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DMF News

Managing the Commonwealth's living marine resources.

Inside

Example of the single-use metal tag that will be affixed to the tautog's gill cover. Photo courtesy of New York State Department of Environmental Conservation and Atlantic States Marine Fisheries Commission.

Tautog Management Changes Coming for 2018

MA & RI to develop consistent management strategy to maintain the localized stock

New management strategies for tautog, a popular recreational fish abundant off our south coast, are in the works for 2018. It's been over two decades since the interstate management plan first was adopted and now the Atlantic States Marine Fisheries Commission has drafted its first plan amendment. This species is one of the most localized of all popular recreational and commercial species, and the proposed changes to the plan will create four regions—each with its own conservation goals and regulations.

The creation of region-specific management is a departure from the previous plan. After twenty years of management, the Commission has concluded there are stark differences

Did You Know?

Although capable of reaching large sizes, tautog are very slow growing. The largest tautog caught in MA weighed 22 lbs 9 oz. Males grow faster and live longer than females with a max age of 35 years. Fish at the 16" minimum size are about 8 years of age. Both sexes mature at 3 or 4 years of age at about 12", so the minimum size provides multiple years of spawning before harvest.

in fishery characteristics and tautog biology, warranting regional management measures. Massachusetts and Rhode Island will form a single region (MA-RI). The other three regions will be Long Island Sound, New Jersey-New York Bight, and Delmarva. States are expected to adopt consistent rules within each of the regions.

Our local (MA-RI) stock size has been unchanged and at a moderate level over the past two decades. Whereas the other management areas are experiencing overfishing, our conservative management strategies of large size limits (16 inches) and low bag limits for the recreational fishery have prevented overfishing. On the commercial side, modest annual commercial quotas (about 65,000 lbs. for Massachusetts, and 48,000 lbs. for Rhode Island) and diligent enforcement of the quotas have also contributed to tautog conservation. According to the latest stock assessment, the MA-RI stock is not overfished nor is overfishing occurring. While the stock is stable, abundance level is considered below its potential—with much higher levels seen in the 80s and early 90s. So, future conservation measures have the potential to bolster the stock to historic highs.

Other regions will require more conservation to address overfishing. In the Long Island region, significant cuts in harvest (47%) are forthcoming. Fortunately, the MA-RI region will be spared significant cuts.

To achieve regulation consistency in our region, Massachusetts and Rhode Island will need to make some compromises. While both states have a common minimum size (16 inches), our recreational seasons and bag limits differ. Current Rhode Island rules feature a two month (May-June) spawning closure, while Massachusetts waters are open year round. Massachusetts has a season long bag limit of three fish. While Rhode Island also has a 3-fish limit for most of the season, they allow a more liberal bag limit of 6 fish per angler (and 10 per vessel) from October 15 through the end of the year. Clear and consistent rules across both states will enhance angler compliance and conservation ethic, as well as improve the precision of catch estimates.

The new management plan will also address the need to improve tracking of commercially landed tautog, especially in interstate commerce. Law enforcement representatives from all the participating states have persistent concerns about illegal and undocumented commercial landings that are destined for sale in in-state and out-of state markets and restaurants. Massachusetts Environmental Police have gotten a glimpse of the problem through high profile busts, discovering hundreds of illegal and undersized fish both during the open commercial season and out of season.

Therefore, all states will be cooperating with a tagging program to make the fishery more accountable. This program will mandate fishermen affix a single-use metal tag, issued by the state of origin, to the gill cover of tautog at the time of capture. Similar to the striped bass model, all fish in commerce will bear a state-issued tag. This will allow fish to be identified back to the state, dealer, and harvester.

The good news for Massachusetts fishermen is the stock is healthy and will be consistently managed between neighboring states that share some popular fishing grounds. We anticipate anglers will respond positively to maintaining the conservative rules that have prevented overfishing while making rules consistent.

In many ways the tautog management approach will become "striped bass like" meaning there will be no overarching federal plan or year-to-year tweaking of regulations. Rather, this new approach will create consistent recreational rules with our neighboring state, firm commercial quotas for each state, and create a tagging program to ensure compliance with quota limits.

By Dan McKiernan, Deputy Director

By the Numbers

90%: Region-wide proportion of harvest taken by recreational anglers (vs. commercial)

49,386: Estimated number of tautog harvested by MA recreational anglers (5-year average)

20,200: Projected number of tautog to be harvested and sold in MA in 2017

$4.35: Price paid per lb. to fishermen in 2016

8: Average age of a tautog at 16" minimum size

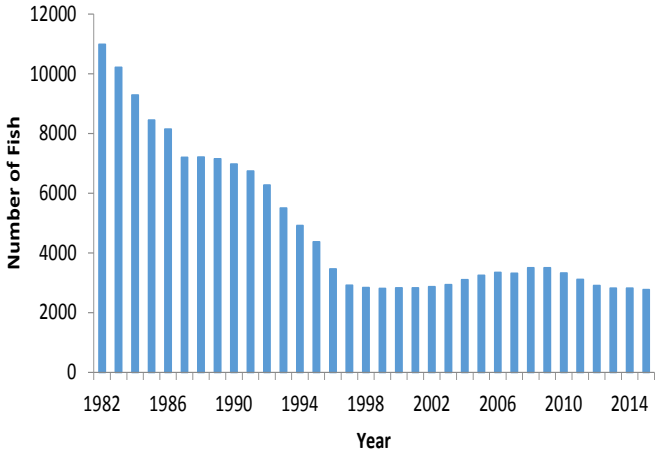
2.75: Average weight (in lbs.) of a 16" tautog

3.74: Average weight (in lbs.) of tautog harvested by recreational anglers (5-year average)

2.8 million: Current estimate of population size in MA-RI region

10.9 million: Historic high population in MA-RI region estimated in 1982

22.9: Largest tautog (in lbs.) caught by hook-and-line in Massachusetts



Tautog abundance of the Massachusetts-Rhode Island stock from 1982 to 2015.

Tautog 101

Tautog vary in color from dark green to black with irregular bars or blotches on the side. They are a stout fish with blunt noses. Their mouths are thick-lipped and have large conical teeth in front and flat crushing teeth in back. The white chin characteristic of large tautog has led many anglers to call this fish the "white chin."

They live along the Atlantic coast from Nova Scotia to South Carolina, especially inshore waters from southern Cape Cod to Delaware. In the northern part of their range, tautog are typically within several miles of shore in water less than 60 feet deep. More southern populations can be found somewhat farther offshore.

Tautog are found in habitats with structure or cover, hovering around steep, rocky shorelines or hiding near wrecks, piers, jetties, oyster beds, and boulder-strewn bottoms. They generally stay within localized home ranges while feeding and resting. While on their summering grounds, tautog establish a "home site", a protected spot in which they rest every night. Small tautog do not venture far from their home site during the day, but adults range more widely when feeding.

Tautog do not undertake long seasonal migrations, but tend to move inshore as water temperatures rise in spring. In the winter large groups move offshore to waters 50-150 feet deep in areas where the bottom is covered with large boulders. Fish less than 10 inches long may remain in shallow estuaries throughout the winter. Some fish remain offshore all year, exhibiting no movement except when searching for food or cover. Tautog tend to remain in small, discrete groups during the spawning season. After reaching sexual maturity, many fish return to the same spawning area each year throughout their lives.

Juvenile and adult tautog are exclusively daytime feeders, with feeding peaks at dawn and dusk. They are usually so inactive at night that divers can easily catch them by hand, as they lie motionless on the bottom. Tautog feed upon shallow water invertebrates such as mussels, clams, crabs, shrimp, and small lobsters. Juveniles and adults living around shoreline ledges feed heavily on blue mussels; their flat grinding teeth are well suited for crushing the hard shells of such animals.

New Way to Determine the Age of Tautog

The Division of Marine Fisheries has a project and laboratory dedicated solely to determining the ages of fish to improve the precision of stock assessments. The team has developed new techniques for aging tautog. Similar work has been accomplished for other high profile species such as striped bass and black sea bass.

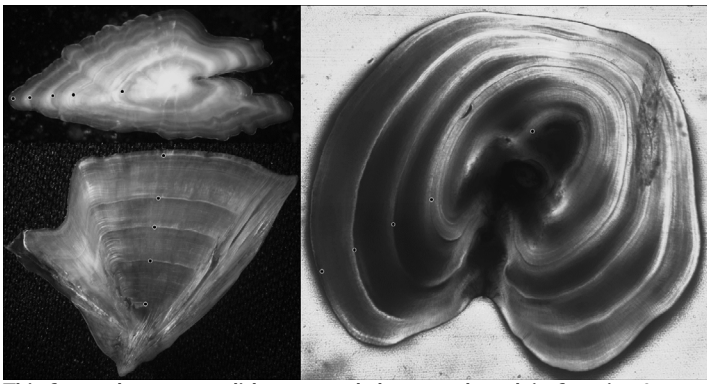
The age structure of a fish population is an important piece of information used to assess the population's health. Because most fish cannot regulate their internal temperature, seasonal variations in temperature and food availability affect the composition of their bones as well as other hard structures. The existence of these seasonal patterns allows biologists to identify the growth zones that are formed during each year of the fish's life. These growth zones, called annuli, can then be counted in much the same way as rings on a tree to determine the age of the fish.

Many parts of the fish can be used to interpret age. Scales, bones, fin spines, and otoliths (calcium carbonate structures that form in the inner ear of fish) are all frequently used structures. Differences between species of fish determine which structure has the most well defined annuli. For tautog, the structures most commonly used for age determination are the opercle bones (bones that cover the gill opening) and otoliths. Both of these structures accurately determine tautog age, but the collection process requires fish to have been sacrificed.

In an effort to find a new structure that works well for determining the age of tautog in a non-lethal manner, we conducted a study to examine tautog scales and fin spines. To determine which structure was the most reliable, we compared ages derived from scales and fin spines to ages derived from otoliths and opercula. Scales were not reliable because they were often regenerated (new scales grow to replace lost scales but they do not contain the growth history prior to the loss) and annuli are very close together in scales from older fish which leads to underestimating the fish age. In comparison, ages from pelvic-fin spines matched very well with the ages derived from opercle bones and otoliths. The ages were consistent between structures for all ages of fish examined. Using pelvic-fin spines to determine the age of tautog will reduce the amount of fish sacrificed and widen the sources and size ranges of fish that can be sampled.

A peer-reviewed paper of our results can be found on the *Marine-Fisheries* Publications webpage as Contribution 66 at www.mass.gov/eea/agencies/dfg/dmf/publications/technical.html.

By Scott Elzey, Age and Growth Biologist



This figure shows an otolith, an opercle bone, and a pelvic-fin spine from an age-5 tautog. Black dots represent the location of annuli.

The Dish on Fish: Grilled Tautog Tacos

Bringing locally caught and sustainable seafood to a table near you

Ingredients

Tacos:
- 1 pound of tautog filets
- 1/4 cup olive oil
- Juice of 1-2 lemons
- 1 teaspoon lemon zest
- 1 tablespoon chili powder
- 1 tablespoon paprika
- 1 teaspoon turmeric
- 1 teaspoon saffron
- Soft tortillas (corn or flour)

Mango Salsa:
- 1 mango
- 2 cloves of roasted garlic, diced
- 1/2 red onion, diced
- 1 jalapeno, diced
- 1/4 cup cilantro, finely chopped
- Juice of 1-2 limes

Garnishes:
- Pickled red cabbage and carrots
- Hot sauce
- Sliced avocado
- Queso fresco

Directions

Peel and chop the mango in to bite size pieces. Mix all ingredients of the salsa and add the juice of 1 to 2 limes. Salsa is best if you can let it sit overnight.

Place fish in a medium size dish. Whisk together the oil, lemon juice, lemon zest, chili powder, paprika, turmeric and saffron and pour over the fish. Let marinate for 30 minutes.

Heat the grill on high and rub a little oil on the grate. Remove the fish from the marinade. Place onto a hot grill, flesh side down. Grill the fish for 4 to 5 minutes on the first side and then flip for up to a minute. Remove fillets and cut into bite size pieces.

Warm up tortillas on the grill and remove. Add pieces of tautog. Top with pickled veggies, mango salsa, two slices of avocado, and a couple pinches of queso fresco. Finish with some hot sauce and a wedge of lime.

Save this recipe for September when locally caught tautog arrives in MA markets!

Record Numbers of Right Whales Seen in Cape Cod Bay

Locally numbers are surging but overall population may be in decline

Cape Cod Bay has become the scene of the nation's densest aggregations of right whales. In the past few years the number of whales observed annually has tripled above what was seen in the beginning of the 21-year surveillance program, despite no change in effort. Not only have season totals of whales increased, but we've also seen astonishing numbers in a single aerial surveillance flight. This year all previous daily records were shattered when 206 individual right whales were documented in Cape Cod Bay—40% of the known right whale population. The plane flew for 10 hours and had to re-fuel twice.

The aerial surveillance team is still analyzing photos, so the total is expected to grow, but thus far 251 individual right whales have been identified during the 2017 season (48% of the population). However, the abundance in Cape Cod Bay belies a growing concern about the overall right whale population. At the same time that right whale activity in Cape Cod Bay has ramped up, there have been discouraging changes in the population as a whole. Population growth has stalled and may actually be declining. The calving rate has significantly declined in recent years, with the majority of mature females not reproducing. Right whales have shifted their distribution and residency patterns, possibly in response to changes in food availability. Recently, the whales appear to be traveling further north during summer months, abandoning the Bay of Fundy and using the Gulf of St. Lawrence. Their increased travels in search of optimal food resources may be contributing to poor health, reduced calving, and a rise in severe entanglements. The increase in severe entanglements could partly be correlated with the shift in distribution, as right whales explore areas of high gear density and/or those without mandated whale-related gear modifications.

In mid-June, at least six right whales were found dead in the Gulf of St. Lawrence area of Canada. As of late June no single cause has been identified. There are very few precedents for large mortality events like this but historically they have been related to naturally occurring neurotoxins produced by algae that then become concentrated at lethal levels in the food chain.

Right whales spotted in Cape Cod Bay. Photo courtesy Center for Coastal Studies, NOAA Permit #19315.

Approximately 83% of North Atlantic right whales show signs of previous entanglement. Recent research suggests that entanglements are contributing to the poor health and low calving rate of right whales. 2017 was an extremely low calving year for right whales, capping off a five-year period of declining birth rate. Only three mother and calf pairs were observed in the southeast calving grounds (Florida and Georgia), which is the second lowest number of calves documented since studies began in the 1980s. However, the Center for Coastal Studies aerial survey team plane found a fourth pair on April 12 off Highland Light in Truro. Federal researchers spotted a fifth pair on May 2 in the Great South Channel. Still, the number of calves born in 2017 barely replaced the right whales known to have died last year.

The strong presence of right whales in Cape Cod Bay and the recent downturn in the population are trends that seem to be in competition with each other. But the surge in right whale presence in Cape Cod Bay in 2017 may actually be related to the overall poor health of the population. Feeding is the main reason right whales return to Cape Cod Bay each year, but they typically take time to socialize as well. This was the first year since 1994 that no right whale social behavior was observed. The whales were foraging almost constantly while they were here, illustrating the importance of Cape Cod Bay to the health of the population.

With such a large portion of the right whale population aggregating in our waters, it is critical to protect them from vessel collision and entanglement while in our waters. The seasonal fixed gear closure in Cape Cod Bay and surrounding areas runs from February 1 through April 30. This ensures the bay is risk-free while whales are present. This closure also coincides with the slowest point in the fixed gear fishing season, thus minimizing the impact to the industry while maximizing the benefit to right whales. In response to the late departure of right whales from the Bay in 2017, *MarineFisheries* delayed the lifting of the fixed gear closure by four additional days to avoid entanglements.

Outside the protection provided in Cape Cod Bay and the extraordinary 2017 season, there is deep concern about the current trend in the right whale population and the continued struggle to reduce entanglements across the North Atlantic. The federal Marine Mammal Commission recently urged regulators to be more aggressive in addressing entanglement issues. This includes the pursuit of new technology like reduced breaking strength lines and fishing gear free from vertical lines. The New England Aquarium and South Shore Lobstermen's Association have been exploring the feasibility of reduced breaking strength vertical lines. However, questions remain about how widespread that technology can or should be applied and the potential risk of entanglement still associated with the gear. It is our hope that continued research and development of "whale-safer" fishing gear will provide a viable solution to this problem. *MarineFisheries* remains committed to developing management strategies that maximize protection to critically endangered right whales while minimizing impacts to the Commonwealth's fishing industry.

Finally a big "thank you" to the Center for Coastal Studies who just completed the 21st consecutive right whale surveillance program for *MarineFisheries*. They provide timely and accurate reports and forecasts of whale distribution and abundance allowing us to responsibly manage the area. This program is funded through the National Marine Fisheries Service and the Massachusetts Environmental Trust.

By Erin Burke, Protected Species Specialist

Seafood Marketing Update

It was an exciting spring for our Seafood Marketing Program as we launched two new marketing initiatives. Earlier this year, we developed a pilot grant program as an additional way for *MarineFisheries* to leverage the knowledge of local groups to better promote sustainably-harvested Massachusetts seafood (See *DMF News* 2016 3rd and 4th Quarters). In March we awarded a total of $105,500 in grants to the following campaigns designed to increase awareness and demand for Massachusetts seafood products.

Cape Cod Commercial Fishermen's Alliance: "Supporting the Local Economy: Demonstrating Skate and Dogfish" – $15,000 – Two boat-to-plate recipe demonstration videos on dogfish and skate for social media, in partnership with Buy Fresh Buy Local Cape Cod.

Fishing Partnership Support Services Massachusetts: "The Faces of Fishermen and their Families" – $10,000 – Five photo essays of fishermen and their families to increase public awareness by showing the positive impact of our commercial fishing industry on our coastal communities.

Red's Best: "Promoting Local Catch at the Boston Public Market" – $14,000 – Twelve free sample sessions for public tastings prepared by Red's Best kitchen staff with promotional material, and four seafood events at the Kitchen at the Boston Public Market.

City of Gloucester/Gloucester Fishermen's Wives Association: "Collaborative Local Seafood Product Development for a New Audience" – $13,000 – Product development for various locally caught species such as redfish, whiting, pollock, hake, and yellowtail flounder in order to market seafood better to buyers in restaurants, hotels, hospitals, and universities.

Green Crab R & D Group: "The Nation's First Soft-Shell Green Crab Harvest" – $20,000 – Production of the country's first harvest of soft-shell green crabs, refine techniques and create market demand.

New Bedford Harbor Development Commission: "Creating a Portal to New Bedford Seafood" – $13,000 – Creation of a New Bedford Seafood website that offers a central location for local, regional, and international buyers, and a Seafood Throwdown.

Wellfleet SPAT: "Taste the Merrior: An Educational Experience" – $20,500 – An educational tasting event in Boston to reacquire and increase market share for Wellfleet oysters and clams after the damaging norovirus outbreak last fall. The event occurred on April 20 at the Samuel Adams Brewery and attracted over 400 attendees, who enjoyed some delicious oysters and got to meet the shellfish farmers!

Industry members shucking fresh oysters at the "Taste the Merrior" event at Samuel Adams Brewery.

Also this spring, we partnered with Massachusetts Farm to School in featuring seafood as the "Harvest of the Month" for the month of May. This exciting new program provided 8,000 servings of locally sourced seafood meals to 139 public schools, two medical centers, and 25 colleges. Leading up to the seafood feature month, we collaborated with Massachusetts Farm to School to host three culinary workshops for school and college food service professionals. These "Sea to School" workshops gave participants hands on experience working with the locally caught species available in Massachusetts. Workshops were held in Wareham, Salem, and Northhampton.

The first "Harvest of the Month" seafood feature was a success and we plan to sponsor another one in May 2018.

This summer look for us on Fox 25 News' Friday morning "Zip Trips". We are sponsoring the "Taste of the Town" segment on each Zip Trip and will be at all ten locations from June through August promoting local seafood.

2017 Zip Trip Schedule. Photo courtesy of Fox 25 News.


Participants having a blast at the Cape Cod Canal Boating and Water Safety Day in Sandwich and the youth fishing clinic in New Bedford!

Let's Go Fishing!

Since 2014, *MarineFisheries* has been sponsoring a series of saltwater angler education youth fishing clinics. These clinics are designed to create an enthusiastic environment for kids and their families to learn responsible fishing and handling techniques, specifically reaching out to those who are new to the sport. At the end of each three-hour event, our goal is to have the participants feel confident enough to saltwater fish on their own.

Our biologists teach basic casting and angling skills, how to handle fish, and the importance of recycling monofilament. Our staff offers other fun activities such as knot tying, fish measuring, and painting of fish prints. Participants receive educational handouts, along with mini tackle kits (which contain circle hooks and sinkers), and a Let's Go Fishing! backpack filled with Fish MA stickers, sunglasses, and a measuring tape. Giving them tackle and teaching them proper fishing techniques increases the chances that participants will be lifelong anglers!

MarineFisheries has coordinated five fishing clinics this year which will occur through August. These events are free to the public and are often geared to children ages 7-15. Most fishing clinics are three hours long. Rods, tackle, and bait are all provided, and a fishing permit is not necessary to participate. Spots are limited so only registered children may participate in the fishing portion of the day, but all others can participate in the other fun activities offered!

Upcoming Event:
Tuesday, August 8, 2017
Bass River Fishing Pier in South Yarmouth, MA

Completed Events:
Saturday, June 10, 2017
Salem Willows Fishing Pier in Salem, MA
Saturday, June 24, 2017
Cape Cod Canal Boating and Water Safety Day in Sandwich, MA
Sunday, June 25, 2017
Fort Taber Pier in New Bedford, MA
Wednesday, July 12, 2017
Family Fishing Night at the Cape Cod Canal visiting center in Sandwich, MA

With four successful clinics already finished, don't miss out on upcoming events!

The Saltwater Angler Education Program is funded in part by the Marine Recreational Fisheries Development Fund, a dedicated fund supported by the sale of Massachusetts recreational saltwater permits. To register for an upcoming event, visit our Saltwater Angler Education Program webpage at http://www.mass.gov/eea/agencies/dfg/dmf/education/saltwater-angler-education-program.html.

By: Kimberly Trull, Saltwater Angler Education Program Coordinator

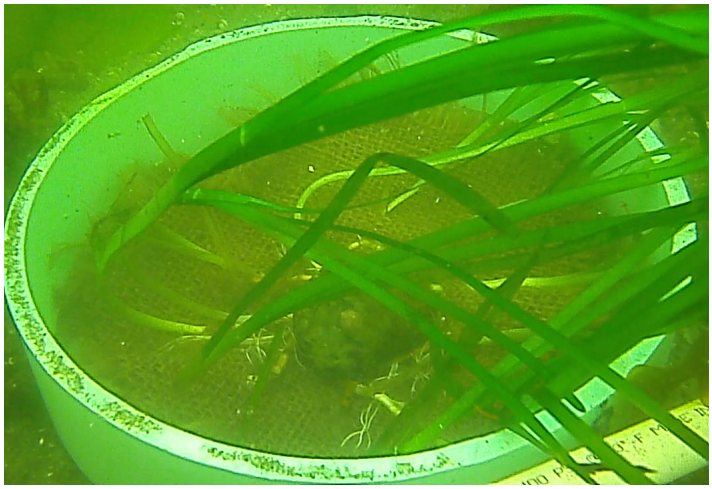
In-Lieu Fee Program: Eelgrass Restoration in Salem Sound

This May divers from *MarineFisheries* and Northeastern University splashed into the water off Salem Harbor in a shoal area called Middle Ground. The goal of this dive was to complete the spring planting of a quarter acre of eelgrass (*Zostera marina*). Eelgrass is an important marine flowering plant that provides habitat for many commercial and recreational species such as winter flounder, bay scallop, and American lobster. Concerns of widespread eelgrass declines in Massachusetts, including a documented 18% loss of eelgrass in Salem Sound between 1995 and 2012, have led to an increased demand for protection and restoration efforts.

Funding for this fisheries habitat restoration is from the Massachusetts In-Lieu Fee Program (ILFP), developed by the Army Corps of Engineers and administered by the Massachusetts Department of Fish and Game (DFG). The ILFP affords Army Corps permittees the option of paying a fee as mitigation for their project impacts to federally-regulated aquatic resources. This fee is a substitute for permittee-responsible mitigation. DFG aggregates the ILFP payments for use on larger-scale mitigation projects with long-term monitoring. The goal is to increase the likelihood of mitigation success by scaling up the restoration and monitoring effort. Proposals for ILFP funding must meet prioritization criteria including targeting resources under threat, restoration near the same area where the impacts occurred, and compatibility with broader conservation and management initiatives. DFG has collected over $1,000,000 in ILFP payments from 26 individual permitees since the program began in 2014. The Department is currently in the process of identifying and selecting other mitigation projects for a future round of funding.

The *MarineFisheries* eelgrass restoration project is the first mitigation project funded through the current ILFP. We received $274,671 to plant one half acre of eelgrass and monitor its growth for a total of five years. *MarineFisheries* has a long-standing successful eelgrass restoration program and is uniquely qualified to complete restoration efforts along the coast of Massachusetts. For over ten years *MarineFisheries* has been restoring eelgrass to sites in Outer Boston Harbor and Salem Sound. This past fall we mapped greater than 50 acres of functioning eelgrass meadow at sites that we jump-started with our eelgrass plantings.

For this project, *MarineFisheries* selected the Middle Ground site because it has sufficient light for eelgrass growth, compatible sediment type, acceptable water depths, protection from storm impacts, and evidence that the area supported eelgrass historically. The quarter acre site was planted in a checker-board pattern. The design enhances the spread and expansion of the grass and provides immediate habitat structure and function.



Once the eelgrass have been woven through a burlap disc, they are ready for planting.

***MarineFisheries* and Northeastern Univeristy divers ready to plant eelgrass in Salem Harbor!**

In addition to habitat restoration, this project is also testing the use of multiple source sites to improve restoration success by increasing genetic diversity. In small-scale field testing, positive effects of genetic diversity included higher density and production of eelgrass. This is the first time this method will be tested in a large-scale restoration effort. Knowing the best mix of source sites to use in an eelgrass restoration will improve the success of future efforts.

Planting along three 43-yard transects, *MarineFisheries* biologists and the scientists from Northeastern scooped the sand and rocks away, placed burlap disks woven with eelgrass plants into the scooped areas, and then carefully buried them with a thin layer of sediment. Each disk contained eelgrass from five, three or one donor meadow. Plants from each donor site and from the new restoration site will be tested for their genetic composition and for the relative success of the mono vs. poly-source transplants, measured as the shoot density, percent cover, and plot aerial expansion.

The team will be back later this summer to monitor the early success and establishment of the transplants. Like farmers, we are hoping for good growing weather. For eelgrass, clear and cold days are ideal. These conditions allow the plants to get as much light as possible and establish themselves in the sediment before algae and crabs come in as the weather warms. Next fall we will continue planting an additional quarter acre of eelgrass at an adjacent site. Monitoring will continue for three years and will include diver surveys and acoustic mapping.

More information about the ILFP can be found on the DFG's website at http://www.mass.gov/eea/agencies/dfg/about/in-lieu-fee-mitigation-program-for-massachusetts.html.

By Tay Evans, Habitat Program Environmental Analyst

Unprecedented Challenges in Lobster Management

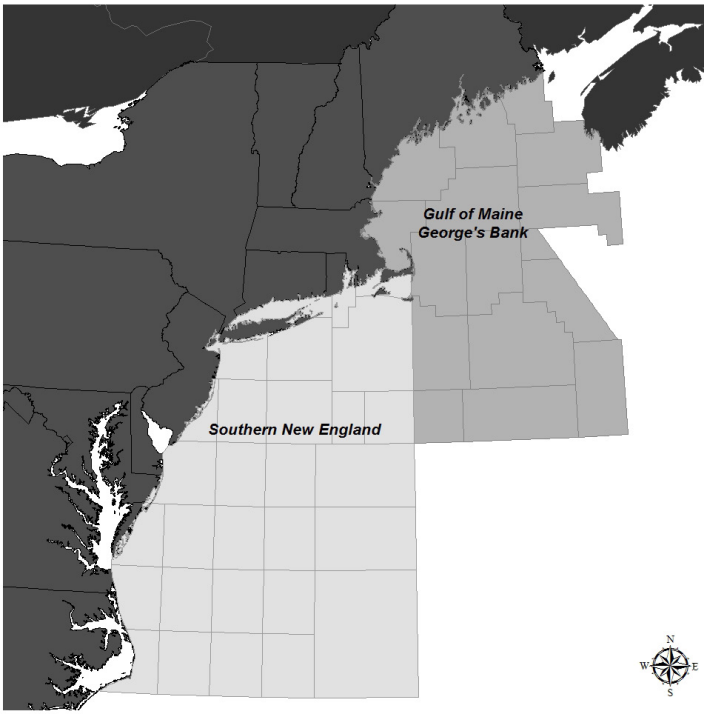
Stocks declining in the southern end of the range while booming in the north

With the landings of lobster in the US and Canada at an all-time high, the fishery in the southern end of the range is diminishing with little hope of recovery to historic levels due to ocean warming.

State and federal fishery managers continue to grapple with how to deal with a declining Southern New England (SNE) lobster stock, affected more by environmental conditions than by the effects of fishing. For over a decade, the American Lobster Management Board of the Atlantic States Marine Fisheries Commission has struggled to address the stock decline that has hardly responded to conservation measures. At the most recent Commission meeting, the Board conceded that the stock is unlikely to be rebuilt. They opted to maintain most of the existing management system but take actions to conserve reproductive females with a (small) stock-wide 5% increase in egg production.

Scientific studies, led by the Division's Bob Glenn and Invertebrate Fisheries Project in collaboration with other states, have confirmed the decline in SNE is related to warming ocean temperatures. Studies have demonstrated spawning females no longer migrate in close to shore to release eggs. This results in drastic reductions in young lobsters settling out in shallow waters. With young lobsters no longer in prime nursery areas, the net productivity of the stock is greatly reduced. Juvenile and adult lobsters also migrate away from waters that are too warm. With nearshore summer-time temperatures routinely reaching into the high 70s each summer, the inshore fisheries can no longer be sustained at historic levels.

Landings figures reveal the decline. During the boom years of the 1990s in SNE, landings in this area averaged about 17.5 million lbs. annually—about 25% of the total US landings. In more recent years, SNE landings have declined by almost 75% to less than 4 million lbs.



Range map showing the two US American lobster stocks.

Commercial fishermen hauling lobster traps.

The proportion of the US landings coming from SNE has fallen to less than 3%, which is in part due to increasing productivity of the Georges Bank and Gulf of Maine stocks.

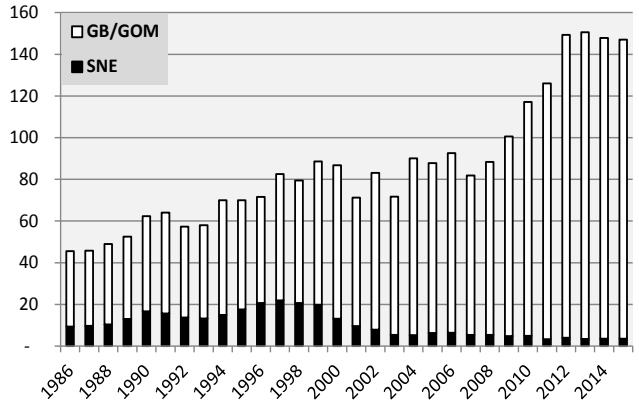
During these years of decline in SNE, fisheries managers enacted numerous area-specific conservation measures adopted with the input of industry members. These rule changes were customized for each management area included minimum size increases and maximum size decreases, closed seasons (in some states), releasing and v-notching of females, and trap cuts. Unfortunately, these measures did not reverse the decline, especially in the nearshore waters.

The managers are also keenly aware of the mixed signals commercial lobstermen provide about their observations. Though catches have fallen inshore, the decline is much less pronounced offshore. Many participating lobstermen who fish offshore have maintained that the offshore fishery may be sustainable thanks to young lobsters successfully settling in deeper waters. Unfortunately, due to higher cost of working offshore, most lobster surveys are conducted inshore—so it is difficult to confirm those theories.

Off Massachusetts and Rhode Island, lobstermen are in the midst of aggressive trap allocation cuts that will result in substantial reduction for each permit holder. The goal of the cuts is to scale the fishery down to the diminished size of the lobster resource. For the nearshore fishery (Area 2) trap allocation cuts nearing 50% will be completed by 2020. The offshore fleet (Area 3) is facing cuts totaling 25%. Some of the cuts in traps will be mitigated by an ongoing state and federal trap transfer program. This will allow fishermen who are leaving the fishery or—willing to downsize—to transfer traps to those remaining in the fishery.

The Management Board recognized the futility of trying to rebuild the fishery to historic levels given the environmental changes. So, they sought to preserve a functional portion of the fishery—regardless of how small that remnant may be. The present and future for lobstermen in SNE is diversification. Many lobstermen have either left the fishery or shifted onto other more abundant species such as Jonah crab, scup, black sea bass, and channeled whelk.

The Management Board's vote to increase stock-wide egg production by 5% will be the focus of each regional group of fishermen in the respective Lobster Conservation Management Team and subject to Board approval in August and October. Lobstermen who are already facing trap allocation cuts have requested those trap cuts suffice as the mandated conservation measure.



Over the past 20 years, US lobster landings (shown in millions of pounds) have doubled. However, SNE lobster landings have decline by 75%.

Long term trends in the SNE area include reduced landings inshore and increased reliance on offshore waters to harvest the available stock. The future for lobstering in shallow inshore waters is not promising. However, the outlook is more optimistic for trapping a combination of lobsters and Jonah crabs in offshore waters.

Despite the stark decline of lobsters on the southern fringe of the range, the loss of production in SNE (about 12 million lbs.) has been replaced by the growth in landings of almost 75 million lbs. in the northern part of the range. With abundance peaking in the Gulf of Maine and Georges Bank, the supply of lobsters in the US is at an all-time high, and landings have reached nearly 150 million lbs. Canada, who is responsible for more than half of the global American lobster harvest, has seen similar growth in landings, which contributes to a robust supply on the domestic and international markets. Most of the US growth has been in the northern portion of the Gulf of Maine. While the growth is less dramatic in Massachusetts, lobster landings reached a record high in 2016 at over 17 million lbs.

Over the next few years, scientists and managers will be carefully tracking the trends in lobster surveys to forecast any future decline from this all-time high in abundance in the north and hope to see a stabilizing of the population in the south.

By Dan McKiernan, Deputy Director

Former MFAC Commissioner Bill Adler Receives Belding Award

This past April, former Commission member Bill Adler received the 2016 Belding Award for his many years of service and commitment to fisheries management. Bill had served as a member of the agency's Marine Fisheries Advisory Commission (MFAC) for 27 years, making him the longest serving member of the Commission in its 55-year history. In addition, for 20 years he represented the Commonwealth as the Governor's appointee to the state's three-person delegation at the Atlantic States Marine Fisheries Commission (ASMFC). His contributions have been numerous, and he is part of ASMFC's history as well as ours.

Bill is a former teacher and life-long commercial fisherman. He served in numerous committees and organizations including his most prominent role as the Massachusetts Lobstermen's Association Executive Director where he served for 25 years until 2014. Other contributions included serving on the Stellwagen Bank Advisory Council and the state's Ocean Management Task Force. He has also served on the Board of Directors of the Gulf of Maine Lobster Institute. These are just a few of his affiliations that made Bill such an engaged fishery manager.

The Belding Award was created in 1989 to honor individuals who, in the opinion of *MarineFisheries* and the MFAC, have done the most to promote the conservation and sustainable use of the Commonwealth's marine resource. While serving on the MFAC, Bill was the most dedicated member in terms of attendance, review of meeting documents, and engagement in debate on the many issues facing the Commission. Bill was highly supportive of the agency's lobster project and its cooperative research conducted with fishermen that helped build bridges of trust between the agency and the commercial fishing industry. Over the years, Bill's guidance was invaluable as the Division navigated difficult marine fishery management decisions. It has been an honor working with him.

By David Pierce, PhD, Director

Former MFAC Commissioner Bill Adler accepting the 2016 Belding Award with *MarineFisheries* Director David Pierce.

Squid Week!

Celebrate the diversity of Massachusetts seafood by trying something new, fresh, and sustainable.

As part of the Division's Seafood Marketing Program, we partnered with local restaurants to highlight and promote locally caught longfin squid. From May 28 through June 4 patrons could enjoy off-menu squid dishes, Squid Week-only exclusives and squid specials at 12 participating restaurant locations.

The majority of longfin squid is harvested year-round using small-mesh bottom trawls. The commercial fishery harvests squid offshore in the winter and inshore in the summer. The majority of landings come from Rhode Island, New York, New Jersey, and Massachusetts. In 2016, 103 Massachusetts commercial fishermen landed over 4.7-million pounds of squid, which has a value of $5.7-million.

We'd like to thank our participating restaurants for helping us increase consumer awareness by bringing local seafood products to a plate near you! We plan to coordinate future "Weeks" featuring other Massachusetts-landed species when they are in-season.

Participating Restaurants:
Bucatino Restaurant, North Falmouth ● EVOO, Cambridge ● Fishermen's View, Sandwich ●The Publik House, Brookline ● Mac's Shack, Wellfleet ● Napi's, Provincetown ● Pilot House Restaurant, Sandwich ● Puritan & Company, Cambridge ● Quarterdeck Restaurant, Falmouth ● Row 34, Boston ● Vee Vee, Jamaica Plain ● Winslow's Tavern, Wellfleet

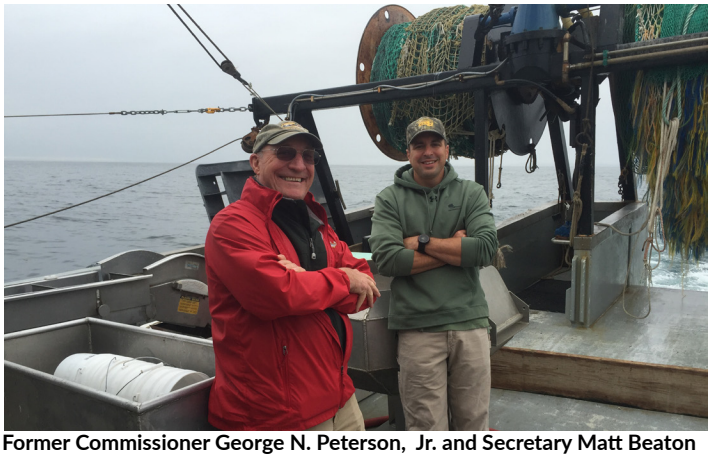
Farewell to the Department of Fish and Game Commissioner

George N. Peterson, Jr., of the Department of Fish and Game (DFG) retired this July. George was appointed Commissioner of DFG by Governor Charlie Baker in February 2015. Over the past two and a half years, George worked directly with *MarineFisheries* on numerous commercial and recreational issues.

Prior to his appointment as Commissioner, Peterson served in the Massachusetts House of Representatives for 20 years, representing the 9th Worcester District and was the Assistant Minority Leader when he left the House of Representatives. An avid recreational fisherman and hunter, George was a commercial fisherman for about five years and owned a small retail/wholesale seafood business for about 10 years prior to his legislative service.

We'd like to thank George for his continued support of our commercial and recreational fisheries and wish him all the best in retirement!

Matt Beaton, Secretary of Energy and Environmental Affairs, announced the appointment of Ron Amidon of Templeton as the new Commissioner. Amidon, who has had a successful career in large-scale construction management, also has an extensive background in the Commonwealth's sportsmen community and has dedicated countless years to ensuring the preservation of wildlife and natural resources. Welcome aboard Ron!



Former Commissioner George N. Peterson, Jr. and Secretary Matt Beaton aboard the F/V *Miss Emily* during last spring's cod Industry Based Survey.

Effectiveness of Imaging Ghost Pots Using Side Scan Sonar

Over the past decade, concern about the impacts of lost fishing gear as a form of marine debris has been increasing, especially with the industry's transition from wooden lobster traps that degrade to plastic coated wire that is far more persistent. Ghost pots are lost or abandoned gear that continue to trap and kill fish, lobsters, and other organisms. Lobstermen lose revenue from replacement costs of lost gear and from the lobster deaths due to ghost pots, and therefore, lost sales opportunities. The total number of ghost pots in the water remains unknown, making it difficult to accurately determine the total number of lobsters killed and the total value lost.

Side scan sonar has been used previously to identify lobster pots on the seafloor, but success in identifying pots reportedly varies based on whether the sonar is used over simple (flat) bottom or complex (rocky) bottom. In spring 2016, Division staff tested if side scan sonar could be used to count lobster pots on the seafloor (see *DMF News* 1st & 2nd Quarters 2016).

We placed a predetermined number of lobster pots randomly in known simple and complex habitats in Buzzards Bay. A side-scan sonar unit was used aboard the F/V Andrea C., captained by Aaron Cebula out of Fairhaven, to survey the area. We attempted to identify the pots in the sonar image to obtain pot detection rates. If successful, a sonar survey of a larger area could then be completed to count derelict pots with the detection rates applied to estimate the actual pot numbers within each habitat.

Our ability to detect placed pots was low overall with slightly better detection rates over the simple habitat. Most pots were not found in either habitats and especially in complex habitat. Our estimated detection rates were 32% for simple bottom and only 5% for complex bottom. Since our detection rates were so low, we decided not to use them to calculate a weighting factor for the larger survey area.

Several potential factors may explain the low detection rates. First, the same object on the sea floor looked different during different sonar passes. This is likely due to the angle that the object is viewed and the image distortion caused by waves at the surface. Second, the sonar imagery was not as reliable to differentiate pots from some other objects, such as boulders in complex habitats. Improvements to detecting pots may be possible by using sonar with a higher frequency, however, this would require more passes to cover the same area resulting in more surveying time and expense. Third, we had limited experience interpreting side scan sonar images.

Overall, our results demonstrate that in order to obtain a reliable detection rate we first need to improve our identification of pots. In mixed and complex bottoms, objects of similar shape and size as lobster pots were common, and hard to distinguish from each other. Acoustic shadows inhibited pot detection. However, even with improvements, using sonar to accurately count pots may only be useful in the most simple bottom type.

By David Chosid, Conservation Engineering Biologist

Mass.gov Gets a New Look!

On June 21, the Baker-Polito Administration announced an overhaul of the Commonwealth's website, Mass.gov. The project will not only update the look and feel of the website, but will also reorganize its navigational structure to be more customer-service focused.

Division staff has been updating *MarineFisheries* content to make things like buying a permit and looking up regulations a more user-friendly experience. The Commonwealth's redesigned website is expected to launch by the end of 2017. In the meantime, you can visit a pilot website, pilot.mass.gov, to check out the new design and provide feedback.

To stay up-to-date on the redesign progress and *MarineFisheries* content, join our email listserv at join-marinefisheries@listserv.state.ma.us.

Creature Feature: Horseshoe Crabs

It wasn't very long ago that horseshoe crabs (*Limulus polyphemus*) were considered a nuisance because of their reputation as a shellfish predator. Predator control programs offered bounties to kill horseshoe crabs in Massachusetts as recently as the early 1970s. However, sentiments on horseshoe crabs and the value of the fishery have changed quite a bit since then.

Though somewhat overstated, similarities between modern horseshoe crabs and their fossilized ancestors have led some to refer to horseshoe crabs as "living fossils". Today there are four living species of horseshoe crab, three of which are found in Asia, and one in North America. Horseshoe crabs are crabs in name only; they are more closely related to spiders and scorpions than they are to true crabs.

Horseshoe crabs are estimated to live up to 20 years. It takes 11 years for a female to reach sexual maturity, nine for a male. A female will lay around 88,000 tiny green eggs in nests along a beach, sometimes spread out over multiple days. The eggs usually hatch within 2-4 weeks, but in some cases they can remain dormant and hatch the following year. Horseshoe crabs grow by molting. They will molt frequently in their first few years of life before slowing down and molting once a year until they reach maturity. A molted crab shell can be distinguished from a dead crab by examining the edge of the prosoma (rim) of the shell on the opposite side of the telson (tail). If the crab is split open at the rim, it is a molt.

In Massachusetts, peak spawning activity is usually toward the end of May and early June. Horseshoe crabs prefer to spawn on sandy beaches, at night, at the water's edge, at high tide, especially during the new or full moon. However, there are some locations in this state where spawning activity is more common during the day, or in slightly deeper water, and some crabs will lay eggs in gravelly substrate. Depending on weather conditions, there are often times when crabs will be more likely to spawn between the new or full moon. In the northern part of their range, as we are in Massachusetts, temperature plays an increased role in the crabs cue to spawn.

Horseshoe crabs once supported a large fertilizer industry and were also used as livestock feed. Today, horseshoe crabs are harvested in the U.S. for two reasons: for bait in the channeled whelk and American eel fisheries, and to collect their copper-based, blue blood for use in the biomedical industry. About 100,000 crabs are harvested annually for bait in Massachusetts; nearly all of which are used in the commercial pot fishery for whelk. While horseshoe crab has long been the preferred bait in the whelk fishery, fishermen now often use a bait medley consisting of a smaller portion of a horseshoe crab mixed with cheaper baits such as green crabs, mussels, or fish parts.

The biomedical industry uses the extracted blood of horseshoe crabs to make a product called Limulus amebocyte lysate (LAL). It was developed due in large part to research conducted at the Marine Biological Laboratory in Woods Hole. The first licensed manufacturer of LAL was Associates of Cape Cod, which is located in Falmouth. LAL is used to test for Gram-negative bacteria (e.g. *E. coli*) in pharmaceutical equipment, biological products, food safety, as well as other uses. The introduction of Gram-negative bacteria into the human blood system will most likely result in a fever, but can be more severe in some cases. If you have ever had a vaccine, an I.V., or an implanted medical device, you have likely benefited from the use of LAL.

Molted shell of a horseshoe crab.

Horseshoe crabs harvested solely for LAL extract are eventually returned back to the area where they were captured. Numerous studies have been conducted to determine how well the crabs survive the transportation and bleeding processes. These studies have provided mortality estimates ranging from 5-30%. The Atlantic States Marine Fisheries Commission (ASMFC), the interstate agency responsible for the coast-wide management of horseshoe crabs, assumes a 15% mortality rate. Possible sub-lethal effects of the bleeding process are less understood but are currently being investigated.

In addition to playing an important role in human health, the eggs of horseshoe crabs are essential to many migratory birds that make long migrations along the eastern seaboard of the U.S. It has been estimated that Delaware Bay shore birds consume roughly 119,000 lbs. of horseshoe crab eggs during the birds' spring migration. Despite the volume of eggs consumed, the birds have a minimal impact on the horseshoe crab population because the eggs they consume have been unearthed by waves or other nesting crabs and would not have survived anyway. Recent declines in the horseshoe crab population have been blamed for the population declines in some shorebirds, including the red knot.

Human activities, other than fishing mortality, also have a negative impact on the horseshoe crab population. Threats include beach alteration projects that can destroy spawning areas and nutrient loading and the consequential decreased availability of oxygen in coastal salt ponds used by juvenile horseshoe crabs as nursery areas. Therefore, *MarineFisheries* plays an active role in reviewing activities and alteration projects in coastal waters and advises local, state, and federal regulatory agencies on measures to protect horseshoe crabs.

To ensure the sustainability of the horseshoe crab fishery, *MarineFisheries* works with ASMFC to establish fishery regulations that include annual quota, minimum size, permit restrictions, closed areas, lunar closures, possession limits, reporting requirements, and a prohibition on importing Asian horseshoe crabs. The biomedical industry has additional restrictions. They have to ensure that the crabs are kept moist, transported and stored in a temperature controlled environment, marked to avoid re-bleeding, and are returned in good condition to the area of harvest.

Additionally, *MarineFisheries* monitors the horseshoe crab population through commercial landings, market sampling, spawning

Horshoe crabs spawning on the beach.

beach surveys, and our annual spring and fall trawl surveys. Landings have been relatively stable over the last few years. Between 101,000 and 108,000 crabs have been landed four of the last five years; about 80% of the catch comes from Nantucket Sound. Our market sampling of bait and biomedical crabs has shown that the size of the crabs being landed has not changed over the last decade.

Our spawning beach surveys are a joint effort between *MarineFisheries* and hundreds of very dedicated volunteers. Spawning crabs are counted at 15 different beaches. These surveys allow us to make comparisons between years to determine if the number of mature crabs is increasing or decreasing. Currently, the majority of beaches are not showing a trend in either direction.

Horseshoe crab abundance is also tracked by the *MarineFisheries* spring and fall trawl survey. In 2016 the abundance index exceeded survey median levels for both sexes, in both the spring and fall. The 2016 survey caught more crabs north of Cape Cod during the spring survey, and more crabs south of Cape Cod in the fall survey than any other point in survey history. The trawl survey, which started in 1978, broke a survey record for the most crabs caught in a single tow (77 crabs) during the fall 2016 survey. The third highest tow (34 crabs) also occurred in 2016. Crabs were also found in a higher percentage of tows than normal in 2016. The increase in the number of crabs seen in the trawl survey is largely being driven by an increase in the number of sub-adult crabs.

The reason for the increase in the number of crabs being observed in the trawl survey is unknown, and it has yet to translate to adult crabs being observed in the spawning beach survey. The increase in sub-adults could be due to favorable environmental conditions or management changes enacted in 2010. Whatever the reason, there is reason to be optimistic about the status of the Massachusetts horseshoe crab population.

By Derek Perry, Invertabrate Fisheries Biologist

Juvenile horseshoe crabs.

Recent Publications

Tracy Pugh was co-author on a study describing the effects of temperature on size at maturity for the American lobster. This study used sea sampling data from southern New England to the Bay of Fundy to estimate female lobster size at maturity at three spatial scales: i) regional, ii) stock, and iii) statistical area. Results confirmed that female lobsters living in warmer waters mature at smaller sizes, and showed that the size at maturity has declined over the last 20 years. These declines in size at maturity were related to changes in water temperature, and fishing pressure likely also contributed. This study suggests that management plans should consider temperature-induced trends in size at maturity to ensure resiliency of the valuable American lobster fisheries in a changing climate. More on this study can be found on our Publications webpage as Contribution 81. LeBris, A., A.J. Pershing, J. Gaudette, T.L. Pugh, and K.M. Reardon. 2017. **Multi-scale quantification of the effects of temperature on size at maturity in the American lobster (Homarus americanus)**. *Fisheries Research*, 186: 397-406.

Greg DeCelles, with researchers from SMAST, developed a new video trawl survey system that used a live-feed video camera mounted in the cod end of a demersal trawl to record, identify, and quantify fish as they pass through the net. Eight field trials were conducted on Georges Bank and in the Gulf of Maine, and 229 hours of video were recorded. Initial data analysis showed that the in-trawl camera system can be used to count and identify roundfishes, such as Atlantic cod and haddock with a high degree of accuracy. However, identifying flatfishes to the species level in the video was challenging. The full study can be found on our Publications webpage as Contribution 82. DeCelles, G. R., E. F. Keiley, T. M. Lowery, N. M. Calabrese, and K. D. E. Stokesbury. 2017. **Development of a Video Trawl Survey System for New England Groundfish**. *Transactions of the American Fisheries Society*, 146:3, 462-477.

Tracy Pugh collaborated with University of New Hampshire researchers to investigate if female lobsters are mating before they reach sexual maturity. To test this hypothesis, the team determined the mating status and physiological maturity of 208 females captured off the coast of New Hampshire. They found that 27.8% of the females with immature ovaries had sperm in their seminal receptacles. Thus, indicating that some females mate while still immature. In the laboratory, the researchers used time-lapse video to record the behavior of immature females that were about to molt. In this study, 11 of 14 immature females exhibited normal mating behavior and successfully mated. It therefore appears that some female lobsters become sexually active before they are physiologically capable of reproducing. To learn more about this study visit our Publications webpage under Contributions 85. Watson, W.H. III, J.S. Goldstein, E.M. Morrissey, H.A. Cole, and T.L. Pugh. 2017. **Evidence of mating**

by sexually immature female American lobsters Homarus americanus (H. Milne Edwards, 1837) (Decapoda: Nephropidae). *Journal of Crustacean Biology*, 37: 2 – 6. DOI:10.1093/jcbiol/ruw010.

Dr. John Logan, **Steve Voss** and **Dr. Kathryn Ford** recently published a study evaluating dock height effects on underlying marsh vegetation and light availability. In Massachusetts, there is a 1:1 height-to-width ratio (H:W) dock design guideline to reduce such impacts, but this guideline's efficacy is largely untested. In this study, they deployed experimental docks set at three different heights (low, intermediate, and high) in the high and low marsh zones in an estuary. Under the current guideline of 1:1 H:W, docks will still cause significant adverse impacts to vegetation. Modifying permit conditions and guidelines based on dock height can reduce dock impacts. This study can be found on our Publications webpage as Contribution 86. Logan, J. M., S. Voss, A. Davis, and K. Ford. 2017. A**n Experimental Evaluation of Dock Shading Impacts on Salt Marsh Vegetation in a New England Estuary.** *Estuaries and Coasts*. DOI: 10.1007/s12237-017-0268-4.

Brad Schondelmeier was on a team of researchers investigating the genetic composition of river herring bycatch. This study used genetic stock identification techniques and fishery observer data to estimate genetic stock-specific bycatch in the southern New England region. Results from this study suggest mitigating bycatch in southern New England may benefit recovery efforts for alewife and blueback herring stocks that have experienced the greatest declines in spawning adult abundances. Check out our Publications webpage under Contribution 87 to read this paper in its entirety. Hasselman, D. J., E. C. Anderson, E. E. Argo, N. D. Bethoney, S. R. Gephard, D. M. Post, B. P. Schondelmeier, T. F. Schultz, T. V. Willis, and E. P. Palkovacs. 2015. **Genetic stock composition of marine bycatch reveals disproportional impacts on depleted river herring genetic stocks.** *Canadian Journal of Fisheries and Aquatic Sciences*, 73(6): DOI: 10.1139/cjfas-2015-0402.

Brad Schondelmeier and **Bill Hoffman** teamed up with researchers from SMAST to describe their voluntary bycatch avoidance program and evaluate its impact by comparing fleet behavior and bycatch prior to and during the program. The impact and spatial distribution of bycatch is frequently unknown making it difficult to develop effective, justifiable mitigation regulations. As an alternative to immediate management action, a voluntary bycatch avoidance program was established through an industry, state government, and university partnership. The combined results suggest that consistent communication, facilitated by the avoidance program, played a role in the approximately 60% decrease in total bycatch and 20% decrease in the bycatch ratio observed during the program. Overall, this project exemplifies how collaborative programs can help reduce difficult management scenarios. The full study can be found on our Publications webpage as Contribution 88. The citation for this paper is: Bethoney, N. D., B. P. Schondelmeier, J. Kneebone, and W. S. Hoffman. 2017. Bridges to best management: **Effects of a voluntary bycatch avoidance program in a mid-water trawl fishery**. *Marine Policy*, 83: 172-178.

Greg DeCelles and **David Martins**, with researchers from SMAST, recently published a study using fishermen's knowledge to map Atlantic cod spawning grounds on George's Bank. This study used data from historical reports, trawl surveys, fisheries observers, ichthyoplankton surveys, and Fishermen's Ecological Knowledge (FEK) to describe the spatial and temporal distribution of cod spawning activity. The seasons and locations identified by fishermen generally matched the information from traditional scientific data, but it was evident that scientific surveys lack the spatial and temporal resolution needed to fully characterize the distribution of cod spawning activity. Results from this study will help inform management measures designed to promote the rebuilding of Georges Bank cod, and provide a basis for further investigation of cod spawning dynamics and stock structure. The citation is: DeCelles, G.R., Martins, D., Zemeckis, D., and Cadrin, S.X. **Using fishermen's ecological knowledge to map Atlantic cod spawning grounds on Georges Bank**. *ICES Journal of Marine Science*. doi.org/10.1093/icesjms/fsx031.

Comings and Goings

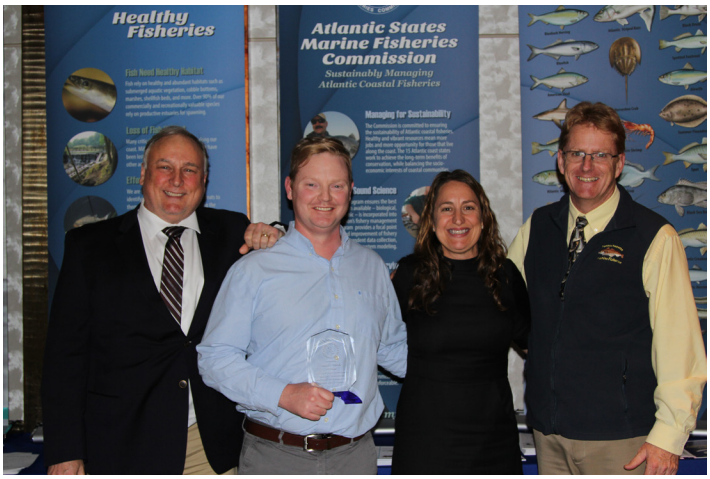
MarineFisheries Information and Education Coordinator, **Elaine Brewer** left the agency in February to pursue a career with the Massachusetts Division of Fisheries and Wildlife. In 2011, Elaine was brought on to increase the visibility of *MarineFisheries* to the general public through online media, visual displays, and outreach events. Over the past five years, Elaine has built the Division's Education and Outreach Program from the ground up. Elaine has been the *MarineFisheries* representative to local and national educational groups including Massachusetts Marine Educators, National Marine Educators Association, and the New England Ocean Science Education Collaborative. She now works as an Outreach Specialist for the Natural Heritage and Endangered Species Program. We wish Elaine the best!

The Division said goodbye to **Kelly Kleister** this May, who embarked on a new adventure with her husband to Kodiak, Alaska. Kelly joined the Division in April 2011 as a seasonal employee in the Diadromous Fishieries Project. She joined the Shellfish Program several months later in July. Her responsibilities included water quality work, report writing and all field work in the South Shore and the outer Cape Cod region. Her knowledge of computer programs was very helpful to the other biologists and assisted the program in accomplishing many duties and activities. For a period of time, Kelly worked on aquaculture issues including the tedious permitting process. Her time in the Shellfish Program was highly regarded and she will be missed.

Tiffany Vidal joined *MarineFisheries* in March as a Stock Assessment Specialist working with recreational fisheries (e.g., black sea bass, fluke, scup, and tautog). Her responsibilities include contributing to the stock assessment process, evaluating harvest regulations through collaborative work with multistate technical committees, and conducting research related to recreationally important fish species. Tiffany recently earned a PhD from the University of Georgia studying the potential effects of climate change on fish populations in the Great Lakes region. She also holds a Master's degree from SMAST, where she studied the reproductive biology of tilefish in the Mid-Atlantic Bight. Originally from Massachusetts, Tiffany has been involved with local marine fisheries projects for over a decade, working with various groups within NOAA.

Accolades

This past May, the Atlantic States Marine Fisheries Commission presented its Annual Awards of Excellence for outstanding contributions to fisheries management, science, and law enforcement along the Atlantic coast. Among the recipients was the Division's Assessment and Survey Program Manager, **Robert Glenn**, whose award was in the category of scientific and technical contributions. For more than two decades, Glenn has served on the Commission's American Lobster Technical Committee and Stock Assessment Subcommittee and contributed to four lobster benchmark stock assessments. Bob's analysis of spatial shifts in fishing effort in the fishery south of Cape Cod was among the earliest indicators of movement by female lobsters into cooler, deeper water. He found that movement of egg bearing female lobsters into more offshore waters could be expected to cause drastic changes in lobster larval recruitment patterns and decline of the Buzzards Bay fishery. His efforts and leadership have provided us with a solid scientific foundation to manage American lobster, at the Division and ASMFC, for years to come.



(From left) ***MarineFisheries*** **Assistant Director Michael Armstrong, Robert Glenn, Toni Kerns (ASMFC), and Deputy Director Dan McKiernan at award presentation. Photo courtesy of ASMFC.**

Ross Kessler, Public Access Coordinator, received the Mass Sportsmen's Council special recognition award for his contributions to recreational saltwater fishing access. Since 2012, Ross has managed all saltwater fishing public access projects for the Divsion. Roughly one million men, women, and children are estimated to participate in saltwater fishing in Massachusetts each year. With increased privatization and development of our shoreline, providing public access to marine waters is essential to maintaining and growing this vibrant saltwater fishing community. Ross accomplishes this through acquiring property and easements and building infrastructure including fishing piers and reefs, in partnership with other state and federal agencies. Congrats Ross!

Marine Fisheries Updates

Public hearings, regulations, and legislation

During the period of January 1, 2017 through June 30, 2017 the following regulatory changes were enacted by the *MarineFisheries* after public hearings and Marine Fishery Advisory Commission approval or by the Director under his declaratory and emergency authorities.

Cancer Crab Bycatch Limits for Net Fishermen

The cancer crab (Jonah and rock crabs) bycatch limit for net fishermen has been increased to 1,000 crabs per trip, consistent with the interstate management plan for Jonah crabs. As this is a bycatch allowance, the weight of the cancer crabs may not exceed 50% of the total catch by weight of all fish retained during the trip. Commercial fishermen must hold a commercial lobster permit in order to possess and land cancer crabs in Massachusetts.

Commercial Dogfish Trip Limits

MarineFisheries set the spiny dogfish possession and landing limit at 6,000 pounds for the period of May 1, 2017 – April 30, 2018. This is consistent with the federal rule for this period. The trip limit applies per day or per trip, whichever period is longer.

Commercial Black Sea Bass Limits

The summertime commercial black sea bass fishery will now open on July 9 for net fishermen, pot fishermen, and hook and line fishermen. The fishery previously opened on the first Tuesday in August. Open fishing days and trip limits remain status quo for these gears. The weir fishery set aside was increased from 10,000 to 15,000 pounds annually.

Commercial Scup Limits

MarineFisheries set the commercial scup trip limit for the Winter I fishery (January 1 – April 30) at 50,000 pounds. This is consistent with the federal rule for this period. DMF also made several liberalizations to the state's commercial scup regulations for the Summer Period (May 1 – October 31). Draggers are now allowed to retain and land scup seven days per week and may land up to 10,000 pounds per week. Hook and line and pot fishermen are also allowed to retain and land scup seven days per week beginning on July 1. Lastly, the weir fishery set aside has been increased from 275,000 to 300,000 pounds annually.

Commercial Striped Bass Limits

MarineFisheries has further clarified to whom the 15-fish and 2-fish commercial trip limits apply. Commercial striped bass fishermen are only authorized to take the 15-fish daily trip limit when fishing under the authority of a boat-based permit or commercial lobster permit and onboard the vessel named on the permit. All other commercial striped bass fishing activity will be subject to the 2-fish daily trip limit. This includes all shore-based commercial fishing, including shore-based commercial fishing conducted under the authority of a boat-based or commercial lobster permit. These limits apply to the permit, vessel and individual per calendar day regardless of how many permits are held.

Commercial Tautog Season

The spring commercial tautog fishery has been eliminated. The commercial fishery will open on September 1 with the entire annual quota allocated to this fall period. Tautog may not be retained or possessed in excess of the 3-fish recreational bag limit or sold until the start of the commercial fishery. No changes were made to the 16" minimum size limit or 40-fish commercial limit.

Commercial Witch Flounder Trip Limits

The commercial witch flounder (grey sole) state-waters trip limit has been reduced to 750 pounds from 1,000 pounds. This trip limit applies to all vessels fishing under the authority of a state-waters Groundfish Endorsement or any federal groundfish permit holder

fishing in state-waters. Federally permitted vessels may land larger amounts in Massachusetts ports provided they were lawfully taken from federal waters.

Menhaden Trip Limit Thresholds
Limited entry commercial menhaden permit holders will be able to land up to 125,000 pounds of menhaden until 85% of the quota is taken. Once this threshold is reached, the trip limit will be reduced to 25,000 pounds. This trigger to reduce the trip limits previously occurred when 75% of the quota was taken.

Mixing of Commercial & Recreational Fishing Trips
Fishing recreationally and commercially on the same trip is now prohibited. If a vessel or an individual is commercially fishing, then all catch on that vessel must conform to the state's commercial fishing regulations. Commercial fishermen are not allowed to retain recreational catch while commercially fishing. However, commercial fishermen are allowed to retain any portion of their commercial catch for personal use. Fish set aside for personal use and not sold must be reported on trip-level catch reports filed monthly. There is one exemption to this prohibition, which allows for the possession and sale of giant Atlantic bluefin tuna taken by rod and reel during a trip when other species were caught for recreational purposes. The Atlantic bluefin tuna fishery is regulated by the National Marine Fisheries Service and *MarineFisheries* is accommodating the occasional sale of giant tuna without encouraging the discarding of recreational catch.

Night Fishing in Conch and Fish Pot Fisheries
The setting or hauling of conch pots and fish pots is prohibited. This restriction is similar to that already in effect for the lobster trap fishery. Gear may only be hauled, tended or set from 1/2-hour before sunrise to 1/2 hour after sunset.

Non-Trap Structures to Catch Lobsters
The setting of materials on the ocean floor for purposes of attracting and retaining lobsters by SCUBA divers is prohibited. The on-the-water possession and/or setting of these non-trap structures is also prohibited. Examples of such structures include porcelain tanks and fabricated cement shelters.

Offshore Lobster Permitting
The transfer of Offshore Lobster Permits for trap fishing is now allowed. Transfers are limited to permit holders in good standing with marine fishery laws and regulations and who are transferring their permit in conjunction with a federal lobster trap permit and allocation. *MarineFisheries* will also issue new Offshore Lobster Permits for landing lobsters taken by trap from federal waters in Lobster Management Areas (LMA) 2 and 3. To be issued a new permit, the applicant must hold an existing federal lobster trap permit with allocation for LMA2 or LMA3, thereby ensuring that the issuance of the permit does not increase trap fishing effort in these waters.

Opening River Herring Spawning Runs
New regulations were enacted that create standards for opening spawning runs to the harvest of river herring. For a spawning run to be opened, the run must have a Sustainable Management Plan that *MarineFisheries* has submitted to the Atlantic States Marine Fisheries Commission. Such a plan requires a minimum of 10-years of demographic data and biological targets such as spawning stock biomass, fish passage counts, mortality rates, repeat spawning rations and juvenile abundances. Once opened, the managing municipality will be required to issue annual harvest permits to named individuals and daily harvest receipts demonstrating the river herring harvest for that calendar day. Other rules apply to the possession of river herring taken by harvesters from spawning runs for personal use. No runs are scheduled to be open in 2017, but *MarineFisheries* will announce any future spawning run openings.

Radar Reflectors on Gillnet Highflyers
In state-waters, gillnet fishermen are no longer required to affix radar reflectors to the highflyers marking the ends of the gillnet. Gillnet fishermen are reminded that the east end of the gillnet is to be marked with a highflyer and the west end is to be marked with a highflyer and a flag.

Recreational Black Sea Bass Limits
MarineFisheries adjusted the recreational fishing season for black sea bass so as to open on a Saturday. The fishery opened on S May 20 and will close on August 29. The 5-fish per angler bag limit and 15" minimum size remain in place.

Recreational Summer Flounder Limits
The recreational per angler bag limit was decreased from 5 fish to 4 fish and the minimum size was increased from 16" to 17". These changes were made to comply with the ASMFC management plan. The open fishing season remains May 22–September 23.

Seasonal Trap Gear Closure in Cape Cod Bay
Historic numbers of right whales remained feeding in Cape Cod Bay throughout the month of April and into early May. To ensure that these right whales did not become entangled in trap gear, *MarineFisheries* extended the season trap gear closure (February 1–April 30) through May 7. The extended closure was later shortened to end after May 4 because aerial surveys of Cape Cod Bay demonstrated that most of the right whales had departed.

Trawl Fishery Measures
Two minor changes were made to trawl fishery rules to complement existing federal regulations. First, the push-pull pressure for measuring large meshes has been increased from 5 kg to 8 kg. Second, a 1 7/8" minimum net mesh opening has been established for the state-waters squid trawl fishery. The use of net strengtheners is still allowed in the small mesh trawl squid fishery.

Whelk Minimum Size Management
Beginning this year, all commercial fishermen fishing for—or in the possession of—knobbed or channeled whelks ("whelks") are required to possess a chute gauge measuring at least 2 7/8" internal width by 6" length by 1 1/2" wall height. To determine if whelks are of a legal size, they must be measured using the chute gauge with the operculum facing down and as flat as possible on the gauge and the siphonal canal in any orientation to the side walls of the gauge. A whelk is considered sub-legal sized if it fits through the chute gauge using this method of measurement. *MarineFisheries* is currently conducting additional sampling to determine a biennial gauge increase that will result in bringing the legal harvest size to 50% size at maturity (3 7/8" shell width) by 2029. Future public hearings will be held in late-2017 or 2018 to enact this gauge increase schedule. Dealers and processors are exempt from the legal harvest size standard for whelks caught and imported into the state from out-of-state dealers provided all containers have shellfish tags naming the state of origin. There is no legal harvest size standard for the recreational fishery.

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

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www.mass.gov/marinefisheries

DMF News

Editors: Dan McKiernan
Samantha Andrews
Nichola Meserve

Charles D. Baker, *Governor*
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