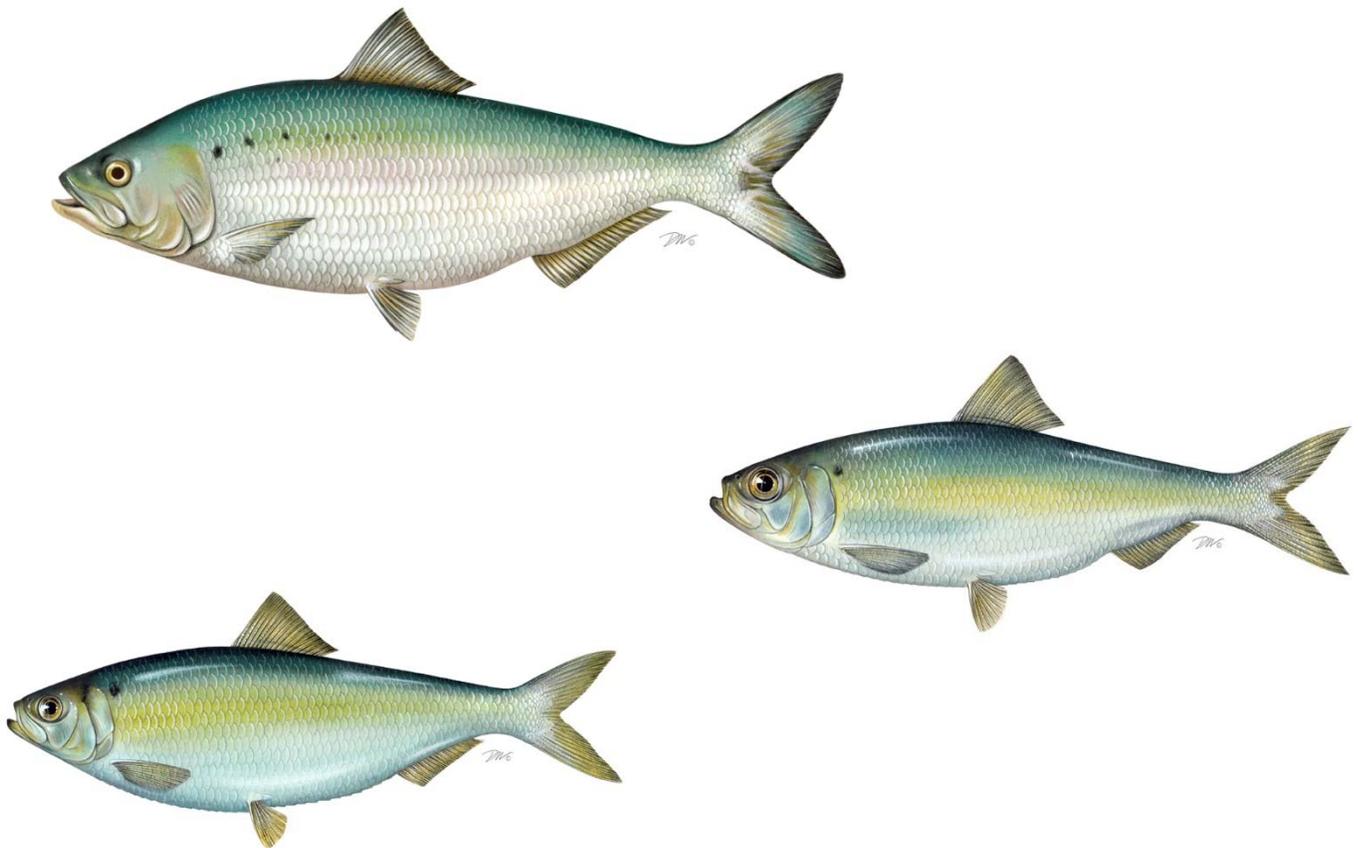


**REVIEW OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
FISHERY MANAGEMENT PLAN FOR
SHAD AND RIVER HERRING (*Alosa spp.*)
2015**



Approved May 2016

Shad & River Herring Plan Review Team

Kirby Rootes-Murdy, Atlantic States Marine Fisheries Commission (Chair)
Mike Dionne, New Hampshire Fish and Game Department
Heather Corbett, New Jersey Division of Fish and Wildlife
Phil Edwards, Rhode Island Division of Fish and Wildlife
Genine Lipkey, Maryland Department of Natural Resources
Derek Orner, NOAA Fisheries

**REVIEW OF THE ASMFC FISHERY MANAGEMENT PLAN FOR
SHAD AND RIVER HERRING (*Alosa spp.*)**

I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	October 1985
<u>Amendments:</u>	Amendment 1 (April 1999) Amendment 2 (August 2009) Amendment 3 (February 2010)
<u>Addenda:</u>	Technical Addendum #1 (February 2000) Addendum I (August 2002)
<u>Management Unit:</u>	Migratory stocks of American shad, hickory shad, alewife, and blueback herring from Maine through Florida
<u>States With Declared Interest:</u>	Maine through Florida, including the Potomac River Fisheries Commission and the District of Columbia
<u>Active Boards/Committees:</u>	Shad & River Herring Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Plan Review Team, Plan Development Team

The 1985 Fishery Management Plan (FMP) for Shad and River Herring was one of the very first FMPs developed at the ASMFC. In 1994, the Management Board determined that the original 1985 FMP was no longer adequate for protecting or restoring the remaining shad and river herring stocks. As a result, Amendment 1, which required and recommended specific monitoring programs to inform future stock assessments, was implemented in October 1998. A Technical Addendum #1 to Amendment 1 was approved in 1999 to correct technical errors in Amendment 1.

The Board approved Addendum I in February 2002. Addendum I did the following: changed the conditions for marking hatchery-reared alosines; clarified the definition and intent of *de minimis* status for the American shad fishery; and modified and clarified the fishery-independent and dependent monitoring requirements. These measures went into effect on January 1, 2003.

In August 2009, the Shad and River Herring Management Board approved Amendment 2, which deals only with river herring management. The Amendment prohibited commercial and recreational river herring fisheries in state waters beginning January 1, 2012, unless a state or jurisdiction has a sustainable management plan reviewed by the Technical Committee and approved by the Management Board. The Amendment defines a sustainable fishery as “a commercial and/or recreational fishery that will not diminish the potential future stock reproduction and recruitment.” Amendment 2 required states to implement fisheries-dependent and independent monitoring programs. Sustainable fishery management plans have

been approved by the Management Board for Maine, New Hampshire, New York, North Carolina and South Carolina (Table 1).

In February 2010, the Shad and River Herring Management Board approved Amendment 3, which revised American shad regulatory and monitoring programs. The Amendment was developed in response to the 2007 American shad stock assessment, which found that most American shad stocks were at all-time lows and did not appear to be recovering. The Amendment requires similar management and monitoring as developed in Amendment 2. Specifically, Amendment 3 prohibits shad commercial and recreational fisheries in state waters beginning January 1, 2013, unless a state or jurisdiction has a sustainable management plan reviewed by the Technical Committee and approved by the Management Board. The Amendment defines a sustainable fishery as “a commercial and/or recreational fishery that will not diminish the potential future stock reproduction and recruitment.” The Amendment allows any river systems to maintain a catch and release recreational fishery. Sustainable fishing plans have been approved by the Management Board for Florida, Georgia, South Carolina, North Carolina, the Potomac River Fisheries Commission, and the Delaware River Basin Fish and Wildlife Management Cooperative (on behalf of New York, Delaware, New Jersey, and Pennsylvania) and Connecticut (Table 1). All states and jurisdictions are also required to identify local significant threats to American shad critical habitat and develop a plan for mitigation and restoration. All states and jurisdictions habitat plans have been accepted and approved.

Table 1. States with approved sustainable fishery management plans (SFP) for river herring or shad.

State	River Herring SFP	Shad SFP
Maine	Approved	
New Hampshire	Approved	
Massachusetts		
Connecticut		Approved
Rhode Island		
Pennsylvania		Approved*
New York	Approved	Approved*
New Jersey		Approved*
Delaware		Approved*
PRFC		Approved
Maryland		
Virginia		
North Carolina	Approved	Approved
South Carolina	Approved	Approved
Georgia		Approved
Florida		Approved

*Delaware River Basin Fish and Wildlife Management Co-op has a Shad SFP, though Delaware and New Jersey are only states that have commercial fisheries. All states have recreational measures, with limited to no catch in the upper Delaware River (New York & Pennsylvania).

II. Status of the Stocks

While the FMP addresses four species, American shad, hickory shad, alewife, and blueback herring, lack of comprehensive and accurate commercial and recreational fishery data for the latter three species make it difficult to ascertain the status of these stocks. A coastwide American shad stock assessment was completed and accepted in August 2007. The 2007 assessment found that American shad stocks are currently at all-time lows and do not appear to be recovering. Recent declines of American shad were reported for Maine, New Hampshire, Rhode Island, and Georgia stocks, and for the Hudson (NY), Susquehanna (PA), James (VA), and Edisto (SC) rivers. Low and stable stock abundance was indicated for Massachusetts, Connecticut, Delaware, the Chesapeake Bay, the Rappahannock River (VA), and some South Carolina and Florida stocks. Stocks in the Potomac and York Rivers (VA) have shown some signs of recovery in recent years. Data limitations and conflicting data precluded the report from indicating much about the current status or trend of many of the stocks from North or South Carolina.

The 2007 report identified primary causes for stock decline as a combination of overfishing, pollution, and habitat loss due to dam construction. In recent years, coastwide harvests have been on the order of 500-900 metric tons, nearly two orders of magnitude lower than in the late 19th century. Given these findings, the peer review panel recommended that current restoration actions need to be reviewed and new ones need to be identified and applied. The peer review panel suggested considering a reduction of fishing mortality, enhancement of dam passage and mitigation of dam-related fish mortality, stocking, and habitat restoration.

In 2012, a new river herring stock assessment was conducted in response to concern over population decline and the impact of ocean bycatch. The stock assessment report concluded that, of the 52 stocks of alewife and blueback herring for which data were available, 23 were depleted relative to historic levels, one stock was increasing, and the status of 28 stocks could not be determined because the time-series of available data was too short. Estimates of abundance and fishing mortality could not be developed because of the lack of adequate data. The “depleted” determination was used instead of “overfished” and “overfishing” because of the many factors that have contributed to the declining abundance of river herring, which include not just directed and incidental fishing, but also habitat loss, predation, and climate changes.

III. Status of the Fisheries

American shad, hickory shad, and river herring formerly supported important commercial and recreational fisheries throughout their range. Fisheries historical were executed in rivers (both freshwater and saltwater), estuaries, tributaries, and oceans. Although recreational harvest data are scarce, most harvest is believed to come from the commercial industry. Commercial landings for all these species have declined dramatically from historic highs. Following is a summary of fisheries by species:

AMERICAN SHAD:

Total combined river and ocean commercial landings decreased from a high of 2,364,263 pounds in 1985 to a low of 1,390,512 pounds in 1999, but increased in 2000 to 1,816,979 pounds. The closure of the ocean-intercept fishery has lowered the coastwide total landings of American shad. The total landings reported in compliance reports from individual states and jurisdictions in 2014 was 776,586 pounds, which is a 28% increase from landings in 2013 (604,372 pounds).

Landings from North Carolina and South Carolina accounted for 25% and 43% of the commercial harvest, respectively, in 2014. The remainder of the harvest came from Maine, Connecticut, New York, New Jersey, Delaware, PRFC, Virginia, and Georgia. In 2014 New Hampshire, Massachusetts, Rhode Island, Maryland, District of Columbia and Florida reported no directed shad harvest in their state compliance reports.

Table 2. American shad and river herring in-river commercial and ocean bycatch landings (in pounds) provided by states, jurisdictions and NOAA Fisheries for 2014.

	American Shad	River Herring	Hickory Shad
Maine³		1,720,285	
New Hampshire			
Massachusetts		192	
Rhode Island			
Connecticut	61,544		
New York^{1, 3}		8,450	
New Jersey²	42,599		456
Pennsylvania			
Delaware	85,794		
Maryland			
D.C.			
PRFC	4,013		1,300
Virginia	1,325		1,025
North Carolina	193,130	989	109,407
South Carolina⁴	333,602	114,905	1,311
Georgia³			
Florida			
Total	776,586	1,844,821	119,118

¹New York American shad landings are from ocean bycatch

²New Jersey shad landings includes in-river and Delaware Bay harvest

³Georgia, Maine, and New York shad landings are confidential

⁴South Carolina American shad landings include hickory shad

Substantial shad recreational fisheries occur on the Connecticut (CT and MA), Delaware (NY, PA and NJ), Susquehanna (MD), Santee and Cooper (SC), Savannah (GA), and St. Johns (FL) Rivers. Shad recreational fisheries are also pursued on several other rivers in Massachusetts, Virginia, North Carolina, South Carolina, and Georgia. Tens of thousands of shad are caught by hook and line from large east coast rivers each year, but detailed creel surveys are generally not available. Actual harvest (catch and removal) may amount to only about 20-40% of total catch, but hooking mortality could boost this “harvest” value substantially. Several comprehensive angler use and harvest surveys are planned or have been recently completed. In October 2006, the Management Board suspended the requirement to monitor the recreational fishery.

Since 2009, MRFSS/MRIP data are no longer provided for American shad. This is a result of the unreliable design of MRFSS that focuses on active fishing sites along coastal and estuarine areas. In previous years the proportional standard error (PSE) has ranged from 0-100.

HICKORY SHAD:

In 2014, New York, New Jersey, Virginia, North Carolina, South Carolina, and Georgia reported hickory shad landings. North Carolina accounts for a vast majority of the landings with 92%. The coastwide commercial landings were 119,118 pounds in 2014, a 51% increase from 2013 landings (78,378 pounds) (Table 2).

RIVER HERRING (BLUEBACK HERRING/ALEWIFE COMBINED):

Commercial landings of river herring declined 95% from over 13 million pounds in 1985 to about 700 thousand pounds in 2005. In 2014, river herring landings were reported from Maine, Massachusetts, New York, North Carolina, and South Carolina, totaling 1,844,821 pounds, a 13% increase from 2013 landings (1,632,149 pounds) (Table 2).

IV. Status of Research and Monitoring

Under Amendment 2 (2009) and Amendment 3 (2010), fishery-independent and fishery-dependent monitoring programs are now mandatory for American shad and river herring. Juvenile abundance index (JAI) surveys, annual spawning stock surveys (Table 3), and hatchery evaluations are required for states and jurisdictions. All States are required to calculate mortality and/or survival estimates, and monitor and report data relative to landings, catch, effort, and bycatch. States must submit annual reports including all monitoring and management program requirements, on or before July 1 of each year.

Table 3. American shad and river herring passage counts at select rivers along the Atlantic coast in 2014.

State/River	Shad	River Herring
Maine		
Androscoggin	0	55,953
Saco	2,580	11,576
Kennebec	1	108,432
Sebasticook	26	2,282,454
St. Croix		26,893
New Hampshire		
Cocheco		29,968
Oyster		4,227
Lamprey		84,868
Exeter		789
Taylor		57
Winnicut		0
Massachusetts		
Merrimack	34,789	33,515
Rhode Island		
Gilbert Stuart		102,408
Nonquit		71,501
Buckeye Brook		47,263
Connecticut		
Holyoke Dam	370,506	647
Pennsylvania/Maryland		
Susquehanna (Conowingo)	10,425	382
Susquehanna (Holtwood)	2,625	2
Susquehanna (Safe Harbor)	1,336	0
Susquehanna (York Haven)	8	0
South Carolina		
St. Stephen Dam	42,535	171,200
Total 2014	426,073	3,031,753
Total 2013	776,162	2,922,985
Total 2012	205,928	2,493,322

Note: Passage numbers on Susquehanna River are cumulative. For example, any shad counted at the York Haven dam has also passed the previous three dams (Safe Harbor, Holtwood and Conowingo). The dams are listed in ascending order of passage mile.

In addition to the mandatory monitoring requirements stipulated under Amendments 2 and 3, some states and jurisdictions continue important research initiatives for these species. For

example, Massachusetts, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, and USFWS are actively involved in shad restoration using hatchery-cultured fry and fingerlings. All hatchery fish are marked with oxytetracycline marks on otoliths to allow future distinction from wild fish. During 2014, several jurisdictions reared American shad, hickory shad, and alewife, stocking a total of 34,766,979 American shad (Table 4).

Table 4. Stocking of Hatchery-Cultured Alosines in State Waters, 2014.

State	American Shad	Alewife
Maine		
Androscoggin River		
Kennebec River		
Union River		
Massachusetts		
Merrimack River	7,700,000	
Nashua River	90,500	
Charles River	3,000,000	
Pawcatuck River	2,500,000	
Pawtuxet River	1,200,000	
Pennsylvania		
Susquehanna River	3,840,971	
Lehigh River	584,730	
Schuylkill River	439,136	
Maryland		
Choptank River	421,000	
District of Columbia		
Anacostia River	796,787	
Virginia		
James River	3,298,726	
North Carolina		
Roanoke River	7,504,291	
South Carolina		
Edisto River	11,074	
Santee River	3,379,764	
Total	34,766,979	0

V. Status of Management Measures

All state programs must implement commercial and recreational management measures or an alternative program approved by the Management Board. The current status of each state's

compliance with these measures is provided in the Shad and River Herring Plan Review Team Report (enclosed).

Shad and river herring are currently managed under Amendments 2 and 3. In 2009 the Board approved Amendment 2, which was initiated in response to concerns over river herring stock. The amendment prohibits commercial and recreational fisheries in state waters beginning January 1, 2012, unless a state or jurisdiction has a sustainable management plan in place. Sustainable fishery management plans have been approved by the Management Board for Maine, New Hampshire, New York, North Carolina and South Carolina.

In 2010, the Board approved Amendment 3, which revised American shad regulatory and monitoring programs under Amendment 1. The Amendment was developed in response to the 2007 American shad stock assessment, which found that most American shad stocks were at all time lows and did not appear to be recovering. The Amendment requires similar management and monitoring as developed in Amendment 2, specifically the development of a Sustainable Fishing Management Plan (SFP) for any jurisdiction that will maintain a commercial or recreational fishery after January 1, 2013 (with the exception of catch and release recreational fisheries). SFPs have been approved by the Management Board for Florida, Georgia, South Carolina, North Carolina, the Potomac River Fisheries Commission, Connecticut and the Delaware River Basin Fish and Wildlife Management Cooperative (on behalf of New York, Delaware, New Jersey, and Pennsylvania).

V. Prioritized Research Needs

Fishery-Dependent Priorities

High

- Expand observer and port sampling coverage to quantify additional sources of mortality for alosine species, including bait fisheries, as well as rates of bycatch in other fisheries to reduce uncertainty.¹

Moderate

- Identify directed harvest and bycatch losses of American shad in ocean and bay waters of Atlantic Maritime Canada.

Low

- Identify additional sources of historical catch data of the US small pelagic fisheries to better represent earlier harvest of river herring and improve model formulation.

Fishery-Independent Priorities

Moderate

- Develop demersal and pelagic trawl CPUE indices of offshore river herring biomass.

Modeling / Quantitative Priorities

¹ A prior statistical study of observer allocation and coverage should be conducted (see Hanke et al. 2012).

High

- Conduct population assessments on river herring, particularly in the south.²
- Analyze the consequences of interactions between the offshore bycatch fisheries and population trends in the rivers.
- Quantify fishing mortality for major river stocks after ocean closure of directed fisheries (river, ocean bycatch, bait fisheries).
- Improve methods to develop biological benchmarks used in assessment modeling (fecundity-at-age, sex specific mean weight-at-age, partial recruitment vector/maturity schedules) for river herring and American shad of both semelparous and iteroparous stocks.
- Improve methods for calculating M.

Moderate

- Consider standardization of indices with a GLM to improve trend estimates and uncertainty characterization.
- Explore peer-reviewed stock assessment models for use in additional river systems as more data become available.

Low

- Develop models to predict the potential impacts of climate change on river herring distribution and stock persistence.

Life History, Biological, and Habitat Priorities

High

- Conduct studies to quantify and improve fish passage efficiency and support the implementation of standard practices.
- Assess the efficiency of using hydroacoustics to repel alosines or pheromones to attract alosines to fish passage structures. Test commercially available acoustic equipment at existing fish passage facilities. Develop methods to isolate/manufacture pheromones or other alosine attractants.
- Investigate the relationship between juvenile river herring/American shad 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.
- Develop an integrated coastal remote telemetry system or network that would allow tagged fish to be tracked throughout their coastal migration and into the estuarine and riverine environments. UPDATE: currently available for American shad but not in use due to tagging mortality
- Continue studies to determine river herring population stock structure along the coast and enable determination of river origin of catch in mixed stock fisheries and incidental catch in non-targeted ocean fisheries. Spatially delineate mixed stock and Delaware stock areas within the Delaware system. Methods to be considered could include otolith microchemistry, oxytetracycline otolith marking, genetic analysis, and/or tagging.³

² A peer reviewed river herring stock assessment was completed in 2012 by the ASMFC.

³ Genetic research currently underway in combination with otolith chemistry.

- Validate the different values of M for river herring and American shad stocks through shad ageing techniques and repeat spawning information.
- Continue to assess current ageing techniques for river herring and American shad, using known-age fish, scales, otoliths, and spawning marks. Conduct biannual ageing workshops to maintain consistency and accuracy of ageing fish sampled in state programs.⁴
- Summarize existing information on predation by striped bass and other species. Quantify consumption through modeling (e.g., MSVPA), diet, and bioenergetics studies.
- Refine techniques for tank spawning of American shad. Secure adequate eggs for culture programs using native broodstock.

Moderate

- Determine the effects of passage barriers on all life history stages of American shad and river herring. Conduct studies on turbine mortality, migration delay, downstream passage, and sub-lethal effects. UPDATE: Recent studies have been conducted by T. Castro-Santos of UMass.
- Evaluate and ultimately validate large-scale hydroacoustic methods to quantify river herring and American shad escapement in major river systems.
- Conduct studies of egg and larval survival and development.
- Conduct studies on energetics of feeding and spawning migrations of American shad on the Atlantic coast.
- Resource management agencies in each state shall evaluate their respective state water quality standards and criteria and identify hard limits to ensure that those standards, criteria, and limits account for the special needs of alosines. Primary emphasis should be on locations where sensitive egg and larval stages are found.
- Encourage university research on hickory shad.
- Develop better fish culture techniques, marking techniques, and supplemental stocking strategies for river herring.

Low

- Characterize tributary habitat quality and quantity for Alosine reintroductions and fish passage development.
- States should identify and quantify potential shad and river herring spawning and nursery habitat not presently utilized, including a list of areas that would support such habitat if water quality and access were improved or created, and analyze the cost of recovery within those areas. States may wish to identify areas targeted for restoration as essential habitat.¹¹
- Investigate contribution of landlocked versus anadromous produced river herring.

VII. PRT Recommendations

State Compliance

All states with a declared interest in the management of shad and river herring have submitted reports and have regulations in place that meet the requirements of the Interstate Fisheries Management Plan for Shad and River Herring. The PRT notes, however, that some states were

⁴ River herring ageing workshop occurred in 2013.

not able to complete the required fishery independent monitoring due to budgetary restrictions.

1. Several of the states did not report all of the monitoring requirements listed under Amendments 2 and 3 (see PRT Report). The states should take note of the required monitoring programs that were not reported and make concerted effort to report all monitoring programs in forthcoming annual reports (most common omissions were: characterization of other losses, variance, length frequency, age frequency and degree of repeat spawning).
2. The PRT requests that those states and jurisdictions that share monitoring should report who was responsible for the required monitoring in lieu of not including the information. In addition, one report could be sent for each state or jurisdiction.

De Minimis Status

Florida, Maine, New Hampshire and Massachusetts have requested *de minimis* status for the 2015 American shad fisheries. Florida, New Hampshire and Massachusetts also requested *de minimis* status for the 2015 river herring fisheries. These states continue to meet the standards for commercial *de minimis* as defined in Amendment 2 and Amendment 3.

The following states had landings that were reported to be less than 1% of the coast-wide commercial landings for American shad: Maine, New Hampshire, Massachusetts, Rhode Island, New York, Pennsylvania, Maryland, PRFC, D.C., Virginia, and Florida. The following states had landings that were reported to be less than 1% of the coast-wide commercial landings for river herring: New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, D.C., PRFC, Virginia, North Carolina, Georgia, and Florida.

The PRT recommends granting all requests for *de minimis* status.

REVIEW OF SHAD AND RIVER HERRING ANNUAL COMPLIANCE REPORTS

INTRODUCTION

In accordance with the Shad and River Herring Fishery Management Plan, the states are required to submit an annual compliance report by July 1st of each year. The Plan Review Team reviewed all state reports for compliance with the mandatory measures in Amendments 2 (River Herring) and 3 (American shad). The following report provides an evaluation of each state program.

MAINE

De minimis

- The state of Maine requests *de minimis* for the commercial fishing year 2015 in the American shad fishery.

Comments or trends highlighted in state report:

- American shad recreational catch estimates = 779 fish caught (A+B1+B2) and 779 harvested (A+B1) (MRIP).
- Comparing the juvenile CPUE to past years, American shad CPUE were above average in the Upper Kennebec River, Merrymeeting Bay, the Abbagadasset, Eastern, and lower Kennebec rivers, but below average in the Androscoggin, Cathance rivers.
- 225,578 pounds of river herring reported harvested by towns (preliminary).
- MRIP estimates for alewife = 3,485 caught and 1,038 harvested. For blueback= 1,745 caught and harvested.
- Comparing the JAI CPUE to past years, alewife CPUE was above average only in the Abagadasset River (where it was also the 4th highest on record), but below average in all other river portions
- River herring run counts were above average for Androscoggin, Kennebec, and Sebasticock rivers and below average in the Saco and St. Croix rivers.
- Spawning Stock Survey: In 2014, no American shad was counted at Brunswick Fishway on the Androscoggin River. On the Saco River, Brookfield Energy biologists counted a total of 2,580 American shad (2,565 passing the East Channel Dam, and 15 passing the West Channel Dam). Additionally 56 shad mortalities were noted, representing a total fishway mortality of 2.2%, similar to annual estimates over the time series (1995-present)

Unreported information / Compliance Issues:

- River herring scale samples collected from commercial harvesters are being processed. Information should be sent to FMP Coordinator as soon as data are available.

Sturgeon bycatch report:

- There was no known bycatch of Atlantic or shortnose sturgeon within the recreational fishery.

NEW HAMPSHIRE

De minimis:

- The state of New Hampshire requests *de minimis* status for the commercial and recreational fishing year 2015 for the American shad and river herring fisheries.

Comments or trends highlighted in state report:

- River herring SFMP target met for 2014 – exploitation rate <20% (9.5%) and returns >72,293 fish (119,909 fish).
- In 2014, 11,474 (5,737 lbs) river herring were reported harvested from New Hampshire waters through mandatory coastal harvest reports. It is noted that this harvest is for personal use and is no longer included with NMFS harvest.
- Recreational harvest estimates for river herring were 5,052 alewives (66.4 PSE) and 898 blueback herring in NH through Marine Recreational Information Program (MRIP)
- Since 2007 JAI for alewife and blueback herring have been declining (with the exception of 2013 for alewife), with the trend continuing for 2014.
- Zero shad were harvested from New Hampshire waters in 2014.

Unreported information / Compliance Issues:

- None identified.

Sturgeon bycatch report:

- No protected species were reported taken as bycatch from New Hampshire's coastal harvest program.

MASSACHUSETTS

De minimis:

- The Commonwealth of Massachusetts requests *de minimis* for the commercial fishing year 2015 for the American shad and river herring fisheries.

Comments or trends highlighted in state report:

- Dealer reporting = 0 pounds of shad landed.

Unreported information / Compliance Issues:

- The preliminary Native American harvest for 2014 was 4.5 bushels which converts to approximately 964 river herring.
- Degree of repeat spawning is not evaluated in the river herring spawning stock assessment.

Sturgeon bycatch report:

- No sturgeon interactions were reported in 2014.

RHODE ISLAND

Comments or trends highlighted in state report:

- JAI has remained below 1.12 geometric mean since 2005
- A total of 72 American Shad passed through the fishway in 2014.

- River herring run counts at Gilbert Stuart (102,408), Nonquit (71,501), and Buckeye Brook (47,263) were all higher in 2014 than 2013.

Unreported information / Compliance Issues:

- Herring scale samples were collected but not aged; mortality estimates are unavailable for 2014.
- Mortality (z) estimates are incomplete for 2014.

Sturgeon bycatch report:

- One Atlantic sturgeon was observed by the NOAA Fisheries Observer Program in 2013 and 2014.

CONNECTICUT

Comments or trends highlighted in state report:

- The preliminary 2014 landings are 61,544 pounds (12,953 fish) of American shad from drift gillnets through harvester catch reporting.
- Shad spawning population relies on a few age classes and low rates of repeat spawners.

Unreported information / Compliance Issues:

- Commercial catch composition of shad is not made available due to limited budget and staff.
- Estimate of other commercial losses is reported by weight instead of length and age.
- Directed recreational harvest of shad is not characterized due to limited budget and staff.
- No sources of river herring loss are listed.
- No description of fishery independent monitoring requirements is provided for herring.
- River herring JAI variance is not provided.
- No age frequency, degree of repeat spawning, or annual mortality rate calculation is provided for river herring.

Sturgeon bycatch report:

- A total of 8 sturgeons (species unclassified) were reported as caught and released by shad fishermen in 2014.

NEW YORK

Comments and trends highlighted in state report:

- Commercial and recreational shad fishery closed in 2010.
- Mandatory reporting of river herring harvest = 8,214 pounds landed in Hudson River.
- Shad landings were reported through ACCSP, however due to confidentiality agreements, this data cannot be disclosed.
- In 2013, estimated American Shad biomass was 4.62
- 2014 American shad spawning stock survey sex ratio was 40:60 (male:female)
- 2014 river herring spawning stock survey sex ratio: 68:32 (male:female) alewife and 47:53 (male:female) blueback herring.

Unreported Information / Compliance Issues:

- Harvest and losses of shad and river herring are reported in weights but not numbers.
- No data for commercial or recreational “other loss” of river herring is available.
- A river herring recreational creel survey was not conducted in 2013.
- Other losses (research, fish passage) attributed to river herring are reported as no data.
- River herring commercial landings data entry is still ongoing. Sex ratio and age frequency are not evaluated.
- Degree of repeat spawning data for shad is not yet complete.
- River herring mortality rate analysis is not yet complete.

Sturgeon bycatch report:

- No data collected due to fishery closure.

NEW JERSEY

Comments or trends highlighted in state report:

- Commercial directed fishery for American shad in coastal waters was closed January 1, 2013 (except for Delaware Bay).

Unreported Information / Compliance Issues:

- There is no commercial river herring fishery and therefore no biological samples were taken.
- More thorough explanation of SAFIS is needed.
- Coastal herring report did not evaluate commercial catch composition and not have come mention recreational fishery (no harvest & losses addressed) as neither commercial nor recreational fishery for river herring exists.
- No biological data given (except for length frequencies) for shad or river herring from the ocean trawl surveys for coastal stocks. Age at length keys are mentioned to be in development.

Sturgeon bycatch report:

- One Atlantic sturgeon was caught as bycatch in Delaware Bay and was released alive (likely an underestimate as permit holders are not required to report Atlantic sturgeon interactions).

PENNSYLVANIA

Comments or trends highlighted in state report:

- No commercial fishery for shad or river herring on Susquehanna; recreational fishery prohibited in 2013 for river herring; no recreational fishery for shad in Susquehanna.
- River herring juvenile indices fail to produce meaningful data due to low numbers.
- Counts of American shad passing Conowingo Dam continue to decline.
- Spawning stock survey conducted and results provided in 2014 report. In general, the 2014 spawning stock showed a nearly 1:1 (M:F) sex ratio, an increase in mean total length and mean total weight, a slight decrease in mean age, and an apparent increase in the frequency of repeat spawning.

- Susquehanna river herring mortality rate. Total harvest loss for river herring (both blueback and alewife) at Conowingo Dam in 2014 was 24.17 lb.

Unreported Information / Compliance Issues:

- No estimates of other losses for river herring have been developed.

Sturgeon bycatch report:

- No sturgeon interactions reported in 2014.

DELAWARE BASIN F&W COOPERATIVE

Comments or trends highlighted in state report:

- In 2014, commercial landings of American Shad as reported to New Jersey via mandatory logbooks was estimated at 42,378 pounds, nearly 88% of which came from the upper Delaware Bay and River.
- In 2014, commercial landings of American shad as bycatch from the Delaware striped bass fishery was estimated at 85,794 pounds, representing a notable increase in harvest compared to recent years which is likely due to the decreased mesh size (<7 inches) deployed by some striped bass fishers during the 2014 season.
- The 2014 Adult American shad relative abundance in the Delaware River based on gill net CPUE at Smithfield Beach (RM 218) was similar to that reported in 2013 (0.97 and 0.98 shad/foot-hr, respectively).
- River herring fisheries were effectively closed in Delaware, New Jersey, New York and Pennsylvania jurisdictional waters in 2014. No estimates of recreational catch and harvest of river herring or hickory shad are available for 2014.

Unreported information / Compliance Issues:

- Spawning stock assessment: Migrating adult River herring were only sampled in the Schuylkill River below Fairmont Dam by electrofishing. Monitoring of the fishway at Fairmont Dam was not conducted in 2014 due to catastrophic flooding destroyed equipment.
- Other losses for river herring were impingement and entrainment. No estimates were calculated.
- Length frequency not reported for herring in NJ, PA, or DE.
- No recreational harvest or mortality estimates for shad.
- Commercial age data for shad remains to be processed.
- Degree of repeat spawning data for shad was not collected in NJ and remains to be processed in DE. Issues remain with determining definite repeat spawning marks.
- Monitoring of recreational landings catch and effort data in the Delaware River is required under Am. 3; this was not addressed.
- No fishery independent mortality rate was calculated for either species in NJ, PA, or DE.

Sturgeon bycatch report:

- DE F&W terminated its voluntary sturgeon reporting and tagging program following the April 2012 ESA listing for Atlantic sturgeon; sturgeon bycatch is unknown in 2014

- According to logbooks collected from New Jersey commercial shad fishers, there were nine Atlantic sturgeon caught as bycatch during 2014 in Delaware Bay; all sturgeon were released alive. Reporting of Atlantic sturgeon remains voluntary, therefore this number is likely an underestimate.
- No sturgeon were observed using the fish passages on the Lehigh and Schuylkill rivers.

MARYLAND

Comments or trends highlighted in state report:

- American shad and river herring commercial fishery is closed; catch and release only.
- In 2014, 105 pounds of dead American shad from the spring pound and fyke net commercial fishery targeting perch and catfish are estimated to have been kept for personal use.
- Total recreational release mortality is estimated to be 144 American shad per year (estimate based on two studies, one from 2007 and one from 2010).
- No trend in Nanticoke and Patuxent Rivers shad JAI; increasing in Upper CB and Potomac River.
- American Shad Stocking continues in Choptank River. 94% of American Shad in river estimated to be hatchery origin.
- In 2014, the Conowingo Dam tailrace American shad population was estimated at 118,883.
- In 2014, The JAI CPUE for alewife and blueback herring both increased in the Upper Bay and decreased in the Nanticoke River.

Unreported / Compliance Issues:

- Spawning stock assessment for river herring began with 2014 gillnet survey for adult river herring in the North East River. Longer time series needed for this assessment.

Sturgeon bycatch report:

- The Atlantic sturgeon bycatch for Maryland's American shad ocean intercept fishery has been zero since this fishery was closed in 2005.

DISTRICT OF COLUMBIA

Comments or trends highlighted in state report:

- Commercial and recreational fisheries for river herring and shad remained closed.
- Fry stocking has been conducted for most years since 2006. In 2014 796,787 American shad fry stocked in Anacostia River. Hatchery evaluation efforts are scheduled to begin in 2015.

Unreported information / Compliance Issues:

- No estimate of potential other losses in any of the fisheries.
- The required harvest & losses table is not included.
- Include which rivers were sampled by the seine survey.
- No ageing has been done for American shad or river herring, thus age frequency, degree of repeat spawning and mortality estimates have not been reported.

- Length frequency and sex ratio not supplied for American shad.
- No information provided for shad regarding spawning stock assessment.

Sturgeon bycatch report:

- No sturgeon captures were reported in the District of Columbia during 2014.

POTOMAC RIVER FISHERIES COMMISSION

Comments or trends highlighted in state report:

- Since 2012, all fisheries are closed to the taking and/or possession of river herring.
- The Potomac River is closed to the directed harvest, commercial and recreational, of American and hickory shad.
- Bycatch landings in 2014 included 4,013 pounds of American shad and 1,300 pounds of hickory shad.
- In 2014, the American shad restoration target (31.1) was exceeded for the fourth year in a row with a value of (40.3)
- The 2014 JAI index for American shad is similar to that in 2013, but significantly higher than the 2012 index

Unreported information / Compliance Issues:

- Please include spawning stock assessment information in the same report.
- Harvest and losses table could be improved by including number of fish per gear type and mean weight per gear type.
- Variances for juvenile indices are missing.

Sturgeon bycatch report:

- In 2014, there were no Atlantic sturgeon captures reported in the Potomac River.

VIRGINIA

Comments or trends highlighted in state report:

- In 2014, river herring and American shad fisheries remained closed to both commercial and recreational harvest and possession.
- The 2014 catch index (7.35) on the James River increased from 2013 (4.48).
- The overall assessment of the James River American shad population is that the stock remains at historically low levels and is dependent on hatchery inputs.
- The 2014 catch index on the Rappahannock River was the highest on record (8.66).

Unreported information / Compliance Issues:

Sturgeon bycatch report:

- In 2014, a total of 20 Atlantic sturgeon were caught as bycatch in the staked gill nets used by VIMS to monitor abundance of adult American shad and released alive (James River, n=15; York River, n=4; Rappahannock River, n=1; all released alive).

NORTH CAROLINA

Comments and trends highlighted in state report:

- In 2014, American shad landings totaled 193,130 pounds with a value of \$160,977 (gill nets contributed nearly 99% of harvest). In 2014, river herring landings totaled 989 pounds with a value of \$1,319.
- Juvenile American and hickory shad catches have been consistently low since the survey began in 1972.
- Adequate sampling of the areas utilized by these species has not occurred
- In 2014, no catches of juvenile alewife were recorded during sampling.

Sturgeon bycatch report:

- In 2014, 63 Atlantic sturgeon were observed or reported from the Albemarle Sound; –14 via the DMF observer data (all released alive), and 49 via the DMF IGNS (one fatality).
- One Atlantic sturgeon was reported captured and released alive via onboard observers within the Pamlico Sound, Pamlico, Neuse and Cape Fear River Areas.

SOUTH CAROLINA

Comments and trends highlighted in state report:

- In 2014, total estimated commercial landings of American (including hickory) shad, as reported through NMFS, was 284,612 pounds (100% in-river)
- In 2014, observed sex ratios for American shad were 65.3 females per male in the Santee River and 79.0 females per male in the Waccamaw River. The high occurrence of females in these samples is most likely due to the marketability of females vs. males.

Unreported information / Compliance Issues:

- River herring recreational effort is not estimated.
- Characterize and quantify other losses related to all fisheries.
- Technical committee determined that river herring juvenile indices would not be required.
- Hatchery evaluation was not mentioned for herring.

Sturgeon bycatch report:

- Atlantics – 14 total, with 71% from Santee River, 29% from Winyah Bay.
- Shortnose – three total, with one from the Santee River and two from the Waccamaw River.

GEORGIA

Comments and trends highlighted in state report:

- A creel survey was not conducted in 2013, but is planned for 2015.
- The population of American shad in the Altamaha River in 2014 was 560,023 shad, a 146% increase from 2013.
- In 2014, commercial shad (American and hickory) season was open from January 1 to March 31, however the Ogeechee, Satilla, and St Marys Rivers are closed to commercial shad fishing

- A small commercial fishery for shad (American and hickory) remains in GA with landings in 2014 over 55,000 lb. Recreational fisheries for shad and river herring are non-existent in GA and commercial shad gear precludes river herring from being caught (communication with Don Harrison).

Unreported information / Compliance Issues:

- No shad recreational harvest data was reported, and no other recreational losses are estimated.

Sturgeon bycatch report:

- Atlantic and shortnose sturgeon are caught in gill nets. In drift nets, essentially 100% of the sturgeon can be released unharmed. During 16 field days of monitoring adult shad in 2014, one Atlantic and one shortnose sturgeon were captured in drift gill nets from the Altamaha River. All sturgeon were released unharmed. In addition, shad fishermen reported capturing seven Atlantic and 10 shortnose sturgeon from the Altamaha River.

FLORIDA

Comments and trends highlighted in state report:

- No commercial fishery exists for shad or river herring.
- There is no recreational harvest of river herring.
- An access point creel was introduced in 2014 and will continue annually as funds allow; in 2014, total estimated shad catch was 11,822 fish.

Unreported information / Compliance Issues:

- Include more detail to characterize other losses related to commercial and recreational fisheries.
- Include more detail on river herring.

Sturgeon bycatch report:

- No netting is allowed for shad, so no sturgeon bycatch is expected.