



New England Fishery Management Council

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MEMORANDUM

DATE: February 19, 2020
TO: Herring Committee
FROM: Herring Plan Development Team (PDT)
SUBJECT: **2020-2024 Council Research Priorities Related to Herring**

The Herring PDT recommends updates to the herring-related Council research priorities for consideration by the Herring Committee ahead of the Council decision on the 2020-2024 Council Research Priorities, scheduled for the April 2020 Council meeting.

The 2019-2023 Council Research Priorities included 16 directly related to herring and several that are broader in scope that are also important to herring. The PDT has reviewed these and recommends three new priorities be added. Details and rationale are in Table 1. Green bold text are proposed additions, red strikethrough are proposed deletions, and comments are in blue text.

SSC Recommendations. In March 2019, during the 2019-2023 research priority setting process, the Scientific and Statistical Committee (SSC) noted that it periodically makes research recommendations and that these should be considered by the Council for addition to its research priority list.

In October 2018, the SSC made the following recommendation:

1. Further investigation into understanding the recent low recruitment of Atlantic herring and possible drivers.

Herring PDT recommendations. The Herring PDT agrees with the SSC recommendations.

The following research recommendations were developed by the Herring PDT and included in Section 6.0 of the final Georges Bank spawning discussion document

(https://s3.amazonaws.com/nefmc.org/2_Herring-Spawning-Review-191122.final.pdf):

1. Enhance portside sampling efforts to increase the number of samples from Georges Bank.
2. Develop a new spawning survey of Atlantic herring on GB (i.e. acoustic survey like overall design previously conducted by NEFSC on GB).
3. Examine the feasibility of collecting spawning data at-sea by observers and ASMs, and on land by portside samplers.

When the Council conducted a debrief of the Herring Management Strategy Evaluation used in Amendment 8, the Herring PDT identified over a dozen specific improvements that could be explored for updates to the current MSE models. These are listed in Section 4.11 of the final report (https://s3.amazonaws.com/nefmc.org/3_Herring-MSE-debrief-final-report.pdf).

These PDT recommendations are included in Table 1.

NEFSC notes. In February 2020, the Northeast Fisheries Science Center provided to Council staff notes on what research it is doing that may meet the Council research priorities. The notes related to the herring priorities are included in Table 1

Table 1 – DRAFT herring-related updates from the 2019-2023 Council research priorities

	Title	Description, rationale, potential use	Priority	Status	FMP	Species	Broad categories	Cross-listing	Notes
NEW	Further investigation into understanding the recent low recruitment of Atlantic herring and possible drivers.		Urgent (essential)	unknown	Atlantic herring	Atlantic herring	Population dynamics	unknown	The SSC recommends adding this.
NEW	Enhance herring fishery sampling (portside, at-sea observers and monitors) to track spawning activity on GB	Increase number of samples and sample for spawning condition	Urgent (essential)	Not begun	Atlantic herring	Atlantic herring	Population dynamics	unknown	See NEFMC (2019) for details. The Herring PDT recommends adding this.
NEW	Improve herring, ecosystem and economic models	For future herring MSE work	Important (near term)	underway	Atlantic herring	Atlantic herring	Population dynamics, Human dimensions, Ecosystems	unknown	See Herring MSE debrief report for details. The Herring PDT recommends adding this.
2	Continue development of hydroacoustic surveys and other resource surveys of pelagic species to provide an independent means of estimating stock sizes and/or defining localized depletion (long-term research e.g., spawning survey for herring on GB).	This priority has two parts: to help evaluate status of resource with acoustic surveys and to see if that tool could be useful for defining localized depletion.	Important (near term)	underway	Atlantic herring	Atlantic herring	Fish surveys	assessment, RSA	An RSA project looked at defining localized depletion (Stockwell et al., 2009), but the work was not completed due to issues securing the research funds. It did test the utility of that survey technology. No other NEFSC efforts since. A 2013 S-K project on herring acoustic survey. NEFSC made note additions. See NEFMC et al (2019) for details on a GB spawning survey. The Herring PDT recommends highlighting this need.

	Title	Description, rationale, potential use	Priority	Status	FMP	Species	Broad categories	Cross-listing	Notes
3	Investigate availability and detectability of Atlantic herring in the NEFSC spring and fall trawl survey to evaluate how well the survey detects herring.	Evaluating how well the bottom trawl survey detects herring could be useful for assessing herring biomass and if it changes over time (i.e., depth preferences).	Important (near term)	underway	Atlantic herring	Atlantic herring	Fish surveys	unknown	The 2018 assessment evaluated depth preference. NEFSC compared acoustic data between bottom trawl surveys and dedicated herring surveys (Jech & Sullivan, 2014). Current assessments incorporate estimates derived from acoustic data collected during the bottom trawl surveys. Personnel changes in Study Fleet have slowed the exploration of commercial data to inform this topic, but should resume in 2020. data may help identify depth preferences and trends. NEFSC added this note.
8	Investigate stock definition, stock movements, mixing, and migration through tagging studies, DNA markers, morphological characteristics and other means for Atlantic herring.	To improve data on estimate of herring biomass and to support herring management under sub-ACL management by area.	Urgent (essential)	underway	Atlantic herring	Atlantic herring	Population dynamics	assessment , RSA	2018 assessment explored a multi-stock model but data were insufficient to estimate movement or relative stock composition. NEFSC proposals for funding to conduct otolith microchemistry have not been successful. NEFSC doing generic research on the consequences of ignoring stock structure. NEFSC added this note. Status changed from "not begun" to "underway".
14	Calculate and/or improve river herring and shad life stage-specific estimates of range-wide natural and human mortality rates, including fishing.	Would improve RH/S stock assessment.	Important (near term)	unknown	Atlantic herring	River herring, Shad	Population dynamics	TEWG	A TWEWG synthesis is being prepared. NEFSC staff involved in shad assessment. NEFSC added this note.
15	Collect information on the marine phases of river herring and shad specific to migrations at sea.	Data would improve RH/S stock assessment on determining: 1) river origin of individual catch in coastal/ocean (independent surveys,	Important (near term)	underway	Atlantic herring	River herring, Shad	Population dynamics	TEWG	Turner et al and Lynch et al published several papers on at-sea distributions. NEFSC added this note. Status changed from "not begun" to "underway".

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		tagging) and in non-targeted ocean fisheries; and 2) marine survival.							
19	Explore the sources of uncertainties in Atlantic herring stock assessments, including retrospective patterns, and identify appropriate adjustments (e.g., data or modeling revisions) to resolve those patterns.	To improve data on estimate of herring biomass.	Strategic (future needs)	underway	Atlantic herring	Atlantic herring	Stock assessment	unknown	Very large topic for all assessments, challenging to resolve. This could be explored during the Atlantic herring management track assessment. NEFSC added this note.
20	Improve and standardize data collection methods for river herring and shad stocks.	Needed for management & assessment of RH/S (e.g., for catch caps). Useful beyond Herring FMP.	Urgent (essential)	underway	Atlantic herring	River herring, Shad	Stock assessment	TEWG	No NEFSC scientists working on this but are involved in ASMFC assessment. NEFSC added this note.
21	Develop biological benchmarks used in RH/S assessment modeling and management.	Needed for management & assessment of RH/S (e.g., for catch caps). Useful beyond Herring FMP.	Urgent (essential)	underway	Atlantic herring	River herring, Shad	Stock assessment	TEWG	NEFSC scientists involved in ASMFC assessment. NEFSC added this note.
31	Analysis of previous actions implemented in the Herring FMP to determine if they have been effective and are meeting intended goals.	A MSE-like study may be appropriate.	Important (near term)	not begun	Atlantic herring	Atlantic herring	Fisheries management	unknown	This priority was added in 2019. NEFSC added description.
52	Identify spawning components on a spatial and temporal scale for Atlantic herring and define whether localized depletion has negative impacts on spawning capacity.	Progress on acoustics and stock mixing herring research priorities would help with this priority.	Important (near term)	unknown	Atlantic herring	Atlantic herring	Fishery performance & monitoring	unknown	NEFSC contributed data to related GMRI study. NEFSC added this note.
53	Investigate Atlantic herring fishery fleet behavior and decision-making with respect to their relationship to population dynamics, closed areas, catch rates, etc.		Strategic (future needs)	not begun	Atlantic herring	Atlantic herring	Fishery performance & monitoring	unknown	Generally lower priority, not very clear what main objective is here. Could help evaluate current and future management measures. No NEFSC work. NEFSC added this note.

	Title	Description, rationale, potential use	Priority	Status	FMP	Species	Broad categories	Cross-listing	Notes
57	Identify gears and/or methods that would reduce bycatch and/or improve discard survival of unwanted catch, that may change the ratio of component catch species or improve size and species selectivity of gear for monkfish, herring and skates.		Important (near term)	underway	Monkfish, Atlantic herring, Skates	Monkfish, Atlantic herring, Skates	Bycatch	RSA	A 2013 S-K project on reducing sturgeon bycatch in monkfish gillnet. Outside NEFSC expertise. NEFSC added this note.
58	Collect data on discards of other clupeids in the A. herring and other fisheries; develop improvements to river herring/shad catch estimation methods in the A. herring fishery.	Improve monitoring and reduce bycatch.	Important (near term)	underway	Atlantic herring	River herring, Shad	Bycatch	TEWG	The PS program collects catch and discard data in the A. herring fishery. This could be expanded to other fisheries, but that is outside the scope of the current herring PS program. The process was peer reviewed and deemed sufficient for catch cap monitoring with no changes recommended. NEFSC using EM to look at slippage issues. NEFSC added this note.
59	Continue River Herring Bycatch Avoidance Program in the Atlantic herring fishery and develop or evaluate innovative approaches for avoidance or monitoring river herring/shad catch in small mesh fisheries (e.g., bycatch avoidance, environmental cues, electronic monitoring, portside sampling).		Important (near term)	underway	Atlantic herring	River herring, Shad	Bycatch	TEWG, RSA	Council maintained this as a research priority for 2019-2021 RSA. Ongoing research by Turner et al. NEFSC added this note.
65	Data collection efforts for improved social and economic impact analyses, as well as cost-benefit analysis, for all fisheries, but particularly groundfish and Atlantic herring.	Some of this is done but need more fixed cost info.	Important (near term)	underway	Northeast multispecies, Atlantic herring, Multiple	Groundfish, Atlantic herring, Multiple	Human dimensions	unknown	2013 and 2017 S-K projects on groundfish communities. For herring, some work was done for the IFM amendment. NEFSC SSB data collection efforts continue (e.g., crew survey, income survey). NEFSC added this note.

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79	Synthesize predator/prey information on A. herring and other forage fish, fill data gaps; investigate the role of forage fish in the Northwest Atlantic ecosystem and their importance for other managed species; assess the relative importance of herring vs. other forage as both prey and predator in the ecosystem (e.g., competition with right whales and juvenile cod for <i>C. finmarchicus</i>).	Information is needed to develop ecosystem management tools and approaches.	Important (near term)	underway	Atlantic herring	Atlantic herring	Ecosystems	unknown	Amendment 8 MSE and 2018 herring assessment looked at some of this but not all. For example, the food web model explored in MSE. Deroba et al (2019) . NEFSC working on long-term ecosystem research. NEFSC added this note .