Published quarterly by the Massachusetts Division of Marine Fisheries to inform and educate its constituents on matters relating to the conservation and sustainable use of the Commonwealth's marine resources.

DMF NEWS

Second Quarter March through May 2003 • Volume 23

MarineFisheries

A Commonwealth of Massachusetts Agency

ASMFC Supports Continuing Modest Dogfish Fishery

To the delight of many commercial fishermen, especially in Massachusetts, the Atlantic States Marine Fisheries Commission (ASMFC) has supported *MarineFisheries'* position that a small-scale fishery of 8.8 million lbs. of spiny dogfish along the Atlantic coast is justified and defensible. These landings will provide important economic supplement to small-scale fishermen.

An impetus for this ASMFC decision was *MarineFisheries*' management practices for our state waters' dogfish small-scale directed fishery and our monitoring efforts to estimate dogfish discards as a percent of total catch. That data revealed discard from 9-15% of total catch (by number) with mortality of these released fish likely being low. Percent of catch by weight was lower. Commercial fishermen target dogfish using longlines and strike gillnets (set and retrieved with little soak time). The fish are caught in shallow waters; and culled as soon as they're pulled from the water. Furthermore, *MarineFisheries* sea samplers have witnessed fishermen testing areas before setting their gear to avoid smaller dogfish, and fishermen communicate on the water to keep off schools of unmarketable dogfish.

Dogfish processors and fishermen have been extraordinarily helpful in providing data about the fishery such as size composition of catches and landings. They have long argued that the federal management approach of allowing a 4 million lbs. bycatch fishery with seasonal landing limits of 300 or 600 lbs. is unworkable.

MarineFisheries and the New England Fishery Management Council have agreed, while the Mid-Atlantic Fishery Management Council and NOAA Fisheries have disagreed. With the Mid-Atlantic being the lead Council for dogfish management and with NOAA Fisheries selecting the Mid-Atlantic's position, we now have two different management approaches – one for state waters and one for federal waters.

An important reason for ASMFC's decision was a better understanding of dogfish discards in Massachusetts' fishery and the conclusion that discarding in fisheries directing towards dogfish (assumed for 1997 and earlier) isn't relevant to today's tightly regulated and closely monitored fishery. In 1997 and in prior years a significant large-scale fishery in federal and state waters existed that had to be curtailed in response to concerns about a decline in abundance of very large females and the need to rebuild to a relatively high biomass target.

Dogfish longliner.
DMF Photo by David Pierce.

Dogfish are slow-growing, have a 2-year gestation period, and bear live young. The controversies: life history, federal fishery management, and *MarineFisheries'* championing a small-scale, economically important commercial fishery – have been detailed in previous DMF NEWS articles. There are legitimate biological reasons for keeping the commercial fishery tightly controlled and landings low.

As a consequence of this ASMFC decision, we agreed to restrict dogfish landings in Massachusetts, New Hampshire, and Maine to 57.9% (5.1 million lbs.) of the total to ensure Mid-Atlantic fishermen have an opportunity to share the quota. Because Maine declared so-called *de minimis* status (not many landings traditionally occur in Maine), Maine will be limited to a small amount of landings. Massachusetts and New Hampshire will share most of the quota. Discussions with our New Hampshire counterparts will begin soon on this issue and other aspects of dogfish management and monitoring.

Discussions also will begin between fishermen and dealers to determine the best seasons to conduct the commercial fishery. With a relatively small quota, it makes sense to land when the largest prices can be expected. We stand to be guided by what fishermen and dealers feel is best for the industry. For example, should the fishery begin on May 1 as planned, or should the opening be postponed until late summer and fall? Should the landings limit remain at 7,000 lbs. or should it be reduced, perhaps to 5,000 lbs.?

Despite our reasoned arguments, there is still continued opposition to a directed fishery of any size in state or federal waters. NOAA Fisheries, along with some environmental groups are opposed to the ASMFC decision. One reason for this opposition is ongoing federal efforts to convince Canada to completely close its commercial fishery. It seems unlikely Canada will ever accede to U.S. wishes, which would press Canada to accept very high biomass targets for female dogfish and a likely unachievable age composition of the dogfish stock shared by both countries in U.S. and Canadian waters.

Another reason for our unwillingness to support the federal position is our own first-hand awareness of how troublesome high dogfish biomass can be (all ages and sizes). Dogfish along the northeast coast and Canada have become a major nuisance interfering with other fishing operations, including recreational fisheries with dogfish frequently taking the bait set for other species. Dogfish are a highly mobile species that are found throughout the water column in very large schools pursuing prey of all kinds such as sea herring and groundfish. Cod, monkfish, and other species capured in nets or on longlines can be mutilated by foraging dogfish.

Dogfish management by the councils and ASMFC is no simple matter. Massachusetts actions, supported by the New England Council, have made the situation more complex. Nevertheless, our actions are an inevitable consequence of our seriously considering socioeconomic benefits of a small-scale fishery that doesn't compromise rebuilding. The New England Council position championed by *MarineFisheries* is not risk prone. It is responsible, pragmatic fisheries management.

The problem we all must face in the next amendment to the federal plan is how to deal with dogfish discards in other fisheries such as those that target groundfish. There are public policy issues, federal law, federal guidelines, and states' rights to consider. Councils will have few, if any, viable options to pursue shy of very large area closures that when combined with closures to protect groundfish could decimate this region's coastal fishing communities. A critical issue will be whether Councils are willing to dramatically restrict fisheries with dogfish by-catch despite the federal management plan objective of "minimizing the impact of regulations on the prosecution of other fisheries."

By David Pierce, Ph.D., Deputy Director

Independent Panel Concludes Groundfish Peer Review

NOAA Fisheries new groundfish biomass targets for many species are very high and in some cases never witnessed before. Therefore, at the urging of fishermen, Congressmen, the New England Fishery Management Council, and New England states, NOAA Fisheries agreed to a peer review of those targets. The review was carried out by scientists from the United Kingdom and Canada who convened at a special week-long meeting in New Hampshire. At the meeting they delved into a wide range of issues regarding the biological basis for these targets and validity of assumptions required for high targets to be achievable.

The Peer Review Panel has concluded its work, and the results are in. As one might have expected, there are different interpretations of those conclusions presented to the New England Fishery Management Council at its March meeting in Providence.

The central question is whether very high, never-witnessed-before biomass targets should be immediately adopted through Amendment 13

To appreciate those conclusions, each reviewer's perspective must be read and clearly understood. Here is *MarineFisheries*' take based on those individual reports and the summary of the Panel's findings presented by Chairman Dr. Andrew Payne. These findings pertain to biological reference points or targets corresponding to what is assumed will provide for maximum sustainable yields (B_{MSY}) and to fishing mortality rates needed to rebuild to biomass targets ($F_{Rebuild}$).

The central question is whether very high, never-witnessed-before biomass targets should be immediately adopted through Amendment 13 to the Groundfish Plan or whether lower, more reasonable targets should be adopted – targets that can be increased to higher and higher levels as each level is achieved. This latter stepwise approach is the one supported by *MarineFisheries* because it is both sensible and practical. It's an option in the upcoming proposals of Amendment 13. What's most important is to control fishing mortality – to keep it low enough so rebuilding can occur and fairly quickly. Potentially unreachable biomass targets created through optimistic and questionable rebuilding assumptions are a recipe for unwarranted lawsuits and the chaos that can follow.

Here are a few reviewer comments supporting our position:

Dr. R.K. Mohn: *"…In many cases, B_{MSY} has not been seen in the period of data, usually back to the 1960s. This data gap calls into question whether $F_{Rebuild}$ and related time horizons are well founded. An adaptive strategy which intermittently*

reassesses F targets without reference to B_{MSY} would be more estimable…and a definition of rebuilt that is not dependent on theoretical (emphasis added) levels of biomass." Also,"From a scientific point of view, an intermediate biomass target could be defended..."and "…The need to select a stock-recruit model was driven by the need for an MSY estimate, instead of approaching the question from the perspective of what the data can support…F_{MSY} estimates are usually within the range of observations, and are not extrapolations like B_{MSY}, which in many cases extend to unseen levels of biomass (emphasis added)."

Dr. Murdoch McAllister: *"In my view most but not all of the methodologies currently used by the NEFSC to compute F_{MSY} and B_{MSY} provide an adequate scientific basis for fisheries management. The protocol that most seriously requires revision (emphasis added) is the one used to evaluate the goodness of fit of the alternative stock-recruit functions to the data and to select from the alternatives the model to determine F_{MSY} and B_{MSY} for the purposes of fisheries management…" Also, "…Due to a lack of sound statistical theoretical basis for the model selection procedure [stock/ recruitment relationship] applied, the biological reference point results obtained for groundfish stocks to which the protocol has been applied are in my view questionable."*

Dr. Robin Cook: *"…In the present situation, where the B_{MSY} estimates are beyond the range of observations, there is the possibility that not only is the target B_{MSY} not where you think it is, but that it may simply be unobtainable…" Also, "…A pragmatic interpretation of an operationally useful determination of B_{MSY} would therefore be to set it at a value closer to the range of the actual observations. If, for example, B_{MSY} is estimated to lie beyond the range of the data, the B_{MSY} proxy might be set provisionally as the largest observed value in the historical time series or some conventionally chosen percentage above the largest value. If after a number of years, more data has been obtained, the B_{MSY} proxy can be evaluated."*

Dr. Ewen Bell: *"…The function [stock-recruitment] resulting in the highest B_{MSY} while minimizing risk to the stock may in fact be unrealistic, resulting in ever more stringent management action, as the target is actually unattainable (emphasis added). One advantage of using the higher B_{MSY} is that the true B_{MSY} is likely to be found en-route although this could be viewed as 'precautionary science' rather than 'precautionary management.' Ideally, scientists should not be compelled to estimate reference points when the data are not available to do so…"*

The above are some of the more important statements regarding biological reference points, and they were included in a summary provided by Dr. Payne who indicated there was "huge uncertainty" as to where B_{MSY} targets were located. He advised "not to adopt overly optimistic positions." He indicated that that Panel concluded one "could come down on either side," but there was "extreme uncertainty about the right side [stock-recruitment relationship]." In other words without having real data indicating what amount of recruitment (young fish) we can expect with very high abundance of mature, older fish, we cannot say whether very high biomass targets are achievable or not. In fact, one reviewer, Dr. Bell, suggested that because cod are known to be cannibalistic for a number of stocks, it's reasonable to assume the same occurs with Gulf of Maine and Georges Bank stocks. Therefore, he concluded assuming consistent high recruitment with high biomass appears wrong for cod.

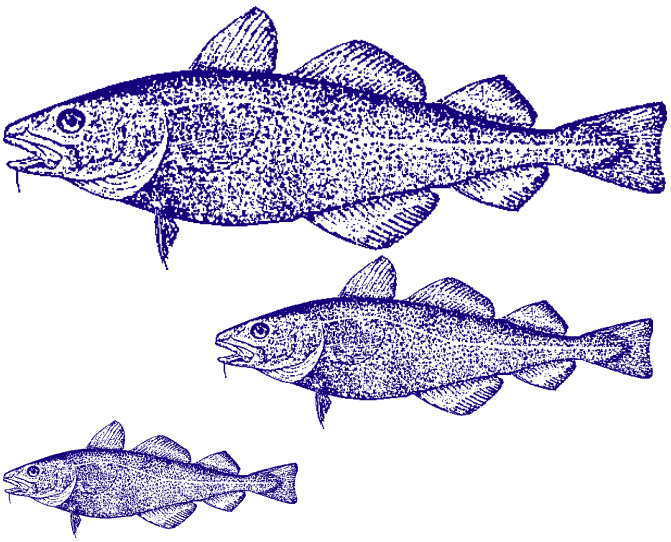
With Dr. Paine saying intermediate or very high biomass reference points are scientifically justifiable depending on one's assumptions, one might think we're left in a quandary. We think otherwise. It's clear to us that very high biomass targets might be achievable, but only through a stepwise process enabling us to refine the regulations as we go. The individual peer reviewers have provided enough good reasons for us to question the current assumptions leading to very high biomass targets.

The debate about reference points will be open and public as we head into the spring and summer. Public hearings on Amendment 13 will be scheduled for this summer. We hope more attention is paid to the critical need for keeping fishing mortality low and not to achieving chimerical biomass reference points developed with little to no data. For now it's the management approach and measures that count and not the biomass target we're trying to achieve. Control mortality, and biomass will take care of itself and likely shoot upwards provided Mother Nature cooperates and good recruitment results.

By David Pierce, Ph.D., Deputy Director

Individual reviewer reports and summary document can be accessed at www.nefsc.noaa.gov/groundfish

Groundfish trawler on Stellwagen Bank. DMF Photo by Daniel McKiernan.



Striped Bass Amendment #6 Update:

Director Diodati addresses conservation and allocation concerns

The Atlantic States Marine Fisheries Commission (ASMFC) has approved Amendment 6 to the Interstate Fishery Management Plan (FMP) for Atlantic Striped Bass. Intended to guide management of a restored striped bass resource, Amendment 6 provides multiple measures to ensure continued sustainability of the resource as well as a recommendation to the Secretary of Commerce to reopen the exclusive economic zone (EEZ) to striped bass fishing after a 13-year closure. This recommendation will initiate a lengthy review and decision-making process by NOAA Fisheries.

Throughout the ASMFC development process for Amendment 6 I have received comments from concerned resource users on a variety of issues ranging from status of the stock to opening the EEZ. As Massachusetts is now proposing regulations for April public hearings to maximize its opportunities in the striped bass fishery, I would like to address these concerns in as broad a forum as possible.

PRESSURE ON THE RESOURCE:

Concern #1: The bass population is skewed toward smaller fish - therefore it has not "recovered" and increased fishing will undermine the recovery.

Response: The best available science that describes Atlantic striped bass stock status embodied in the most recent NOAA Fisheries annual report to Congress and ASMFC annual stock assessment report, indicates that the resource continues to grow under a Virtual Population Analysis (VPA) estimated mortality rate (F) of 0.29. Stock size increased about 13% between 2001 and 2002. Growth in numbers of the larger, older age classes of fish is also apparent. Additionally, alternative methods to estimate mortality, such as from tag information, suggest that mortality may be significantly lower than F = 0.29; it may be closer to 0.20. As far as breeders are concerned, 75-80% of all egg production has been produced by fish aged 10 or less in recent years and there is no lack of abundance of these fish. Lastly, regardless of the uncertainty of the mortality rates, all mortality estimates are below target rates, and regardless of spawning potential by age group, juvenile production as evidenced by young-of-the-year recruitment during the past decade is at an all time high. In fact, another record number of young striped bass were born in the Chesapeake during the spring of 2001.

Concern #2: The mortality targets set forth in Amendment 6 to the striped bass FMP are too high to sustain a viable and healthy population.

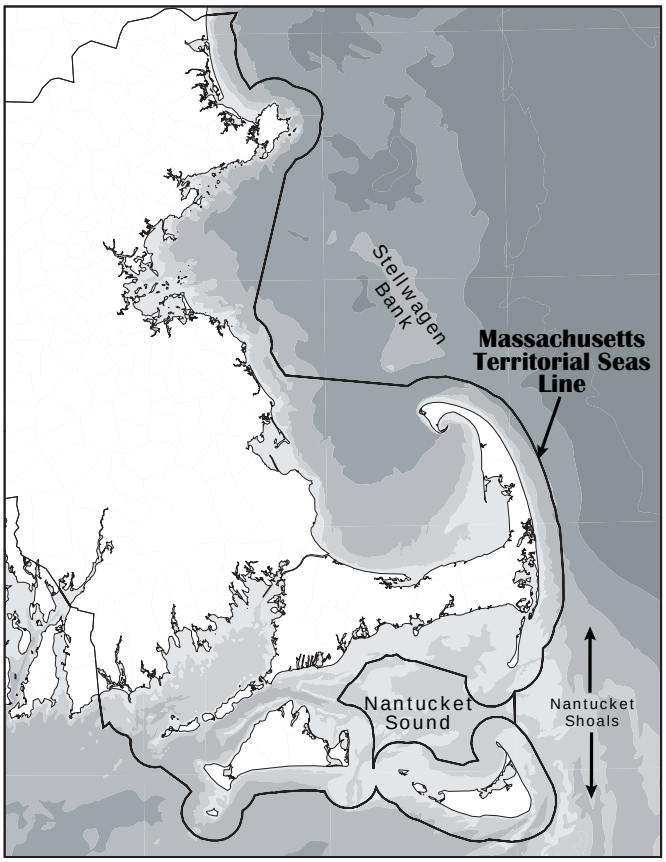
Response: If this were true, than it would be difficult to explain the following: (1) the stock was recovered under similar mortality rates; (2) the stock has grown five times larger than its pre-recovery size over the past 20 years under similar mortality rates; and (3) the stock continues to expand at annual rates of about 13% under similar mortality rates. The answer is simple: current harvest rates and those rates set forth in Amendment 6 are designed to sustain a viable and healthy population of striped bass. Record-breaking numbers of young stripers being born routinely in major spawning areas are more proof of a healthy fish population.

Concern #3: Opening of the EEZ is a premature move that will quickly exhaust the rebound in the striped bass resource we now enjoy due to past management measures.

Response: The EEZ has been closed for 13 years and stock recovery occurred in 1995, so to characterize a reopening of the EEZ at this time as "premature" is an obvious overstatement.

Advocates for a continued closure of the EEZ argue that (1) the closure provides an important conservation measure needed to protect striped bass; (2) the closure is linked with curtailment of commercial fishing activity; and (3) fishing regulations beyond three miles from shore cannot be enforced. All these arguments are baseless.

We already know that striped bass swimming in the EEZ also venture close to shore in states' waters all along the east coast as shown by striped bass tagging programs. Our refraining from catching them when they are beyond the 3 mile limit off our coast does not translate into zero fishing pressure on parts of the population because they move freely in and out of other state waters - from Maine to North Carolina during their annual migrations. Continued closure of the EEZ thereby becomes an allocation, not conservation, issue. The best protection of fish is not the closed area, a last resort in resource management, but the bag limits, quotas, and closed seasons that we have capitalized on effectively for the past 23 years.



Above: Chart depicting Mass. coastline and waters under the jurisdiction of the Commonwealth. Federal waters (EEZ) are those beyond the territorial seas line out to 200 nm, while state waters are those shoreward of the line. However, Nantucket Sound is considered state waters for fisheries management purposes under a 1983 federal law.

DMF biologists Paul Caruso and Bob Lawton (retired) during a striped bass tagging trip on Nantucket Shoal.

Reopening our traditional EEZ fishing areas would be a conservation neutral measure with regards to commercial fisheries since they are already restricted by quotas. True beneficiaries of an extended fishing range would be recreational anglers. Keep in mind, if we were to be consistent in following baseless arguments for a continued striped bass fishing closure in the EEZ, then we would have to support the notion that we cannot effectively prosecute any fishery in federal waters. This would include fishing closures for lobster, herring, weakfish, tautog, bluefish, winter flounder, summer flounder - and others - all species managed primarily by the Atlantic States Marine Fisheries Commission. Striped bass stocks are in the best shape of them all.

ENFORCEMENT:

Concern #1: The opening of offshore waters to bass fishing will put additional pressure on already over-extended state and local enforcement personnel.

Response: Actually, just the opposite is true. As it stands now the U.S. Coast Guard (USCG) is obligated to enforce striped bass fishing closures in the EEZ. I think we all agree that our USCG personnel have much more important things to do today than to stop private recreational anglers and charter boat operators to investigate possible striped bass violations. An opening of the EEZ will put enforcement efforts where it belongs – at the dock. Dockside inspections account for over 90% of the striped bass violations issued annually. State landing rules are based on "possession" of fish, and whenever they are more conservative, state rules supercede fedral rules.

QUALITY OF LIFE ISSUES:

Concern #1: The economic value of the recreational fishery far outweighs any commercial interest in the striped bass resource.

Response: I don't know anyone who doesn't acknowledge the economic benefits and cultural value that is gained by recreational striped bass fisheries here in Massachusetts or elsewhere along the coast. Massachusetts enjoys being host to the most successful recreational striped bass fishery along the Atlantic coast and our recreational fishery in general is the most valuable seasonal fishery in the country. Since commercial fishing provides food to the marketplace, which is often destined to reach the tables of the non-fishing public, I have trouble making dollar to dollar comparisons between these two very different sectors. Their individual purposes differ significantly. A commuter bus and a minivan have transportation needs as a common factor, but most comparisons stop there.

Concern #2: The striped bass resource would be more responsibly managed under gamefish status.

Response: This is a broad public policy debate that needs to be discussed in the correct venues, state and federal legislatures. Some argue that Marine Protected Areas with no fishing zones are also a more responsible way to manage marine resources. The mission of *MarineFisheries* is to manage the Commonwealth's living marine resources and the harvesting of those resources by commercial and recreational fisheries, while maintaining a diverse number of self-sustaining fish populations at healthy levels of abundance in balance with the ecosystem - thus, providing wealth and benefits to **all** citizens of Massachusetts.

By Paul Diodati, Director

New Advisors to ACCSP Advisory Committee Appointed

MarineFisheries recently solicited applications from individuals who would like to participate as advisors to the Atlantic Coastal Cooperative Statistics Program (ACCSP). The mission of the ACCSP is to become a cooperative state-federal program to design, implement and conduct marine fisheries statistics data collection programs and to integrate such data into a single data management system that will meet the needs of fisheries managers, scientists and fishermen.

Chuck Casella, an active member of the state's Marine Fisheries Advisory Commission since 1997, was appointed as the recreational advisor. Besides his seats on advisory panels on the Atlantic States Marine Fisheries Commission and the New England Fishery Management Council, Chuck is involved with recreational fishing organizations such as the Massachusetts Striped Bass Association and the Plum Island Surfcasters.

Chuck DiStefano was appointed as the commercial advisor, having fished commercially out of the Boston area for over 26 years. Chuck is the president of the Boston Harbor Lobsterman's Association and has assisted *MarineFisheries* on many occasions taking biologists out on observer trips.

Serving in these voluntary positions both Mr. Casella and Mr. DiStefano will provide invaluable service to the Commonwealth as the program design nears completion and the ACCSP enters into the implementation stage. Many southern states already are participating and several New England states will come on line this year. *MarineFisheries* expects to begin using some of the ACCSP system as early as this fall.

Horseshoe Crabs:

Balanced management plan yields fishery and biomedical benefits

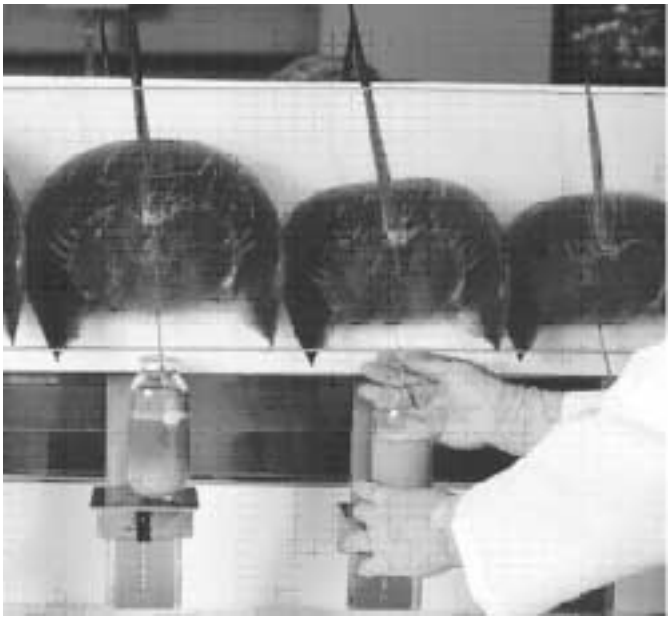
MarineFisheries Senior Biologist Frank Germano provides this overview of the horseshoe crab, the fishery and its current use in biomedical research. This species has gone from "nuisance" status locally to become a "poster child" for marine conservation nationally in just a few years. Tightly regulated under the interstate plan and state regulations, horseshoe crabs have warranted increased attention from MarineFisheries to manage and oversee the fishery.

SOCIAL HISTORY

Horseshoe crabs have been a part of our history for hundreds of years. Early references cite how the Indians used the shell of the crab to bail water out of their canoes and made fishing spears from the tails. Farmers from colonial days until the 1950s used horseshoe crabs to feed their hogs and to grind them for use as fertilizer.

Because the horseshoe crab feeds on commercially important shellfish such as the soft shelled clam, shellfishermen destroyed hundreds of thousands crabs each year. In fact, many Massachusetts towns offered a bounty of three cents on the tail of a horseshoe crab. In the early 1960s, the Town of Chatham paid as much as $1,500.00 in bounty on crab tails. A preliminary review of towns' Annual Reports suggests that as many as one million crabs were killed annually as part of local shellfish predator control programs. As recently as 2000, eight towns still had regulations requiring fishermen to kill all crabs encountered while shellfishing or be fined.

Horseshoe crabs are probably one of the most studied invertebrate animal in the world. Three Noble Prizes have been given to scientists who did their research on some aspect of horseshoe crab physiology. In 1967, H.T. Hartline was awarded the Noble Prize for his research on the mechanics of human vision, research which was done in part on horseshoe crabs. Horseshoe crabs have been used in research in neurobiology, immunology, biochemistry and drug development.



Crabs are bled via a heart puncture using large gauge needles. Up to 30% of the crab's blood is collected without injuring the crab.

In the 1950s, Dr Frederik Bang at the Marine Biological Laboratory (MBL) in Woods Hole discovered that horseshoe crab blood clotted when exposed to bacteria. The reagent, Limulus Amoebocyte Lysate or LAL, was able to detect minute levels of bacterial toxins in patients, drugs and intravenous devices. No other procedure has the same accuracy in predicting pharmaceutical purity as the LAL test.

Commercial development of LAL started in 1974 when James Sullivan and Stanley Watson began producing a high quality reagent at Associates of Cape Cod (ACC) in Falmouth. ACC has grown from the small company in Dr. Watson's basement to a large modern laboratory which processes the blood from tens of thousands of crabs annually. Recently, researchers at ACC have completed a clinical trial that investigates the test using LAL to detect fungemia. Fungemia is a potentially fatal fungal infection of the bone marrow that has been increasing over the past several years particularly in immunocompromised individuals.

Beginning in the 1970s, horseshoe crabs were used as bait for the channeled or smooth whelk (a.k.a. conch) and eel pot fisheries. Fishermen found that the crabs were the most effective bait for these fisheries. They are easy to collect and there was minimal expense other than their time and effort. Approximately 70 to 80% of the crabs are gathered from spawning beaches and stored in live cars or freezers for later use. Fishermen would generally cut the female crabs into three or four baits and the males into two or three baits depending on the size of the crab. The towns as well as the State originally encouraged fishermen to use horseshoe crabs as bait as it removed two shellfish predators, the conch and the crab, from shellfish beds.

While there are no numbers allowable for horseshoe crab landings in the Commonwealth prior to 1999, it is estimated that as many as 400,000 crabs per year were needed to sustain bait needs in the pot fisheries. Meetings with fishermen and dealers indicated that the conch pot fishery is mostly a part time seasonal operation with only about a dozen fishermen harvesting conch full time. Conch potting is allowed from April 15 until December 14. However, most fishermen limit their conch potting to fall months after scup, sea bass and lobster pot fisheries have closed or have become non-productive due to movement of fish or lobsters from the area. Recently, the decline of the lobster fishery and the seasonal closure of scup and sea bass pot fisheries have caused fishermen to begin their conch pot fishery earlier in the year.

BIOLOGY

Horseshoe crabs (*Limulus polyphemus*) are bottom dwelling arthropods found in near shore estuaries out to the continental shelf of the Atlantic coast from Nova Scotia to the Yucatan Peninsula in Mexico. Horseshoe crabs are not true crabs but a descendent of ancient Eurypterids which included sea scorpions and an ancient horseshoe crab, the *Aglaspida*. The presence of chelicera (pincher-like appendages), five pairs of walking legs, and lack of a jaw and antennae makes the crabs more similar to arachnids, spiders, ticks and scorpions than true crabs. Today, horseshoe crabs are the

single surviving representative of the Order Xiphosurida, having existed for approximately 120 million years.

The public associates horseshoe crabs with estuarine habitats. Adults migrate to deeper water where they lie half-buried in mud during winter months. In spring as the water warms the adult crabs move to the beaches to spawn in correlation with the tidal phase, water temperature and wave height on the beach. Spawning events generally occur at night during highest tides of the new and full moons in May and June although high waves at the beaches apparently override the influence of the lunar periodicity. Tagging studies have shown horseshoe crabs probably do not return to the same spawning beaches over successive years. However, there appears to be short term fidelity to a spawning site with crabs returning to the same beach until spawning is complete. While the crabs do not return to the same beach each year, some researchers believe they return to the same estuary to spawn.

Male horseshoe crabs are first to arrive at spawning beaches followed by females about a week later. Typically, a male suitor crab is attached to a female prior to coming ashore where waiting satellite males quickly surround the couple. The female will lay as many as 4,000 eggs in a nest or cluster and will deposit several clusters each tide. After returning to the beach on several successive tides to lay more eggs, average number of eggs per female is estimated to be approximately 88,000. Once the eggs are laid, the suitor and satellite males deposit their sperm over the eggs. This external fertilization is another unique facet of horseshoe crab life history as arthropods generally use internal fertilization.

After 14 to 30 days, eggs hatch and free-swimming larvae take to nearshore waters for about six days before settling to the bottom to begin feeding and molting. Nursery areas where the crab will spend the first two years are often located in shallow intertidal waters near spawning beaches.

Because horseshoe crabs are arthropods, they must shed their hard external skeleton to grow. Molting will occur several times during the first three years but decreases in frequency significantly as crabs grow older, and finally stops when they become sexually mature. Crabs will molt at least 16 to 17 times over a period of 9 to 11 years. Once sexually mature, crabs can live at least an additional eight years making the life span at least 17 to 19 years.

MANAGEMENT

In 1997, the Atlantic States Marine Fisheries Commission (ASMFC) voted to develop a fishery management plan for the horseshoe crab. The decision to develop this plan was based upon the perceived over-exploitation of crabs and concerns about harvest of crabs by conch and eel fisheries, the biomedical and pharmaceutical industries and their impact on shorebirds. Based upon several surveys horseshoe crab populations in some states appear to have declined. Horseshoe crabs mature slowly and can be harvested with a minimal effort making stocks sensitive to over harvest.

Coincidentally, a decline of horseshoe crabs was noted with a simultaneous decline in migratory shorebirds in Delaware Bay, the largest staging area for shorebirds in the Atlantic Flyway. As many as one million birds stop at the bay on their northward migration to feed. The 2-3 week stopover in the bay generally follows horseshoe crabs spawning when the birds gorge themselves on horseshoe crab eggs. Estimates place the consumption of horseshoe crabs eggs as high as 8,300 eggs per day per bird.

The Horseshoe Crab Fishery Management Plan was approved and adopted by ASMFC on October 22, 1998. The plan requires the Commonwealth of Massachusetts and other Atlantic Coast states to develop regulations to conserve and protect the horseshoe crab resource to ensure its continued role in the ecology of coastal ecosystems, while providing for its continued use over time.

In 1999, in response to the mandatory compliance element for the states' section of the Horseshoe Crab Fishery Management Plan, *MarineFisheries*, established a regulated fishery permit for the management of horseshoe crabs (322 CMR 6.34). Permit holders are required to report monthly the

Volunteers wanted: Help us identify spawning beaches.

MarineFisheries is seeking the public's assistance in identifying shoreline used as horseshoe crab spawning habitat. Each spring, from late April though June, horseshoe crabs come ashore to lay their eggs. Weather conditions, water temperature and habitat can affect where and when crabs gather. However, spawning generally occurs on evening high tides near the full and new moons. *MarineFisheries* is looking for your help in identifying where horseshoe crabs spawn in Massachusetts waters.

Some scientists believe there may be localized population declines. One of the biggest threats to the horseshoe crab is loss of spawning habitat. Each year more and more horseshoe crab spawning beaches are lost because of development such as new bulkheads, piers and beach nourishment projects.

This spring, if you notice crabs spawning, please note the location (beach, nearby street or other landmark) and contact Frank Germano at (508) 563-1779, xt 123 or e-mail frank.germano@state.ma.us. Your assistance in identifying horseshoe crab spawning beaches will help *MarineFisheries* determine the relative importance of these sites and help us in protecting this important resource in the future.

Photo courtesy of Tom O'Connel, MD DMR

number of crabs harvested daily by gender, the beach or embayment of harvest, type of gear used and intended use of the harvested crabs.

If crabs are sold, fishermen must identify the dealer or individual buying their crabs. Failure to report is grounds for suspension of the permit and non-renewal. Wholesale or bait dealers who purchase horseshoe crabs from licensed fishermen are required to submit monthly catch reports. These reports include the number of crabs purchased from Massachusetts fishermen and out-of-state dealers or fishermen. Regulations also require all biomedical, research and educational research facilities to report the name of the harvester, harvest site, use and disposition of horseshoe crabs monthly.

In 1999, 151 fishermen reported harvesting 545,715 horseshoe crabs for bait and for biomedical use. However, as this figure was going to be used by the ASMFC as "reference period landings" (RPL) to establish a quota, *MarineFisheries* submitted a number approximately 20% lower (440,503) to ASMFC to correct for any over reporting of harvest. The RPL for the fifteen Atlantic Sates was 2,999,491 horseshoe crabs.

In February 2000, the ASMFC Management Board approved Addendum I of the Fishery Management Plan. Addendum I established a state by state cap at 25% below the RPL. States were required to close their bait fishery once the cap or quota was reached. Biomedical harvest would be allowed to continue after the bait harvest closed and not counted towards the quota because of low mortality rate associated with biomedical use of the crabs. The Massachusetts annual cap was set at 330,377 crabs. In 2000, 175 fishermen reported harvesting 272,930 horseshoe crabs, approximately 82.6% of the cap.

In an effort to further reduce the numbers of horseshoe crabs needed for bait use, the American Bird Conservancy, Massachusetts bait dealers and *MarineFisheries* began distributing bait bags free to conch fishermen. The bags were donated by Ecological Research and Development Group Inc. (ERDG) in Delaware. A ten month study by Bob Fisher at the Virginia Institute of Marine Science concluded that bait bags significantly reduced the amount of crab required in a pot without reducing the catch. As an apparent result of the bait bags, 2001 landings showed that 231 fishermen landed 134,143 horseshoe crabs, a reduction of more than 50% over the 2000 landings and 60% below the cap. Landings in 2002 from 191 fishermen were at approximately the same level, increasing only slightly to 138,613 crabs. A survey of Massachusetts conch fishermen indicated that 82% now use bait bags.

CURRENT STATUS OF HORSESHOE CRABS

Contrary to what some have stated, the Massachusetts horseshoe crab population is not on the brink of extinction. The cessation of the horseshoe crab predator control program stopped the annual destruction of up to a million crabs a year. The progression from unregulated harvest to a regulated fishery with a management plan, reduced quota, daily catch limits, and closed harvest days along with the use of bait bags by most fishermen have reduced the annual harvest of horseshoe crabs in the Commonwealth from over 545,000 crabs in 1999 to about 138,600 crabs in 2002.

A comparison of harvesters catch reports and the annual spawning beach survey conducted by *MarineFisheries* indicate that no harvest occurs on approximately 78% of Massachusetts horseshoe crab spawning beaches. As an example, over the last four years a total of only 405 horseshoe crabs have been harvested from waters north of the Cape Cod Canal to New Hampshire.

The lack of harvest from these areas is not due to a lack of crabs. *MarineFisheries* surveys have shown that there are numerous untouched spawning sites. A study of Plum Island Sound estimated the horseshoe crab population at over one million crabs. On Cape Cod a recent MBL survey of Pleasant Bay found that the bay contained approximately a half a million spawning adult crabs and 13.5 million juvenile horseshoe crabs. These numbers are encouraging as some previous studies had suggested that the Pleasant Bay horseshoe crab population was only about 50,000 crabs. To paraphrase a recent comment made at a horseshoe crab presentation in Brewster, horseshoe crabs in Massachusetts are more abundant and widely distributed than previously thought.

By Frank Germano, Senior Marine Fisheries Biologist and Horseshoe Crab Specialist

MarineFisheries

A Commonwealth of Massachusetts Agency

Get in touch with DMF:

Boston Office
251 Causeway St., Suite 400
Boston. MA 02114
(617) 626-1520
FAX: (617) 626-1509

Annisquam River
Marine Fisheries Station
30 Emerson Avenue
Gloucester, MA 01930
(978) 282-0308
FAX: (617) 727-3337

South Shore Office
50A Portside Drive
Pocasset, MA 02559
(508) 563-1779
FAX: (508) 563-5482

Martha's Vineyard Office
Marine Fisheries Station
P. O. Box 68
Vineyard Haven,MA 02568
(508) 693-4372
FAX: (508) 693-4157

Get up-to-date rule changes and notices!
Send e-mail to joinmarinefisheries@listserv.state.ma.us
with nothing in the subject or body.

Massachusetts Saltwater Fishing Derby 2002 Awards

Each year March 1 through November 30 DMF conducts the Massachusetts Saltwater Fishing Derby. Fish entered must be caught on hook and line and must be measured and weighed at a DMF-certified official weigh station. At the end of the derby year, trophies are awarded to anglers who landed the heaviest fish in each species category. Winners are chosen in three divisions - men, women, and juniors (age 15 and younger).

This year 45 anglers were awarded engraved silver-plated Paul Revere bowls. *MarineFisheries* Director Paul Diodati and Commissioner Dave Peters presented the awards on February 9, 2003 at the Eastern Fishing and Outdoor Expo in Worcester, MA. The winners for 2002 are listed below.

Four state records were established for species that were new to the derby in 2002. Robert Dary landed a 55 lb. albacore; Eddie Gomez landed a 13 lb. 8 oz. bonito; Ed Sawlit landed a 416 lb. thresher shark; and Josepth E. Baca III landed a 83 lb. 4 oz. wahoo.

All inerested anglers and weigh station operators are advised that there are changes to the program for 2003 that include new minimum entry weights, eligible species, and mailing address for the program. Please use new affidavits for this year's derby

by Karen Rypka

Ed Sawlit (left) and his record breaking 416 lb. Thresher Shark.

2002 Winners

Species	Minimum Entry Weight (lbs.)	State Record	Division	Name	Winning Weight
Albacore	30	**55 lbs. New Record**	Men	**Robert Dary**	55 lbs.
Albacore	30		Women	Danielle MacPhee	42 lbs. 13 oz.
Black Sea Bass	3	8 lbs.	Men	Robert Medeiros	6 lbs. 8 oz.
Black Sea Bass	3		Women	Jacqueline Leitao	5 lbs. 6 oz.
Black Sea Bass	3		Junior	Michael T. Crane II	4 lbs. 14 oz.
Bluefish	10	27 lbs 4 oz	Men	Joe Manzone	16 lbs.
Bluefish	10		Women	Ellie Dale	15 lbs.
Bluefish	10		Junior	Amanda Perry	15 lbs. 3 oz.
Blue Shark	150	454 lbs.	Men	Tom Acciavatti	383 lbs.
Bonito	7	**13 lbs. 8 oz. New Record**	Men	**Eddie Gomez**	13 lbs. 8 oz.
Cod	25	92 lbs	Men	Mike Mahurin	72 lbs 9 oz
Cod	25		Women	Leah Simas	35 lbs
Cod	25		Junior	Anthony Noel	33 lbs 10 oz
Cusk	20	34 lbs. 4 oz	Men	Art Bukaske	21 lbs 8 oz.
Dolphin	10	28 lbs 8 oz	Men	Kevin Rakos	28 lbs.
Dolphin	10		Junior	Cooper Taymore	14 lbs.
False Albacore	10	19 lbs 5 oz	Men	Stephen F. Halley	16 lbs. 3 oz.
Fluke	5	21 lbs 8 oz	Men	William Pecha	13 lbs. 14 oz.
Fluke	5		Women	Jill C. Tuch	9 lbs 4 oz
Fluke	5		Junior	Emily Eickoff	10 lbs 6 oz
Haddock	8	20 lbs	Men	Jay Mollenhauer	14 lbs 8 oz
Haddock	8		Junior	Steven Bednarcyyk	9 lbs
Macherel	2	3 lbs. 8 oz.	Men	Bruce Lloyd	2 lbs 14 oz
Mako Shark	100	1,324 lbs.	Men	Tom Acciavatti	235 lbs.
Mako Shark	100		Women	Kitty Kania	301 lbs.
Pollock	20	48 lbs 2 oz	Men	Peter Chiapulis	39 lbs.
Pollock	20		Junior	Dave Osier Jr.	30 lbs.
Scup	2	5 lbs 14 oz	Men	Jeff rey Capute	3 lbs 10 oz
Scup	2		Women	Lisa Simmons	3 lbs 3 oz
Scup	2		Junior	Kenny Simmons	3 lbs 15 oz
Striped Bass	30	73 lbs	Men	Michael Almeida	59 lbs 4 oz
Striped Bass	30		Women	Susan R. Erickson	41 lbs 6 oz
Striped Bass	30		Junior	Nathan Paul Ostrom	41 lbs 10 oz
Tautog	8	22 lbs 9 oz	Men	William Duchemin	13 lbs 10 oz
Tautog	8		Women	Judy Silva	14 lbs
Thresher Shark	150	**416 lbs. New Record**	Men	**Ed Sawlit**	416 lbs
Wahoo	30	**83 lbs. 4 oz. New Record**	Men	**Josepth E. Baca III**	83 lbs. 4 oz.
Weakfish	10	18 lbs 12 oz	Women	Laurett Landry	10 lbs
Winter Flounder	2	8 lbs 2 oz	Men	Phil Begley	5 lbs 12 oz
Winter Flounder	2		Women	Cindy Clark	4 lbs
Wolf fish	20	55 lbs	Men	William H. Dodge	47 lbs. 3 oz.
Wolf fish	20		Women	Anne Francis	39 lbs. 1 oz.
Wolf fish	20		Junior	Mitch Graziano	24 lbs
Yellowfin Tuna	50	187 lbs.	Men	Robert Lind	86 lbs.
Yellowfin Tuna	50		Women	Danielle McPhee	65 lbs. 6 oz.

DMF *Rules UPDATE*

Public Hearings • Regulations • Legislation

During the period January through March, the following regulatory changes were enacted by DMF and the Marine Fisheries Commission.

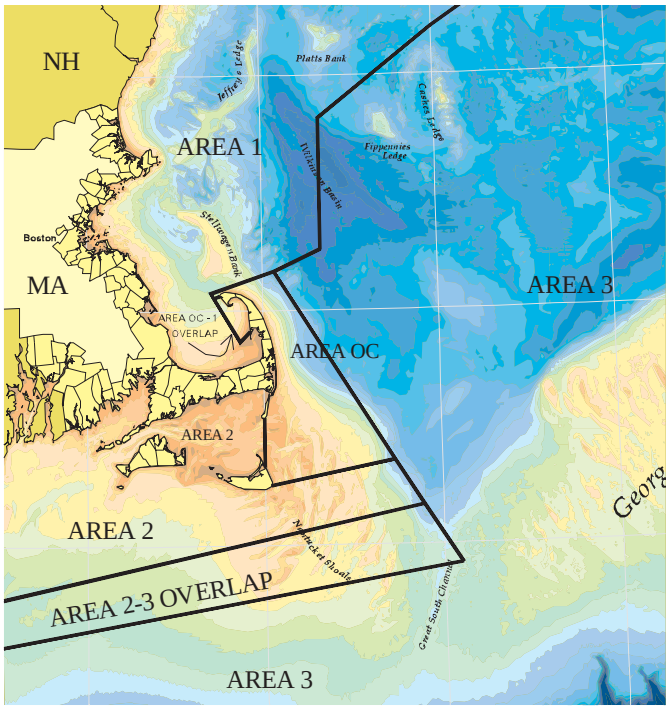
Actions affecting the commercial lobster, cod, black sea bass, tautog and scup fisheries as well as recreational tautog and weakfish fishing were discussed at February 3 & 4 public hearings and approved at the February and March business meetings of the Commission. Actions affecting the commercial lobster fishery were also taken through emergency action.

1) Changes to commercial lobster regulations (322 CMR 6.01 & 6.33) to comply with the ASMFC Interstate Fishery Management Plan:

(a)Marine Fisheries adopted all relevant commercial regulations pertaining to areas beyond Massachusetts waters (Areas 3, 4, 5, and 6) as mandated by the ASMFC.

(b)A more restrictive "v-notch" definition was adopted to complement that in New Hampshire. It is unlawful for any person to possess a v-notched lobster but in Area 1 commercial fishermen are required to carve a v-notch into the tail of any egg-bearing female. For purposes of the v-notching requirement in Area 1, it shall be at least 1/4 inch and not greater than 1/2" inch in depth and tapering to a sharp point. For purposes of defining a v-notch for the statewide possession rule, references to the presence of setal hairs was eliminated.

(c)The minimum size for lobster in Area 2 was increased to 3 11/32" through emergency action effective March 14, 2003 and to 3 3/8" effective July 1, 2003 as mandated by the ASMFC. Note that a previously approved minimum size increase for lobster in Area 3 and Outer Cape Cod to 3 11/32" will also become effective on July 1, 2003.



Lobster Conservation Management Areas adjacent to the Massachusetts coast. Since 1999 fishermen have been choosing one or more fishing areas on their permit.

(d) Under emergency rulemaking, a temporary moratorium was enacted on the issuance of offshore lobster permits, and a freeze on coastal lobster license transfers effective February 7, 2003.

2) Changes to winter period commercial scup regulations (322 CMR 6.28) for compliance with the ASMFC Interstate Fishery Management Plan.

(a) Winter I Period (January through April). It is unlawful for commercial fishermen to land or possess more than 10,000 of scup during a 24-hour day, or more than 1,000 pounds of scup per day when the Director determines that 85 % of the federally approved commercial fishery quota has been reached.

(b) Winter II period (November through December). It is unlawful for commercial fishermen to land or possess more than 1,500 of scup during a 24-hour day.

3) Changes to recreational weakfish regulations (322 CMR 8.06): The recreational bag limit for weakfish as lowered from 12 to 10 fish to comply with the ASMFC Interstate Fishery Management Plan.

4) Changes to commercial cod regulations (322 CMR 6.03): The trip limits shall be determined by the weight of whole, whole-gutted, or gilled fish. For purposes of determining weights for trip limits the weight of fillets will be multiplied by 3, and the weight of headless whole-gutted cod will be multiplied by 1.25. The weights of cheeks removed from cod heads and cod gonads consistent with 322 CMR 6.03(b) shall be exempt from the possession limits.

5) Changes to commercial black sea bass regulations (322 CMR 6.28): Half the annual quota will be allocated for the period January 1 through July 31, and the other half from August 1 - December 31.

(a) January 1 – April 30. It is unlawful for commercial fishermen to land or possess more than 100 lbs. of black sea per day.

(b) May 1 – May 22; June 1 – July 31. On a daily basis, it is unlawful for commercial fishermen to land or possess more than 500 lbs. of black sea bass in the directed sea bass pot fishery and weir fishery, 200 lbs of black sea bass for all other gear types or 100 lbs. in the commercial lobster fishery during a 24-hour day. It is unlawful for commercial fishermen to land or possess black sea bass from May 23 through May 31.

(c) August 1 – December 31. On a daily basis, it is unlawful for commercial fishermen to land or posses more than 500 lbs. of black sea bass in the directed sea bass pot fishery and weir fishery, 200 lbs of black sea bass for all other gear types or 100 lbs. in the commercial lobster fishery during a 24-hour day.

(d) The landing and/or possession of black sea bass on Fridays and Saturdays during the period May 1 - December 31 is prohibited.

6) Changes to recreational tautog regulations (322 CMR 8.06) to comply with the ASMFC Interstate Fishery Management Plan: The recreational tautog possession limit was lowered from 6 fish to 3 fish.

Notice of Public Hearings
Scheduled for April 14, 16 & 17, 2003

Under the provisions of M.G.L. Ch 30A and pursuant to the authority found in M.G.L. Ch. 130 ss. 17A, 80, 100A and 104, Division of Marine Fisheries (DMF) and the Marine Fisheries Commission (MFC) have scheduled hearings on the following regulatory proposals. Contact DMF for draft regulations and further details.

1. Concerning lobster regulations (322 CMR 6.01), take comments on the following proposals to:

a. permanently enact a recent emergency action to increase the minimum size for the commercial lobster fishery in Area 2 to 3 11/32" consistent with the ASMFC Interstate Fishery Management Plan;
b. increase the minimum size to 3 3/8" on July 1, 2003 in Area 2 consistent with the ASMFC Interstate Fishery Management Plan.

2. Concerning striped bass regulations (322 CMR 6.07), take comments on the following proposals to:

a. take two fish at or above the 28 inch minimum size limit in the recreational striped bass fishery;
b. modify the current 40-fish trip limit in the commercial striped bass fishery;
c. modify the current 34" minimum size in the commercial striped bass fishery;
d. modify the current open fishing days of Sunday through Wednesday in the commercial striped bass fishery;
e. modify reciprocal licensing in the commercial striped bass fishery;
f. increase the commercial striped bass quota.

3. Concerning scup regulations (322 CMR 6.28), take comments on the following proposals to:

a. increase the weir set-aside from 125,000 pounds to 225,000 lbs. (about 21% of summer quota or average of 2000-2002 set-asides);
b. provide for a scup bycatch of 100 lbs./trip for sea bass potters (currently no possession until start of commercial season on July 1). If adopted this limit cannot be implemented until May 16 with about 1 week left in their May 1-22 fishing period. However, if the fishery reopens in June the bycatch allowance would be in place;
c. not increase the 300-lbs. bycatch limit for draggers during the squid season. More than 300 lbs. would create incentive for a scup directed fishery using small-mesh, squid nets;
d. change the start of the directed fishery with gear other than weirs from July 1 to August 1 (beginning of summer season for black sea bass);
e. increase days off from Saturday and Sunday to Friday through Sunday thereby creating 4-day fishing week;
f. increase limit from 250 lbs. to 400 pounds (60% increase) from August 1 until the summer quota is reached.

4. DMF proposal to complement federal trawl regulations pertaining to mesh size restrictions (322 CMR 8.07) by requiring at least 6 +" mesh only in the cod-end of the net but allow at least 6" mesh in the remainder of the net.

Three public hearings have been scheduled :

❖ April 14, 2003 (7-10 PM) at the Annisquam River Marine Fisheries Station in Gloucester;
❖ April 16, 2003 (7-10 PM) at the Forestdale School in Sandwich;
❖ April 17, 2003 (7-10 PM) at the Viking Club in Braintree (for STRIPED BASS issues only).

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

Schedule of Lobster Minimum Size Increases in Massachusetts for 2003 and beyond.

	March 14, 2003	July 1, 2003	July 1, 2004
Area 1	3 1/4" - No Change	3 1/4" - No Change	3 1/4" - No Change
Area 2	3 11/32"	3 3/8"	3 3/8" - No Change
Area 3/ Offshore	3 5/16" - No Change	3 11/32"	3 3/8"
OCC	3 5/16" - No Change	3 11/32"	3 3/8"

INSIDE...

Surfers • Surfers • Surfers

This Newsletter and Other Information is available at our Web Site!

http://www.mass.gov/marinefisheries

DMF NEWS

EDITORS: **Dan M^cKiernan**
David Pierce
Kevin Creighton
Melanie Griffin
Jeanne Shaw
GRAPHICS: **David Gabriel**

MarineFisheries 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.

Mitt Romney, Governor
Ellen Roy Herzfelder, Secretary, EOEA
David M. Peters, Commissioner, DFWELE
Paul J. Diodati, Director, *MarineFisheries*

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

Publication #17020-12-7000-04/2003-$4,200

Printed on recycled paper. 269C

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