



Atlantic Mackerel, Squid, and Butterfish Fishery Performance Reports April 2019

The Mid-Atlantic Fishery Management Council's (Council) Mackerel-Squid-Butterfish (MSB) Advisory Panel (AP) met via webinar on April 12, 2019 to review the Fishery Information Documents and develop the following Fishery Performance Reports. The primary purpose of this report is to contextualize catch histories for the Scientific and Statistical Committee by providing information about fishing effort, market trends, environmental changes, and other factors. A series of trigger questions summarized below were posed to the AP to generate discussion of observations in the MSB fisheries. Please note: Advisor comments described below are not necessarily consensus or majority statements. At the start of the meeting Michelle Duval led a discussion on the Council's Strategic Planning process, and a summary of that discussion is included in a separate document.

Advisory Panel members present: Katie Almeida (MA - Towndock (RI)), Joseph Gordon (D.C. - Pew Trusts), Howard King (MD), Leif Axelson (NJ - FV Dyrsten), Emerson Hasbrouck (NY - Cornell), Eleanor Bochenek (NJ - Rutgers), Gerry O'Neil (MA - Cape Seafoods), Jeff Kaelin (NJ - Lund's Fisheries), Meghan Lapp (RI - Seafreeze), and Pete Kaizer (MA - Althea K Sportfishing).

Others present: Jason Didden (MAFMC Staff), Doug Christel (NMFS), Aly Pitts (NMFS), Dave Secor (MAFMC SSC), Michelle Duval (MAFMC Contract), Kiley Dancy (MAFMC Staff), Deirdre Boelke (NEFMC Staff), Alan Bianchi (NC-DENR), and Brad Schondelmeier (MA-DMF).

Trigger questions:

The AP was presented with a series of trigger questions that addressed the following issues:

1. What factors have influenced recent catch (markets/economy, environment, regulations, other factors)?
2. Are the current fishery regulations appropriate? How could they be improved?
3. What would you recommend as research priorities?
4. What else is important for the Council to know?

For organizational purposes, the summary is broken down by MSB species. Some general points were also made as described immediately below. Staff noted that some management issues raised by the AP may be out of the scope of specifications and/or this call, and that individuals should write to the Council or talk to their Council members to have such issues considered by the Council.

1.1 General

Each species discussion began by reviewing the species' "information document" and where available, the NMFS NEFSC data update. The AP has often remarked in the past that the NEFSC data updates are very helpful. This year, only the squid updates were provided in time for the AP meeting - the 2018-2019 federal shutdown delayed completion of the mackerel and butterfish NEFSC data updates.

It was requested that the NEFSC data updates include information on what is known and not known about ecosystem relationships for MSB species and how the various assessments already account for natural mortality/forage needs. Some AP members believe that consumption of forage stocks by marine mammals likely dwarfs mortality from fishing. There are both concerns that natural mortality may be over or under considered, and some AP members think the Council should direct the SSC to consider forage needs through a forage-based ABC control rule and further implement the policy goals of the Ecosystem Approaches to Fishery Management (EAFM) Guidance Document (<http://www.mafmc.org/eafm>). See 2018 FPR for additional details on this point (<http://www.mafmc.org/ssc-meetings/2018/may-8-9>). A request was made for more information on the size distribution of landings and discards, and/or more information regarding the numbers of various fish species discarded.

AP members continued to note that several factors could be negatively impacting catches for all species. Spiny Dogfish can create interference (loading nets), and/or be an ecological barrier (e.g. maybe mackerel won't go into areas with high dogfish concentrations). High dogfish populations seem to be associated with other species declining and this issue should be an important component of ecosystem management. Existing regulations, including the Northeast Canyons and Seamounts Marine Monument reduce fishing opportunities and catches in many ways – some specific examples are described in the species sections. There is strong concern that the size and breadth of all wind energy areas need consideration in terms of not just fishing but also related to loss of survey access, which could then in turn impact uncertainty/ABCs/quotas. Also, the various opportunities in the entire suite of fisheries in the area can drive effort into and out of particular fisheries in a given year.

A request was made that the comments made by fishermen during the April 2018 Meeting Agenda Item "State of the Ecosystem Report" discussion (ex., cold bottom temperature anomalies) be captured and preserved. A recording is available at <http://www.mafmc.org/briefing/april-2018>. Concern was voiced that shifting of thermal habitat suitability is likely impacting the distribution and/or productivity of MSB species, and that the impacts (habitat, bycatch, etc.) of northerly/inshore effort shifts should be evaluated.

1.2 Butterfish

Market/Economic Conditions

The fishery is totally market driven and it is too early to determine how markets will respond to more U.S. butterfish in the long run. Low butterfish availability/abundance resulted in low landings in the 1990s and it has been very difficult to re-establish markets. It might take years to fully re-establish export markets. Low recent catches are not surprising given the few participants, the developmental phase of the fishery, and low prices compared to other species (especially squid). Upcoming lobster bait issues (high bait prices) could result in more activity in 2019 and beyond.

Boats have been increasing fresh butterfish production carefully so as to not crash the price. The fresh market has been absorbing a surprising quantity of fish without major price drops. The frozen market is driven by a few vessels and there is limited interest by most dealers. The primary processor does have markets for fish. Low prices make it difficult and speculative for most vessels to justify targeting butterfish. Export fish need to be either frozen at sea or kept in refrigerated seawater to keep product quality high. Traditional export markets want fish caught in December-March due to fat/roe/feed/quality issues. The overall mentality for some vessels is still to avoid butterfish.

Vessels landing at Lund's in New Jersey typically retain butterfish as bycatch and the low 2017/18 landings at Lund's were not surprising given the slow longfin squid fishery in 2017/18.

Environmental Conditions

There is always a mix of good and bad weather but there was some particularly bad early 2018 weather that could have influenced landings. Participants have not noticed recent major changes in butterfish availability. There have been abundances of small butterfish in some areas recently that made them a nuisance. Butterfish abundance has been relatively high in the last few years compared to the early 2000s, both inshore and offshore.

Some advised precaution given butterfish's important role in the ecosystem as part of the forage base and since butterfish catches have been very low compared to recent projection results (and possible future catches). There is concern about focusing on 1-year of recruitment data for 3-year specifications for a relatively short-lived species. Others noted that butterfish's role as forage is already accounted for in the conservative reference point currently used for butterfish, which was specifically recommended in a paper (Patterson 1992) looking at harvest of forage species. There remains some concern about the age structure of butterfish. Another perspective added was that the commercial catch is not a good representation of the stock.

Management Issues

Effective May 26, 2016, moratorium permits can retain up to 5,000 pounds butterfish with under 3" mesh. The 5,000 pound limit is still likely to drive regulatory discards; a much higher limit would be necessary to totally eliminate regulatory discards. Staff noted plans to

analyze this later in 2019 now that several years at the higher trip limit have passed. An advisor suggested using caution when using “discard reason” or “species targeted” to analyze bycatch due to observer protocols. An adviser previously noted there is a need to keep communicating butterflyfish rules and regulations and there was no objection to continued outreach.

It was noted that the Northeast Canyons and Seamounts Marine Monument has been negatively impacting access to butterflyfish, especially large butterflyfish that command the best prices.

Other Issues

Poor longfin squid fishing and/or herring/mackerel fishing pushed some vessels into butterflyfish as an alternative fishery in early 2017. 2018 would likely have similar patterns at some times. Unregulated Jonah Crab gear is becoming an increasing problem for the butterflyfish fishery and pushing butterflyfish vessels out of traditional trawl grounds. There are many new Jonah Crab participants who are setting gear without proper markings, etc. The trawl boats don't know which side of a Jonah crab set is which, since they aren't marked properly, and they are trying to tow around the Jonah crab trawl that is now in the middle of butterflyfish grounds. Lobster restricted gear areas are also an issue (fixed gear is not being properly removed from mobile gear areas).

Some but not all advisors think butterflyfish should qualify for an exemption to ACLs and questioned the need for a butterflyfish discard cap on the longfin squid fishery given the current butterflyfish ABC. The ability to balance quotas (and increase butterflyfish landings if a substantial part of the discard cap has not been used) late in the year is important since good quality butterflyfish start being available in December. Staff noted the butterflyfish discard cap substantially lowers management uncertainty for butterflyfish and that Framework 8 allows quota balancing, which was used in 2014.

Cornell has previously examined mesh issues – preliminary data suggested 8cm square mesh and 8cm T-90 mesh could be productive for eliminating small butterflyfish. More information should be available in a final report (still pending). Cornell's 'squid trawl network' is still providing information on butterflyfish availability – negative reports are very important for operation of the avoidance network. The network also provides bycatch updates for river herring/shad, yellowtail flounder, windowpane flounder, Red hake, and haddock.

Advisors remarked that for short lived, tightly schooling fish you need a targeted & dedicated survey - this is how the rest of the world assesses these kinds of stocks. State trawl data needs to be incorporated into the butterflyfish assessment; looking at only the Bigelow's area sample misses a substantial amount of butterflyfish habitat. Staff noted NEAMAP survey data is also used and use of state data will be reconsidered during the planned 2021 benchmark assessment.

Research Priorities

The current butterflyfish research priorities were reviewed. Given the timing of the call and the Council's ongoing efforts to develop a new research plan, the advisors were asked to provide input on the current research priorities by email by May 1, 2019.

1.3 *Illex* Squid

Market/Economic Conditions

Demand drives the fishery and participation. Price/demand are mostly dependent on S. Atlantic landings and the international market, which drive world trade prices and/or demand for U.S. *Illex*. Annual variability and price combine to drive interest in fishing for *Illex*. A strong dollar may also impact demand and effort. Market demand for *Illex* was robust in 2016-2018 and new markets are opening up (bait and food). MSC certification should help open new markets and increase prices.

Environmental Conditions

Availability changes quickly even in a year (waves of squid “come up onto the bank”). Quota levels have not hurt the stock and are unnecessarily impacting catches in some years; we need to think out of the box regarding quotas. Understanding migration is key and we don't understand the migration behavior and only access a small portion of the population. Real-time assessment would be optimal to avoid leaving excess *Illex* (and revenues) in the water without a conservation purpose during natural peaks. We need to research ways to take advantage of boom years, including considering the size of squid (taking large squid means harvesting fewer animals). Current management is not sensitive to actual *Illex* productivity or the impact of the fishery. The fishing community should be an integral part of any effort; make changes carefully but don't just get stuck where we are.

Abundance generally and of large squid was unprecedented in 2017-2018, especially near the closures (300-400 grams). One industry representative reported slightly smaller squid in 2018 but noted the early closure prevented access to larger squid later in the year as they grow.

Some noted the decline in survey indices (individual weight) and high variability of *Illex* should give the SSC pause for concern. There is also interest in learning more about spawning habitat and timing.

Management Issues

Deep-Sea Coral closures may impact the ability of vessels to operate depending on where squid are in a given year. Reduced herring quotas may increase participation in the *Illex* fishery.

A higher incidental limit for *Illex* vessels during longfin closures or a more gradual slowing of longfin fishing could avoid regulatory longfin discarding. The new (since 2014) higher limit (15,000 pounds for Tier 1 longfin permit, 5,000 pounds for Tier 2 when on an offshore *Illex* trip and having more than 10,000 pounds of *Illex*) may not totally solve this problem. There is also interest in seeing commercial size data included annually for review by the AP.

Other Issues

For refrigerated sea water vessels to participate, they need high densities to drive participation because they have to return to the dock within two days of starting to put *Illex* onboard due to

spoilage issues.

Concern was reiterated about latent permits. 2017/18 highlights realization of this concern; the season could be even worse in 2019 if availability is high. Conversely there was also concern about being kicked out of the fishery and the creation of monopolies if participation is further limited.

Research Priorities

The current *Illex* squid research priorities were reviewed. Given the timing of the call and the Council's ongoing efforts to develop a new research plan, the advisors were asked to provide input on the current research priorities by email by May 1, 2019.

1.4 Longfin Squid

Market/Economic Conditions

-Recent ex-vessel prices are sufficient to drive increased effort if squid are available. 2018 prices/demand were very good and fuel prices have been relatively low. The market prefers larger squid but most sizes are marketable. No demand glut factor exists given international demand. High effort in summer can cause closures and temporary gluts and may be exacerbated by high capacity. There have been some instances of "yellow squid" with unknown impacts on demand/prices so far. Longfin was recently MSC certified, which should help open additional markets and keep prices/demand high.

Environmental Conditions

Longfin squid has variable productivity and availability both within a year and between years and between inshore and offshore. Weather was not cited as an unusual issue overall for 2016/2017/ 2018. In March/April of 2018 there were some weather constraints. Some fishermen reported lower availability in 2018 but better availability in early 2019. Dogfish continue to make some areas unfishable and are a reason why landings can turn off; restraints on the dogfish fishery correlate with lower squid landings. Mackerel seemed to drive squid out of some areas in early 2018.

Management Issues

Area limitations negatively affect fishing/landings. Scup, Tilefish, and Fixed/Mobile Gear Restricted Areas (GRAs) have made longfin squid fishing more difficult/less profitable, likely leading to somewhat less effort overall. Recent modifications to the scup GRAs have been helpful for flexibility. Lack of access to Georges Bank also limits landings – some would like to see provisions for some kind of access. Offshore wind projects may limit fishing access in the future – several projects are under consideration/ development. Some effort shifts may occur, but the fleet can't fish too far east due to groundfish restrictions. Some windmill locations could have high impacts on longfin habitat/spawning and squid egg data should be forwarded to relevant management agencies. Construction noise may damage squid statoliths and it is uncertain how squid may react to operational noise, powerlines, and/or sediment

plumes. The Council and/or NOAA should continue to highlight the potential impacts to habitat (especially squid spawning) from wind construction and operation.

There remains general concern about how Trimesters and rollovers affect access and limit total annual catches, or that the current system may not preserve quota for vessels that access the fishery during a limited time of year. Annual landings (especially 2016) would have been higher in some recent years if not for the Trimester 2 closures (not the case in 2017/2018). Some believe the Council should consider an annual quota without Trimesters or a larger Trimester 2 quota. Others would like less Trimester 2 effort to protect spawning squid and see a need to further consider impacts of effort in one season on productivity in the following season (per Amendment 20 analyses). There is some concern about what the VMS reporting requirements are being used for; staff noted they are used for Trimester monitoring when the quota is approached (e.g. 2016). The operational importance of sufficient notice before closures was also noted.

Multiple AP members have questioned the value of the 2 1/8" mesh requirement and believe it may be harming productivity and contributing to the relatively low landings in recent years. Squid that go through 2 1/8" mesh are marketable and likely have high mortality. 2 1/8" mesh may appear practicable for the fishery but may be increasing squid mortality and is unlikely to allow substantial escapement of other fish. The mesh requirement should be examined in detail. Some AP members thought the 2 1/8" mesh should be extended to the summer Trimester 2 fishery and were concerned that the use of strengtheners reduces effective mesh sizes and should be analyzed and/or prohibited. Other advisors voiced concern that a net without a strengthener could not withstand pressure during towing/splitting, and going just to a 2-inch mesh only would require much stronger/larger twine that might not currently exist or be practicable. A larger strengthener mesh (more than 5 inches) may or may not be feasible depending on vessel configuration and other fishery participation.

Other Issues

Very good *Illex* fishing may have shifted some effort off of longfin in recent summers.

Research should continue into how to determine longfin productivity. Current management is not sensitive to actual longfin productivity or the impact of the fishery on the stock. The fishing community should be an integral part of any effort; make changes carefully but don't just get stuck where we are.

Concern was reiterated that entry of latent effort could disrupt smooth operation of the fishery despite recent Council actions. Lower quotas and/or depleted status and/or opportunities in other fisheries could redirect effort into longfin. Amendment 20 may address some of these concerns. There is disagreement about the need for the recent requalification and concern about the potential for monopolies. For many fishermen, there's not much left besides squid and scup.

There are times of substantial local directed recreational effort and catch, which may not be reflective of overall abundance. Recreational catch is likely very small compared to the overall quota but there is a sense that the recreational squid fishery is increasing (e.g. more squid tackle in stores and more reports on social media). We may be approaching a level that needs to be

accounted for.

Concern remains by some over “area of catch” issues, particularly related to squid spawning and egg bycatch (see attached below Figures 1-3, which display where observed trips that caught longfin eggs caught those eggs). There is interest by some in a near-shore buffer/spawning closure area (especially for rolled-over Trimester 2 squid quotas), or other means to protect the spawning event and eggs given the likely high mortality of bycaught eggs.

There is concern about the high bycatch rates in the longfin squid fishery, especially in Trimester 2 inshore areas. P. Kaizer noted the observer program provided him with data that bycatch exceeded 50% in these areas in 2018. The Council should consider ways to ensure that incidental catch is actually incidental to other fishing. An opposing point of view was that hemming vessels in too much would cause regulatory discarding, and the low quotas of other species will not allow reasonable catches of squid, or other species that are similarly regulated while in pursuit of the target species. Amendment 20 may address some of these concerns.

Research Priorities

The current longfin squid research priorities were reviewed. Given the timing of the call and the Council’s ongoing efforts to develop a new research plan, the advisors were asked to provide input on the current research priorities by email by May 1, 2019.

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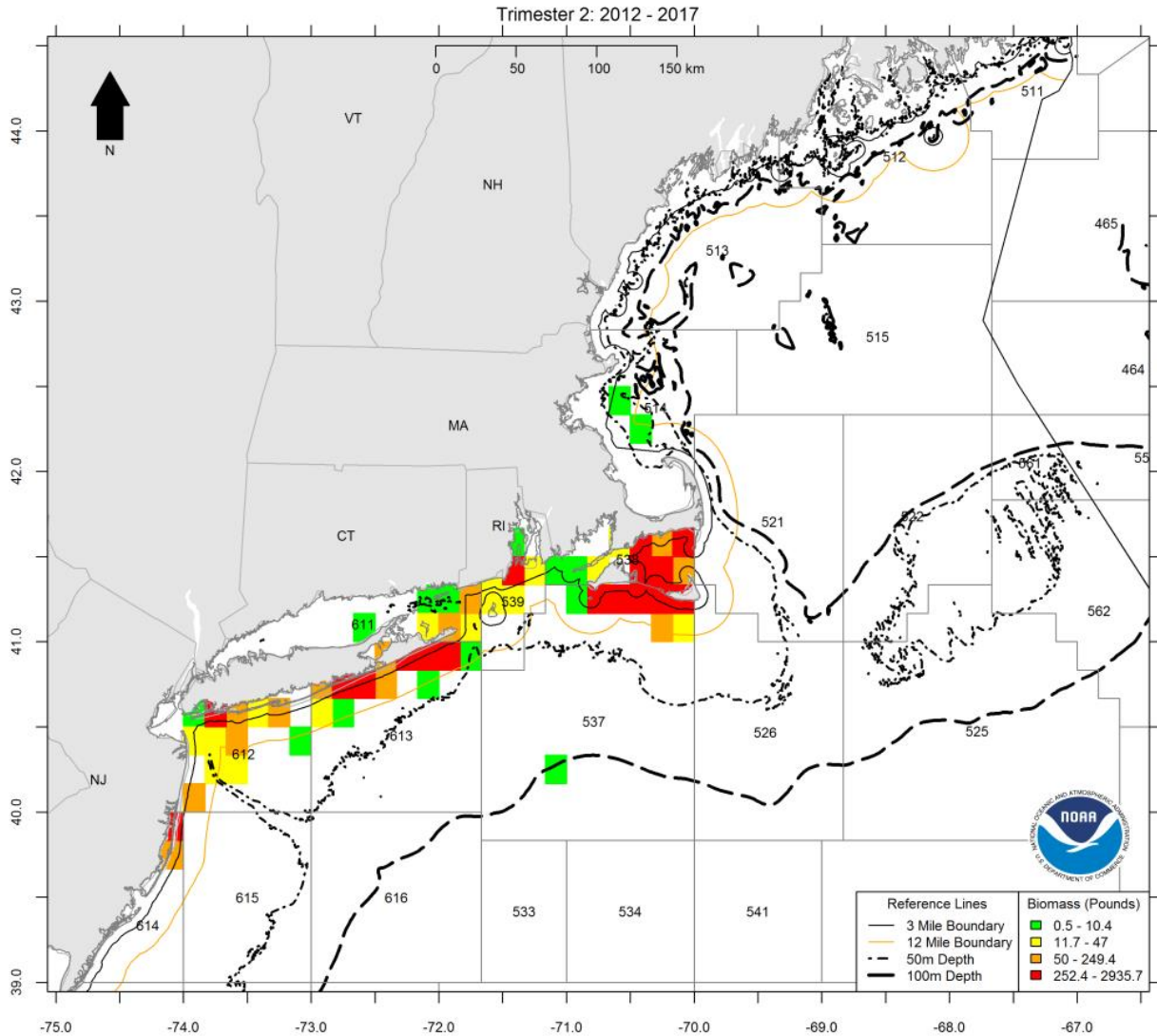


Figure 1. Longfin squid, *Doryteuthis pealeii*, egg bycatch (lbs) in bottom trawls, by ten-minute square (TNMS), during Trimester 2 of 2012-2017. The Trimester 2 egg bycatch comprised 96% of the year-round egg bycatch in bottom trawls during 2012-2017. Egg bycatch from each tow was summed by TNMS and then binned and mapped as quartiles, meaning each of the four legend categories is comprised of a similar number of TNMS. This distribution of egg bycatch is for areas where bottom trawl fishing occurred during this time period and may not be representative of the distribution of all longfin squid egg habitat. Data source: Northeast Fisheries Observer Program Database.

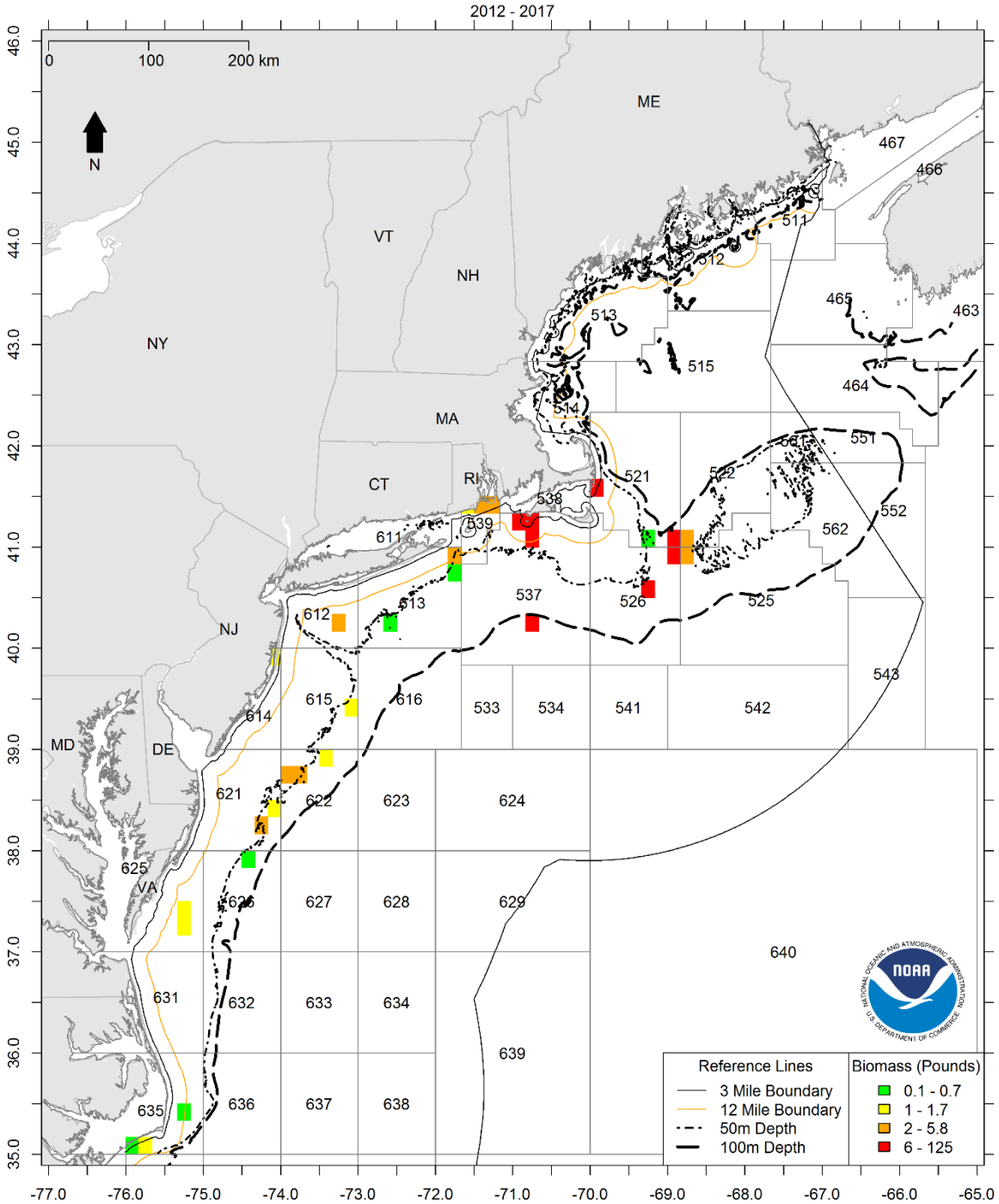


Figure 2. Longfin squid, *Doryteuthis pealeii*, egg bycatch (lbs) in gear types other than bottom trawls, by ten-minute square (TNMS), during 2012-2017. Egg bycatch from each tow was summed by TNMS and then binned and mapped as quartiles, meaning each of the four legend categories is comprised of a similar number of TNMS. This distribution of egg bycatch is for areas where bottom trawl fishing occurred during this time period and may not be representative of the distribution of all longfin squid egg habitat. Data source: Northeast Fisheries Observer Program Database.

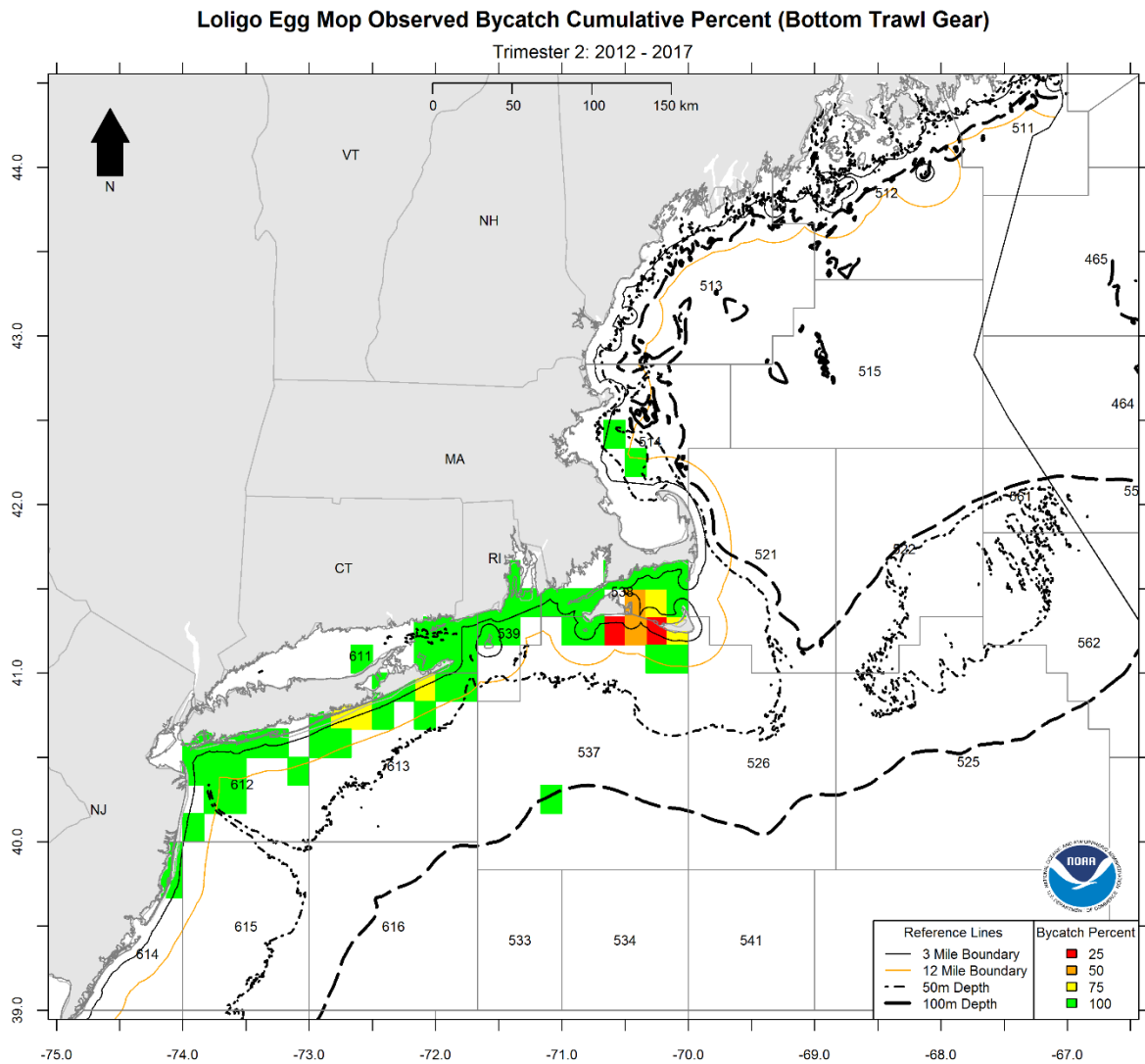


Figure 3. Longfin squid, *Doryteuthis pealeii*, egg bycatch (cumulative percent, in quartiles, by weight) in bottom trawls, by ten-minute square (TNMS), during Trimester 2 of 2012-2017. TNMSs shaded red contain the highest 25% of the cumulative total egg bycatch weight and TNMSs shaded orange contain the second highest 25% of the cumulative total bycatch weight and so forth.

1.5 Mackerel

Market/Economic Conditions

Price is mostly driven by world prices/demand/supply and mackerel prices are sufficient to stimulate directed activity if fish are available. Larger mackerel are more valuable than smaller mackerel.

Environmental Conditions

Availability is the primary driver for catches, and availability is likely highly variable and highly sensitive to external environmental factors, making catch a poor indicator of stock status. The trawl survey also appears to have no connection to landings. The perspective on 2014-2016 was that lack of availability discouraged searching and resulted in low landings: “Can't catch what's not here.” There were pulses of fish late in those years which was somewhat unusual. Not seeing the 2015 year class in 2017 but having them available in 2018 reinforced the perceived discrepancy between availability and abundance for some AP members. The fishery was not even looking much through most of 2017 given low availability and other regulatory issues. Availability was much better in 2018 across a wide area and impacted fishing on herring/squid in some areas. Mackerel were seen all along the coast in multiple sizes/year classes. Late 2017/early 2018 landings were from shoal waters around Hudson but industry saw mackerel elsewhere also. Substantial mackerel were seen (sonar) in late 2018 (“most in last ten years”) by some fishermen but the fishery was closed due to the RH/S cap. The 2019 fishery appeared promising to some AP members before the RH/S closure. However, the low Area 2 Atlantic herring quota and high initial RH/S cap rate drove a race to fish as fishermen feared an imminent directed herring closure or mackerel RH/S closure.

Given the stock assessment findings and the potential beginning of rebuilding, some AP members voiced concern that the Council should be careful about how mackerel is managed, warranting consideration of a further lowering or maintenance of the ABC to reflect mackerel's forage value and potential for rebuilding to historical levels. If a shift north was the primary issue Canadian landings should have remained strong. Conversely, some AP members have noted that Canadian landings are with inshore purse seines, so mackerel could be offshore in deeper water and not encountered in the Canadian fishery. Joint research with Canadians should continue to be pushed and U.S. research should proceed where appropriate relative to assessment recommendations (especially on the influence of environmental factors).

There had been a lack of mature mackerel in recent years before 2018. Some of the advisors have provided size information to the NEFSC. 1999/2000 seemed to be a turning point, with small mackerel dominating catches since. Spawning must be taking place somewhere given the age-1s...the question is what happens to them? The size issue appears to apply to other forage species like Atlantic Herring and *Illlex*, possibly due to warming waters (see Ohlberger 2013, Kingsolver & Huey 2008, Conover et. al. 2002, Forster et. al. 2012). Based on the size of mackerel generally seen in Canada (larger) and U.S. (smaller) within a season and

presumed migration pattern (Canada to U.S.), it appears to some that the Canadian and U.S. stocks are different (fish don't shrink). Fish were of more similar size in 2017/early 2018. Staff will forward summary info from recent stock assessment on stock structure regarding east/west and north/south fish to the AP. It was also noted that the Canadian minimum size may affect the size structure of Canadian catches.

Management Issues

Herring management limits mackerel fishing. Annual herring gear closures in Gulf of Maine (1A) limit the fleet's ability to explore/catch in that area. Midwater trawl gear cannot fish in 1A from Jun 1-Sept 30. The NEFMC herring committee recently recommended considering modifying the herring incidental trip limit (currently 2,000 pounds) to facilitate mackerel fishing and/or modifying the 1B seasonal closure (January through April).

Requests were made for the Council to modify the RH/S cap including: Redefine the definition of mackerel trips so the herring fishery can't close the mackerel fishery; reconsider how to start the assumed rate at the beginning of the year to avoid shutting down the fishery as soon as it starts based on a prior year's data; consider changing the fishing year to begin in November to allow the fishery to get some cleaner trips before the previous year's data shuts the fishery down; and reconsider what level of RH/S avoidance is practical for the fishery. An advisor who had limited availability during the call communicated via email and in addition to supporting several of the concepts above, recommended increasing the RH/S cap to the original amount before mackerel quotas were cut and using a stock assessment to better assess RH/S stocks. Another advisor who could not attend communicated via email opposing increases to the RH/S cap and recommending revisiting hotspot analyses and/or mandatory participation in the SMAST/MA RH/S bycatch avoidance program, including individual vessel accountability.

Requests were also made that the Council should consider allowing a roll-over of unused quota like Atlantic Herring, and should consider modifying gear to allow more fish to get to spawning size/age.

Other Issues

In recent years (less so starting in late 2017 through the closure in 2019) much of the mackerel catch has been retained incidental catch from herring fishing. With relatively high fuel prices, high catches of mackerel will only occur if fish are abundant (gas price not as substantial of an issue recently).

There was previous concern about what exactly an MSE (Management Strategy Evaluation that generated 2016-2018 ABCs/quotas) means and consisted of - The new assessment is being used for ABCs once the new specifications are implemented (a proposed rule is expected in spring of 2019). There is still concern about the uncertainty regarding mackerel, especially projections that rely on uncertain recruitments. Catches could increase substantially and riskily dependent on limited data about one year class, potentially jeopardizing rebuilding.

There was concern by some AP members that the evolving small-scale mackerel fishery could start to harvest a substantial portion of the quota (by incidental permits) and that it would be good to track and learn more about it, especially since the historical limited access participants

will be restricted during rebuilding. Some advocated for all directed vessels acquiring a directed permit and making sure the hook/jig fishery gets biological sampling since they target a different/specific size class of fish. Staff noted this is occurring. There was also concern by some AP members that selective small-scale fisheries with high product quality should be incorporated into management versus eliminated and the Council should consider allowing jigging at higher levels if a closure is due to the RH/S cap. The public has communicated in the past that the open access trip limit is key to several operations that have become dependent on this fishery.

Research Priorities

The current mackerel research priorities were reviewed. Given the timing of the call and the Council's ongoing efforts to develop a new research plan, the advisors were asked to provide input on the current research priorities by email by May 1, 2019.

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