful to hook and drag from the area and especially difficult to handle if entangled.

Over the course of the two week period, the shark showed no signs of aggressive behaviour or chronic stress, but *Marine Fisheries* was nearly overwhelmed with the media inquiries that its presence created. *Marine Fisheries* responded by setting up a website where members of the public and media could view constant updates, photos and even short video clips of the shark and our work.

Concerned with growing public safety issues, *Marine Fisheries* Director Paul Diodati exercised his authority to restrict public access of the waterway by creating a "control zone" around those waters and lands surrounding the shark. This control zone was needed to safeguard mariners, swimmers, divers, and other users of these waters from dangers associated with a shark, and to prevent an onslaught of the public attempting to enter private property. Department of Fish and Game Commissioner Dave Peters worked with the Office of Environmental Law Enforcement and island residents to ensure a constant enforcement presence on shore and on the water.

With these precautionary measures in place, the team debated whether the shark would leave on its own accord or whether it needed some help. If the shark remained in the inlet for many weeks, it was likely that its health would deteriorate. Moreover, public safety would remain a huge factor given the intense public interest in getting up close.

The team hoped the shark would swim out of the area the same way it got in when water levels were expected to peak on September 28 and 29, the result of an expected storm surge from remnants of Hurricane Jeanne coupled with full moon tides. This did not happen.

The team concluded that water depth was the critical factor limiting movements of this fish. The area where it was residing has deep sections up to 20 feet in the center of the channels surrounded by shallow areas. As long as the deeper areas provided adequate depth for the shark, it was not likely that it would move over the shallow areas to escape from the area.

After a week of observations, it was increasingly apparent that the shark would have to be coaxed over the shallows to the south, but her size clearly limited handling options. Just



Photo by John Chisholm

Greg Skomal (left) and Ed Lyman approach the shark.

how does one move a healthy, vibrant 1,700 lb. great white shark? This shark's 3 foot girth, alone, was about the same depth as the rocky channel outlet.

The team drafted a number of options ranging from the passive technique of luring her from the area to more aggressive intervention. Initially an attempt was made to bait the shark with fresh bluefish, false albacore, and bluefin tuna. But there was no reaction to these baits.

The team noted from daily observations that the shark seemed to avoid silt plumes created by boat propellers, so the team tried creating a silt cloud using ground limestone. This method failed as well.

A commercial product called Shark Shields, which generates electrical fields to overwhelm the electro-sensory system of a shark, was used to drive the shark out of the inlet. This method did not succeed. Greg contacted a company called Shark Defense regarding their shark chemical repellents, but environmental concerns and the sheer volume of water in this area kept the team from using this option.

By September 30, the team felt that the shark's daily pattern of circling the embayment needed to be disrupted and that she needed to be actively motivated to swim through the southern inlet. Not desiring to physically handle the shark, physical barriers would be used to impede her movement north, thereby giving her only the option of moving south. There was considerable debate about the type of structural barriers to build, but the best option proved to be small-mesh nylon net panels used by weir fishermen. Chatham fisherman, Ernie Eldredge and retired fisherman Mark Simonitsch visited the site and confidently concluded their gear would fit the bill. Weir fishermen frequently encounter many species, large and small, that are successfully released.

On Friday, October 1, the *Marine Fisheries* team working with Mark, Ernie, and their crew succeeded in moving the shark out of the inlet to within 100 yards of deeper water. This was achieved by progressively setting net barriers across the channel in a leap frog fashion diminishing the shark's effective range of movement. The final push over the shallow mouth of the narrow inlet was accomplished by guiding the shark with a high-powered water hose.

After the shark had cleared the inlet, a net was set across the mouth of the embayment to keep her from returning. However, the shark had one more obstacle to contend with: a shallow eelgrass bed roughly 100 yards in width that separated her from the open deeper water of Lackey's Bay. The extent of the eelgrass-covered shoal was evident when the biologists and fishermen studied the aerial footage shot by a WBZ TV-4 helicopter news crew. With a more complete, aerial view of the situation, the team was confident the fish

could be moved out on the next sufficient high tide with just a little coaxing.

The commercial fishermen built a mock net to force the shark to swim over the shoal; comprised of a line sweep with individual lead lines the net would act like a curtain. It was anticipated that the shark would encounter the curtain and turn in the opposite direction. This design also minimized any possibility of the shark becoming entangled.

On Monday, October 4, the team returned to the scene just before high tide and attempted to corral the fish. Although the curtain was effective on the first pass, the shark quickly began swimming through the curtain, rendering it ineffective. The team then moved to Plan B, which involved constructing a larger wall of net that could be dragged ever-so-slowly to displace the fish over the bar. While the fishermen prepared the net, biologists decided to try and push the shark using high pressure water streams from two vessels. Once the shark began to move onto the shoal and away from the blasts of water, it was limited in its ability to turn back. With a chant of "Go!, Go!, Go!" from all on site, the shark ultimately traversed the shallow eelgrass bed into deeper water to the southeast. This movement was confirmed by news crews reporting via cell phones to the team on shore. With a great sigh of relief, the team celebrated the end of a long, yet invigorating, once-in-a-lifetime experience.

There is an unfortunate post-script to this incredible event. The extended time in shallow waters of the embayment on Monday October 4 caused the tag to release prematurely. The tag is designed to initiate a detachment if the depth data that it collects shows little vertical movement which would be indicative of death of the fish.

However, Skomal is confident he'll have other tagging opportunities through many of the professional contacts made during this event. The notoriety of this shark's appearance resulted in numerous calls from researchers and fishermen throughout the region who might help us locate other great white specimens for tagging.

Throughout this saga, the agency had a high profile with the public and media, providing information about the agency, its professional staff, as well as the conservation and management of living marine resources. Moreover, the public saw a team of knowledgeable, professional commercial fishermen, lending their much-needed skills in a cooperative effort to protect wildlife.

by Paul Diodati, Director and Dan McKiernan, Deputy Director.



Photo by Dan McKiernan.

Fishermen John Eldredge, Ernie Eldredge, Mark Simonitsch, and Chip Foster set the net panel and prevented the shark from swimming back into the inlet.

Haddock Recovery: Managers & Fishermen Confront Challenges

Tremendous news for rebuilding of New England groundfish has raised the question: "How do we handle success?" After decades of relatively low abundance of Georges Bank haddock caused by low to no recruitment of young fish, we're suddenly faced with the fruits of rebuilding and rising abundance of adult, spawning haddock.

Now, fisheries managers of the New England Fishery Management Council, including *Marine Fisheries*, must determine how to increase protection of a phenomenal 2003 haddock year-class to ensure that it bolsters the spawning stock and provides sustained annual fishery benefits.

The 2003 year-class of haddock is thought to be larger than the 1963 year-class estimated to be 486 million fish at one year-old! For almost 40 years recruitment has been abysmal - seldom rising above 20 million fish. Prior to 2003, the last noteworthy recruitment was in 2000 with 75 million haddock. It's as if Rip Van Winkle has awakened.

The New England Fishery Management Council (NEFMC) and the fishing industry is faced with a long sought-after bonanza. Most of these haddock will be legal-size (19") in 2006. Perhaps the haddock stock might be returning to levels of recruitment witnessed from the 1930's through the early 1960s - recruitment averaging over 50 million fish with many greater than 100 million-fish year-classes. This is pleasant speculation.

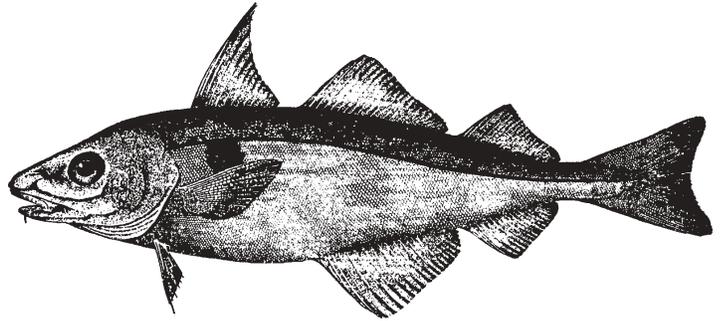
Annual landings over that time period were frequently more than 90,000,000 lbs. supported by a stock size remaining high - even with fishing mortality levels far above what is now required by the NEFMC. Therefore, it seems that the industry within two years will have a lasting opportunity to harvest haddock.

But first, steps must be taken to ensure this year-class is not unnecessarily wasted through discarding of sublegal or legal-sized fish caught as a bycatch. Haddock traditionally have been found across all of Georges Bank, and they seasonally move around the bank and back and forth from shallow to deeper water and are commonly captured in nets targeting cod, flounders, and other species.

One notable overlap in distribution is with Atlantic sea herring. This already has created concern that mid-water trawlers have been catching large amounts of juvenile haddock and that catch may increase because both species will be co-distributed during summer and fall, especially from the Northeast Peak of Georges Bank to the Great South Channel east of Chatham and Nantucket Island. Media coverage had depicted what at first seemed to be a serious bycatch problem. However, a recent review of this issue by the NEFMC at least temporarily dispelled concern. Representatives of federal enforcement and the NOAA Fisheries' Observer Program provided no evidence of a problem demanding Council attention. Nevertheless, the NEFMC agreed the potential for haddock bycatch deserves scrutiny. No one wants rebuilding to be compromised or set back due to bycatch in other fisheries.

The NEFMC must determine very soon how to deal with bycatch of juvenile and sublegal haddock in groundfish fisheries and other fisheries occurring in areas where haddock will be abundant, such as on Cultivator Shoals where an important whiting fishery is found. Whiting are pursued with "small-mesh" nets.

The potential for bycatch and waste is real and great especially as the 2003 haddock year class "grows into" the



selectivity of nets with large mesh (trawls and gillnets) fished for groundfish. Furthermore, if nets are overwhelmed with haddock of one size, such as this 2003 year-class, net selectivity may break down. Smaller haddock will not pass through large meshes as net cod-ends rapidly fill and meshes plug or are blocked. Now is the time for fishermen and managers to band together to develop strategies to avoid this possibility.

Marine Fisheries' Conservation Engineering Program will assist with this effort. (See related article). With Georges Bank cod being far below the Council rebuilding target, the challenge will be to determine improved ways for fishermen to target haddock and avoid cod. Similarly in some Georges Bank areas, haddock fishermen will have to avoid other species in need of rebuilding. More fishing gear research and special net designs will be ways to accomplish these tasks. *Marine Fisheries* will be in the forefront combining our scientific and technical expertise with that of our Marine Fisheries Institute (MFI) partners including the University of Massachusetts Intercampus Graduate School of Marine Science and Technology.

by David Pierce, Ph.D., Deputy Director

Marine Fisheries Contributions

Marine Fisheries' professionals contribute to continued progress in marine sciences and management through submission of formal papers and participation in local, regional, national and international conferences. The following is a summary of those contributions made by *Marine Fisheries* employees (listed in bold) over the last six months. Individuals interested in receiving copies of published papers should contact the appropriate author. *Marine Fisheries* Technical Reports (TR) are available by visiting our website at www.mass.gov/marinefisheries.

Papers

Skomal, G., G. Wood, and N. Caloyiania. 2004. Archival tagging of a basking shark, *Cetorhinus maximus*, in the western North Atlantic. *J. Mar. Biol. Ass. U.K.* 84:795-799.

Skomal, G., and G. Benz. 2004. Ultrasonic tracking of Greenland sharks, *Somniosus microcephalus*, under Arctic ice. *Marine Biology*. 145.

Nelson, G. 2003. Massachusetts Striped Bass Monitoring Report, TR-21.

Environmentally-Friendly “5-Point” Net to Target Haddock & Avoid Cod

Former Project Leader, Thomas Moth-Poulsen and Michael Pol of *Marine Fisheries*' Conservation Engineering Program, working with Tor Bendiksen of Reidar's Net Manufacturing (New Bedford), have developed a design for an innovative haddock net. Because haddock stocks are growing off New England, but stocks of Georges Bank cod have yet to fully recover, modified fishing gear has become an integral part of the solution to keep fishermen fishing sustainably. The New England Fishery Management Council (NEFMC) recognized this when it required use of a separator trawl, a net with a horizontal mesh panel across the entrance, as part of Amendment 13 to its Groundfish Plan. *Marine Fisheries*' design appears to improve upon other proposed haddock nets while continuing to minimize bycatch and discard of cod in the directed haddock fishery.

Underwater video shows vertical separation of the two species with haddock rising higher off the sea floor than cod. *Marine Fisheries*' new net design takes advantage of this differential behavior by elevating the net's mouth opening well above the sea floor. Advantages for fishermen include a trawl that is easy to handle and mend, is stable under different ocean conditions, and maintains minimum contact with the sea floor.

Tor, well-known as a creative net designer, developed a plan based on these advantageous criteria, and a net model was constructed. He and *Marine Fisheries*' gear specialists traveled to Memorial University's flume tank in St. John's, Newfoundland for net testing. Working closely with Harold Delouche and George Legge of the Institute, this team tested the net over two days resulting in a design that met or exceeded expectations.

Dubbed the “five-point net,” the final design is a modified three-bridle box trawl capable of fishing five feet off the ocean bottom with a 25-foot high net opening. The bottom gear consists of just five chains (hence the “five-point” net). The inclusion of this environmentally-friendly footrope in the net design is the latest offshoot of the raised footrope trawl, a highly successful whiting net design used off the New England coast.

Overall net measurements consist of 24-inch (610 mm) diamond mesh in the wings, top square, and front belly, graduating to 12-inch (305 mm) diamond mesh in the bosom, ending with 6-inch (152 mm) meshes in the back. “I could have gone with even larger meshes, or a more radical design,” said Tor, “but we wanted a net that was reasonably familiar to haddock fishermen.” Tor also deliberately picked mesh sizes that would allow a straightforward matching of 2:1 when making the net. Tor added, “I'm pleased with the way the net model opened up, and I especially liked the way stresses in the net were transferred to the gore lines.”

The net design is remarkably stable. Testing the model at 3.0, 3.5 and 4.0 knots resulted in no change in the height of the fishing line off the bottom. Height off the bottom was adjusted by adding or removing chain links from the bottom bridle. “This feature will allow us to easily fine-tune the net during field testing,” said Pol.

Using the flume tank allowed adjustments to the net design that saved considerable time in the field. For example, both high- and low-aspect doors were modeled, and the appropriate rigging was determined for each type. “What we have done in two days would have taken two weeks or more at sea,” said Moth-Poulsen. The next step in the experiment will be construction of a full-size model and field-testing on a commercial vessel. *Marine Fisheries* will use cameras and acoustic net monitoring systems to examine fish reactions and to measure net geometry on the net in the field.

Also under examination will be the deployment of 10-foot chains, which may cause problems under the net drum as the net is brought in or out. “It's already pretty risky to be under the net drum,” Pol said, “but we will be curious to see if the long chains cause problems operationally.” One suggested idea is to have the drop chains taken on and off during deployment. “We are open to suggestions. We want to make sure the net is workable.”

To contact *Marine Fisheries* with suggestions, please call Mike Pol at 508 563-1779 or email Mike.Pol@state.ma.us.



Photo by Michael Pol

Memorial University's flume tank is the mecca for gear researchers working to develop new fishing gears using scale models in a simulated environment. It is filled with nearly a half million gallons of water with a belt along the base that can be adjusted to replicate changes in towing speed. Water current also can be adjusted to create various fishing conditions to model net performance.

Notice of Public Hearings Scheduled for October 18 & 19, 2004

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 (MFC) have scheduled hearings on the following regulatory proposals. Contact DMF for draft regulations and further details.

Marine Fisheries proposes:

1. The required use of a raised footrope trawl to fish during September in the Cape Ann Whiting Area (322 CMR 3.04 & 8.07) compatible with federal regulations in adjacent waters;
2. **A May 20, 2004 control date for any commercial fishery conducted using hook-and-line, longline, or handgear within waters under the jurisdiction of the Commonwealth (322 CMR 7.04);**
3. Final adoption of the May 1, 2003 control date for the commercial striped bass fishery (322 CMR 6.07);
4. Clarification of the allowance for commercial striped bass fishing to occur aboard for-hire vessels while carrying recreational fishing customers (322 CMR 6.07 & 7.01):
 - all persons aboard a for-hire vessel commercial fishing for striped bass would be prohibited from possessing striped bass smaller than the 34" commercial minimum size limit;
 - the vessel would be restricted from possessing more than the striped bass vessel limit (e.g. 30 bass during the 2004 season);
5. Increasing the minimum ring size for sea scallop dredges from 3 +” to 4” consistent with federal regulations (322 CMR 4.10);
6. **Closing the recreational black sea bass fishery from September 8th – 21st and December 1st – 31st in compliance with the ASMFC Interstate Fishery Management Plan (322 CMR 6.28).** *Marine Fisheries* previously implemented the September closure through emergency regulation and will take comments on this action;
7. Complementing federal groundfish regulations contained in Amendment 13 (322 CMR 6.03):
 - **22” minimum size for recreational cod**
 - **19” minimum size for recreational haddock**
 - **800-lb. commercial cod possession limit north of Cape Cod; 1,000-lb. limit south and east of Cape Cod**
 - **season commercial yellowtail flounder trip limits of 250-lbs. during Apr – May & Oct. – Nov. and 750-lbs. during Jun. – Sep. & Dec. - Mar.;**
 - **commercial and recreational halibut minimum size of 36” and a one halibut per angler recreational possession limit and a one halibut per trip commercial possession limit .**
8. Extending Right whale protection measures that restrict fixed gear use in the Cape Cod Bay Critical Habitat by 15 days through May 15th (322 CMR 12.05) to be consistent with federal regulations;
9. Implementing increases in lobster minimum sizes and trap escape vents to comply with Addendum IV of the interstate plan (322 CMR 6.01 & 6.02):
 - **an increase of the commercial lobster minimum size in LCMAs 2, 3, & Outer Cape and for non-commercial fishermen in the Southeast Recreational Lobster Area to:**
 - i. 3 13/32” on July 1, 2005;
 - ii. 3 7/16” on July 1, 2006;
 - iii. 3 15/32” on July 1, 2007;
 - iv. 3 1/2” on July 1, 2008;
 - **an increase of the commercial lobster trap escape vent minimum size in LCMAs 2, 3, & Outer Cape Cod and for non-commercial fishermen in the Southeast Recreational Lobster Area to:**
 - i. 2 5/8” for circular vents on January 1, 2005;
 - ii. 2 1/16” x 5 3/4” rectangular or 2 11/16” circular on July 1, 2008;
10. **Accept comments on emergency action regarding commercial sea herring fishery that amended the Area 1A no-fishing days from Saturday – Sunday to Friday – Saturday as approved by the ASMFC Sea Herring Committee (322 CMR 9.04).**

Two public hearings have been scheduled:

Monday, October 18, 2004 (7PM) at Gloucester High School (32 Leslie O. Johnson Rd.; Gloucester, MA 01930) & Tuesday, October 19, 2004 (7PM) at Plymouth North High School (41 Obery Street; Plymouth, MA 02360). Comments received by e-mail, fax or mail will be accepted until 5PM on Friday, October 22, 2004.

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

Regulations Update

During the period March - September 2004, the following regulatory changes were enacted by DMF after public hearings and Marine Fisheries Advisory Commission (MFAC) approval. Emergency regulations that have subsequently expired or regulations preempted by subsequent filings are not included:

Commercial lobster permit restrictions and trap allocation transfer programs were amended to allow non-trap fishermen to endorse their permits for more than one Lobster Conservation Management Area (LCMA) and the transfer of permits into the Outer Cape Cod LCMA for fishermen who have obtained an appropriate Outer Cape trap allocation (322 CMR 7.03). These measures were taken to attain the goals of the Interstate Plan, specifically the Effort Control Plan implemented in the Outer Cape under Addendum IV, without over-regulating non-target fisheries.

Minimum size for recreational scup fishing was increased from 9" to 10" and recreational scup possession limits were lowered from 50 to 40-fish (322 CMR 8.06) in compliance with the Interstate Plan's requirement to lower landings by 40% from 2003. An exception aboard for-hire vessels was maintained allowing possession of 100-fish during the period May through June.

Recreational minimum sizes were lowered for cod (22") and haddock (19"), consistent with recent federal actions under Amendment 13 (322 CMR 6.03). Additionally commercial cod possession limits were implemented: **800-lb. north of Cape Cod and 1,000-lb. south and east.**

Two Recreational Lobster Management Areas (Gulf of Maine & Southeastern) were created to facilitate enforcement. Area-based size limits, v-notch regulations, and escape vent minimum sizes were implemented along with a uniform, statewide 15-lobster recreational bag limit (322 CMR 6.01 & 6.02).

The 2004 striped bass fishery was established with a lower 30-fish bag limit on opening days and a July 11th start date (322 CMR 6.07).

Coastal lobster permit transfers (322 CMR 7.03) were amended by defining "actively fished" criteria as landing 1,000 pounds of lobster in a year or conducting 20 transactions involving the sale of lobster in a year, eliminating qualification criteria (work experience, family member, etc.) for recipients of a transferred permit, exempting transfer to immediate family members from "actively fished" criteria, and limiting recipients of a posthumous transfer to two years of letters of authorization permitting another individual to fish the permit. The exemption from the commercial lobster permit owner/operator requirement for certain grandfathered permit holders was eliminated beginning in 2006.

The renewal deadline for limited entry permits was extended from June 30th to December 31st.

Right whale protection rules were amended by requiring fishermen fishing with lobster pots in the Cape Cod Bay Critical Habitat from May - Dec. to comply with only one gear feature of the Inshore Gear Technology List consistent with federal requirements (322 CMR 12.04).

Seasonal commercial yellowtail flounder trip limits were implemented to complement federal regulations enacted under Amendment 13 (322 CMR 6.03): 250-lb daily trip limit from Apr. - May and Oct. - Nov. and 750-lb. daily trip limit from Jun. - Sep. and Dec. - Mar.

The recreational black sea bass fishery was closed from September 8th – 21st consistent with Interstate Plan

mandates (322 CMR 6.28). Area-specific regulations for Connecticut River Watershed river herring (322 CMR 6.17) were implemented to be compatible with DFW and Connecticut DEP regulations for the area: 12-fish daily bag limit seven days a week by hook-and-line only and ban on sale of river herring from the watershed.

Appeals process created for commercial lobster permit holders endorsed for Outer Cape Cod who received their permit off the waiting list in 2001 but had no fishing performance in 2001 to receive an Outer Cape Initial Trap Allocation based on their 2002 Outer Cape fishing performance (322 CMR 7.03).

Recreational cod possession limit raised to 10 during Dec. - Mar. (322 CMR 6.03), resulting in a year-round limit of 10 fish per person. This limit applies to all persons on private vessels and charter boats fishing in state waters or landing in state ports. Anglers aboard party boats in federal waters may fish consistent with federal regulations.

Appeals process established for small vessel (<40') owners with Mobile Gear Coastal Access Permits seeking to upgrade vessel length, tonnage, and horsepower by up to 20% (322 CMR 7.05).

Marine Fisheries Enforcement Actions

In conjunction with the Office of Environmental Law Enforcement and the DFG's General Counsel, the following enforcement actions were taken by *Marine Fisheries* for violations to the *Marine Fisheries* laws and regulations.

1. Fines

Carmelo Meranda of Gloucester was found guilty on two counts of landing codfish over the 800-lb. limit. He paid \$500.00 for each violation totaling \$1,000.00.

Thomas Burns of Gloucester was found guilty for the possession of 9 "v-notched" lobsters and 3 "Jumbo" lobsters. He was fined a total of \$500.00.

2. Permit Suspensions & Revocations

In our previous DMF News, *Marine Fisheries* reported on the Director's decision to not renew any permits issued to Peter or William Picken for setting lobster gear in the Cape Cod Bay Whiting area's fixed gear free zone. Following an appeal in Suffolk Superior Court, The Director's action revoking William and Peter Pickins' coastal commercial lobster permits was upheld by the Superior Court. The Pickens' have filed an appeal in the Massachusetts Appeals Court.

The Superior Court upheld the Director's action limiting William Martin to 800 trap tags, rather than the 1,600 he was seeking. The court's opinion acknowledged *Marine Fisheries'* implementation of the Interstate Plan and *Marine Fisheries'* authority to regulate the lobster fishery in federal waters through the trap tag program and Memorandum of Agreement with NOAA Fisheries. Martin did not appeal.

Besides significant Federal action, the Aveiro Corporation's F/V Lutador II has had its state Offshore License suspended. By agreement with the Commonwealth the offshore lobster permit for the F/V Lutador was also surrendered as part of the condition that no current or future agent of the Defendant's corporations (Aveiro and the Silva Fishing Corporation) may hold a state issued lobster permit for a period of five years. A boat license was issued to the F/V Lutador in its place. The F/V Lutador II was found in multiple violation of federal and state fisheries laws including possession of 594 scrubbed lobsters, 92 v-notched female lobsters, and berried female lobsters.

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Surfers • Surfers • Surfers

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Information is available
at our Web Site!

<http://www.mass.gov/marinefisheries>

DMF NEWS

EDITORS: **Dan McKiernan**
David Pierce
Melanie Griffin

GRAPHICS: **David Gabriel**

Marine Fisheries receives state and federal funds to conduct research, management and development of the Commonwealth's marine fishery resources. Information in this publication is available in alternative formats.

Paul J. Diodati, Director, *Marine Fisheries*
David M. Peters, Commissioner, DFG
Ellen Roy Herzfelder, Secretary, EOE
Kerry Healey, Lieutenant Governor
Mitt Romney, Governor

Comments and suggestions for the newsletter are welcome. Please contact the Editors at (617) 626-1520, or write to:

Division of Marine Fisheries
251 Causeway Street, Suite 400
Boston, MA 02114

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Division of Marine Fisheries
251 Causeway Street, Suite 400
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