

# Research Priorities and Recommendations to Support Interjurisdictional Fisheries Management

## RIVER HERRING

(Full Citation: Atlantic States Marine Fisheries Commission. 2012. River Herring Benchmark Stock Assessment. Atlantic States Marine Fisheries Commission. Arlington, VA.)

### Assessment

- Improve methods to develop biological benchmarks used in assessment modeling (fecundity-at-age, mean weight-at-age for both sexes, partial recruitment vector/maturity schedules) for river herring stocks. (short term, moderate priority)
- Explore use of peer-reviewed stock assessment models for use in additional river systems in the future as more data become available. (long term, moderate priority)
- Analyze the consequences of interactions between the offshore bycatch fishery and population trends in the rivers. (short term, high priority)

### Implementation

- Develop better fish culture techniques and supplemental stocking strategies for river herring. (long term, low priority)
- Encourage studies to quantify and improve fish passage efficiency and support the implementation of standard practices. (long term, high priority)

### Population Dynamics

- Investigate contribution of landlocked versus anadromous produced fish. (long term, low priority)
- Continue genetic analyses to determine population stock structure along the coast and enable determination of river origin of incidental catch in non-targeted ocean fisheries. (short term, high priority)
- Determine and quantify which stocks are impacted by mixed stock fisheries (including bycatch fisheries). Methods to be considered could include otolith microchemistry, oxytetracycline otolith marking, genetic analysis, and/or tagging. (long term, high priority)

- Develop models to predict the potential impacts of climate change on river herring distribution and stock persistence. (short term, low priority)
- Validate [better estimate] the different values of natural mortality ( $M$ ) for river herring stocks and improve methods for calculating  $M$ . (long term, high priority)
- Continue to assess current ageing techniques for river herring, using known-age fish, scales, otoliths, and spawning marks. (short term, high priority)
- Conduct biannual ageing workshops to maintain consistency and accuracy in ageing fish sampled in state programs. (long term, high priority)
- Summarize existing information on predation by striped bass and other species; quantify consumption through modeling (e.g., MSVPA), diet, and bioenergetics studies. (long term, moderate priority)
- Investigate the relation between juvenile river herring production and subsequent year class strength, with emphasis on the validity of juvenile abundance indices, rates and sources of immature mortality, migratory behavior of juveniles, and life history requirements. (long term, high priority)
- Evaluate the performance of hatchery fish in river herring restoration. (long term, low priority)

### **Monitoring**

- Improve reporting of harvest by waterbody and gear. (short term, high priority)
- Investigate additional sources of historic catch data of the U.S. small pelagic fisheries to better represent or construct earlier harvest of river herring. (short term, moderate priority)
- Develop and implement monitoring protocols and analyses to determine river herring population responses and targets for rivers undergoing restoration (dam removals, fishways, supplemental stocking, etc.). (short term, high priority)
- Develop comprehensive angler use and harvest survey techniques for use by Atlantic states with open or future fisheries to assess recreational harvest of river herring. (long term, low priority)
- Expand observer and port sampling coverage to quantify additional sources of mortality for alosine species, including bait fisheries, as well as rates of incidental catch in other fisheries. (long term, high priority)
- Evaluate and ultimately validate large-scale hydroacoustic methods to quantify river herring escapement (spawning run numbers) in major river systems. (long term, moderate priority)

- Explore the sources of and provide better estimates of incidental catch in order to reduce uncertainty in incidental catch estimates. (short term, high priority)
- Develop bottom and mid-water trawl catch-per-unit-effort (CPUE) indices of offshore biomass. (short term, moderate priority)
- Consider the use of generalized linear models (GLM) to provide better trend estimates and to better characterize uncertainty in trends. (short term, moderate priority)