

2018 Mackerel-Squid-Butterfish (MSB) Advisory Panel (AP) Fishery Performance Reports (FPRs)

The Mackerel-Squid-Butterfish (MSB) Advisory Panel (AP) met April 13, 2018 to provide input on mackerel rebuilding and develop the Fishery Performance Reports (FPRs) below. This document does not represent a consensus but rather a summary of the perspectives and ideas that were raised at the meeting.

The meeting was conducted via internet webinar and facilitated by Jason Didden, the MSB Fishery Management Plan (FMP) coordinator. The MSB advisors who participated were:

Katie Almeida
Joseph Gordon
Greg DiDomenico
Jeff Reichle
Emerson Hasbrouck
Hank Lackner

Peter Kaizer
Peter Moore
Jim Gartland
Peter Kaizer
Chris Roebuck
Steven Weiner

Other attendees included:

Doug Christel
Ally Pitts
Tara Froehlich
Peter Hughes
Michael Pratt
Meghan Lapp
Fred Akers
Jenny March

THIS SPACE LEFT BLANK
INTENTIONALLY

1.0 Atlantic Mackerel Rebuilding

Staff provided an overview of the 2017 benchmark assessment, recent fishery performance, and the alternatives being considered for mackerel rebuilding and associated 2019-2021 specifications (including the river herring and shad (RH/S) cap).

Input on rebuilding:

- General preliminarily support for the range of options pending the results of the SSC meeting.
- Given the much higher historic size of the mackerel population, its forage value, and national/Council policies regarding forage, the range of rebuilding options is incomplete and should include at least one alternative that would have mackerel reach a much higher spawning stock biomass (SSB) than the rebuilt biological reference point (BRP) derived from the recent assessment. 120% could be an option but would have to evaluate further. Another way would be to modify the control rule so that forage species are included in the atypical category.
- Concern about ability to evaluate management precaution trade-offs should cut both ways - we are equally limited in our ability to evaluate social, economic, biological, and ecological impacts if we modify the control rule to liberalize or be more restrictive.
- Need to consider how the rebuilding alternatives impact long-term biomass.
- There is concern about ramping up catch so quickly given where we are now and only *might* have a good 2015 year class that *might* increase biomass. There is a lot riding on belief in the 2015 year class being robust and surviving. Concern that increasing catch may delay/impede rebuilding/recovery.
- The Council should consider the approach used with butterfish to account for mackerel's forage value (use 2/3 natural mortality as a proxy for the overfishing level for small pelagics based on Patterson 1992 paper).

Input on management measures associated with rebuilding:

- Can we lower management uncertainty buffer or remove altogether? We should be able to remove/lower the management uncertainty buffer given the fishery has daily reporting via VMS.
- There is some preference for closing at a higher threshold with a lower post-closure trip limit to facilitate traditional participants' access to quota. Mackerel is a low value fish and international markets control demand for the bulk of the quota – if you close and leave a large part of the quota with a 40,000 pound trip limit you won't catch the quota because most vessels can't target profitably at 40,000 pounds per trip.
- Is it possible to have some flexibility within the year in terms of the closure threshold? Closing late in the year with 15%-20% of quota left might leave a lot of fish on the table.

-Meghan Lapp (Public): There is need to preserve some quota for later in the year. The Council should consider starting the fishery year on November 1. If there is a big part of the quota left after a closure, need a high enough trip limit to utilize remainder, perhaps 40-80,000 pounds.

-There was some AP interest in considering shifting the fishing year but it would need to be carefully considered because there could be allocative aspects to changing the fishing year.

-How the mackerel quota is managed could affect RH/S bycatch.

Input on River Herring/Shad Cap related to mackerel specifications that would be associated with rebuilding:

-There's no evidence that RH/S abundances in the Mid-Atlantic are improving and the goal is not to catch the RH/S cap but to catch as little RH/S as possible.

-There was general support for the range considered (keep cap at 82 mt or scale with mackerel quota). The AP would like more information on recent performance of the cap. There were differing perspectives on whether to scale with the mackerel quota or stay at 82 mt or use some ceiling level of catch.

-It would be useful to know the species and size distribution in the RH/S cap re: recent performance. (Staff is already formulating a request to the observer program for this data.)

-Meghan Lapp (Public): If RH/S cap has been scaled down with the mackerel quota to keep a similar amount of pressure on industry then it should be scaled up to still keep a similar amount of pressure on industry. NEAMAP RH/S indices are rising and the fishery will have to work harder and harder to avoid hitting cap if RH/S abundances increase.

-Jeff Kaelin (Public): The directed fishery and other sources of RH/S mortality should be assessed and compared to fully determine the practicability of bycatch reduction relative to achieving optimum yield. The shoreside monitoring program is being paid for by industry.

-The River Herring and Shad Committee should convene prior to the final decision on RH/S cap levels for the next 3 years. Through the list of questions that structure the RH/S Committee's annual progress review, the committee pulls together important background information and context for the cap decision. The objective was to reduce bycatch from what was then current levels. Looking at the river herring cap table for the mackerel fishery in Amendment 14, if a ceiling were established using the 5-year average of total ocean removals, we would have a ceiling cap of 437 mt split between the herring and mackerel fisheries. From a river herring/shad perspective, it's important to keep total ocean removals in mind when we discuss the cap, including how the herring fishery cap is performing and how it is set. Coordination and alignment with the New England Council is also a charge of the RH/S Committee.

2.0 Fishery Performance Reports (FPRs)

The fishery performance reports' primary purpose is to contextualize catch histories for the Scientific and Statistical Committee (SSC) because of the potential importance of catch histories for considering Acceptable Biological Catches (ABCs), especially in cases of fisheries with high levels of assessment uncertainty. The goal is to record information about fishery conditions and characteristics that may influence catches. A series of trigger questions was posed to the AP. The questions are based on the discussion and results of the 2011 fishery performance meeting that focused on 2010 and prior catches. The meeting seeks to generate discussion of direct observations by knowledgeable individuals involved in the fisheries in some fashion, especially as related to factors that may have influenced catches. The trigger questions were:

1. Are you aware of market issues that influenced MSB catches? For example: Fish prices, fuel prices, overall economy, etc...
2. Are you aware of environmental/ecological issues that influenced MSB catches? For example: Weather, sea temperature, climate, etc...
3. Are you aware of management issues that influenced MSB catches? For example: management induced effort shifts, management prohibiting directed fishing, etc...
4. Are you aware of other fishing behavior issues that influenced MSB catches? For example: refrigerated sea water (RSW) vs. at-sea freezing activity, vessels focusing on other fisheries, etc...
5. What other issues/concerns does the AP want to highlight? For example: lack of U.S. mackerel allocation, forage concerns, calibration issues, fishery conflicts, regulatory concerns, etc...

The charge to the AP was thus to provide input on factors that may have influenced catch levels over time as well as any other observations and ideas that could prove useful to the SSC and/or Council as specifications for 2019 and beyond are considered. For organizational purposes, the summary is broken down by species and several thematic categories (per the above trigger questions). Some general points were also raised by AP members, as noted immediately below. Like the fishery-specific summaries, these do not reflect a consensus but rather a summary of the various ideas presented by the AP members. Many ideas are carried forward from last year. Staff noted that some management issues raised by the AP are 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.

2.1 FPRs General

-The AP appreciates the Biological Updates provided by the NMFS Northeast Fisheries Science Center (NEFSC) as a concise summary of what is known (or not known) about the status of each of the species.

-Spiny Dogfish abundance could be severely impacting MSB and other fisheries, in terms of predation, interference (loading nets), and/or as an ecological barrier (e.g. maybe mackerel or squid won't go into areas with high dogfish concentrations). As dogfish have come back it seems like everything else has gone down and this issue should be an important component of ecosystem management.

-Consumption of forage stocks by marine mammals likely dwarfs mortality from fishing.

-Need to keep looking at consumption issue – try to build connections between fishery management plans.

-Shifting of thermal habitat suitability is likely impacting the distribution and/or productivity of MSB species.

-There is concern that effort has shifted North/inshore – consideration of possible impacts is warranted.

-Regulations impact opportunities for all fisheries, including new National Monument – see discussions in species' sections below.

-It would be useful to get discard info as #s of fish, in addition to weight, to better understand impacts.

-The Council should direct the SSC to consider forage needs though a forage-based ABC control rule. In 2017 AP Member Pam Gromen requested a fuller discussion/write-up of the ecological considerations term of reference, so we understand what ecological factors were part of the assessment model (if any). In terms of the role of squid, mackerel, and butterfish as forage, it would be helpful to understand if/how the resulting ABC accounts for predator needs. What is the confidence in providing adequate prey for predators in the ABC recommendation? What are sources of uncertainty in meeting forage demands? Is biomass being maintained at a level above Bmsy in the long term as suggested by NS1 guidelines? It is important to recognize the forage policy goal in the EBFM Guidance Document, the shortcomings of current practices, and the steps that will need to be taken to realize the policy goal.

- There were some interesting comments made by fishermen during the April 2018 Meeting Agenda Item “State of the Ecosystem Report” discussion (ex., cold bottom temperature anomalies). It would be helpful to capture these comments in writing by having a designated spot in this report.

2.2 FPR: Mackerel

The key points (not consensus positions) were:

Market Issues

-Mackerel prices are sufficient to stimulate directed activity if fish are available.

-Price is mostly driven by world prices/demand/supply.

Environmental/Ecological Issues

-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. Fishery was not even looking much through most of 2017 given low availability and other issues (see regulatory issues below). Water was too warm in spring of 2017 (throughout range). Availability was much better in 2018 across wide area and impacted fishing on herring/squid in some areas. Mackerel were seen all along coast, multiple sizes/year classes. This winter most landings were from shoal waters around Hudson but industry saw mackerel elsewhere also.

-Can't catch what's not here - and mackerel that did appear in 2014-2016 were north. Can't hurt a stock that's not here - need to figure out where it is (ctenophore research, Labrador Current, etc.). The fish are not gone, just not swimming here. 2015 year class would have been seen by fishery last year if they had been available. Their availability in 2018 reinforces that availability does not equal abundance.

-Both availability and the size of fish have been low in recent years before 2018, both offshore and inshore. 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).

-There's been a lack of mature mackerel 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 age-1s...the question is what happens to them?

-Would be useful to see long-term consumption trends. We don't have knowledge base to set aside fish for ecosystem services at this time. (Science Center is following up on questions at Council meeting regarding scale of mackerel consumption by finfish predators).

-The low landings and Canadian assessment should give pause for concern and warrant 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, Canadian landings are inshore purse seine, so the animals may be offshore in deep water and not encountered in Canadian fishery.

-The trawl survey appears to have no connection to landings. More science needs to be conducted to figure out what is really going on with mackerel, including communicating with Iceland about mackerel's recent abundance there. The AP would like results of previous genetic work.

-Based on the size of mackerel seen in Canada (larger) and U.S. (smaller) and presumed migration pattern (Canada to U.S.), it appears that the Canadian and U.S. stocks are different (fish don't shrink). Fish were of more similar size in 2017/early 2018.

-Would be useful to look at distribution trends over time. i.e. impacts of climate shifts & ecosystem changes.

Management Issues & Management Induced Effort Shifts

-Herring management limits mackerel fishing :

-Annual herring gear closures in Gulf of Maine (1A) limit ability to explore/catch in that area. MWT cannot fish in 1A from Jun 1-Sept 30.

-Georges Bank Haddock AM closed Georges Bank herring fishing October 22 2015-April 30, 2016.

-Herring 1A Closed Oct 18, 2016, 1B Closed Nov 18, 2016.

-Had good runs in late 2014/2015/2016/2017 which had been rare previously.

-The observer call-in requirements may limit opportunistic fishing.

-Need to leave some amount of mackerel quota so that fishery can capitalize on availability when it occurs. There is a concern that once a quota is reduced it will never be restored given the current state of mackerel science. Recent catches of mackerel should not be used as an indicator of what the catch should be next year.



Other Fishing Behavior Issues

-In recent years (through 2016, less so starting in late 2017) 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 recently). Economics will self-regulate this fishery and the fishery has not impacted the mackerel stock.

Other Issues for Council/SSC Consideration as Appropriate

-Joint research with Canadians should be pushed and U.S. research should proceed where appropriate relative to assessment recommendations (especially on the influence of environmental factors and on mackerel's stock structure).

-In terms of buffering against U.S. ACL overages, management uncertainty buffer seems excessive given the monitoring that occurs in the mackerel fishery and the apparently low level of mackerel discarding.

-There is concern about what exactly an MSE (Management Strategy Evaluation that generated 2016-2018 ABCs/quotas) means and consists of.

-Specifications should consider allowing a roll-over of unused quota like Atlantic Herring.

-Council should consider increasing the mesh size (or requiring square mesh codends) to allow more fish to get to spawning size/age. Concern that catch of small fish not allowing sufficient number of fish to reach spawning maturity.

-Concern about uncertainty in general.

-Michael Pratt (public) communicated that the open access trip limit is key to his business operations especially when he has to travel further from his home port. 10,000 pounds would work and catches at his level after the directed fishery closes would be negligible. He noted he is very dependent on this fishery and has been for the last seven years. He fishes May-December. There are a few other participants in a similar position but not quite as dependent as he is.

-It could be good to make sure the hook/jig fishery is getting biological sampling since this component of the fishery is targeting a different/specific size class of fish.

-There was concern by some AP members and other public that the evolving small-scale mackerel fishery could start to harvest a substantial portion of the quota and that it would be good to track and learn more about it, especially since the mackerel stock needs to be rebuilt and historical limited access participants will be restricted. There was also concern by some AP members that selective small-scale fisheries with high product quality should be incorporated into management versus eliminated.

Herring/Mackerel Interaction Issue if Mackerel Reaches 100% of Quota and Goes to Zero Possession

-The AP generally supported the Council considering changing the trip limit when 100% of the quota is reached from zero to 5,000 or 10,000 pounds.

-There was some concern that all permits would be going to the same limit (directed and incidental).

THIS SPACE LEFT BLANK INTENTIONALLY

2.3 FPR: *Illex* Squid

The key points (not consensus positions) were:

Market Issues

- Price/demand are mostly dependent on S. Atlantic landings and international market, which drive world trade prices and/or demand for U.S. *Illex*. Availability must be sufficient to overcome any market/fuel price issues to drive interest in fishing for *Illex* for most vessels. Strong dollar may impact price/sales/demand.
- Demand drives the fishery and participation. Market demand for *Illex* was robust in 2016 and 2017.

Environmental/Ecological Issues

- Availability changes quickly even within a year (waves of squid “come up onto the bank”). Understanding migration is key to understanding *Illex*, 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 *Illex* (\$) in the water without a conservation purpose. Should develop some way to have some flexibility. Need to think out of the box with both squids. With *Illex*, natural peaks occur, while market conditions can contribute to low years. Quota levels have not hurt stock and are unnecessarily impacting catches in some years. Need to research way to take advantage of boom years, including considering size of squid (taking large squid means you are harvesting fewer animals for any given quota).
- 2016 was a late season with relatively low availability and small size, especially early in season. Some vessels dropped out given low initial landings. Abundance of large squid was unprecedented in 2017, especially at end of year near closure (300-400 grams).
- The decline in indices and high variability of *Illex* should give the SSC some pause for concern.

Management Issues & Management Induced Effort Shifts

Deep-Sea Coral measures may impact ability of vessels in fishery to operate.

Other Fishing Behavior Issues

- For refrigerated sea water vessels to participate, they need high densities to fish to drive participation because they have to return to the dock within two days of starting to put *Illex* in the tank due to spoilage issues.

Other Issues for Council/SSC Consideration as Appropriate

- Research should continue into how to determine *Illex* productivity. Current management is not sensitive to actual *Illex* productivity or impact of fishery on the stock. The fishing community should be an integral part of this effort, which should proceed in a methodical fashion. Proceed carefully before you make any changes but don't just get stuck where we are.
- The rationale that 24,000 MT-26,000 MT catches have not caused problems doesn't match the 24,000 MT ABC (shouldn't the ABC be 26,000 MT?)
- Summer & fall longfin closures can lead to discarding of longfin 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 higher limit in 2014 is better but may not totally solve this problem.
- Concern was reiterated about re-entry of latent permits. Entry of latent effort could disrupt smooth operation of the fishery. 2017 highlights realization of this concern; could be worse in 2018 if availability is high again.

2.4 FPR: Longfin Squid

The key points (not consensus positions) were:

Market Issues

- Recent ex-vessel prices are sufficient to drive increased effort if squid are available. 2017 prices were very good and fuel prices have been relatively low. No demand glut factor exists given international demand.
- High effort in summer can cause closures and temporary gluts. May be exacerbated by high capacity.
- Some instances of “yellow squid.” Unknown impacts on demand/prices so far.

Environmental/Ecological Issues

- 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 for 2016/2017. In early 2018 (March/April) there were weather constraints.
- Dogfish continue to make some areas unfishable and are a reason why landings can turn off. The restraint on the dogfish fishery correlates with lower squid landings.
- Mackerel seemed to have driven squid out of some areas in early 2018.

Management Issues & Management Induced Effort Shifts

- 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 scup GRAs have been helpful for flexibility.
- The mistaken April 2012 closure may have substantially impacted 2012 Trimester 1 landings because landings were on the upswing immediately prior to the closure.
- Annual landings would have been higher in some recent years if not for the Trimester 2 closures. Any seasonal closures likely depress annual landings (there were no seasonal closures in 2013/2015 and 3 weeks in August 2014). 2016 landings may have been substantially higher if the summer closure had not occurred. There were no closures in 2017.
- The 2 1/8” mesh requirement may be harming productivity and causing the relatively low landings in recent years (landings have been lower since 2007). Squid that go through 2 1/8” are marketable and likely have high mortality. 2 1/8 may appear practicable for fishery but may be increasing squid mortality and is unlikely to allow substantial escapement of other fish. Should be examined in detail. Multiple AP members have questioned the value of the 2 1/8” mesh. Some fishery participants would prefer 1 7/8” year round.
- 2 1/8” mesh should be extended to the summer trimester 2 fishery. Use of strengtheners reduces effective mesh sizes – consider eliminating the use of strengtheners. Consider impact of strengtheners on retention/bycatch and the use of square-mesh. Some advisors voiced concern that a net without a strengthener could not withstand pressure during towing/splitting, and going to a 2-inch mesh only would require much stronger/larger twine...that type of material might not currently exist. A larger strengthener may or may not be feasible depending on vessel configuration and fishery, and could be much more inconvenient for some vessels.

-Offshore wind projects may limit fishing access in the future – several projects are under consideration/development. Some effort shifts may occur, but can't go too far east due to groundfish restrictions. Some windmill locations could have high impacts on longfin habitat/spawning. The 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 highlight the potential impact to squid spawning/habitat from wind construction/operation.

-Need to further consider impacts of effort in one season on productivity in the following season as described in the squid amendment.

-Council should consider ways to ensure that incidental catch is actually incidental to other fishing (applies to all Council-managed fisheries). 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 (e.g. NY with low SF/S/BSB trip limits).

-There was concern about what the new VMS reporting requirements are being used for. Staff noted they were used for Trimester 2 monitoring in 2016.

Other Fishing Behavior Issues

-Some vessels have been focusing on other species (other quotas increased or fisheries more valuable - e.g. scallops; some vessels were retrofitted for pelagic fishing). Several participants have left the fishery for good.

Other Issues for Council/SSC Consideration as Appropriate

-Research should continue into how to determine longfin productivity. Current management is not sensitive to actual longfin productivity or impact of fishery on the stock. The fishing community should be an integral part of this effort, which should proceed in a very methodical fashion.

-The lack of proper NMFS notification for the 2012 Trimester 2 longfin closure needs to continue to be avoided in the future.

-Concern was reiterated about reentry of latent permits. Entry of latent effort could disrupt smooth operation of the fishery despite recent Council actions to reduce latent permits.

-There is 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.

-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. Sense that recreational fishery is increasing. See more squid tackle in stores. There is also a traveling recreational contingent that uses social media/internet to spread the word about varying local availability. 2014 spring fishery in MA drove some towns to enact regulations to address high participation. May be approaching a level that needs to be accounted for.

-Concern was voiced over area of catch issues, particularly related to squid spawning and egg bycatch. The AP reviewed location of egg bycatch data requested by Pete Kaizer from the observer program (attached below Figures 1-3, which display where observed trips that caught longfin eggs caught those eggs). The Council should consider a near-shore buffer/spawning closure area, especially for rolled-over squid. There has not been enough consideration of protecting the spawning event and eggs given the likely high mortality of bycaught eggs. The Council should revisit the rollover provisions and/or Trimester allocations to protect summer spawning squid.

-There is concern about the high bycatch rates in the longfin squid fishery.

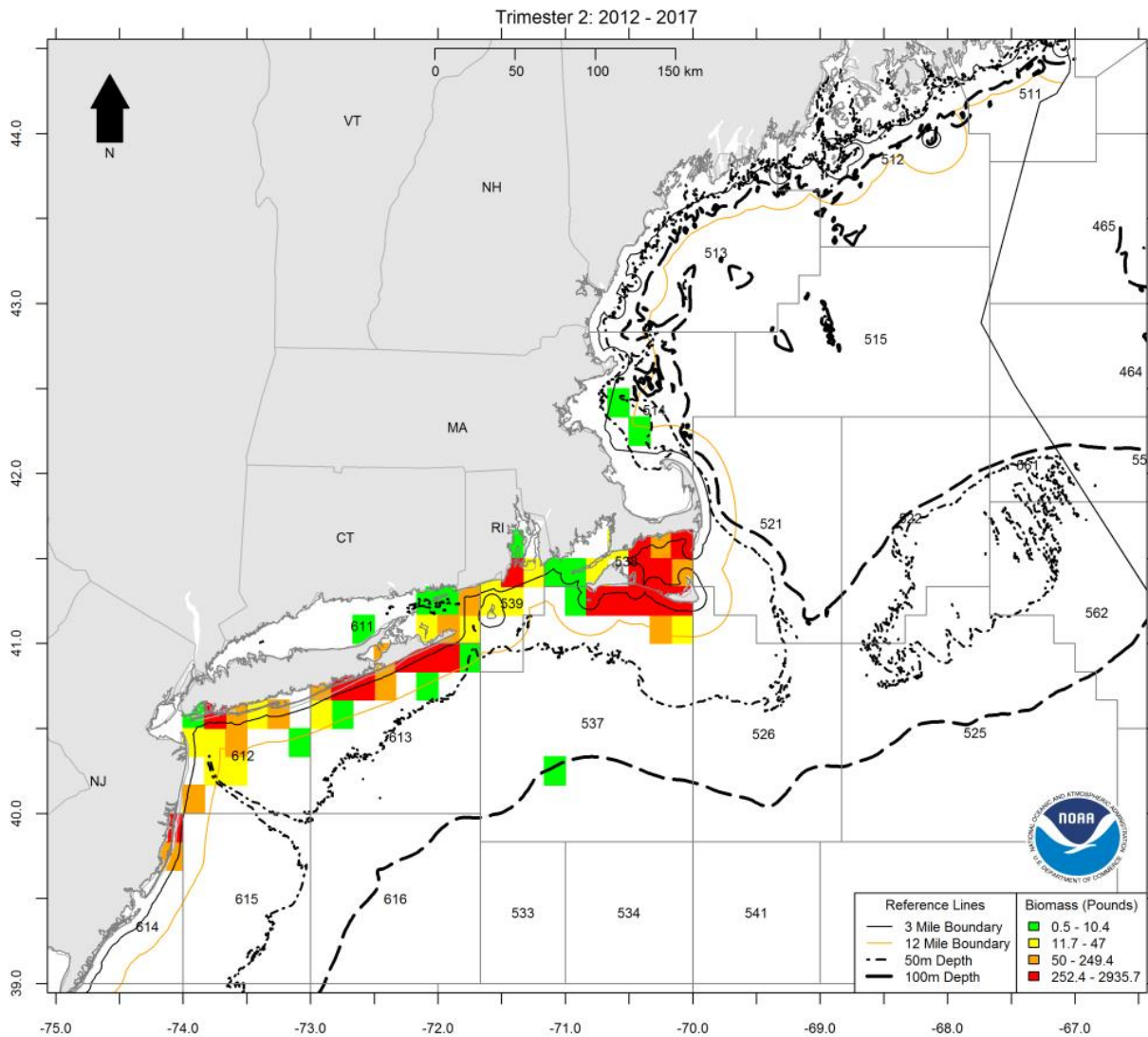


Figure 1. Longfin squid, *Doryteuthis pealeii*, egg bycatch (lbs) in bottom trawls, by ten-minute square (TNMS), during Trimester 2 of 2012-2017. The Trimester 2 egg bycatch comprised 96% of the year-round egg bycatch in bottom trawls during 2012-2017. Egg bycatch from each tow was summed by TNMS and 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.

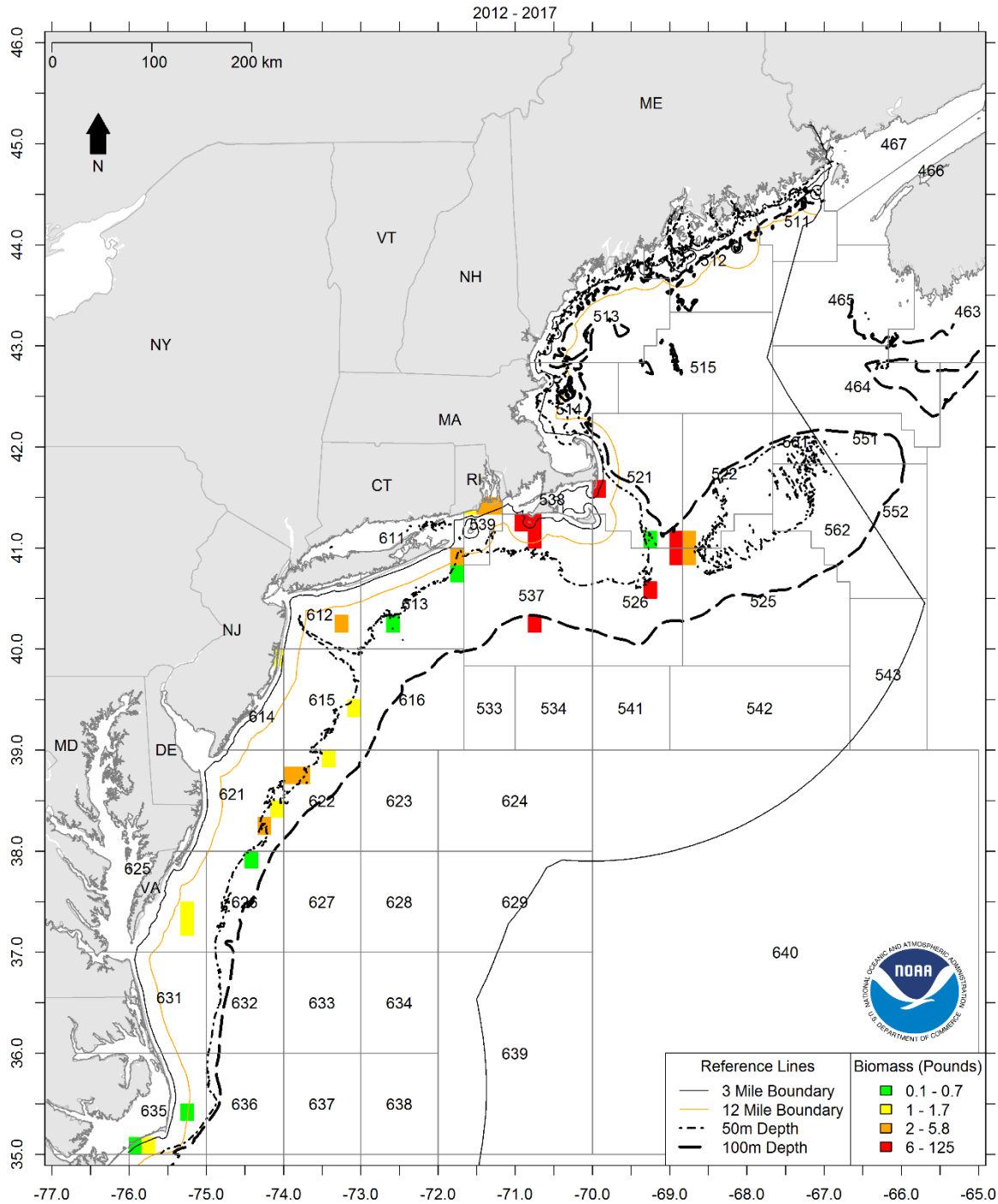


Figure 2.

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.

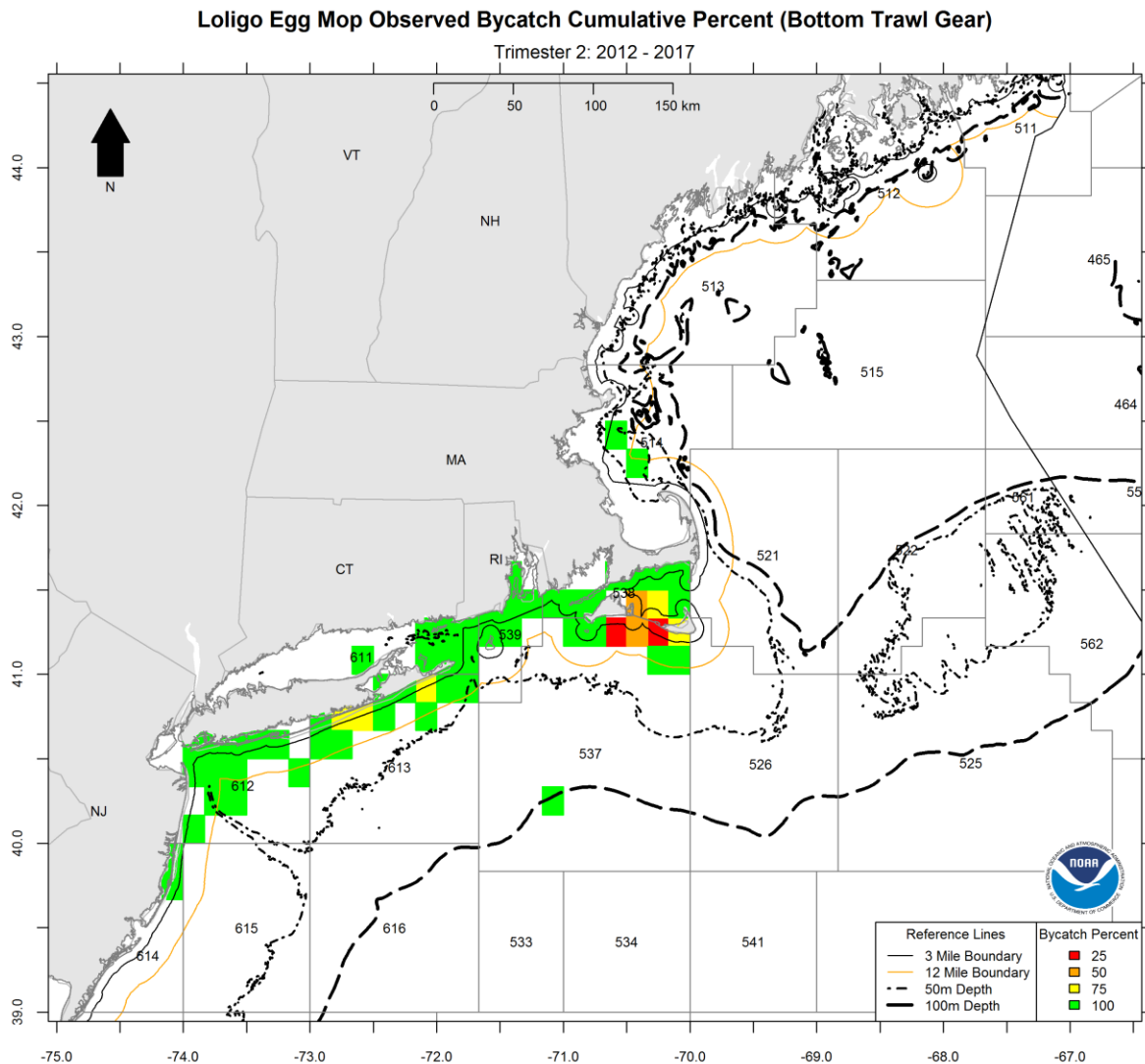


Figure 3. Longfin squid, *Doryteuthis pealeii*, egg bycatch (cumulative percent, in quartiles, by weight) in bottom trawls, by ten-minute square (TNMS), during Trimester 2 of 2012-2017. TNMSs shaded red contain the highest 25% of the cumulative total egg bycatch weight and TNMSs shaded orange contain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

2.5 FPR: Butterfish

The key points (not consensus positions) were:

Market Issues

-Low butterfish availability/abundance resulted in low landings in the 1990s and it has been very difficult to re-establish a market. It might take several years to re-establish export markets, but there are some indications that demand may be higher than anticipated. Traditional export food markets want fish caught in December-March (fat/roe/feed issues).

-Boats have been increasing fresh butterfish production relatively slowly so as to not crash the price. The fresh market has been absorbing surprising quantity of fish without price dropping.

-It is too early to determine how the markets will respond to U.S. butterfish in the long run. The fishery is totally market driven. The primary processor does have markets for fish.

-The 2017 and early 2018 fishery was by a few vessels and there is limited interest by most dealers. Low prices make it difficult for most to justify targeting butterfish. Good size but low fat content in early 2017 fish. 2017 could have been much higher already but processing any butterfish is still a speculative activity for some given the market but markets do exist for butterfish currently. Export fish need to be either frozen at sea or kept in refrigerated seawater to keep product quality high.

-The overall mentality for many is still to avoid butterfish.

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

Environmental/Ecological Issues

-For 2016/2017/2018 weather, typical mix of good and bad weather. Some particularly bad early 2018 weather.

-No major changes observed in butterfish availability.

-Dogfish continue to be a major problem.

-Butterfish abundance has been relatively high in the last few years compared to the early 2000s, both inshore and offshore.

-Some advisors indicated that precaution is warranted given butterfish's important role in the ecosystem as part of the forage base and given butterfish catches have been very low compared to recent projection results (and possible future catches).

-Some advisors 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 & Management Induced Effort Shifts

-The mesh requirement is holding landings back and causing regulatory discards. Need an analysis of any discards to determine cause – regulatory discarding may be a primary cause of discarding. The 2,500 pound trip limit for using <3-inch mesh was causing regulatory discarding. If you are out squid fishing and happen to come across some butterfish, having to discard does not make any sense. Focused butterfish fishing will probably use 3-inch mesh anyway. Less than 3-inch mesh is probably targeting something else and hitting butterfish incidentally - why not keep? Note: Effective May 26, 2016, moratorium permits can retain up to 5,000 pounds butterfish with under 3" mesh. 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 they have plans to do this analysis after a couple of 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.

Need to keep communicating butterfish rules and regs.

The Monument has been negatively impacting access to butterfish, especially large butterfish (and there's a price differential for small vs large butterfish).

Other Fishing Behavior Issues

-Low recent catches are not surprising given few participants and the developmental phase of the fishery and low prices compared to other species, especially given strong squid prices.

-Poor longfin squid fishing and/or herring/mackerel fishing pushed the vessels that did butterfish in early 2017 into butterfish as an alternative fishery.

-Meghan Lapp (public) reported that Jonah Crab gear is becoming an increasing problem for the butterfish fishery and pushing butterfish vessels out of traditional trawl grounds. The Jonah Crab fishery is virtually unregulated. There are many new participants who are setting gear without proper markings, etc, and it is becoming a bigger problem all the time. The boats don't know which side of a Jonah crab trawl is which, since they aren't marked properly, and if they are trying to tow around the Jonah crab trawl that is now in the middle of butterfish grounds, that's a problem. The Jonah crab fishery is taking over traditional butterfish grounds with improperly marked/set fixed gear.

Other Issues for Council/SSC Consideration as Appropriate

-There is concern about focusing on 1-year of recruitment data for 3-year specifications for a relatively short-lived species.

-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.

-Some but not all advisors think butterfish should qualify for an exemption to ACLs.

-Looking at only the Bigelow's area sample misses a substantial amount of butterfish habitat (NEAMAP is also used)

-The need for a discard cap on the longfin squid fishery appears questionable given the current butterfish ABC.

-The ability to balance quotas (and increase butterfish landings if a substantial part of the discard cap has not been used) late in the year is important since good quality butterfish start being available in December. (Framework 8 allows this and it was used in 2014).

-Cornell is examining mesh issues – preliminary data suggest 8cm square mesh and 8cm T-90 mesh could be

productive for eliminating small butterfish. More information should be available in final report (still pending).

-Squid trawl network still providing information on butterfish availability – negative reports are very important for operation of the avoidance network. (Network also provides bycatch updates for river herring/shad, yellowtail flounder, and windowpane flounder. Red hake and haddock are being added for small mesh fisheries on Georges Bank).

-State trawl data needs to be incorporated into the butterfish assessment. Staff notes state surveys were considered in the 2014 benchmark (ME-NH, RI, CT, NY, NJ, DE, NC, ChesMMAP) and reconsideration of using state surveys would require another benchmark assessment.

THIS IS THE END OF THIS DOCUMENT