2018 • 3rd and 4th Quarters • Volume 42

DMF News

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

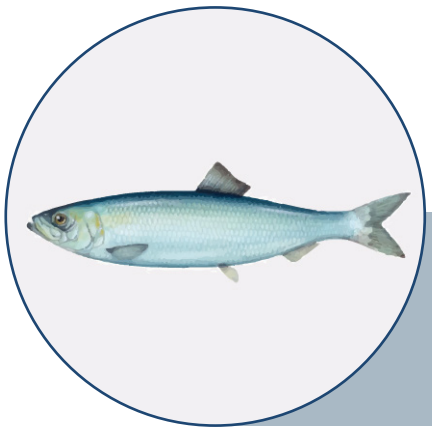
Inside

Sea herring catch sampled at one of DMF's River Herring Bycatch Avoidance Program portside sampling stations.

Sea Herring "Buffer Zone" Bans Mid-Water Trawl Gear Nearshore

Atlantic sea herring have long been recognized as an important prey item for several of the region's key commercial and recreational predators and protected species, including tuna, striped bass, cod, whales, and seals. Recent efforts from the New England Fishery Management Council (NEFMC) resulted in recommendations to directly account for herring's role as a food source in the ecosystem by reducing commercial fishing rates and establishing mid-water trawl gear bans in nearshore areas. The management action known as Amendment 8 to the Atlantic Herring Fishery Management Plan was accepted by the NEFMC in September and, if approved by the National Marine Fisheries Service (NMFS), will be implemented in mid-2019.

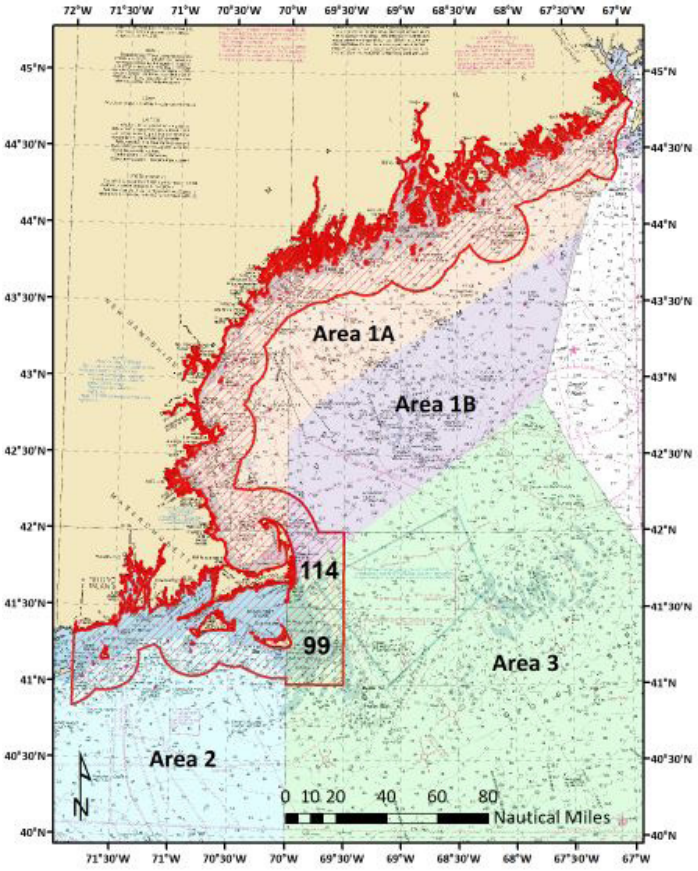
The gear ban area established through Amendment 8, frequently referred to as "buffer zone," includes a year-round, 12 nautical mile mid-water trawl restricted area extending from the Canadian border to Montauk, with an additional restricted area, up to 20 nautical miles,



Did you know?

Similar to other zooplankton, Atlantic herring larvae exhibit daily vertical movements in the water column. These vertical migrations are thought to be a mechanism by which larvae hold their relative position in response to strong tidal currents. Image and fact courtesy of the Atlantic States Marine Fisheries Commission.

within two 30-minute squares, known as Blocks 99 and 114, off the backside of Cape Cod. The buffer is intended to minimize the effects of user conflicts and localized depletion, which the NEFMC defined as, "when harvesting takes more fish than can be replaced either locally or through fish migrating into the catch area within a given time period." Amendment 8 was initiated in 2015 due to concerns with concentrated commercial fishing of herring in specific areas and at certain times, namely off Cape Cod, that may cause impacts on other user groups (other commercial fisheries, recreational fisheries, and ecotourism) that depend on local availability of herring to support business interests.



Herring Management Areas 1A, 1B, 2, and 3 with the 12-nautical mile buffer zone adopted by the NEFMC (outlined in red). The buffer zone runs from the Canadian border to Montauk and includes blocks 99 and 114 eastward of Cape Cod. Image courtesy of NEFMC.

Sea herring are small pelagic fish that migrate in large schools between feeding and spawning areas in the Gulf of Maine, Mid-Atlantic Bight, and Georges Bank. Herring have been harvested from New England waters for centuries, but commercial fishery landings reached a peak in the late 1960s prior to the exclusion of foreign boats, resulting in a collapse of the Georges Bank herring stock. In the absence of intense fishing pressure from European fleets, the stock was rebuilt and US managers encouraged expansion of the herring fishery. While the majority of US herring landings were from purse seine vessels in the 1970s–1980s, the use of mid-water trawl gear grew in prevalence through the 1990s, raising concern about the potential impacts of large scale removals of herring. Localized depletion of herring in the Gulf of Maine became a concern about 15 years ago, and in 2007 a mid-water trawl restricted season from June–September was adopted for Herring Management Area 1A.

The recent call for action to address localized depletion initially focused on concentrated mid-water trawl effort off the backside of Cape Cod in Herring Management Areas 1B and 3. The area of concern includes Georges Bank, the Great South Channel, and Nantucket Shoals. Due to shifts in availability of herring in certain areas and increased bycatch of the massive Georges Bank haddock stock, the mid-water trawl fleet has frequented fishing grounds close to Cape Cod in recent years. Conflicts between the mid-water trawl fleet and other users in this region came to a head during the development of Amendment 8.

Proposals for gear bans, area restrictions, and seasonal fishery closures were debated over the course of two years, along with the potential socioeconomic impacts to the herring fleet and benefits to other users, including the commercial groundfish fishery, recreational striped bass and tuna fisheries, and whale watch industry. Throughout the public process, which included scoping meetings, public hearings, and several NEFMC meetings of the Herring Industry Advisory Panel and Oversight Committee, additional concerns about river herring bycatch, ecosystem and habitat degradation, and the herring resource itself were raised, resulting in proposals to ban the gear in nearshore areas along the entire coast.

In the spring of 2018, while the buffer zone debate continued, a new benchmark stock assessment for herring was conducted by the Northeast Fisheries Science Center. The assessment results showed a drastic change in stock size and productivity. Previous estimates of stock size suggested that annual fishery catch could be over 200 million pounds. The updated assessment, which showed that recruitment in the last four years was the lowest on record, suggested significantly reduced catch limits of 3 to 5 million pounds. This major change fueled the buffer zone debate and further polarized perspectives from the mid-water trawl fishing fleet and other user groups.

The NEFMC made their final recommendation in a packed hotel ball room in Plymouth after several hours of heated debate and public comment. Passions ran high on both sides of the argument, with mid-water trawl herring fishermen describing the economic impacts that the gear ban would have, and other nearshore users and conservation groups maintaining that the ban was necessary to restore the herring resource to support other nearshore activities. A surge of media coverage and political input on the topic in the weeks preceding the NEFMC meeting added to the pressure for managers to take action on the controversial issue.

In the end, the NEFMC weighed the rationale for a coastwide buffer with the economic impacts to the herring fleet and chose a combination of the proposals. The year-round, 12 nautical mile area was selected from a range of alternatives that included a suite of seasonal and spatial options between six and 50 nautical miles in federal waters, and the extended buffer off the backside of Cape Cod was selected from a range of alternatives that extended between the Gulf of Maine and Rhode Island. The compromise motion passed the NEFMC nearly unanimously, including DMF support.

Amendment 8 will be submitted to NMFS for review in early 2019, and could be implemented by mid-year. The immediate effects of the buffer zones are likely to cause economic hardship to the mid-water trawl fleet, but longer term effects may be beneficial for the region as a whole. Lower catch limits for the next several years, combined with nearshore herring buffer zones may support increased herring recruitment and increase stock size. Despite the controversial nature of localized depletion and user conflicts, the herring population may be afforded an opportunity to rebound in nearshore areas.

By Cate O'Keefe, PhD, Marine Science and Policy Analyst

Proposals to Reduce Striped Bass Release Mortality

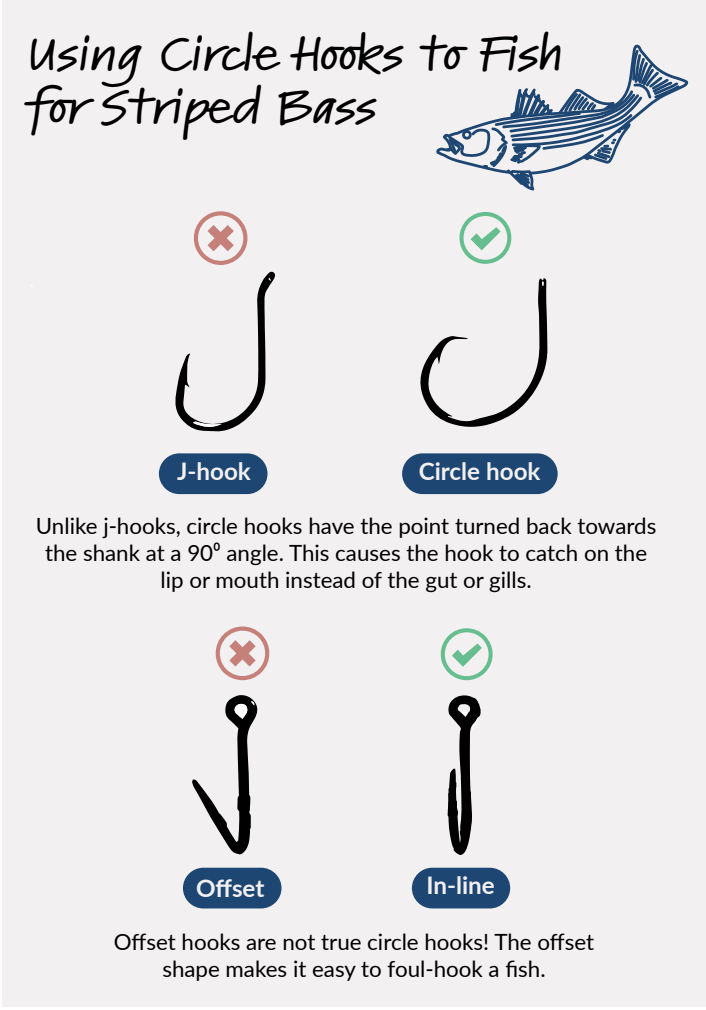
This winter DMF will be proposing to implement two new conservation measures for the striped bass fisheries aimed at minimizing the number of fish that are killed through hooking and releasing. The proposed measures would prohibit the use of gaffs and mandate the use of in-line circle hooks when using live or cut natural baits.

The Massachusetts recreational striped bass fishery is primarily catch and release. Our anglers release about 93% of all the striped bass they catch. Discards in the commercial striped bass fishery, though difficult to quantify, are also believed to make up a significant share of the catch, especially given the larger minimum size for that fishery. Studies have shown that about 9% of released striped bass will die from the effects of hooking and handling (called release mortality). Given that recent stock assessments have shown that fishing mortality is increasing, we think it is time to institute some broad-based and effective measures to lower the mortality rate and ensure the future health of the striped bass stock.

We have heard from many anglers that feel a no-gaffing rule in the striped bass fishery is a no-brainer. Using a gaff to assist in bringing your catch aboard causes significant injury to the fish and there is often no way to tell the precise length of this fish until it is removed from the water. Given that our fisheries release large numbers of striped bass that are just below the legal size limit, we feel it is irresponsible to continue to allow the practice. Numerous other Atlantic coast states have already implemented such a provision in their striped bass fisheries, including Maine, New Hampshire, Connecticut, Maryland, and Virginia.

The mandatory use of in-line circle hooks is the single most effective way to decrease mortality in striped bass. There are many studies that demonstrate the efficacy of circle hooks in lowering release mortality in striped bass and other species. Deep hooking (i.e., when the hook catches in the esophagus or gills rather than the lip) is the major contributor to release mortality. It has been demonstrated that the use of circle hooks, as compared to j hooks, greatly reduces the incidence of deep hooking and therefore mortality. The latest catch estimate from the revised Marine Recreational Information Program (see page 7) indicates that **Massachusetts recreational anglers released almost 13 million striped bass in 2017. If we apply the release mortality rate of 9%, that means over 1 million striped bass died after being released.** That's compared to only 300,000 that were taken home and eaten! Clearly the mortality resulting from fishing in Massachusetts can have an effect on the striped bass population. That's why DMF is proposing the mandatory use of circle hooks for anglers using certain natural baits. A study in Maryland found a 90% reduction in mortality when using in-line circle hooks. Imagine if we could reduce the number of release deaths from over a million fish to 100,000!

A striped bass caught using a circle hook.



DMF will be bringing the proposal to implement these two conservation regulations to public hearing this winter. We seek the public's input on certain aspects of how the regulations will apply. For instance, should the gaffing and circle hook rules apply to the recreational, for-hire, and commercial sectors universally or should some groups be exempt; should artificial lures with bait (e.g., tube and worm) be included? We hope to see you at the public hearings and let us know your opinion.

By Michael Armstrong, PhD, Assistant Director

Want more info?

To learn more about circle hooks and upcoming public meetings visit: www.mass.gov/marinefisheries.

New Laws Enacted to Update Fines and Penalties

For too long, low fines were considered the "cost of doing business" for poachers of marine fish and shellfish resources. In response to longstanding and urgent demands from fishermen and Environmental Police, DMF led an initiative to overhaul state laws to increase the fines and penalties associated with violations of marine fisheries rules. This past summer, the Legislature included in the Environmental Bond Bill a substantial re-write of state laws to address the problem of outdated and insignificant fines. Governor Baker signed the legislation in August and the new laws took effect on November 7, 2018.

Under Massachusetts law, fines and penalties are set in law and require legislative and gubernatorial approval for any changes. Almost two years ago, DMF convened a committee, which included members of its Marine Fisheries Advisory Commission and leadership of the MA Environmental Police, to identify the problems with outdated statutes levying fines and make recommendations to the Legislature. It's a complicated task to amend 42 sections of state law, but DMF received strong legal support from staff at the Department of Fish and Game, Executive Office of Energy and Environmental Affairs, and the Governor's office. Once the proposals for change were drafted, DMF received stakeholder input and support from commercial fishermen's organizations, municipal shellfish officials, and recreational fishing groups.

When citing a person for a marine fisheries violation, an Environmental Police Officer (EPO) can use discretion to charge the individual with non-criminal (civil) or criminal charges. EPOs rely heavily on non-criminal penalties as an enforcement tool for minor violations because courts are often not supportive of criminal prosecution/conviction of fishermen for low level violations. However, the consensus among the Environmental Police was that the low level of fines set by law was not a sufficient deterrent to discourage law-breakers. The experience and guidance of the EPOs was invaluable to achieve the right balance in establishing new fines. For example, the EPOs advised us not to set the fines so high that some courts might waive the fines upon appeal.

As a result of the new laws, the new fine schedule for non-criminal tickets has been doubled. Previously, the fines were scaled at $50, $100 and $200 depending on the violation; these fines are now $100, $200 and $400. On top of the base fine, officers may now also issue a $10 fine per non-compliant fish. The additional $10 fine applies to all regulated marine fish species except for bivalve shellfish (clams). This per-fish fine will be especially effective for some of the high profile cases where large numbers of illegally harvested black sea bass, tautog, and whelk have been discovered. These additional fines will add up quickly and serve as a deterrent for poaching.

On the criminal side, many of the old laws established specific fines for each section of law and were so outdated to be considered quaint—or laughable depending on your perspective. The penalties reflect attitudes, conservation priorities and currency values of the time period when they were enacted. For example the criminal fine for poaching river herring (last amended about a century ago) was just $5 to $50! Many sections of law written over the last century had different criminal fines, and this needed to be streamlined and stiffened. Now, nearly all criminal violations will result in a consistent $400 to $10,000 fine and up to 2 ½ years in jail.

Longstanding criminal fines specific to lobster and shellfish were unchanged because they are recently enacted and sufficiently strong to deter poaching. For example, lobster violations carry stiff fines per lobster: egg-bearing female lobsters at $150–$500 each; short lobsters at $100–$500 each; and removing eggs from a lobster at $250–$500 each. These per-lobster fines help make the lobster industry highly compliant.

Another creation of the new law is the authority for the Commonwealth to assess a civil penalty of up to $10,000 for marine fisheries violations. This new enforcement tool will be reserved for the most egregious violations that the Attorney General may decide does not warrant criminal prosecution but does require a more substantial economic penalty than that provided by a non-criminal citation. Such cases would be prosecuted by the Attorney General's office on behalf of DMF or the Environmental Police.

Finally, like a good, old-fashioned attic cleanup, some sections of Chapter 130 that were no longer needed have been eliminated. These include a requirement to label all containers of sea scallop meats as "sea scallops" (Section 92); a prohibition on transporting fish out of state (Section 99); and a requirement to kill all starfish, "cockles," and "winkles" by placing them above the high water mark (Section 103). This last law was particularly awkward in modern times given the commercial whelk fishery is now worth millions annually.

A multitude of thanks go all around for the completion of this important update: to all who contributed on the committee including the leadership of the Environmental Police, to the Marine Fisheries Advisory Commission for their support, to the legal staff for their detailed review and edits, to the Legislature and Governor.

By Daniel McKiernan, Deputy Director and Jared Silva, Fisheries Analyst

An Unusual Summer

The summer of 2018 was marked by a number of unusual events in our marine environment, some good and some troubling. Though the ocean is a dynamic setting in which change is expected, here are a few of the happenings that caught DMF's eye.

Striped bass & bluefish quotas not reached. For the first time in decades, a substantial portion (~11%) of the striped bass quota was left uncaught. Of the 847,585 lb commercial quota for Massachusetts, landings tallied about 753,000 lb. Anecdotal reports from commercial anglers reveal fewer schools of commercial-sized bass were available within Massachusetts waters this past summer. The Massachusetts commercial fishery is constrained by a higher size limit (34") than that of the recreational fishery (28"), just two open fishing days per week (Monday & Thursday), a commercial season that opens on June 23, and strictly enforced daily limits of 15 fish for boat-based fishing and 2 per angler for shore-based harvest. Environmental police have been diligent about inspecting commercial anglers' catches. The shortfall in bass landings was similar to that seen in the bluefish fishery of which only 40% of the 486,539 lb quota was landed. Commercial quota shortfalls were seen in all states throughout the range suggesting a stock-wide downturn for bluefish.

Juvenile tropical species abundant north of Cape Cod. The late summer and early fall of 2018 brought a healthy number of adult Atlantic bonito to their normal haunts in Nantucket Sound, Vineyard Sound, and Buzzards Bay. Fishing guides and recreational anglers alike enjoyed seeing these tasty speedsters in numbers not

A young-of-the-year bonito caught by an angler at the Piscataqua River. Photo courtesy of Pierce Howell.

witnessed this great in over a decade. Most of these fish were in the 2–8 pound range considered typical in these waters. Perhaps more intriguing was the arrival of hordes of juvenile Atlantic bonito that showed up in Cape Cod Bay and Massachusetts Bay in mid-August. Even though Atlantic bonito have been recorded as far north as Nova Scotia, anglers rarely encounter these young fish north of Cape Cod. From late August until the end of September DMF received numerous reports of small bonito being caught by anglers targeting Atlantic mackerel at the East end of the Cape Cod Canal, outside Boston Harbor, and around Gloucester. And not just a few fish; we received calls from people reporting catching them by the bucket full! We even received a report from the Piscataqua River (between Maine and New Hampshire) of one of these young-of-the-year bonito! The unexpected presence of these young fish North of Cape Cod may be a result of warming New England waters.

Abundant menhaden (pogies) attract feeding whales nearshore and succumb to summer temperatures. In late August, there were press reports of a handful of humpback whales inside Boston Harbor feeding on menhaden—a rich forage species and one of their favorite prey. These whales were visible from shore and mariners were warned to be on the lookout in the busy harbor. Menhaden often aggregate in dense schools in harbors and other embayments and many predators (e.g., striped bass, tuna) capitalize on these feeding opportunities. These scenarios are ideal for small boat anglers who then fish close to home. Such predation, as well as the summer's heat, likely contributed to a menhaden die-off that occurred within the Mystic River along Everett and Somerville in mid-July. DMF was called upon to assess the probable cause of the mortality event, estimated to number in the tens of thousands of fish, which created an unsightly and smelly attraction for local residents and businesses along the river's banks. These fish kills can and do happen throughout the menhaden's range along the Atlantic coast when large schools of fish enter tight embayments, often chased there by predators, and deplete the water's dissolved oxygen content and consequently suffocate. Long stretches of cloudy, hot weather can also contribute to lowered oxygen levels. This natural event, while unpleasant, was another indication of high menhaden abundance re-establishing itself north of Cape Cod, and one reason why DMF supports the maintenance of a commercial menhaden fishery in Massachusetts capable of taking the state's share of the coastwide quota. Menhaden fish kills have not been common in Massachusetts since the last population boom in the 1980s; the 2018 event may be a harbinger of things to come.

Atlantic surf clams die-off. DMF also received word of clams having washed up on Revere Beach in mid-July. A search of the area revealed millions of Atlantic surf clams left high and dry on the sand, encompassing an area over 8 acres. Many of the clams were already dead, causing a nuisance smell for beachgoers; however, a good portion were still alive and many were actively reburying. A similar event with comparable numbers of juvenile surf clams was reported at Long Beach in Nahant. Subsequent reports of washed up clams occurred at the end of August and again in mid September. Events like this, while rare, are not unknown. Mass die-offs have occurred at other Massachusetts beaches and in other Atlantic states. Because these clams were found in varying states of distress and decomposition, it is presumed that this was a prolonged event and not necessarily due to one particular cause. High water temperature and associated low levels of dissolved oxygen may have contributed by causing physiological stress to the surf clam, resulting in impacts to metabolism, filtration rates, and immune functions. Pathology studies showed no evidence of common parasites, although analysis of the digestive organs revealed a high number of unidentified algal cells which may have been an additional stressor potentially clogging the clams' gills which are important for both feeding and respiration. While an abundance of a species of Vibrio bacteria was also observed, it cannot be assumed a bacterial infection was the causative agent of the mass die-off, and not a secondary effect due to other environmental stressors like high temperature. More than likely, it was a combination of factors that led to this large scale die-off.

Mysterious whale deaths. Unfortunately, more marine mortality events occurred this summer when a handful of large whales were also found dead in Massachusetts coastal waters. Two dead humpback whales washed ashore in September in the Mass Bay area, although no cause of death could be determined. Earlier in the year, two other dead humpback whales were seen floating offshore. Additionally two fin whales washed ashore dead in Cape Cod Bay, one in August and one in October. No cause of death was determined in those cases either. The humpback whale deaths are part of an ongoing Unusual Mortality Event (UME) for that species that started back in 2016. A UME is a designation under the federal Marine Mammal Protection Act which defines a significant die-off of any marine mammal population and demands an immediate investigation. It is important to determine the causes of UMEs and their effect on the population involved, as well as give insight into environmental causes that might have human health impacts. Many of the humpbacks appear to have been killed by collisions with boats. Thus far a total of 80 humpback deaths have been documented, with 14 of them observed in Massachusetts coastal waters. Boaters are urged to keep a close eye out for feeding whales and follow safe viewing guidelines, which include staying 100 feet away for their safety and yours.

By Erin Burke, Protected Species Specialist, Jeff Kennedy, North Shore Shellfish Project Leader, Ross Kessler, Public Access Coordinator, and Daniel McKiernan, Deputy Director

Atlantic surf clams that washed ashore Revere Beach this summer.

2019 Commercial Quota Outlook

Atlantic herring: To be determined (coastwide catch limit)
The coastwide commercial catch limit will be reduced significantly in 2019 based on assessment results indicating a declining stock due to poor recruitment of herring into the population. These results led the 2018 catch limit to be reduced mid-season from 223 million pounds to 110 million pounds, so that the 2019 catch limit wouldn't be even lower. The National Marine Fisheries Service has proposed a 2019 catch limit of 54 million pounds, more than the 33 million pounds recommended by the New England Fishery Management Council. The Council's recommendation considered the role of herring as forage in the ecosystem (see page 1 for a summary of the Council's recommendations), while the Service proposed the higher level to reduce socio-economic effects of the cutback. The final limit should be known in early 2019. Allocations to Areas 1A, 1B, 2, and 3 are expected to remain status quo at 28.9%, 4.3%, 27.8%, and 39%, respectively. Harvest in 2018 is roughly 95 million pounds through mid-December.

Atlantic menhaden: 6,045,252 pounds (MA quota)
The 2019 coastwide commercial quota of 476.2 million pounds is unchanged from last year. MA's share is 1.27%, after 1% is set aside for "episodic events." Our 2019 state quote is marginally lower than 2018 (about 20,000 pounds), based on less quota being relinquished by states that don't intend to use all or part of their fixed minimum allocation. (Amendment 3, implemented in 2018, provided each state with at least a 0.5% allocation; this increased our share from 0.84%. States may forgo their default share which is then redistributed elsewhere along the coast per the prescribed formula.) The Massachusetts fishery harvested 5.7 million pounds in 2018 (about 95% of the quota), the largest amount since 2009.

Black sea bass: 457,600 pounds (MA quota)
A coastwide commercial quota of 3.52 million pounds is in effect for 2019. An 11% cut was initially called for based on projections made from the last stock assessment; however, the National Marine Fisheries Service took the appropriate step of further analyzing the influence of the above-average 2015 year class on expected abundance, which provided for status quo specifications in 2019. Massachusetts' share is 13%. The Massachusetts fishery landed 105% of its quota in 2018, but this is not expected to affect our 2019 quota because of underages in other states. An assessment update in 2019 will provide the basis for specifying the 2020–2022 quotas.

Bluefish: 517,828 pounds (MA quota)
While the overall catch limit for 2019 is equal to 2018, the coastwide commercial quota of 7.71 million pounds is up 6.5% because of a larger transfer from the recreational to commercial fishery than in 2018. (The recreational fishery is allocated 83% of the total catch limit, but some of this can be redirected to the commercial fishery when the recreational fishery is projected to have an underage). Our state share of the quota (6.7%) is similarly increased, but unlikely to be utilized if current harvest trends continue. Commercial landings in MA were less than 200,000 pounds in 2018, the lowest amount in over four decades. The next bluefish stock assessment is scheduled for 2019.

Horseshoe crab: 165,000 crabs (MA quota)
Massachusetts' 2019 commercial quota for horseshoe crabs harvested for bait purposes is unchanged from 2018. Horseshoe crabs harvested for other purposes (i.e., biomedical use, research, display) are not counted against this quota.

Northern shrimp: 0 pounds (coastwide quota)
The commercial harvest moratorium that has been in place the last six years for northern shrimp will continue into 2019, and for an additional two years. This three-year moratorium was set by the Atlantic States Marine Fisheries Commission in response to low levels of biomass and recruitment and the fact that, should recruitment improve, it would take several years for those shrimp to be commercially harvestable. The stock has limited prospects for the near future due to an increasingly inhospitable environment, i.e., warming ocean temperatures in western Gulf of Maine shrimp habitat. Given the low biomass levels, the research set-aside fishery was also discontinued; fishery-independent surveys will continue to monitor the stock.

Scup: 2,016,280 pounds (MA Summer Period quota)
At 23.98 million pounds, the 2019 coastwide commercial quota is unchanged from 2018. The quota is divided among three seasons. The Winter I Period (January–April) and Winter II Period (October–December) receive 45.11% and 15.94% of the coastwide quota, respectively; this equates to 10.82 million pounds and 3.82 million pounds for 2019. Quota during these periods is open to all states. Of the 38.95% (or 9.34 million pounds for 2019) allocated to the Summer Period fishery (May–September), Massachusetts receives roughly 21.6%. Our Summer Period harvest in 2018 was roughly 0.74 million pounds, a 44% decline from 2017.

Spiny dogfish: 11,903,243 pounds (ME–CT regional quota)
The coastwide commercial quota is decreasing by 46% to 20.52 million pounds for the May 1, 2019 through April 30, 2020 fishing year. The Northern Region of Maine through Connecticut receives 58% of the coastwide quota, of which Massachusetts generally takes the largest portion. Despite the large quota decrease, our fishery may not be impacted based on recent landings trends; this year's Northern Region fishery is nearing its conclusion with less than 9 million pounds landed despite a quota of 22.15 million pounds. The overall quota for FY2019 is in line with the 20 million pound global demand estimated in a recent marketing study commissioned by DMF (see page 8 for more details on the study). Harvesters landing dogfish in the Northern Region will once again be restricted to 6,000 pounds per trip.

Striped bass: 869,813 pounds (MA quota)
Massachusetts' striped bass fishery will see an effective 3% increase for 2019 because there is no prior year quota overage to account for (unlike in 2018). While DMF strives to avoid quota overages that negatively impact the fishery the subsequent year, the 2018 fishery was unusual in that it did not require a closure and remained open until year's end with about 10% of the quota unused, even with an additional day opened to fishing in mid-September. It is more typical for the fishery to close by mid-to-late August. Recently implemented management changes (e.g., 2-fish limit for all shore fishing, holiday closures) undoubtedly played a role. In response, the Marine Fisheries Advisory Commission asked DMF to consider an earlier season start to promote full quota utilization. A stock assessment due in early 2019 will be well-timed to inform whether resource conditions also had an impact on the 2018 fishery.

Summer flounder (fluke): To be determined (MA quota)
The coastwide commercial quota will be determined in early 2019 after a stock assessment update is concluded. Massachusetts' state share of the coastwide quota is 6.82%. The quota in 2018 rebounded slightly after reaching an all-time low in 2017. Our fishery had a slight (3%) overage in 2018 that will need to be accounted for. Reallocation of the state-by-state shares (currently based on 1980–1989 landings) is under consideration by the Mid-Atlantic Fishery Management Council and Atlantic States Marine Fisheries Commission, with a final decision expected in early 2019.

Tautog: 64,753 pounds (MA quota)
Massachusetts' 2019 tautog quota is nearly status quo with 2018. The 2018 fishery ended with landings just under the quota, meaning the 2019 fishery has no overage to account for and the quota can return to its base level. A slight (1%) overage in 2017 had affected the 2018 quota.

By Nichola Meserve, Fisheries Policy Analyst

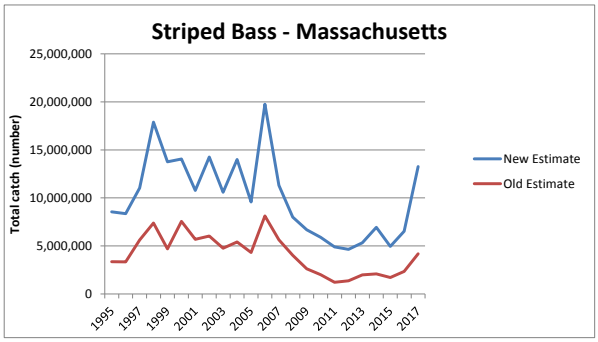
New Approach to Calculating Recreational Catch

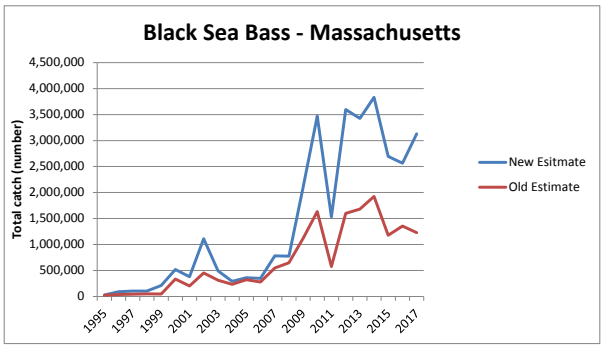
Many anglers are familiar with the federal Marine Recreational Information Program (MRIP) that is implemented by individual states to estimate the number of fish caught by the recreational fishery (see *DMF News* 1st & 2nd Quarters 2018). MRIP has been revised several times in recent years to address recommendations that followed from a National Academy of Science (NAS) review. These recommendations were all intended to increase the statistical rigor and reliability of the catch estimates.

The latest change has been to the manner in which effort (the number of fishing trips taken) is estimated. Effort was formerly estimated through a survey method called random digit dialing in which households were contacted by phone in a random fashion. This method was inefficient for sampling active anglers because it would call non-fishing households. Worse, the survey reached fewer and fewer anglers over the years as more households switched from landlines to cell phones only (which are not accessible through random digit dialing). In response to the critique from the NAS, the effort survey has been changed to a mail survey targeting anglers from state lists of recreational saltwater fishing permit holders. While it may seem like we are going backwards in technology ("snail mail"!), the survey has turned out to be much more effective at reaching active anglers. The new methodology has resulted in much higher estimates of recreational fishing effort compared to the old methodology, sometimes as much as 2–4 times as many fishing trips.

While the exact reason for this significant increase in effort under the new methodology is not completely understood, it is believed that the older methodology of random digit dialing was biased low. This is likely due to its great inefficiency at targeting anglers and the manner in which the survey is taken (written vs. by phone), which often lead to low response rates or incomplete/inaccurate responses. The end result is that the new effort estimates have, in most cases, significantly raised the estimated number of recreationally caught fish. For instance, the estimated numbers of striped bass and black sea bass recently landed in Massachusetts have about tripled and doubled, respectively, under the new approach (see graphs). You can conduct your own queries of the MRIP website to examine results for other species: https://www.st.nmfs.noaa.gov/st1/recreational/queries/.

The new estimates have been adopted for use in future management decisions and will likely have significant effects on stock assessments. Inserting the new (and generally higher) catches into assessment models will likely change the resulting fishing mortality rates and/or stock biomass. The exact effects are difficult to predict and they will most likely be different for every species. In some cases, the proportion of fishing mortality from the recreational sector





Comparison of Massachusetts recreational catch estimates of striped bass and black sea bass using the old and new MRIP approach to survey effort.

on particular stocks may be greater than previously thought. Appropriately addressing unanticipated changes in fishing mortality and in allocations between recreational and commercial sectors present significant challenges to managers going forward.

By Michael Armstrong, PhD, Assistant Director

Recent Publications

Gary Nelson recently authored a historical review of commercial fishery regulations for striped bass. Nelson, G. A. 2018. Historical Review of Commercial Fishery Regulations for Striped Bass (Morone saxatilis Walbaum) in Massachusetts. Northeastern Naturalist, 25(1): 143-160.

John Logan recently authored a study on the above ground production of salt marsh plants in New England estuaries in relation to nitrogen loading and other environmental factors. Logan, J. M. 2018. Salt Marsh Aboveground Production in New England Estuaries in Relation to Nitrogen Loading and Environmental Factors. Wetlands. https://doi.org/10.1007/s13157-018-1056-z.

Greg Skomal worked with a team of researchers to examine trends in the activity and swimming depth of juvenile sand tiger sharks. Kneebone, J., M. Winton, A. Danylchuk, J. Chisholm, G. Skomal. 2018. An assessment of juvenile sand tiger (Carcharias taurus) activity patterns in a seasonal nursery using accelerometer transmitters. Environmental Biology of Fishes. https://doi.org/10.1007/s10641-018-0821-4.

Gary Nelson was on a team that authored a Technical Memorandum chronicling restoration efforts for striped bass. A chronicle of striped bass population restoration and conservation in the Northwest Atlantic, 1979-2016. NOAA Technical Memorandum NMFS-NE-246, 51 p. https://www.nefsc.noaa.gov/publications/tm/tm246/.

Exploring New Markets for Spiny Dogfish

Considerable time and energy have been spent managing and marketing spiny dogfish over the past 25 years. Successful management allowed the coastwide quota to be raised to approximately 40 million pounds for the past several years. Despite the increased quota and current trip limit of 6,000 pounds, recent coastwide landings have only averaged around 20 million pounds and ex-vessel prices have remained largely stagnant. Change is on the horizon for 2019, when the coastwide quota is scheduled to drop to 20.5 million pounds, which happens to be right around the recent annual landings. What does the future of this market look like?

Recognizing that there are market forces in play that we do not have a good handle on, DMF's Seafood Marketing Program commissioned Michael Carroll (Vice-President, The Vertex Companies) and Joshua Wiersma, PhD (Independent Consultant) to do an economic analysis of the spiny dogfish fishery. The informative analysis detailed the complexities of dogfish supply and demand trends, and potential future steps the industry could take to expand markets.

A tow of spiny dogfish from a recent DMF trawl survey.

Currently, the dogfish market consists of two separate products, fresh and frozen, with the US fishery accounting for over 90% of the global supply. The market is driven by exports, primarily to the European Union (EU), representing 90% of the global demand. Increasingly the exports are frozen products rather than fresh. Frozen dogfish is used in products like fish & chips in the EU. Although the frozen market has been growing, it is sensitive to over-supply and other factors that can drive down demand.

The analysis showed that the recent annual landings of approximately 20 million pounds are what the current market can handle. Additionally, a significant increase in landings would overwhelm the existing processing capacity. These constraints on market demand and processing capacity are central to industry members' views on management measures, particularly the amount of the trip limit.

Moving forward, the report suggests the biggest opportunity for market growth is through increased domestic consumption. This could include new markets for frozen product with institutional organizations (e.g., schools & military), value-added products, and potential local fresh fish markets. Any growth in these markets will help support the local seafood industry and put more local fish on our plates. The full report can be found online at www.mass.gov/dmf/seafood.

By Story Reed, Permitting and Fisheries Statistics Program Manager

2018 Dogfish Statistics

Total MA Dogfish Landings
7.7 million pounds

Average Catch per Trip
3,700 pounds

Top MA Ports Landing Dogfish
Chatham - 92%
Gloucester - 3.5%
Scituate - 1.6%

Peak Months for Dogfish Landings
July and August account for 65% of annual dogfish landings in MA

Top Gear Types for Harvest
Gillnet - 55%
Hook-and-line - 44%
Trawl - <1%

Dogfish Permit Endorsements
958

Approx. # of Permits Landing Dogfish
70

Massachusetts Shellfish Initiative

Massachusetts is home to some of the most abundant and accessible near-shore shellfish resources in the country. These resources provide invaluable ecosystem services while supporting thousands of year-round jobs and countless recreational shellfishing opportunities in our coastal communities. Annually, DMF permits over 3,000 commercial shellfish wild harvesters and aquaculturists who make their living to various degrees harvesting and growing shellfish in our coastal waters, adding over $50 million to Massachusetts' Blue economy, and continuing a way of live for many in the Commonwealth.

The coastal waters of Massachusetts where shellfish are harvested and grown are some of the most heavily utilized and economically, socially, and culturally valuable shared spaces in the state, often resulting in complex, interactive, and competing views from user groups. As declines in many traditional fisheries continue, and issues such as ocean acidification, disease, pollution, sea level rise, invasive predators, naturally occurring human pathogens, and harmful algae blooms are expected to increase, the complexity of managing our nearshore shellfish resources has never been greater. DMF and the Commonwealth are strongly committed to preparing for these emerging challenges, but we can't do it alone.

The Massachusetts Shellfish Initiative (MSI) has emerged as a major partner in the effort to ensure the state and our coastal communities are well positioned to address these growing challenges. And in doing so, the initiative is hoping to maximize the economic, environmental, and social benefits of the Commonwealth's shellfish resources. The MSI builds off a national program led by NOAA Fisheries to increase shellfish populations in coastal waters through commercial production and conservation activities. Some states, such as Washington, New York, Connecticut, and Rhode Island, have already begun successfully implementing their statewide plans, and now it is Massachusetts' turn.

Kick-started in 2016 by the Massachusetts Aquaculture Association, Cape Cod Commercial Fishermen's Alliance, and The Nature Conservancy, with guidance from DMF, the MSI partnership has engaged members of the Commonwealth's major shellfish sectors (aquaculture, wild harvest, and restoration) through public meetings, listening sessions, and an online survey to identify common goals and opportunities to resolve and manage the perceived and real conflicts impacting growth and innovation in the related sectors.

In 2017, the MSI team, in partnership with DMF and students from UMass Boston's School for the Environment, was awarded a grant from the National Fish and Wildlife Federation to continue and expand stakeholder engagement efforts. In 2018, the team approached Executive Office of Energy and Environmental Affairs (EEA) Secretary Matthew Beaton and a number of other state and local leaders, with the goal of garnering support for the establishment of an MSI Task Force that could further improve communication among stakeholders, leverage ongoing state and municipal efforts, and turn the common themes identified in stakeholder engagement efforts into action through the development of a comprehensive, coastwide, holistic strategic plan for nearshore state and municipally managed shellfish resources. The idea was well received and on January 2, 2019 the MSI Task Force held its first meeting.

The MSI Task Force includes commercial shellfishermen, shellfish growers, recreational harvesters, restoration groups, and municipalities, as well as Legislative and Executive branch members. The Task Force is Co-Chaired by EEA Secretory Beaton and Woods Hole Sea-Grant Director Matthew Charette (a full list of Task Force Members can be found on the website listed below). To support the MSI Task Force, a number of sub-committees (Citizen Advisory Sub-committee, Resources Sub-committee, and Strategic Plan Sub-committee) will be established. The sub-committees will be populated by Task Force members or designees and other stakeholders that can bring the detail and experience needed to fulfill the overarching charge of the MSI Task Force. If you'd like to participate in an MSI sub-committee, go to www.massshellfishinitiative.org for more information.

DMF sees the MSI Task Force as a great opportunity to work cooperatively to strengthen the sustainability of the Commonwealth's shellfish resources and growing shellfish industry. We look forward to working with our fellow Task Force members to support the continued development of an ecologically sustainable shellfish aquaculture industry, protect and enhance opportunities for wild shellfish harvest, and promote and strengthen state and municipal shellfisheries management in the Commonwealth.

By Chris Schillaci, Aquaculture and Propagation Coordinator & Jeff Kennedy, North Shore Shellfish Project Leader

The Dish on Fish: Dogfish Tacos

Bringing locally caught sustainable seafood to a table near you!

Dogfish is a small shark species that is abundant right off the shores of Cape Cod. It's a boneless, firm, white meat that is mild in flavor, and a great source of low fat protein. Dogfish is a great alternative for making tacos, fish & chips, and stews.

Ingredients:

- 1 lb. dogfish fillets, cut into 12 equal-sized pieces
- Olive oil
- Mesquite seasoning blend (to taste)
- 1 small green or red cabbage, shredded
- 3 carrots, grated
- Handful of cilantro, chopped
- Fresh juice of 1-2 limes, plus lime wedges for serving
- 12 corn tortillas, warmed

For the sauce:

- 1/2 cup mayonnaise
- 1/2 cup sour cream or plain yogurt
- Juice of 1/2 to 1 lime
- Salt (to taste)

Directions:

For the sauce: Whisk together the mayonnaise, sour cream and lime juice in a medium bowl. Add a pinch of salt. Cover and refrigerate until ready to use.

For the fish and tacos: Preheat oven to 375 degrees F. Line a baking pan with tinfoil or parchment paper and spray with nonstick spray. Place fish onto pan and brush tops with olive oil and sprinkle generously with mesquite seasoning. Place in oven and bake for 10 minutes or until fish is solid white throughout. When ready to serve, smear a generous spoonful of the sauce on each tortilla, topping with a small handful of cabbage, carrot and cilantro. Place 1-2 pieces of fish on top. Squeeze a lime wedge over the fish and more sauce, if desired. Serve warm.

This recipe is brought to you by the Cape Cod Commercial Fishermen's Alliance's Pier to Plate initiative, which was funded by a Saltonstall-Kennedy grant from NOAA Fisheries. The recipe development was sponsored by the Massachusetts Seafood Marketing Program and Buy Fresh Buy Local Cape Cod. You can find more delicious and local recipes like this on the Fishermen's Alliance's YouTube channel.

Small Boats. Big Ideas.

Creature Feature: Atlantic Bonito (*Sarda sarda*)

Description
The Atlantic bonito is a member of the family Scombridae, which is the family of fishes that includes the mackerels and tunas. Cousins of the Atlantic bonito include the Atlantic mackerel, the false albacore (aka little tunny), and the Atlantic bluefin tuna. Like these closely related species, the bonito is built for speed with a streamline, torpedo-shaped body, two dorsal fins, and a series of small "finlets" leading to a well-forked, bony tail supported by lateral keels. The Atlantic bonito is often confused with the skipjack tuna and the false albacore, but can be differentiated by the 5 to 11 oblique dark stripes on its back against a steel blue or blue-green background; the belly of the bonito is silvery with no stripes (skipjack tuna) or spots (false albacore).

An Atlantic bonito caught by a recreational angler.

Distribution and Habitat
The Atlantic bonito lives in both tropical and temperate waters throughout the Atlantic Ocean. In the western North Atlantic, it can be found from Nova Scotia to Argentina, but is not considered common in the Caribbean Sea. The Atlantic bonito migrates seasonally north and south along the eastern seaboard of the US and is most common in Massachusetts waters, typically south of Cape Cod, from July to October. As an epipelagic and neritic species, the Atlantic bonito is a schooling fish that lives in the top levels of the water column in our coastal waters. It is known to occasionally enter estuaries and bays, which are typical along the Cape and Islands. The bonito is generally thought to occur in a broad water temperature range of 54 to 81°F.

Life History
With a relatively large mouth armed with sharp teeth, the bonito is a voracious predator of smaller fishes like mackerels, menhaden, silversides, and sand lance as well as squid. Like all other tunas, the Atlantic bonito is a powerful, fast swimmer and ram ventilator, which means that it must always swim forward to force water over its gills and breathe; it also means that it cannot bite its food and must swallow prey whole. In Massachusetts waters, schools of bonito are often seen streaking at the surface and leaping from the water as they herd and attack prey. These schools become an easy target for anglers in search of this incredible game fish.

Although the bonito is a common species in US waters, very little is known about its life history on this side of the Atlantic. Based on research conducted in the eastern Atlantic and Mediterranean, where it is exploited by a variety of fisheries, this species is fast growing attaining an average length of 20 inches and becoming sexually mature within the first year. Atlantic bonito grow up to 30 inches and live as long as 5 years. According to the International Game Fish Association, the current world record bonito is 18 lb. 4 oz. and was taken in the Azores in 1953, but several international line and tippet class records have been set in Massachusetts waters. The current Massachusetts Saltwater Derby (https://www.mass.gov/saltwater-fishing-derby) record is 13 lb. 8 oz.

The reproductive biology of the Atlantic bonito is not well known, but spawning is thought to occur in the late spring and early summer off the east coast of the US. Small young-of-the-year bonito (in the 5–8 inch range) have been documented off the coast of Long Island during the fall in previous years, and in 2018, DMF received numerous reports of these small bonito being taken by anglers off the coast of Massachusetts and even into the Gulf of Maine (see page 4). The abundance of these young fish in our region is a testament to their rapid growth rate and might be indicative of warming New England waters.

Management
This widespread species has been historically harvested by commercial and recreational fisheries along the eastern seaboard of the US. Annual commercial landings, largely associated with net fisheries, increased in the 1970s and 80s, peaking at 1.8 million pounds in 1994 and steadily declining in subsequent years. Since 2000, landings have averaged about 69,000 lb. per year. With its incredible speed and power, the Atlantic bonito is also a highly prized game fish targeted by recreational anglers. Since 2002, the NMFS Large Pelagics Survey estimates that 5,500 are captured per year, on average, by recreational anglers and about 40% are released.

Despite these fisheries, the Atlantic bonito is a largely unregulated species in federal and state waters in the US. Although there is no historical or current population assessment for the species, it is considered abundant with no evidence of population declines. On an international scale, the Atlantic bonito is listed as "least concern" by the International Union for Conservation of Nature.

By Greg Skomal, PhD, Recreational and Diadromous Fisheries Program Leader

A recreational angler following proper technique to release his bonito catch.

Accolades

Jared Silva recently received the Department of Fish and Game's Pride and Performance award for his work as DMF's Regulatory Coordinator and Fishery Policy Analyst. He takes the lead in keeping DMF on point regarding the agency's regulatory initiatives ranging from listening and responding to constituents' concerns about the need for new or revised marine fisheries rules and regulations. He works closely with the Marine Fisheries Advisory Commission and facilitates public hearings and rule changes. Immersed in the minutia and intricacies of legal issues and requirements, Jared has crafted tomes of regulatory language for the Director and Commission and has shepherded those regulations through the Administration to publishing as final rules.

Recent examples of his accomplishments were a complete re-write of 322 CMR to carry out Governor Baker's Executive Order 562 To Reduce Unnecessary Regulatory Burden by rescinding, revising, or simplifying Agency regulations. After months of work on this order with guidance from staff, he accomplished this required task, and on time. Jared also reexamined and reconfigured many of DMF's state water boundaries for mobile gear fishing using fishermen's input and his own understanding of the complex history of those boundaries for reducing gear conflicts, protecting marine habitats, and conserving the Commonwealth's living marine resources. Jared was also a key contributor to enhancing fines and penalties for marine fisheries violations. The Governor's office included this package in the Environmental Bond Bill, which Congress passed in August.

This September, commercial fisherman **Arthur DeCosta** was presented with the 2017 Belding Award for his lasting contributions to fisheries science and conservation. Over his 37 years as a Massachusetts fisherman, Arthur has gained a reputation for finding the right balance between staunch advocacy for the fishing industry while at the same time promoting a conservation ethic among his peers. This was displayed in particular when he helped DMF develop the innovative "chute gauge" for measuring whelk. He also represented Massachusetts on the Lobster Conservation Management Team for Area 2 during some of the most controversial years of lobster management in the late 1990s and 2000s. DMF and the Marine Fisheries Advisory Commission were pleased to honor Arthur with this award as he prepares to retire from commercial fishing this year.

Comings and Goings

Harriet Booth joined DMF in April 2018 as a Shellfish Restoration Technician in the Shellfish Program. Her responsibilities include managing and conducting all fieldwork and outreach associated with two large-scale shellfish restoration projects in Buzzards Bay, one that is restoring shellfish populations lost due to the 2003 Bouchard oil spill and the other associated with the construction of the New Bedford Marine Commerce Terminal. Harriet holds a Master's in Ecology, Evolution, and Marine Biology from Northeastern University and a Bachelor's in Marine Biology from Brown University. She studied predator-prey dynamics in Florida oyster populations for her graduate research and has experience studying New England shellfish populations from a research position at the Atlantic Ecology Division of the EPA (Narragansett, RI), and a position working for NOAA's Northeast Fisheries Science Center conducting offshore stock assessments of ocean quahogs and surf clams.

George Davis joined DMF in March of this year as a Receiving Teller in our Gloucester Office. He has previously worked for the agency, entering catch reports and assisting many DMF projects. He left briefly to work at NOAA Fisheries as a contractor for the permitting staff. George worked on the water growing up as a deckhand on his father's lobster boat; he enjoys fishing whenever he gets a chance. He holds a Bachelor's degree in Business/Economics from the University of Maine at Farmington.

Regulatory Updates

During the period of July 1, 2018 through December 31, 2018 the following regulatory changes were enacted by DMF after public hearings and Marine Fishery Advisory Commission approval or by the Director under his declaratory and emergency authorities.

Importation of Commercial Striped Bass
In October, DMF filed a 90-day emergency regulation to rescind the regulation that requires all striped bass imported into Massachusetts by seafood dealers while the state's commercial striped bass fishery is open conform to the commercial striped bass minimum size of 34". Massachusetts' commercial striped bass fishery typically closes during the late summer and therefore sub-legal sized fish lawfully harvested in other jurisdictions (e.g., Mid-Atlantic states) may be imported into the state during the fall and winter for both sale in-state and distribution out-of-state. For various reasons, the 2018 commercial striped bass quota was not harvested and the commercial fishery remained open through the end of the year. As a result, DMF rescinded this minimum size requirement on imported striped bass to accommodate traditional fall and winter interstate commerce in striped bass that would otherwise be prohibited.

2018 Winter II and 2019 Winter I Commercial Scup Limits
Pursuant to the Director's declaratory authority, DMF established the 2018 Winter II (October–December) and 2019 Winter I (January–April) commercial scup possession and landing limits at 28,500 pounds and 50,000 pounds, respectively. These limits were set commensurate with the federal specifications set forth by the National Marine Fisheries Service. While scup are typically not caught in Massachusetts waters in these quantities during these periods, these actions allows vessels fishing offshore to possess and land fish lawfully caught in federal waters in Massachusetts' ports.

Adjudicatory Hearing Decisions
For a full list of 2018 adjudicatory hearing decisions, visit https://www.mass.gov/service-details/review-dmf-adjudicatory-hearing-decisions.

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DMF News

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