



## New England Fishery Management Council

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### MEETING SUMMARY

#### Herring Plan Development Team

webinar

February 10, 2016

The Herring Plan Development Team (PDT) met on February 10, 2016 via webinar primarily to discuss the PDT tasking from the January 13 Herring Committee to provide data and analyses to support the localized depletion aspect of Amendment 8.

**MEETING ATTENDANCE:** Dr. Rachel Feeney (Herring PDT Interim Chairman), Ms. Deirdre Boelke (NEFMC staff); Mr. Daniel Luers, Mr. Brant McAfee, Ms. Carrie Nordeen (NMFS GARFO); Mr. Glenn Chamberlain, Dr. Jonathan Deroba, Dr. Min-Yang Lee (NEFSC); Mr. Matt Cieri (MEDMR); Mr. Micah Dean and Mr. Brad Schondelmeier (MADMF); Ms. Renee Zobel (NHFG); Dr. Madeleine Hall-Arber (MIT Sea Grant); and Ms. Ashton Harp (ASMFC). About 5 members of the public attended in listen-only mode.

#### **KEY OUTCOMES**

- Planning for what information the PDT will provide to support the March 29-30 meetings of the Herring Advisory Panel and Committee, focused on Amendment 8.

#### **OPENING REMARKS AND AGENDA REVIEW**

Interim PDT Chairman Dr. Feeney opened the meeting at 1:00 PM and reviewed the purpose of the meeting; there were no changes to the agenda.

#### **OUTCOMES FROM THE JANUARY 2016 HERRING COMMITTEE AND COUNCIL MEETINGS**

As discussed during the January 21, 2016 Herring PDT webinar, the PDT was tasked by the Herring Committee on January 13 with examining data relative to questions regarding localized depletion. On January 26, the Council moved to support conducting a Management Strategy Evaluation to support developing measures in Amendment 8 for the Acceptable Biological Catch control rule for Atlantic herring. The Council also tasked the Committee with developing a definition of localized depletion and a problem statement that related alternatives would address, as well as discussing a range of alternatives that includes specific examples identified through scoping. The Council agreed by consensus that the Herring Committee and PDT will focus on Amendment 8 and the herring and mackerel alternatives in the Industry-Funded Monitoring Omnibus Amendment through the April Council meeting; work on the haddock catch cap accountability measures would occur subsequently.

The PDT will focus on the Herring Committee tasking in the near term and does not anticipate discussing the localized depletion definition, draft problem statement, or alternatives considered by the Council on January 26 until after the Herring Committee has reviewed the progress on current tasking, likely at its March 30 meeting. Herring PDT input on the development of the Industry-Funded Monitoring Omnibus Amendment is not anticipated at this time.<sup>1</sup>

***TIMELINE OF UPCOMING HERRING-RELATED MEETINGS***

The PDT discussed the timeline of upcoming herring-related meetings. Documents in support of the March 29-30 meetings that will focus on localized depletion will ideally be distributed a week in advance, but will depend on when a full-day in-person PDT can be scheduled and how much subsequent work will be necessary.

Feb. 12	MSE workshop steering committee mtg
March 8	Target for sending docs to AP/Cte for Mar 15-16 mtgs
March 15	Herring AP mtg ó focus on herring/mackerel alternatives in IFM action
March 16	Herring Cte mtg ó focus on herring/mackerel alternatives in IFM action
March TBD	In-person PDT mtg ó Amendment 8
March 22	Target for sending docs to AP/Cte for Mar 29-30 mtgs
March 29	Herring AP mtg ó Amendment 8
March 30	Herring Cte mtg ó Amendment 8
April 19-21	Council mtg ó may select preliminary preferred alternatives in in the IFM action; discuss Amendment 8 progress

***PLANNING PDT WORK RELATED TO LOCALIZED DEPLETION***

The PDT discussed the tasking from the January 13 Herring Committee, to provide data and analyses to support the localized depletion aspect of Amendment 8. Data from 2015 is not available yet for use.

*TASK - Identify herring fishing locations, by season and gear type; identify any evidence of pulse fishing (i.e., multiple herring vessels in a concentrated time/area).*

Dr. Lee presented heat maps of herring revenue by midwater trawl vessels in 2000 and 2014 generated by the NEFSC Social Sciences Branch, using Vessel Trip Report (VTR) data combined with a statistical model based on matched VTR and observer data. The statistical model compares haul-level observer data with the VTR point location to model the probability that an observed haul is within a particular distance within a VTR point. The model results are then applied to the VTR data to construct concentric rings. This approach is a way to resolve the limitations of having one VTR point per trip.

Alternative versions of these maps can be generated for different gears and time intervals, and for all fisheries that are in the VTR database. Maps for quantities and effort (trips) are also readily available. They provide a description of where fishing is located. The lat/lon data of the trip is used along with other data, primarily days absent. This method does not just take a VTR point and expand it to a stat area, but takes into account the trip length, gear used, and general

<sup>1</sup> Not discussed on February 10, but the Council also passed a motion in support of using state portside data to monitor the bycatch caps of the herring fishery. The PDT anticipates that any additional work on this matter will be coordinated by GARFO, not the PDT, but likely involve several PDT members.

area of the ocean. All subtrips with a lat/lon point are used, not just observed trips. There is a NOAA technical memorandum on the model that includes a comparison of observed and unobserved trips (DePiper 2014).

The PDT noted that a major question from the last PDT meeting was whether the VTR position information could be used on a grid finer than statistical area. It appears that this probability mapping approach could be a good means to do so, but there should be caution in interpreting results and ensuring appropriate time scales are used. However, it would not help with catch per tow. The approach has not yet been used to look at finer temporal scales than a year.

Mr. Cieri then presented data on trips catching over 6,600 lb of herring from 2000-2014. Catch has remained relatively stable, while price per pound has generally increased. Since the Area 1A closure, the number of trips and active trips in June-September has decreased in that area. On an annual basis in Area 1A, most of the catch is now being harvested with purse seines. He presented maps of purse seine effort in Area 1A; there seems to be more effort to the south and west since 2008. He also looked at all catches since 2008 over 6,600 lb on the back side of Cape Cod; it is rare to have herring catches for more than 2-3 weeks in a row. This correlates with what is known about herring in that area, that it is used as a corridor and not a feeding ground. Catches there are predominantly in the spring and fall. He also mapped herring catch for each month throughout the range of the fishery, using the single VTR lat/lon point per trip as the location information.

The PDT felt that the maps generated with probability weighting may be more appropriate for the current tasking, but aspects of both approaches can be combined to form descriptions of fisheries. The causal tests that the Committee is interested in will be challenging. The PDT discussed whether the VMS data on vessel track lines (V-track) would be helpful, but it may not be necessary if the probably weighted maps are used. VTR data includes all herring vessels.

*TASK - Focused look within 12 nm territorial sea line. Identify areas within the 12-mile line where herring fishing seasonally intensifies (e.g., Ipswich Bay, Nantucket shoals). Determine and compare midwater trawl trip catches over time in each area, considering variation in tow-specific catches, accounting for tow time, number of tows and trip duration. Determine if, over the time of intensified fishing, catches could only be maintained by longer tows, more tows and/or longer trips, thereby indicting local depletion (e.g.,  $F$  much higher than  $F$  set for entire stock).*

The PDT noted that Study Fleet data may be useful for estimations of catch rates on a given trip, though only a subset of the fishery participates in Study Fleet. At this point, the PDT is uncertain how many herring trips that have participated in Study Fleet have occurred within 12 nm. Within 12 miles, there is very little trawl fishing for herring, except on the back side of the Cape, around Block Island, and in Area 1A (fall only). As noted earlier, herring fishing on the back side of the Cape is primarily done in the spring and fall and is episodic. The fishery around Block Island is primarily prosecuted in the winter, and is unlikely to have much interaction with other fisheries (e.g., tunas are only present from about May-September, primarily in the Gulf of Maine and Georges Bank).

*TASK - Identify predator fishery (e.g., striped bass, tuna) locations, by season and gear type.*

The PDT noted that it will be relatively simple to describe where and when fishing has occurred for predator fisheries to the degree that data is available. It will be a challenge to identify if and

how other fisheries have been impacted by herring catches. There are many constraints that determine where and when a fishery is prosecuted (e.g., area closures, weather windows, mobility of fish) that would need to be understood. Identifying correlations would be a logical first step prior, and then investigate whether there is causality to the correlations. The PDT discussed what data may be available for predator fisheries.

### *Striped bass*

There is no commercial fishery for striped bass in New Hampshire and Maine. The only data would be from the recreational fishery within state waters, collected through the Marine Recreational Information Program (MRIP). However, this includes no spatial data. The Massachusetts recreational and commercial fishery occurs within state waters, and the commercial fishery only occurs in the summer. There are 14 statistical areas within Massachusetts state waters that catch is reported for. The PDT could provide data on total catch and effort after 2010 by trip in the 14 state statistical areas. The data could be converted to same raster grid/time intervals that the probability mapping is done on. The PDT doubts there will be much herring removals in state waters to correlate against.

### *Bluefin Tuna*

Mr. McAfee contacted the GARFO Highly Migratory Species office, which indicated that the spatial data for the bluefin tuna fishery is pretty spotty. For the recreational fishery, there is no spatial data. The bluefin dealer data are reported by broad areas that do not correlate with statistical areas (i.e., 10 HMS areas from Gulf of Mexico to Canadian border). There are also pelagic logbooks used by general category vessels, but that does not capture the bulk of the bluefin fishery.

Dr. Feeney contacted Dr. Walt Golet (GMRI/UMO), who has not examined localized depletion questions specifically, but has done a lot of research on bluefin migration and diet. He has been given access by the fishermen and dealers to their logbooks, which has finer resolution spatial data than what is submitted to NMFS. Aggregations of bluefin have been linked to aggregations of herring, though not all herring aggregations have bluefin present (Schick & Lutcavage 2009). Bluefin rely on herring for a substantial portion of their diet and come to the Gulf of Maine specifically to feed on herring (e.g., Golet et al. 2013). Bluefin has declined in mean weight over time, and it appears this is connected to herring weight decline, despite high herring abundance (Golet et al. 2015). Dr. Golet indicated that an investigation of localized depletion would be possible, but would involve using acoustics in addition to the logbook data, be a long-term project, and involve a diverse array of investigators to ensure that causality is appropriately identified.

### *Groundfish*

The PDT is not aware of pre-existing maps of groundfish fishing locations that would be comparable to the maps the PDT will generate for the herring fishery (the approach presented by Dr. Lee). Recreational information is more limited. Through public comment at Council meetings, Mr. Patrick Paquette has indicated that recreational catch information is published in fishermen's magazines, though it may take some effort to see what is useable. There may be specific studies to draw from (e.g., Stellwagen Bank National Marine Sanctuary and Mass. Oceans Partnership reports). Dr. Feeney can follow-up with him.

### *Whale watch*

Dr. Feeney contacted Ms. Allison Rosner (GARFO protected species office) and Mr. Zach Klyver (Herring AP member; Bar Harbor Whale Watch Company). Whale watch companies do not report to NMFS where they go and what protected species they see, though many if not all vessels carry naturalists on board to collect data. Mr. Klyver's company has been collecting data (number of humpbacks and finbacks, location and date) since the 1990s, but in 2003, started carrying scientists from Allied Whale on every trip. Their data is digitized, but he was not sure of the format. The Blue Ocean Society and The Whale and Dolphin Conservation provide scientists for trips by other companies to Jeffries Ledge and Stellwagen Bank. The PDT viewed the Northeast Ocean Data Mapping portal, which has both herring fishing and whale watch data on maps (<http://j.mp/1NUHkXw>).

*TASK - Repeat the preliminary PDT analysis, examining Area 1A in the years prior to 2006 (i.e., Amendment 1) and examining catch of predators in the second week after herring catches (across the full time range).*

Dr. Deroba indicated he can address this.

*TASK - How much herring is set aside currently to account for the forage needs of predators? What is the best estimate of how much herring is needed for forage?*

Dr. Deroba indicated he can address this; much of this information is in the latest Atlantic herring stock assessment. The PDT noted that the EBFM PDT report from spring 2015 contains some information as well.

*TASK - Examine predator/prey relationships between cod and herring in Ipswich Bay.*

The PDT had no further discussion of this task. There is limited diet data in the NMFS surveys. There may be published studies that could be referenced.

*TASK - Examine ideas for analysis identified in the public scoping comments for Amendment 8.*

Dr. Hall-Arber identified the following topics within the scoping comments. The PDT felt that there is not enough time to investigate these topics prior to the next round of Herring AP and Committee meetings, but perhaps these could be tasked to the PDT in the future.

- Stock assessment/modeling
  - Determine why there is a retrospective pattern in the stock assessment.
  - Revise modeling based on closer to real-time data (not 2-3 year lag).
- Formally explain and/or determine how much herring is used by predators.
  - Consider differences in age/size/nutritional value for different predators.
  - What other species are alternative prey? Is there a difference in their ability to fulfill prey role?
  - Role of herring in the ecosystem.
  - What is required to measure/account for scientific uncertainty?
- Look at the effects of inshore closures waters to herring fishing (Area 1A, Canada)
- Where is midwater trawling allowed world-wide; where is it banned? What has been the effect?

- Consider socio-economic impacts on businesses and communities of changes in herring regulations, considering economic value of other businesses that depend on herring (tuna, whale watch, recreational fishing).
- Devise tools to analyze localized depletion.
- Has abundance of herring declined inshore (e.g., off Nantucket)?
- Historical reconstruction of environmental factors such as ocean temperatures, salinity, shifts in oceanic and climatic regimes (here and elsewhere) to determine impacts on pelagic species.
- Better understand herring schooling behavior.
- Are the effects of herring seining different from midwater trawling? Why/How?

*TASK - Examine potential impacts (biological, economic, social) to different fisheries (herring, tuna, striped bass, etc.) of closing the following 30-minute squares to midwater trawl gear year-round: 99, 100, 114, 115, and 123. Calculate the percent of the total Atlantic herring stock area that these 30-minute squares comprise.*

In the mapping work the PDT intends to do, the fishing that occurs in those squares can be identified. The PDT assumes this is addressing importance of these areas relative to where the fishery is pursued.

#### *Next steps*

The PDT identified what it aims to accomplish prior to the end of March on the above tasks.

- Probabilistic maps/model (Dr. Lee lead). Identify herring and predator (e.g., cod) fishing activity. Need to provide general overview of where/when the fisheries occur. Identifying overlaps may indicate where/when user conflicts occur. Identifying where/when herring fishing occurs followed by no predator fishing may help focus subsequent efforts to identify reasons why there was no predator fishing.
  - Removals by year. Map for each year, herring and predator identified by different colors/symbols.
  - Removals by season. Map for each season, all years combined, herring and predator identified by different colors/symbols.
  - Removals by herring gear type. Map for each year/season, gear types identified by different colors/symbols.
  - Identify where/when there is herring and predator catch within 12 miles of shore.
  - Identify the amount of catch in in 30 minute squares: 99, 100, 114, 115, and 123, and the proportion of these areas to the total stock area.
- Characterizing herring fishing effort (Mr. Cieri lead).
  - Figures of trips catching over 6,600 lb of herring from 2000-2014. Catch price per pound, gear type, effort in Area 1A.
  - Effort on the back side of the Cape since 2008. Gear type, catch by week.
- Characterizing/mapping the MA striped bass fishery (Mr. Dean lead).
- Characterizing the tuna fishery (Dr. Feeney/Mr. McAfee lead).
  - Summarize NMFS information.
  - Literature review (tuna-herring interactions).
- Characterizing the whale watch industry (Dr. Feeney lead).

- Follow-on work from preliminary PDT data analysis (Dr. Deroba lead).
- Summarize state of knowledge of how much herring is needed by predators and how that is accounted for (Dr. Deroba lead).

#### ***UPDATE ON MANAGEMENT STRATEGY EVALUATION***

Dr. Feeney updated the PDT that since the January Council meeting, planning has continued for the Management Strategy Evaluation of Acceptable Biological Catch control rules for Atlantic herring. A steering committee has formed to organize the public workshop on developing objectives, including Mr. Peter Kendall (Herring Committee Chairman), Dr. Sarah Gaichas and Dr. Deroba (NEFSC), and Ms. Boelke and Dr. Feeney (NEFMC staff). The first committee meeting will be on February 12. Given the need to vet workshop results through the PDT, Herring Advisory Panel, and Herring Committee, prior to Council consideration, and the other herring-related meetings and worked planned for the next few months, the workshop and subsequent vetting will not occur prior to the April Council meeting.

#### ***OTHER BUSINESS***

There was no other business. The meeting adjourned at 3:10 PM.

#### ***REFERENCES***

- DePiper GS. (2014). *Statistically Assessing the Precision of Self-reported VTR Fishing Locations*. Woods Hole (MA): USDo Commerce. NOAA Technical Memorandum NMFS-NE-229. 22 p.
- Golet WJ, Galuardi B, Cooper AB & Lutcavage ME. (2013). Changes in the distribution of Atlantic bluefin tuna (*Thunnus thynnus*) in the Gulf of Maine 1979-2005. *PLoS ONE*. 8(9): e75480.
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