

1.1 HERRING FIVE-YEAR RESEARCH NEEDS

The Council identifies research needs through its five-year research priority setting process. This list was last updated in September 2017, and the needs related to Atlantic herring are in Table 160. Further information is available at: <https://www.nefmc.org/library/nefmc-research-priorities-and-data-needs-for-2017-2021>.

Herring AP/Cmte –

The PDT reviewed these priorities, and recommended seven modifications. The Council has decided to review research priorities on an annual basis, so each spring moving forward the PDT will be requested to review the status and relevance of these research priorities. Please review this input and discuss whether you agree with these recommendations. The SSC and Council are scheduled to review this for all FMPs by the April 2019 Council meeting.

1.2 HERRING RSA PRIORITIES

The Council also identifies research priorities for the Herring Research Set-aside program. The RSA program for herring began in 2007 and the Council sets aside 0% to 3% of the Annual Catch Limit from each herring management area to support research identified by the Council as priority projects. NOAA Fisheries manages the RSA competition and administers the program. The Council approved the priorities below for the 2019-2021 announcement in December 2017. The list was expanded from the previous RSA priorities for 2016-2018 to specifically include the desire to fund projects that better define localized depletion.

The 2019-2021 RSA priorities, in no priority order, are:

- **Portside sampling and bycatch avoidance projects** primarily related to haddock and river herring/shad;
- **Stock structure and spatial management projects** – in particular, continued work on: (a) distinguishing among subcomponents of the herring resource – Gulf of Maine, Georges Bank, and Southern New England – and identifying stocks of origin from mixed catches, (b) identifying the relative size of stock components, movements, and mixing rates, (c) ascertaining the degree of homing, and (d) investigating potential effects of climate change;
- **Research spawning dynamics**, including projects related to life history, gear interactions, and spatial patterns, including studies to evaluate whether gear interactions disrupt spawning and negatively affect recruitment due to egg disposition and survival;
- **Localized depletion** studies to evaluate the influence of potential localized depletion of herring on predators; and
- Projects designed to evaluate **discard rates and mortality of released fish** in the purse seine fishery.

Table 1 - Council research priorities and data needs related to Atlantic herring, 2017-2021

#	Title	Description, rationale, potential use	Priority	Status	Cross-listing	Notes
3	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).	This priority has two parts, the first to help evaluate status of resource with acoustic survey and the second to see if that tool could be useful for defining localized depletion.	Important (near term)	underway	assessment, RSA	One RSA project looked at defining localized depletion, but the work was not completed due to issues securing the research funds. It did test the utility of that survey technology. A 2013 S-K project was funded to support a herring acoustic
4	Develop fishery acoustic indices for herring, and develop a volume to weight conversion factor for herring target strength relevant for Atlantic herring.	To improve data on estimate of herring biomass.	Important (near term)	underway	unknown	This is similar to Priority #3 on acoustics. The 2018 assessment did include a relative index for herring using acoustics, but not an absolute index.
5	Investigate availability and detectability of Atlantic herring in the NEFSC spring and fall trawl survey in terms of evaluating how well the bottom trawl survey detects herring.	If this priority means evaluating how well the bottom trawl survey detects herring, that could be useful for assessing herring biomass and if it changes over time (i.e. depth preferences).	Important (near term)	underway	unknown	The 2018 assessment did evaluate depth preferences but results not conclusive yet. There may be useful info from commercial data (Study Fleet) to get at question of depth preferences and trends. ##4

Commented [DB1]: PDT Recommendation #1: Remove this research need. A relative index from acoustic data has been developed and an absolute index may not be critical.

9	Further investigations into 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)	not begun	assessment, RSA	
15	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	TEWG	
16	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, tagging) and in non-targeted ocean fisheries; and 2) marine survival.	Important (near term)	unknown	TEWG	
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	unknown	Very large topic for all assessments, challenging to resolve.
21	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	TEWG	
22	Develop biological benchmarks for RH/S used in assessment modeling and management.	Needed for management & assessment of RH/S (e.g., for catch caps). Useful beyond Herring FMP.	Urgent (essential)	underway	TEWG	

Commented [DB2]: PDT Recommendations #2 – Review research recommendations from recent RH/S assessments and consult with TEWG on data gaps.

44	Improve sampling for commercial A. herring including support for portside sampling and bycatch avoidance programs, catch at age data (e.g., cooperative NMFS industry programs to supplement port agent efforts), with an emphasis on bycatch (incl. incidental catch).		Strategic (future needs)	underway	unknown	This priority is unclear. Catch at age data are not critical for this species - lots of data already collected. If this is about bycatch port sampling, that has higher relevance.
46	Define localized depletion of 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 other herring research priorities on acoustics and stock mixing would help with this priority.	Important (near term)	unknown	unknown	
47	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	unknown	Generally lower priority, not very clear what main objective is here. Could help evaluate current and future management measures.
59	Investigate portside sampling & electronic monitoring as tools to monitor the A. herring fishery.	Improve monitoring	Important (near term)	underway	unknown	Pilot study recently funded for MWT fishery.
60	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	TEWG	The PS program is currently collecting catch and discard info in the Atlantic herring fishery, this could be expanded to other fisheries, but outside the current scope of the herring PS program. The process was NMFS had a discard peer reviewed and deemed sufficient for catch cap monitoring and no changes recommended. ↪ look at this.

Commented [DB3]: PDT recommendation #3 – Remove this priority because it is redundant with #61 and part about catch-at-age is not needed; this resource has plenty of catch at age data already.

Commented [DB4]: PDT Recommendations #4 – Remove this priority. Sufficient work has been done on this topic to date and peer review found that PS/EM sufficient for catch cap monitoring.

61	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., environmental cues and bycatch avoidance, electronic monitoring and portside sampling).		Important (near term)	underway	TEWG, RSA	Council maintained this as a research priority for 2019-2021 RSA.
85	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 C. finmarchicus).	Information is needed to develop ecosystem management tools and approaches.	Important (near term)	underway	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.
97	Investigate protected species bycatch/discards in the Atlantic herring fishery.		Strategic (future needs)	underway	unknown	Observers collect these data. EM has proven useful. A8 included a summary of all observed takes to date by gear, area, and species.

Commented [DB5]: PDT Recommendations #5 – All observed bycatch of protected species are summarized in Council actions. Amendment 8 most recently included detailed tables and figures of takes by gear, area and year. What specifically needs to be investigated? What is not known?

102	<p>For the Atlantic herring fishery: (1) Characterize the individuals, families, firms, organizations, and communities involved in the Atlantic herring fishery; (2) Identify capacity use and fixed costs of Atlantic herring vessels; (3) Characterize Atlantic herring stakeholders besides those of the commercial herring fishery (e.g., whale watching, tuna, groundfish, lobster fisheries); (4) Characterize Atlantic herring dealers and processors (e.g., dependence on herring, location, costs, earnings, employment); and (5) Characterize market dynamics (e.g., relationships between fishermen, buyers, and processors; and end users in bait and fresh markets).</p>	<p>Some of this is done but more info always useful. Amendment 8 did expand the description of other stakeholders in the Herring FMP, but there are data limitations. Areas that need the most attention are (2) and (5); the other subjects were updated in Amendment 8 relatively thoroughly.</p>	Strategic (future needs)	underway	unknown	
-----	---	---	--------------------------	----------	---------	--

Commented [DB6]: PDT recommendation #6 – Remove this item. Many of these have been updated extensively in Amendment 8. Some data are still limited to get at everything, especially (2) and (5), but most of these have been evaluated to the extent practicable. The PDT supports development of a more holistic priority that would look at costs, fishing communities, and relationships between various users overall, not just specific to herring.

Herring PDT Recommendations for 5-year research priorities

1. PDT recommends removing #4 from a stock assessment perspective. We have a relative index and having an absolute is not critical.
2. Council should review the latest RH/S assessments for data gaps and update these priorities to be consistent, could also consult with TEWG periodically on RH/S priorities.
3. Remove #44 because redundant with #61 and details about more catch at age data is not necessary for this fishery.
4. PDT recommends removing #59. Pilot study was completed, peer reviewed, and EFP is underway and adjustments could be made during implementation of IFM. The Amendment is scheduled to review EM/PS requirements in two years so this will all be reviewed.
5. PDT recommends removing #97 – Amendment 8 includes tables, figures, and text about bycatch/discards of protected species. What else needed? Not clear what this is getting at?
6. PDT recommends removing #102 and would support more holistic work across FMPs.
7. PDT recommends consideration of a new research priority that would be:

Analysis of previous actions implemented in the Herring FMP – have they been effective, are they meeting intended goals?