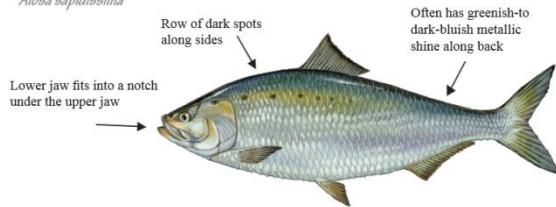


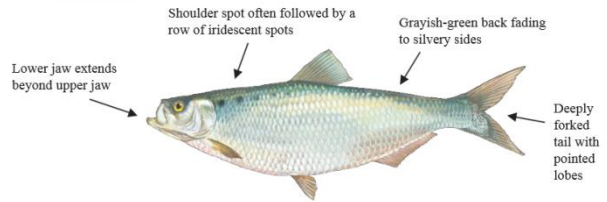
**RIVER HERRING AND SHAD - POTENTIAL MANAGEMENT BY THE
MID-ATLANTIC FISHERY MANAGEMENT COUNCIL**

2016 Staff White Paper
Jason Didden, Mid-Atlantic Fishery Management Council

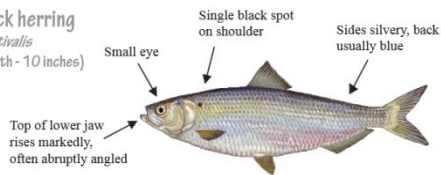
American shad (average length - 20 to 24 inches)
Alosa sapidissima



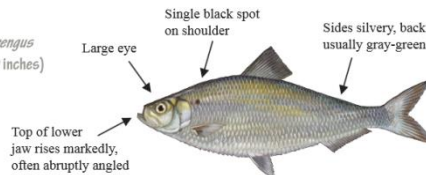
Hickory shad (average length - 12 to 20 inches)
Alosa mediocris



Blueback herring
Alosa aestivalis
(average length - 10 inches)



Alewife
Alosa pseudoharengus
(average length - 10 inches)



Fish illustrations: Duane Raver/U.S. Fish and Wildlife Service, Source:
http://www.ncwildlife.org/Portals/0/Fishing/documents/Herring_Shad_ID_guide_sm.pdf



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1.3 COMMON ACRONYMS AND ABBREVIATIONS

ABC	– Acceptable Biological Catch
ACL	– Annual Catch Limit
ACFCMA	– Atlantic Coastal Fisheries Cooperative Management Act
AM	– Accountability Measure
ASMFC	– Atlantic States Marine Fisheries Commission
Commission	– Atlantic States Marine Fisheries Commission
Corps	– U.S. Army Corps of Engineers
Council	– Mid-Atlantic Fishery Management Council
EA	– Environmental Assessment
EFH	– Essential Fish Habitat
FERC	– Federal Energy and Regulatory Commission
FMP	– Fishery Management Plan
Lb.	– pounds
Kg	– kilograms
MAFMC	– Mid-Atlantic Fishery Management Council
MT	– Metric Ton (~2204.6 pounds)
Nm	– Nautical Mile
NEFMC	– New England Fishery Management Council
NMFS	– National Marine Fisheries Service (also known as NOAA Fisheries)
NOAA	– National Oceanic and Atmospheric Administration
TEWG	– Technical Expert Working Group
U.S.	– United States
U.S.C.	– United States Code

1.4 WORDING CONVENTIONS

In this document, "catch" refers to all fish caught in a fishery (whether targeted or not and whether retained or discarded). Targeted fish are those intended to be caught. Non-target species are those caught but not targeted. Bycatch usually refers to discards but is a term often used in fishery management to refer to several different things and so it is not used in this document except where unavoidable (for example a statute, report title, program name, etc.). Instead, fish caught and then discarded at sea are called "discards." Landings are fish caught and retained. Fish that are not targeted but are landed are called "incidentally landed catch."

In this document, "river herrings" include blueback herring and alewife. "Shads" include American shad and hickory shad. "RH/S" refers to river herring and/or shads.

The Magnuson-Stevens Fishery Conservation and Management Act is the primary law governing marine fisheries management in United States federal waters. The Act was first enacted in 1976 and amended in 1996 and in 2006. In this document, "MSA" refers to the Magnuson-Stevens Fishery Conservation and Management Act as currently amended.

The term "mortality cap" refers to a management system whereby directed fishing for one species may be stopped or limited when catch of some other species reaches a pre-set limit. Similar terms include bycatch caps or discard caps, but these would only apply to discarded fish, while a mortality cap would track all catch (retained or discarded).

“Mackerel” refers to Atlantic mackerel unless otherwise noted.

2.0 EXECUTIVE SUMMARY

This document is designed to help the Mid-Atlantic Fishery Management Council (Council) decide whether to initiate a fishery management plan (FMP), or an amendment to an FMP, that could add, either immediately or in a longer time frame, four species *as Council-managed species*: two river herrings (blueback herring and/or alewife) and/or two shads (American shad and/or hickory shad) – these are collectively referred to as river herring/shad, or RH/S. Whether an amendment is used to add species to an existing plan, or if a new plan is created, the same requirements would apply, so the terminology used in this document is simply adding RH/S “*as Council-managed species*.” The key issue is whether RH/S require conservation and management by the Council under The Magnuson-Stevens Fishery Conservation and Management Act as currently amended (MSA).

This document describes the relevant MSA provisions, information on RH/S, and the likely impacts of Council management on RH/S to facilitate a Council decision on whether to proceed with an action that could add RH/S as Council-managed species. As planned, the Council intends to make this decision at its October 2016 Council meeting - three years after it made a decision not to add RH/S as Council-managed species. Since then, the Council has been participating in an interdisciplinary Technical Expert Working Group (TEWG). The TEWG has provided and compiled information used by NOAA Fisheries and the Atlantic States Marine Fisheries Commission (ASMFC) in the development and execution of a proactive conservation plan focused on river herring but with logical extensions to shad. ASMFC has maintained its lead RH/S management role. This document also responds to the orders of U.S. District Judge Gladys Kessler requiring the completion of an updated white paper to ensure that a “hard look” is taken as to whether to add RH/S as Council-managed species or not.

3.0 INTRODUCTION

RH/S are managed by the ASMFC (<http://www.asafc.org/species/shad-river-herring>), but in the late 2000s concerns were brought to the Council that high volume fisheries such as mackerel may have incidental RH/S catches that are substantial enough to negatively impact RH/S populations. RH/S populations are generally at historically low levels (ASMFC 2007, ASMFC 2012). These concerns led to increased consideration of possible impacts from the mackerel fishery (also longfin squid fishery) on RH/S populations¹ by the Council, and eventually implementation of several related actions, including Amendment 14 to the Atlantic Mackerel, Squid, and Butterfish (MSB) FMP (<https://www.greateratlantic.fisheries.noaa.gov/mediacenter/2013/11/partialapprovalam14msb.html>), Framework Adjustment 9 (<https://www.greateratlantic.fisheries.noaa.gov/nr/2015/August/15smbfw9ph1.pdf>), and components of several specification packages. Currently the Council is also considering ways to increase observer coverage for the mackerel fishery through the Industry-Funded Monitoring (IFM) Amendment (Council action expected in early 2017 - <http://www.mafmc.org/actions/omnibus-observer-funding>). Through the first three actions, the Council has placed a limit on the incidental catch of RH/S in the mackerel fishery (currently 82 metric tons or 180,779 pounds), and taken a number of steps to improve the *quality* of observer data. The IFM Amendment seeks to build on those actions by increasing the *quantity* of observer data in the mackerel fishery.

In 2013 the Council considered whether to begin an additional step of adding RH/S as Council-managed species. In October 2013, the Council determined that additional management of RH/S under a Council FMP was neither required nor appropriate at that time. Instead, the Council adopted a motion to establish a working group composed of regional, state, and Federal management partners to comprehensively address river herring and shad mortality and stock status throughout their ranges. Since then the Council and its RH/S Committee have collaborated with the River Herring Technical Expert Working Group (TEWG - <http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/tewg/>) to address a variety of related issues. The Council also committed in 2013 to conducting a formal evaluation of the effectiveness of the approved working group approach in three years (which will be October 2016) to determine if a different approach is required and/or appropriate. Orders from U.S. District Judge Gladys Kessler reinforced the Council's planned evaluation and provided additional guidance for what that evaluation should consider, so that the Council's decisions, and NOAA Fisheries' review of those decisions are appropriate given NMFS' responsibility for ensuring that the requirements of the MSA, NEPA, and any other applicable laws are met. This document facilitates the Council's (and NOAA Fisheries') evaluation of the RH/S management issue.

¹ E.g. https://ff4cf846da5decac479230d72f1f69132643cd28.googleusercontent.com/host/0B7aKVuJOPoZVdEJQZ1pweHVnX1k/2009/4-%20August%202009/Tab%2005_Squid,%20Mackerel,%20Butterfish%20Committee.pdf

4.0 MAGNUSON-STEVENSON ACT (MSA) REQUIREMENTS

4.1 DEFINITION & NEED FOR CONSERVATION AND MANAGEMENT

The MSA provides for management of fish by the Council. It states that “[e]ach Council shall...for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary (A) a fishery management plan” [16 U.S.C. § 1852(h)(1)].

The MSA provides a definition of conservation and management in its definition section:

- (5) The term "conservation and management" refers to all of the rules, regulations, conditions, methods, and other measures
- (A) which are required to rebuild, restore, or maintain, and which are useful in rebuilding, restoring, or maintaining, any fishery resource and the marine environment; and
- (B) which are designed to assure that—
- (i) a supply of food and other products may be taken, and that recreational benefits may be obtained, on a continuing basis;
 - (ii) irreversible or long-term adverse effects on fishery resources and the marine environment are avoided; and
 - (iii) there will be a multiplicity of options available with respect to future uses of these resources.

The MSA also includes a set of findings, purposes, and policies which help provide perspective on Congress’s intent (staff has excerpted the most relevant).

“Findings”

(1) The fish off the coasts of the United States...and the anadromous species which spawn in United States rivers or estuaries, constitute valuable and renewable natural resources. These fishery resources contribute to the food supply, economy, and health of the Nation and provide recreational opportunities.

(2) Certain stocks of fish have declined to the point where their survival is threatened, and other stocks of fish have been so substantially reduced in number that they could become similarly threatened as a consequence of (A) increased fishing pressure, (B) the inadequacy of fishery resource conservation and management practices and controls, or (C) direct and indirect habitat losses which have resulted in a diminished capacity to support existing fishing levels.

(3) Commercial and recreational fishing constitutes a major source of employment and contributes significantly to the economy of the Nation. Many coastal areas are dependent upon fishing and related activities, and their economies have been badly damaged by the overfishing of fishery resources at an ever-increasing rate...

(5) Fishery resources are finite but renewable. If placed under sound management before overfishing has caused irreversible effects, the fisheries can be conserved and maintained so as to provide optimum yields on a continuing basis.

(6) A national program for the conservation and management of the fishery resources of the United States is necessary to prevent overfishing, to rebuild overfished stocks, to insure conservation, to facilitate long-term protection of essential fish habitats, and to realize the full potential of the Nation's fishery resources.

(8) The collection of reliable data is essential to the effective conservation, management, and scientific understanding of the fishery resources of the United States.

(9) One of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States.

“Purposes”

(1) to take immediate action to conserve and manage the fishery resources found off the coasts of the United States, and the anadromous species and Continental Shelf fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone ...

(4) to provide for the preparation and implementation, in accordance with national standards, of fishery management plans which will achieve and maintain, on a continuing basis, the optimum yield from each fishery;

(5) to establish Regional Fishery Management Councils to exercise sound judgment in the stewardship of fishery resources through the preparation, monitoring, and revision of such plans under circumstances (A) which will enable the States, the fishing industry, consumer and environmental organizations, and other interested persons to participate in, and advise on, the establishment and administration of such plans, and (B) which take into account the social and economic needs of the States;

(7) to promote the protection of essential fish habitat in the review of projects conducted under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat.

“Policies”

(3) to assure that the national fishery conservation and management program utilizes, and is based upon, the best scientific information available; involves, and is responsive to the needs of, interested and affected States and citizens; considers efficiency; draws upon Federal, State, and academic capabilities in carrying out research, administration, management, and enforcement; considers the effects of fishing on immature fish and encourages development of practical measures that minimize bycatch and avoid unnecessary waste of fish; and is workable and effective;

(6) to foster and maintain the diversity of fisheries in the United States

4.2 NATIONAL STANDARDS (NS)

U.S. marine fisheries are managed under the MSA with a number of requirements, including ten National Standards. The National Standards are principles that must be followed in any fishery management plan (FMP) to ensure sustainable and responsible fishery management. As mandated by the MSA, NOAA Fisheries has developed guidelines for each National Standard. When reviewing FMPs, FMP amendments, and regulations, the Secretary of Commerce must ensure that they are consistent with the National Standard guidelines. The ten National Standards are summarized below, and then additional details are provided on several that are most relevant to the decision of whether to manage a stock.

National Standard 1 – Optimum Yield

Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_1_cfr.pdf

National Standard 2 – Scientific Information

Conservation and management measures shall be based upon the best scientific information available.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_2_cfr.pdf

National Standard 3 – Management Units

To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_3_cfr.pdf

National Standard 4 – Allocations

Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United

States fishermen, such allocation shall be (a) fair and equitable to all such fishermen; (b) reasonably calculated to promote conservation; and (c) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privilege.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_4_cfr.pdf

National Standard 5 – Efficiency

Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_5_cfr.pdf

National Standard 6 – Variations and Contingencies

Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_6_cfr.pdf

National Standard 7 – Costs and Benefits

Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_7_cfr.pdf

National Standard 8 – Communities

Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirement of paragraph (2) [i.e., National Standard 2], in order to (a)

provide for the sustained participation of such communities, and (b) to the extent practicable, minimize adverse economic impacts on such communities.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_8_cfr.pdf

National Standard 9 – Bycatch

Conservation and management measures shall, to the extent practicable, (a) minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_9_cfr.pdf

National Standard 10 – Safety of Life at Sea

Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Current guidelines:

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/national_standard_10_cfr.pdf

4.2.1 National Standard 7 details & applicability

National Standard 7 states that "[c]onservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication." 16 U.S.C. §1851(a)(7). Guidelines for National Standard 7 begin by stating that "[t]he principle that not every fishery needs regulation is implicit in this standard." National Standard 7 guidelines advise that "The Magnuson- Stevens Act requires Councils to prepare FMPs only for overfished fisheries and for other fisheries where regulation would serve some useful purpose and where the present or future benefits of regulation would justify the costs." The guidelines recommend that the following criteria be considered when deciding whether a fishery needs management through an FMP:

- (1) The importance of the fishery to the Nation and to the regional economy.
- (2) The condition of the stock or stocks of fish and whether an FMP can improve or maintain that condition.
- (3) The extent to which the fishery could be or is already adequately managed by states, by state/Federal programs, by Federal regulations pursuant to FMPs or

international commissions, or by industry self-regulation, consistent with the policies and standards of the Magnuson-Stevens Act.

(4) The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution.

(5) The economic condition of a fishery and whether an FMP can produce more efficient utilization.

(6) The needs of a developing fishery, and whether an FMP can foster orderly growth.

(7) The costs associated with an FMP, balanced against the benefits (see paragraph (d) of this section as a guide).

(d) Analysis. The supporting analyses for FMPs should demonstrate that the benefits of fishery regulation are real and substantial relative to the added research, administrative, and enforcement costs, as well as costs to the industry of compliance. In determining the benefits and costs of management measures, each management strategy considered and its impacts on different user groups in the fishery should be evaluated. This requirement need not produce an elaborate, formalistic cost/benefit analysis. Rather, an evaluation of effects and costs, especially of differences among workable alternatives, including the status quo, is adequate. If quantitative estimates are not possible, qualitative estimates will suffice.

There is some debate about whether National Standard 7 should apply to the question of whether to manage a fishery, or whether National Standard 7 should really only apply when considering what measures to use for a fishery that has been determined is in need of conservation and management. NMFS has proposed revisions (Jan 20, 2015) to the National Standard 1 guidelines that may help “to address the important issue of identifying stocks that require conservation and management”

(http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/ns1_revisions.html), which are further described below.

4.2.2 Proposed NS1 guideline revision details relative to stock in fishery decision

The proposed new National Standard 1 guidelines that relate to the decision whether Council management would be necessary are provided below. While they are draft (in the form of a proposed rule -

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/ns1_proposed_rule.pdf), it appears likely that there will be new guidance regarding whether Federal management is necessary and appropriate, so considering the proposed revisions appears appropriate, especially since the National Standard guideline are *guidelines*.

(c) Stocks that require conservation and management.

(1) Magnuson-Stevens Act section 302(h)(1) requires a Council to prepare an FMP for each fishery under its authority that requires (or in other words, is in need of) conservation and management. Not every fishery requires Federal management. Any stocks that are predominately caught in Federal waters and are overfished or subject to overfishing, or likely to become overfished or subject to overfishing, are considered to require conservation and management. In addition, the following non-exhaustive list of factors should be used by a Council when deciding whether stocks require conservation and management:

- (i) The stock is an important component of the marine environment.
- (ii) The stock is caught by the fishery.
- (iii) Whether an FMP can improve or maintain the condition of the stocks.

- (iv) The stock is a target of a fishery.
- (v) The stock is important to commercial, recreational, or subsistence users.
- (vi) The fishery is important to the Nation and to the regional economy.
- (vii) The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution.
- (viii) The economic condition of a fishery and whether an FMP can produce more efficient utilization.
- (ix) The needs of a developing fishery, and whether an FMP can foster orderly growth.

- (x) The extent to which the fishery could be or is already adequately managed by states, by state/Federal programs, by Federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the policies and standards of the Magnuson-Stevens Act.

(2) When considering adding a new stock to an FMP or keeping an existing stock within an FMP, Councils should prepare a thorough analysis of the factors, and any additional considerations that may be relevant to the particular stock. No single factor is dispositive, but Councils should consider weighting the factors as follows. Factors (c)(1)(i)-(iii) of this section should be considered first, as they address maintaining a fishery resource and the marine environment.

These factors weigh in favor of including a stock in an FMP. Councils should next consider factors (c)(1)(iv)-(ix) of this section, which set forth key economic, social, and other reasons contained within the MSA for an FMP action.

Regardless of whether any of the first nine factors indicates a conservation and management need, a Council should consider factor (c)(1)(x) of this section before deciding to include or maintain a stock in an FMP. In many circumstances, adequate management of a fishery by states, state/Federal programs, or another Federal FMP would weigh heavily against a Federal FMP action.

In evaluating the above criteria, a Council should consider the specific circumstances of a fishery, based on the best scientific information available; to determine whether there are

biological, economic, social and/or operational concerns that can be addressed by Federal management.

(3) Councils may choose to identify stocks within their FMPs as ecosystem component (EC) species (see 50 CFR 600.310(d)(1)) if they do not require conservation and management. EC species may be identified at the species or stock level, and may be grouped into complexes.

Consistent with National Standard 9, MSA section 303(b)(12), and other applicable MSA sections, management measures can be adopted in order to, for example, collect data on the EC species, minimize bycatch or bycatch mortality of EC species, protect the associated role of EC species in the ecosystem, or for other reasons.

(4) A stock or stock complex may be identified in more than one FMP. In this situation, the relevant Councils should choose which FMP will be the primary FMP in which reference points for the stock or stock complex are established. In other FMPs, the stock or stock complex may be identified as “other managed stocks” and management measures that are consistent with the objectives of the primary FMP can be established.

(5) Councils should periodically review their FMPs and the best scientific information available and determine if the stocks are appropriately identified. As appropriate, stocks should be reclassified within a FMP, added to or removed from an existing FMP, or added to a new FMP, through a FMP amendment that documents the rationale for the decision.

In the proposed rule for these guidelines

http://www.fisheries.noaa.gov/sfa/laws_policies/national_standards/documents/ns1_proposed_rule.pdf), NMFS notes that “the MSA and current NS guidelines indirectly touch upon” whether a fishery requires or is in need of conservation and management. The revised guidelines appear to encourage the same type of evaluation that was in the National Standard 7 guidelines (and some of the same language is proposed to be transferred), but make it more explicit that these considerations would take place when considering whether to manage in the first place by placing this guidance first, in the general section. By noting that FMPs shall be submitted for any fishery “that requires conservation and management,” there logically must be situations where Council-management through a federal FMP is not required, and both the current National Standard 7 guidelines and the proposed revisions both recommend the Council to evaluate how relevant Council management would be so that a good-faith effort is conducted to determine the answer to whether a fishery *requires* conservation and management under a Federal FMP by a Council.

4.3 REQUIRED & DISCRETIONARY CONTENTS OF FISHERY MANAGEMENT PLANS (FMPS)

The required and discretionary provisions for fishery management plans are the tools that Councils use to manage any particular fishery. Reviewing the provisions is thus useful for considering the question of whether to manage RH/S as Council-managed species, because these are the measures the Council could use as part of management.

Required Provisions

Section 303a of the MSA contains 15 required provisions for FMPs, which are listed and discussed below.

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the National Standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification

(4) assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3); (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing; and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on-- (A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority-- (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery.

(15) establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.

Section 303b of the MSA contains discretionary provisions allowed for FMPs, which are listed and discussed below.

(1) Permitting of vessels, operators, and dealers;

(2) Zones where, and periods when, fishing shall be limited, or shall not be permitted, or shall be permitted only by specified types of fishing vessels or with specified types and quantities of fishing gear;

(3) Specified limitations on catch/sale/transshipment, which are necessary and appropriate for the conservation and management of the fishery;

(4) Regulations that prohibit, limit, condition, or require the use of specified types and quantities of fishing gear, fishing vessels, or equipment for such vessels, including devices which may be required to facilitate enforcement of the provisions of the MSA;

(5) Incorporating (consistent with the national standards, the other provisions of the MSA, and any other applicable law) the relevant fishery conservation and management measures of the coastal States nearest to the fishery and accounting for the different circumstances affecting fisheries from different States and ports;

(6) Establishment of a limited access system

-Other sections allow limited access privilege programs (generally referred to as individual fishing quotas (IFQs) or individual transferrable quotas (ITQs));

(7) Requiring fish processors who first receive fish that are subject to the plan to submit data;

(8) Requiring that one or more observers be carried on board a vessel;

(9) Assess and specify the effect which the conservation and management measures of the plan will have on the stocks of naturally spawning anadromous fish in the region;

(10) Measures that provide harvest incentives for participants within each gear group to employ fishing practices that result in lower levels of bycatch or in lower levels of the mortality of bycatch;

(11) Research set-asides;

(12) Management measures in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations;

(13) (blank)

(14) such other measures, requirements, or conditions and restrictions as are determined to be necessary and appropriate for the conservation and management of the fishery.

5.0 RH/S BACKGROUND

5.1 DESCRIPTION OF RH/S BIOLOGY/LIFE HISTORY/ABUNDANCE (CURRENT AND HISTORICAL)

Life History

RH/S are anadromous fish that spend the majority of their adult lives at sea, only returning to freshwater in the spring to spawn. Historically, shad and river herring spawned in virtually every river and tributary along the coast.

River herring is a collective term for alewife and blueback herring. Alewife spawn in rivers, lakes, and tributaries from northeastern Newfoundland to South Carolina, but are most abundant in the Mid-Atlantic and the Northeast. Blueback herring prefer to spawn in swift flowing rivers and tributaries from Nova Scotia to northern Florida, but are most numerous in waters from Chesapeake Bay south. Mature alewife (ages three to eight) and blueback herring (ages three to six) migrate rapidly downstream after spawning. Juveniles remain in tidal freshwater nursery areas in spring and early summer, but may also move upstream with the encroachment of saline water. As water temperatures decline in the fall, juveniles move downstream to more saline waters. Little information is available on the life history of juvenile and adult river herring after they emigrate to the sea and before they mature and return to freshwater to spawn.

Shad young leave their home river within the first year and will spend the next few years at sea, schooling in large numbers with shad from other regions and feeding on plankton and other small fish or crustaceans. Upon reaching maturity – at about age four – they will return to the streams they were born in to spawn. Males or "buck shad" return first, followed by females or "roe shad." They spawn usually at night or during overcast days. In the southern range, females release as many as 700,000 eggs during the spawning season, but both males and females normally die after spawning. In the northern range, females typically release 300,000 eggs or less during the spawning season; however, most shad will return again to spawn in the following years, with some shad living up to ten years (<http://www.asmfc.org/species/shad-river-herring>).

5.1.1 Review of indices and available run information

Indices

NMFS/NEAMAP

The NMFS Northeast Trawl Survey and the NorthEast Area Monitoring and Assessment Program (NEAMAP) survey provide the best synoptic information on RH/S abundances. Updated NMFS (through 2015) and NEAMAP (through 2016) trawl survey indices for river herrings and American shad are provided below. Hickory shad are caught in very few numbers. Spring 2016 NMFS trawl data should be available prior to October 2016,

but the spring 2016 NMFS data will have to be interpreted cautiously given the issues with the timing of that survey in 2016 (it took place substantially later in the year than usual).

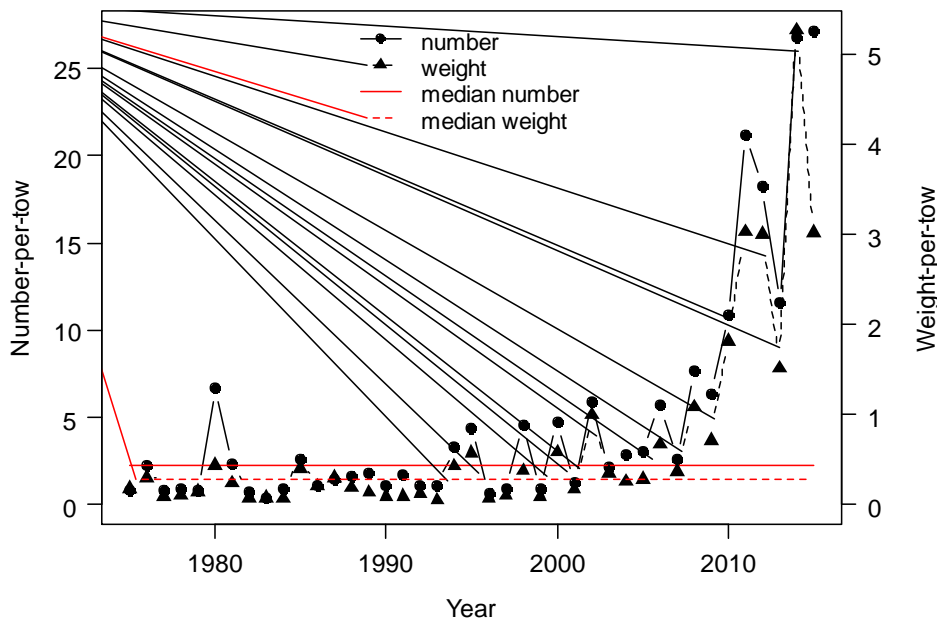


Figure 1. NMFS Fall Trawl Survey - Alewife

(Abbreviated strata set due to 2014 survey issues, but previous analyses demonstrated no substantial change in trends using the abbreviated survey strata)

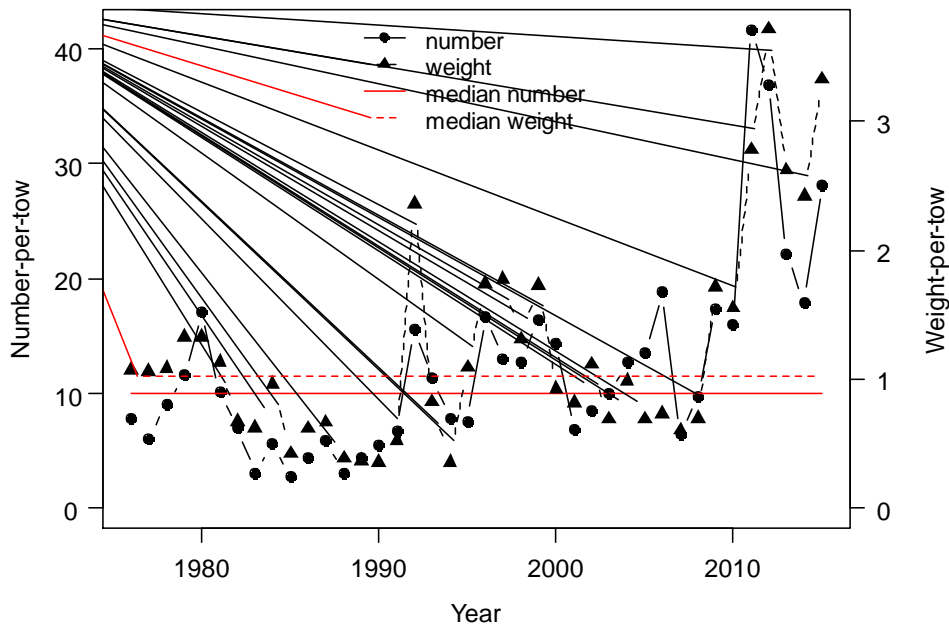


Figure 2. NMFS Spring Trawl Survey - Alewife

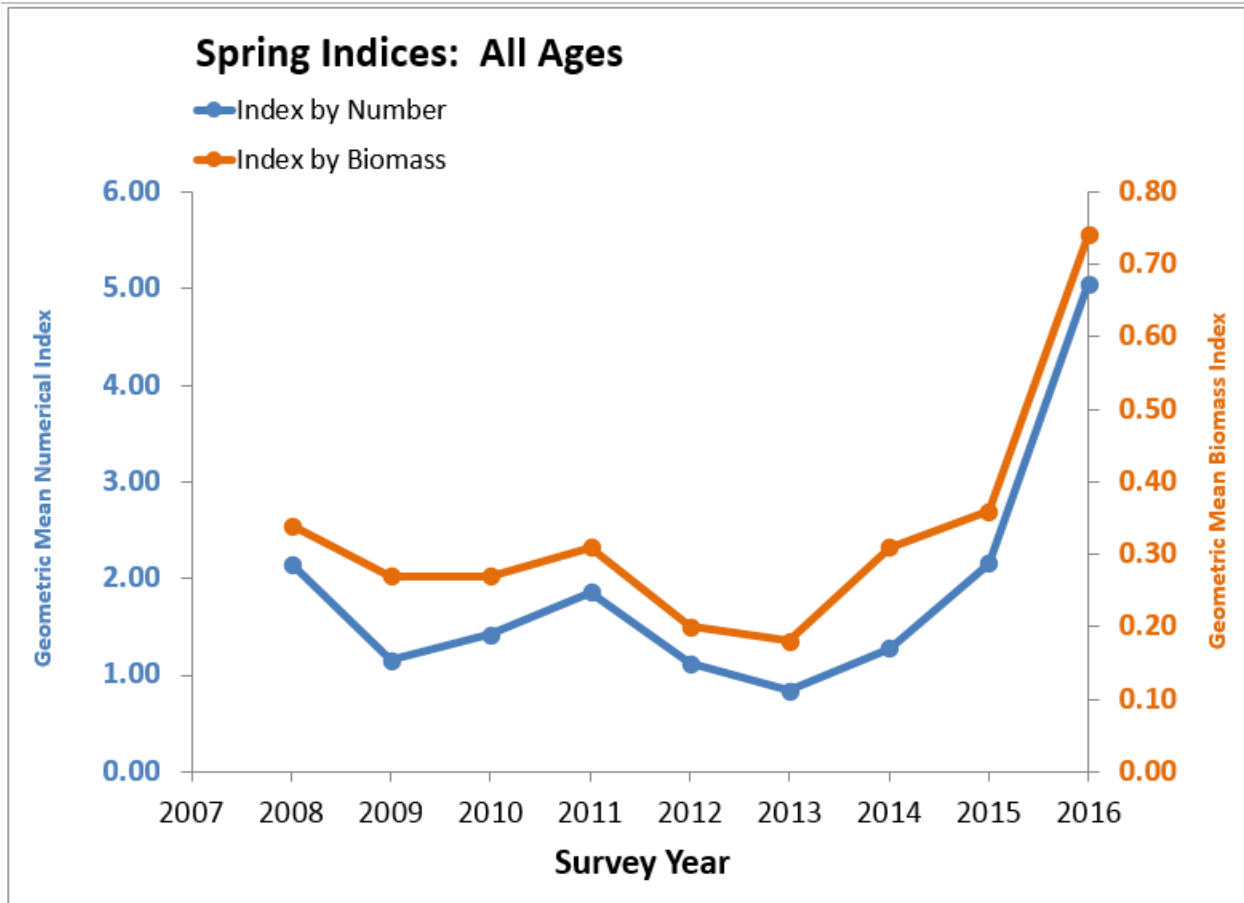


Figure 3. NEAMAP Alewife SPRING Indices

Figure 4. NMFS Fall Trawl Survey - Blueback

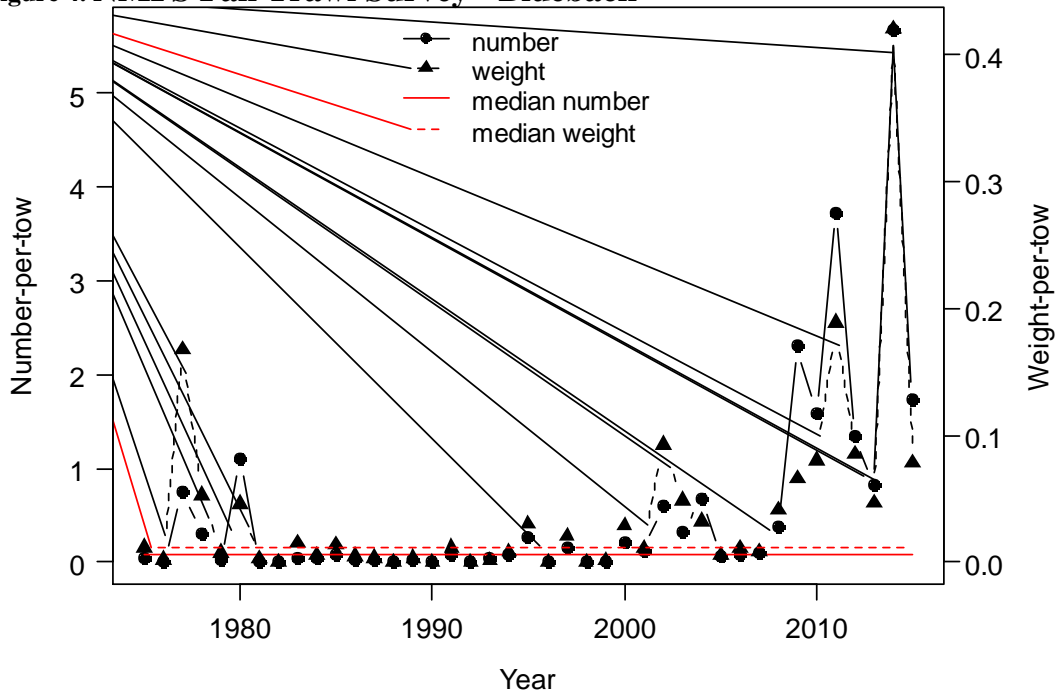


Figure 5. NMFS Fall Trawl Survey - Blueback

(Abbreviated strata set due to 2014 survey issues, but previous analyses demonstrated no substantial change in trends using the abbreviated survey strata)

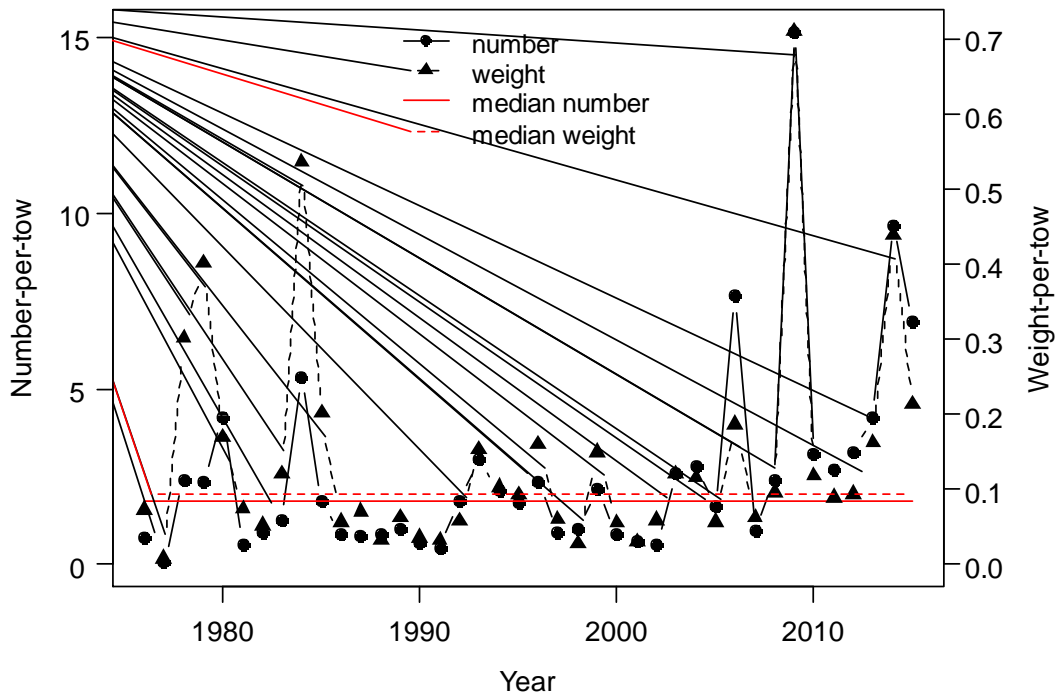


Figure 6. NMFS Spring Trawl Survey - Blueback

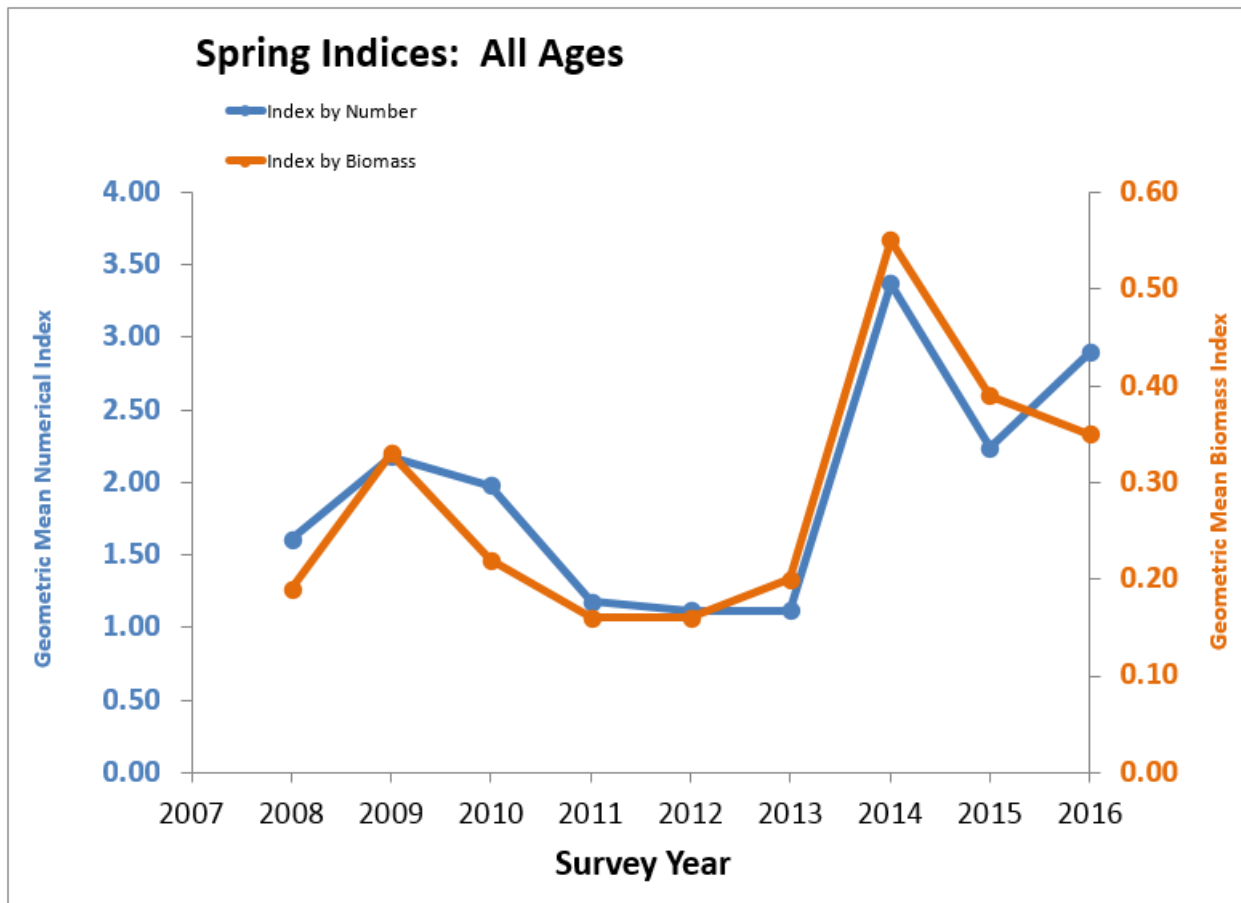


Figure 7. NEAMAP Blueback SPRING Indices

(Abbreviated time series due to Bigelow/Albatross conversion issues)

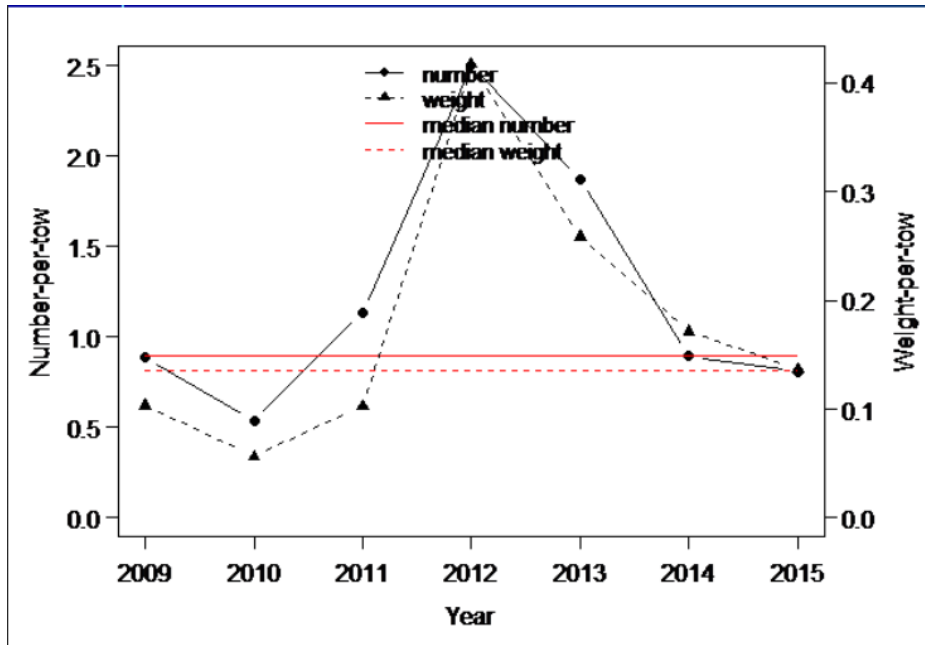


Figure 8. NMFS Spring Trawl Survey – American Shad

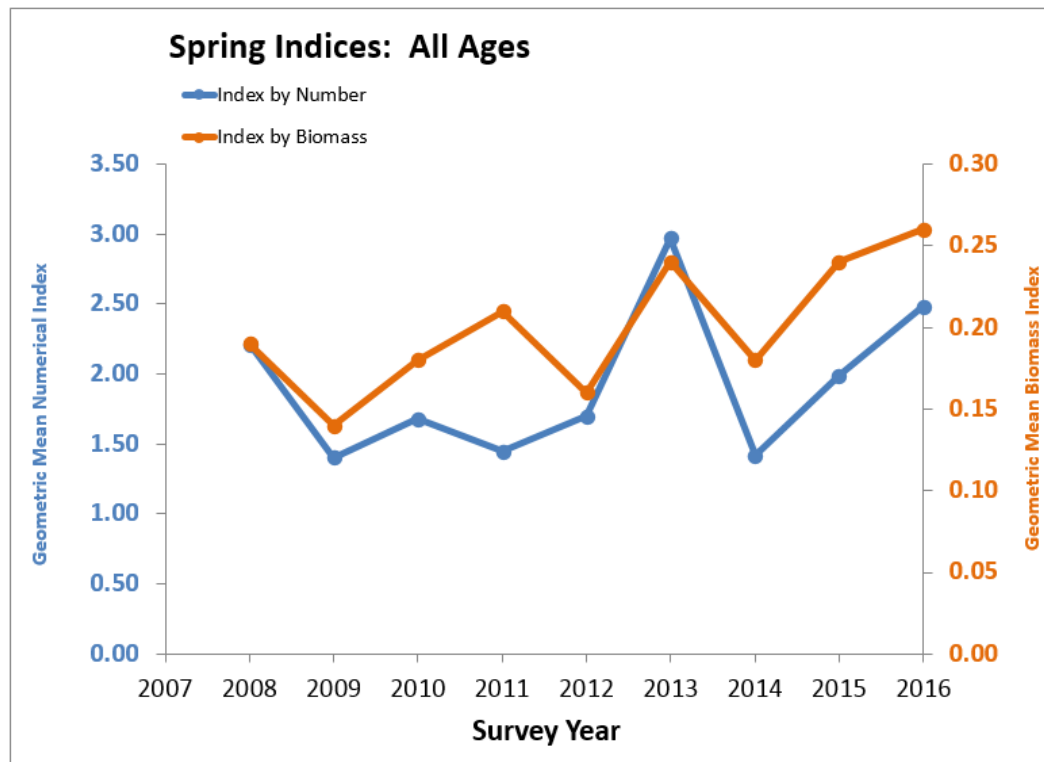


Figure 9. NEAMAP American Shad SPRING Indices

Staff also asked state staff to provide survey data for several Mid-Atlantic states that have relevant surveys. While smaller in scale than the NMFS and NEAMAP surveys, several of the state surveys are provided below for North Carolina through Connecticut. Staff did not include all of the state data that was provided, but focused on surveys that appeared most representative of overall abundances in state waters in the Mid-Atlantic.

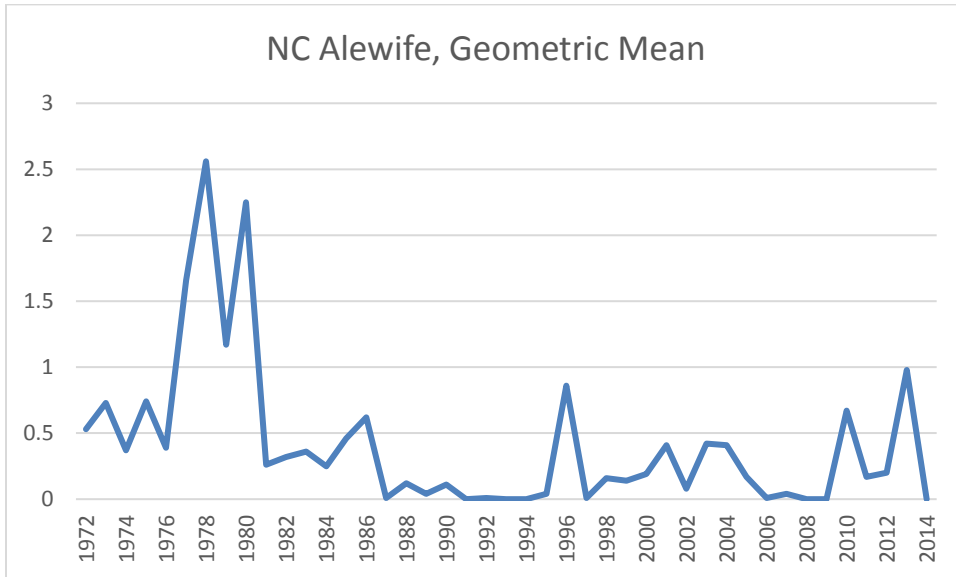


Figure 10. Alewife juvenile abundance index, from the 11 core stations, Albemarle Sound area, NC, 1972-2014.

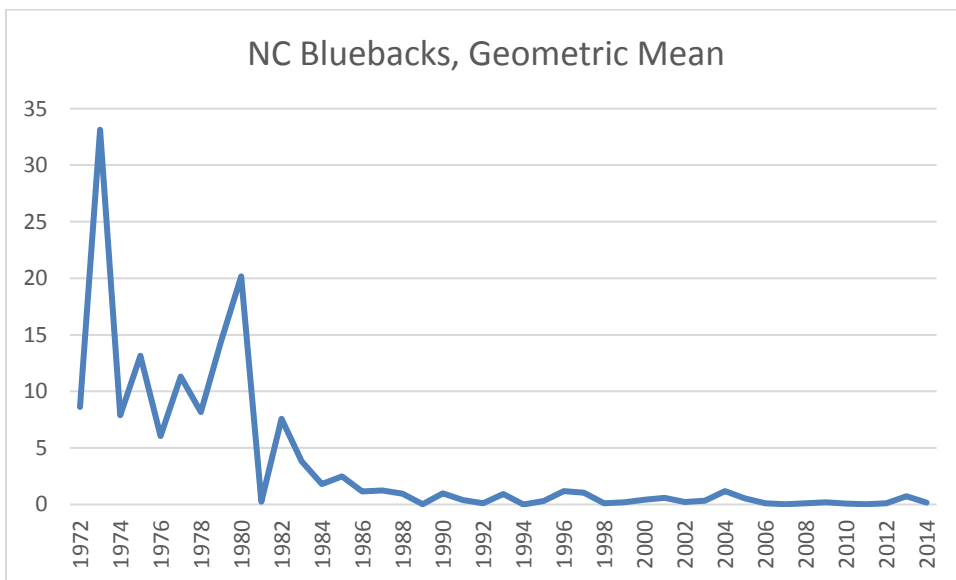


Figure 11. Blueback herring juvenile abundance index, from the 11 core stations, Albemarle Albemarle Sound area, NC, 1972-2014.

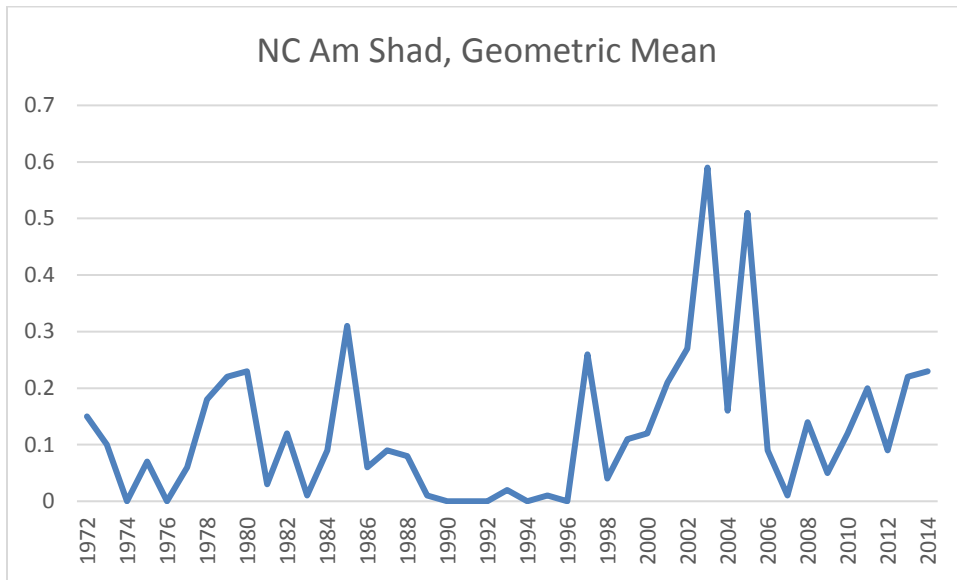


Figure 12. American shad juvenile abundance index, from the 11 core stations, Albemarle Sound area, NC, 1972-2014.

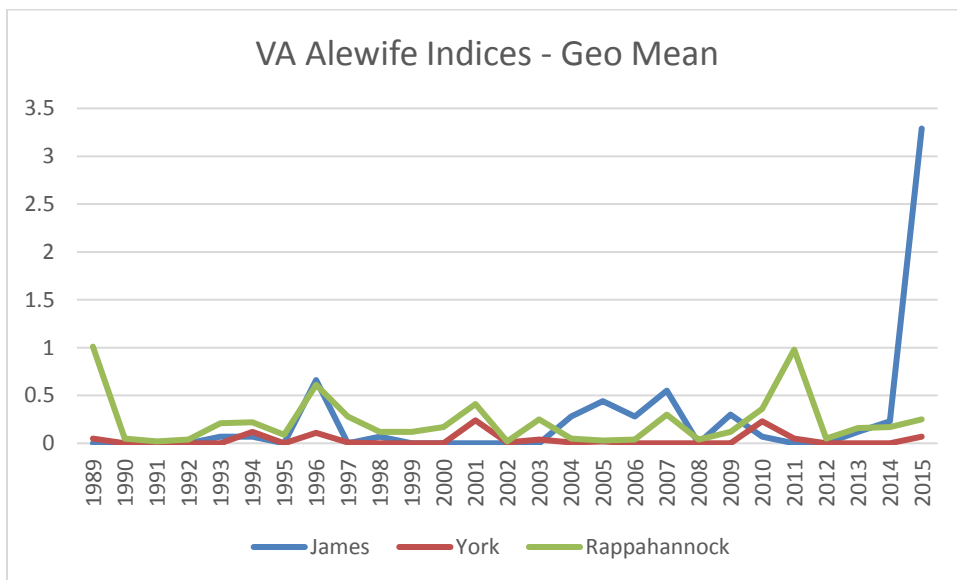


Figure 13. Geometric mean abundance of juvenile Alewife collected in beach seine surveys (1989-2015) on the James, York, and Rappahannock rivers.

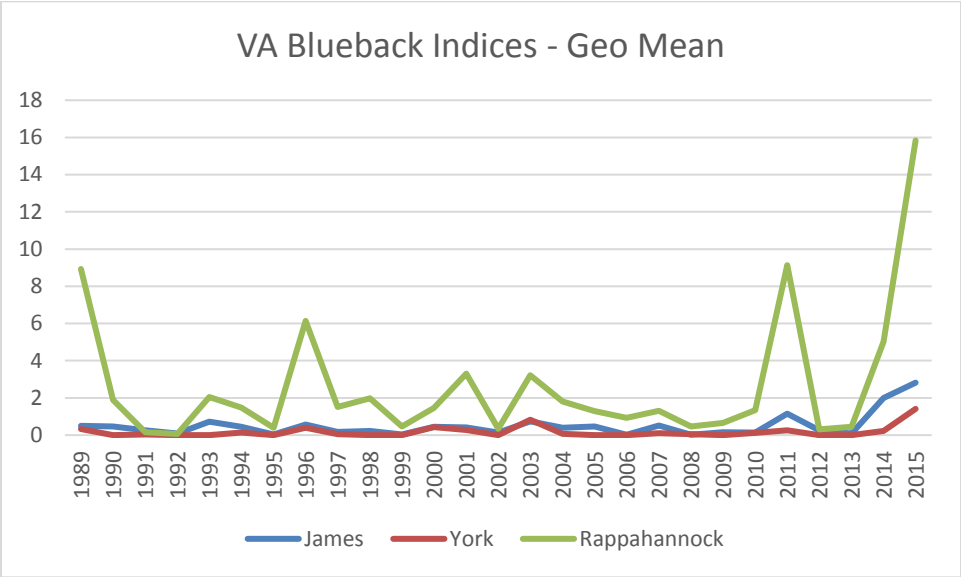


Figure 14. Geometric mean abundance of juvenile Blueback collected in beach seine surveys (1989-2015) on the James, York, and Rappahannock rivers.

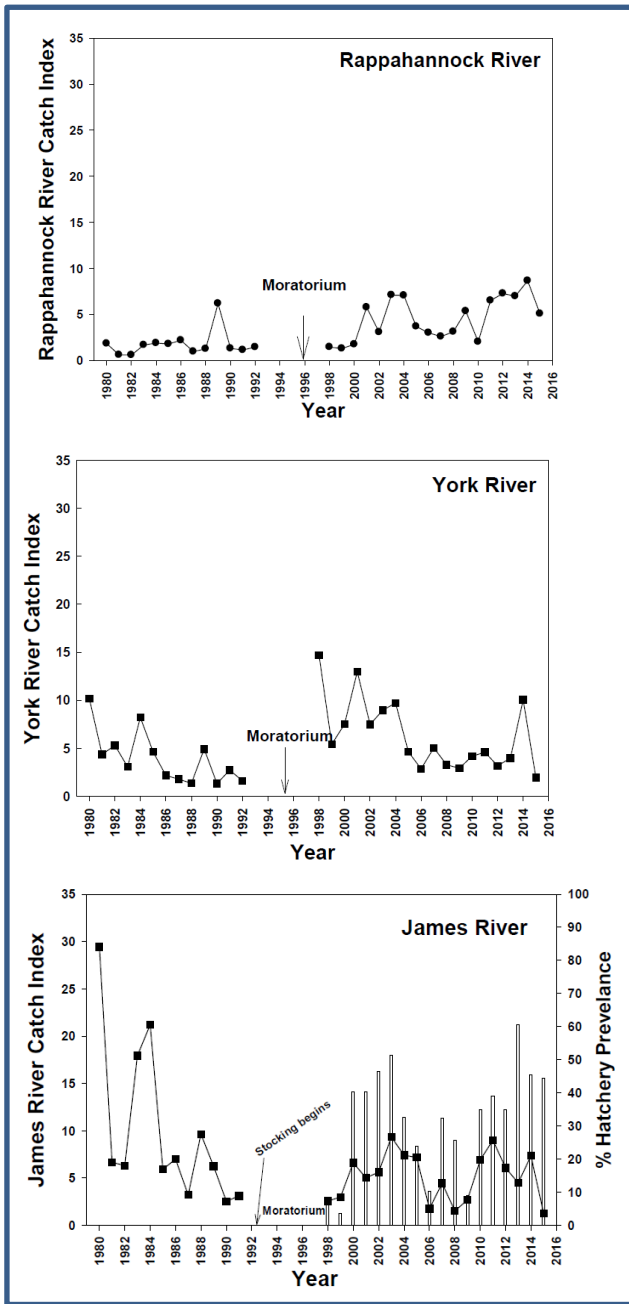


Figure 15. Catch indices of female American shad, Rappahannock, York and James Rivers

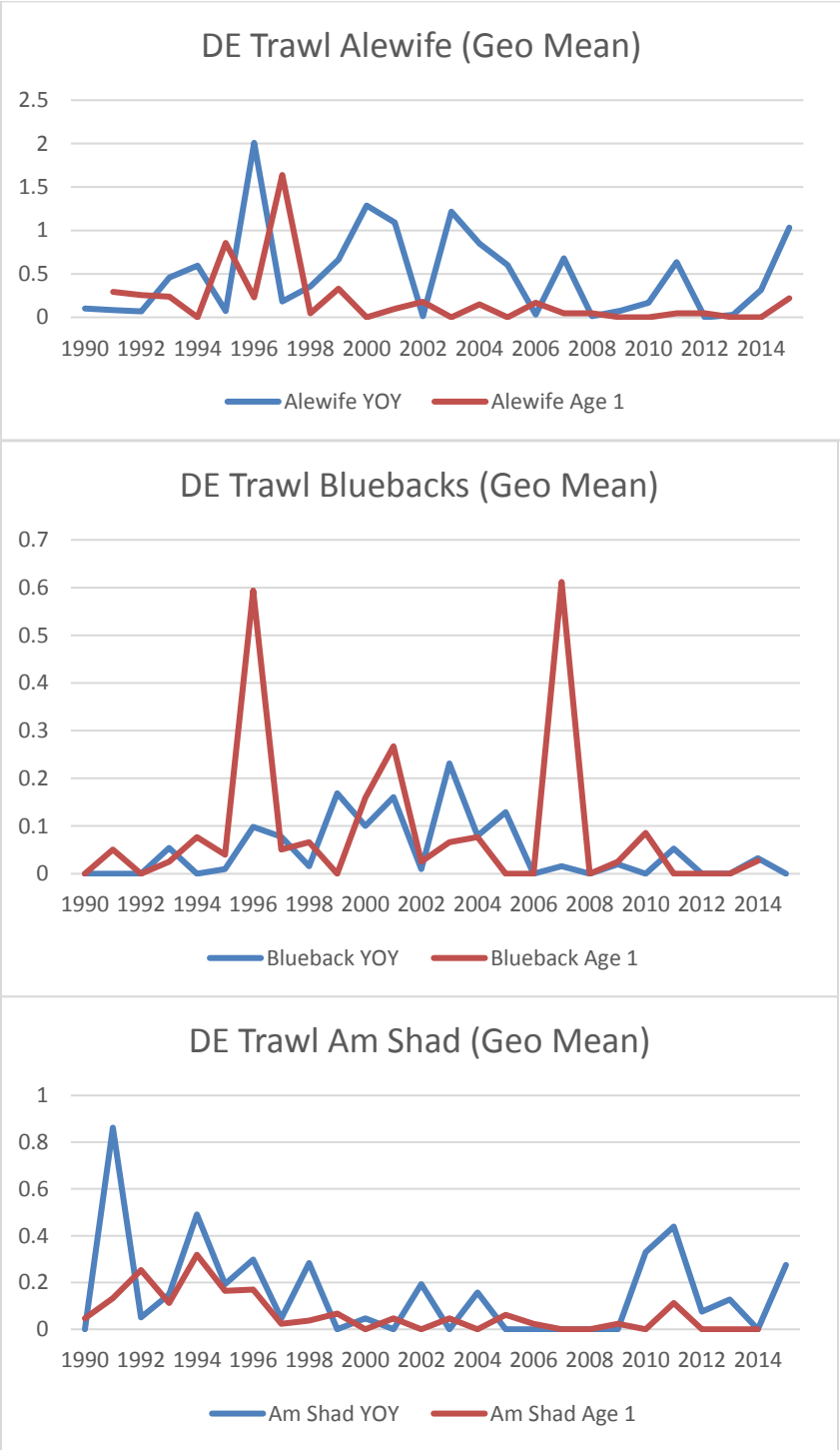


Figure 16. Delaware Juvenile Trawl Survey Indices, Alewife, Blueback, Shad

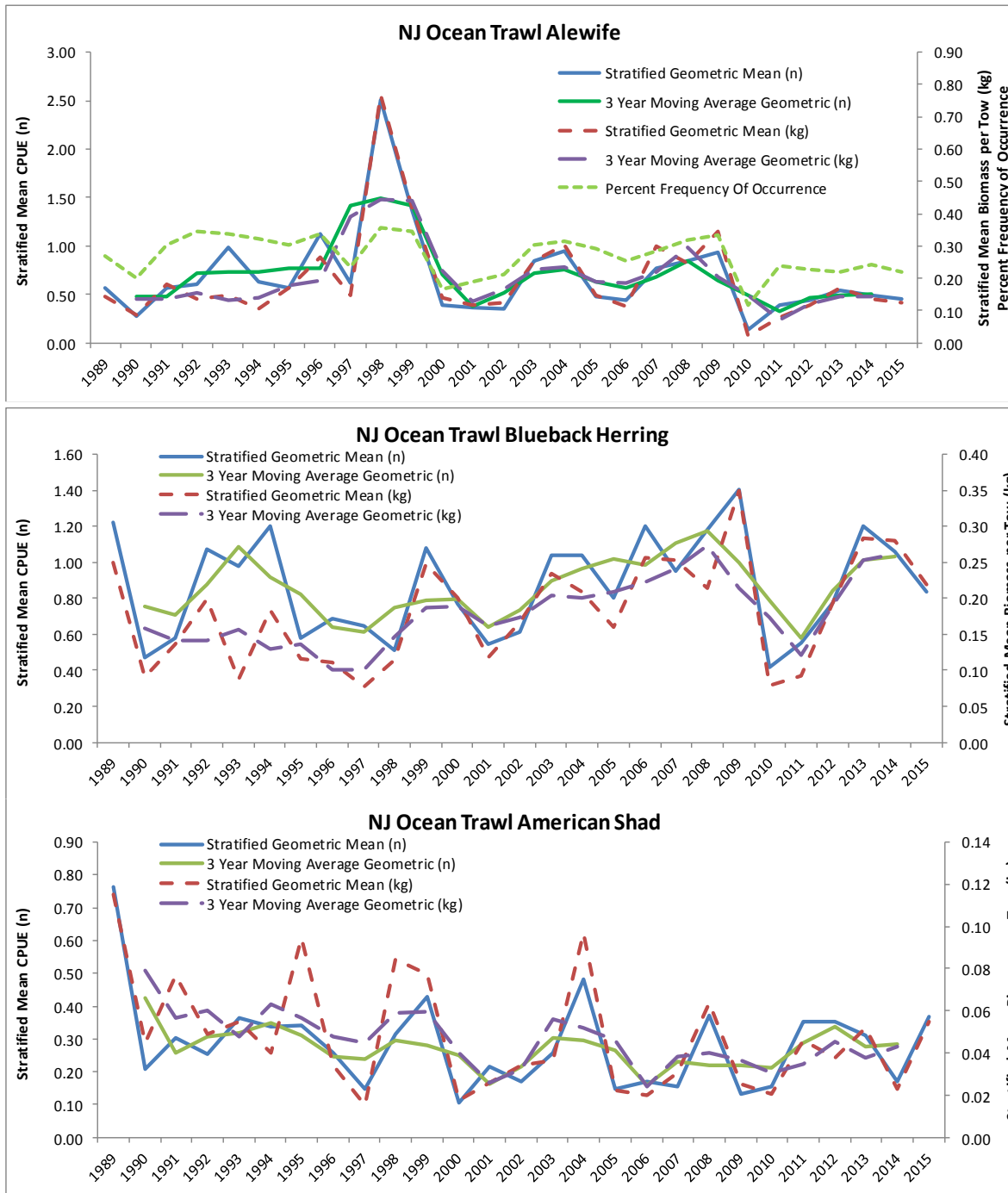


Figure 17. New Jersey – Ocean Trawl Indices Alewife, Blueback, Shad

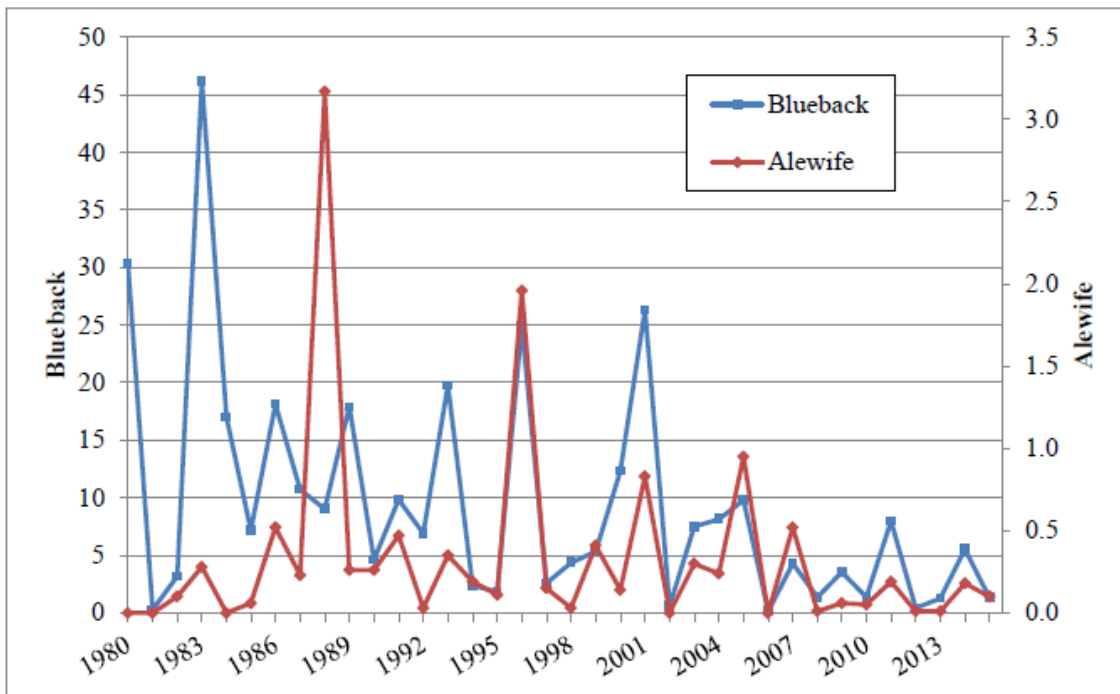


Figure 18. DE River juv. Alewife and Blueback herring indices from NJ beach seine, geometric means

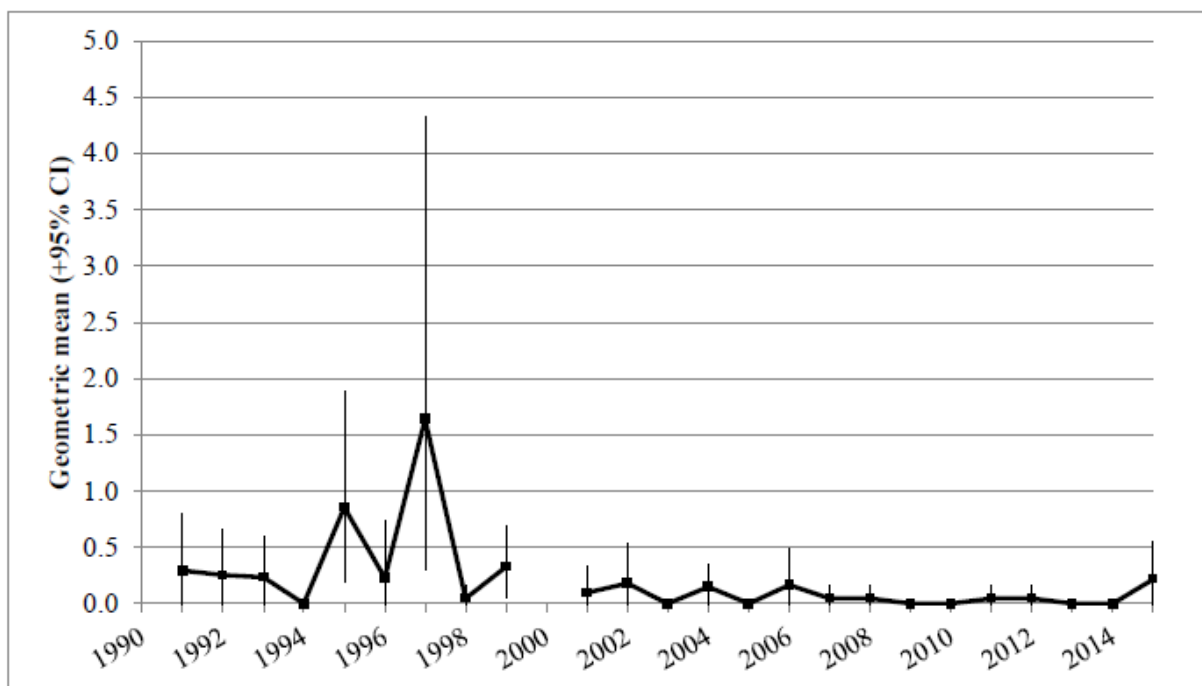


Figure 19. Annual Age 1 Alewife geometric mean DE River and Upper Bay

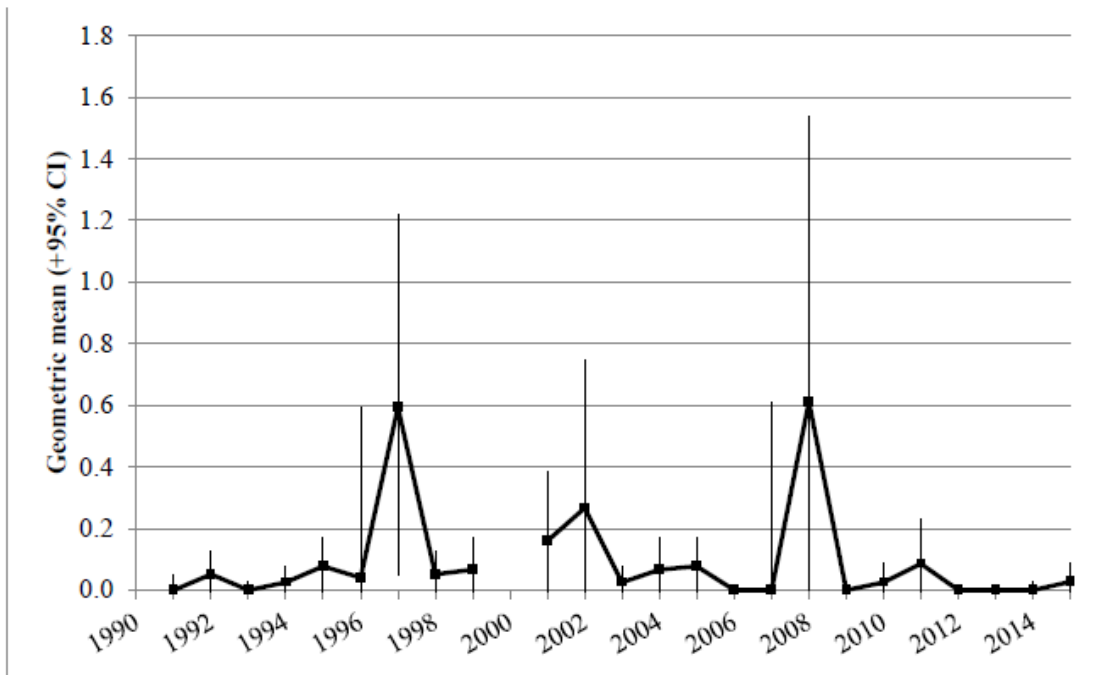


Figure 20. Annual Age 1 Blueback geometric mean DE River and Upper Bay

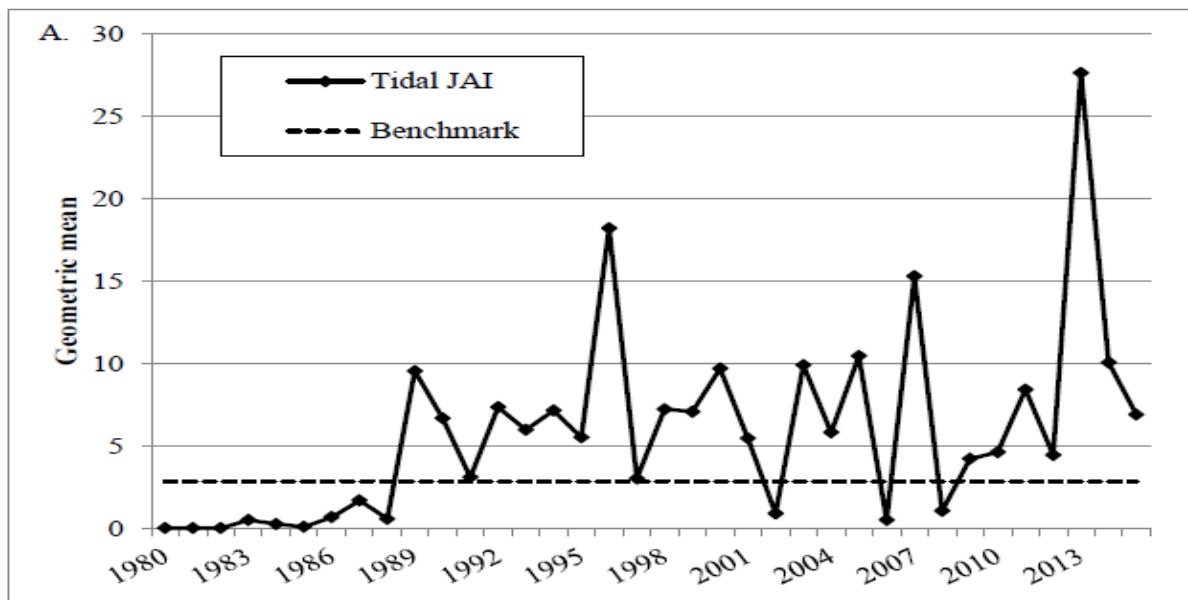


Figure 21. Juvenile American Index (JAI) Shad CPUEs (geometric mean) for the upper tidal (A) Delaware River (B) : 1980 – 2015. The 25th percentile benchmark defined in the Co-op American Shad Sustainability Plan is illustrated as the dashed line. The benchmark was derived from data inclusive of 1987 – 2010 for the upper tidal JAI.

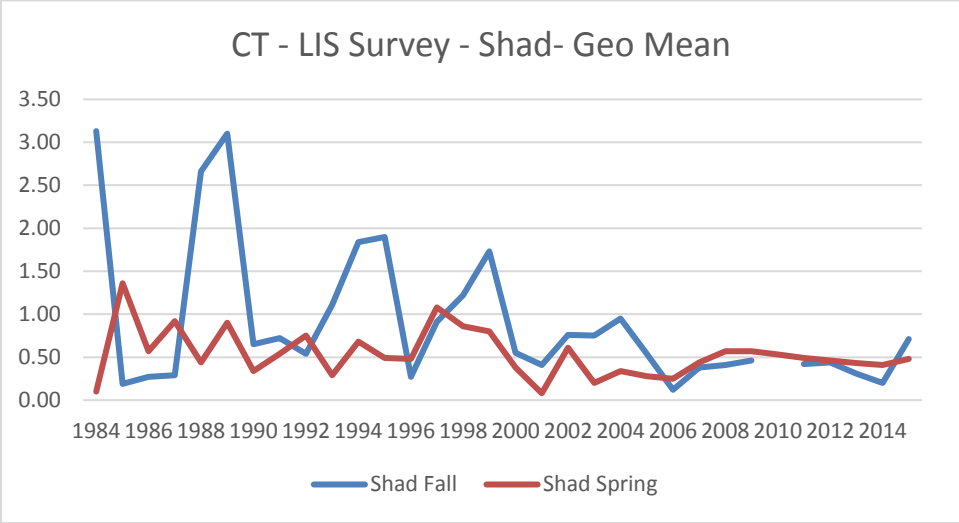
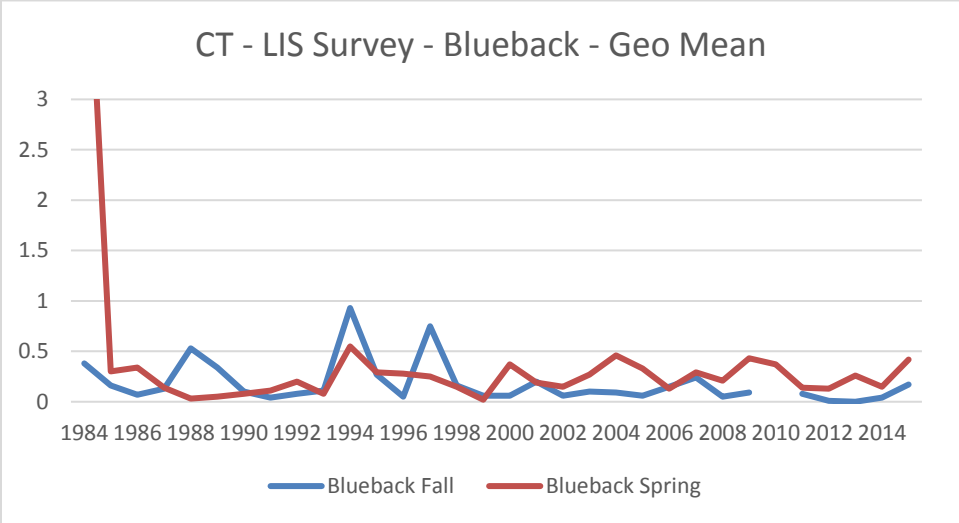
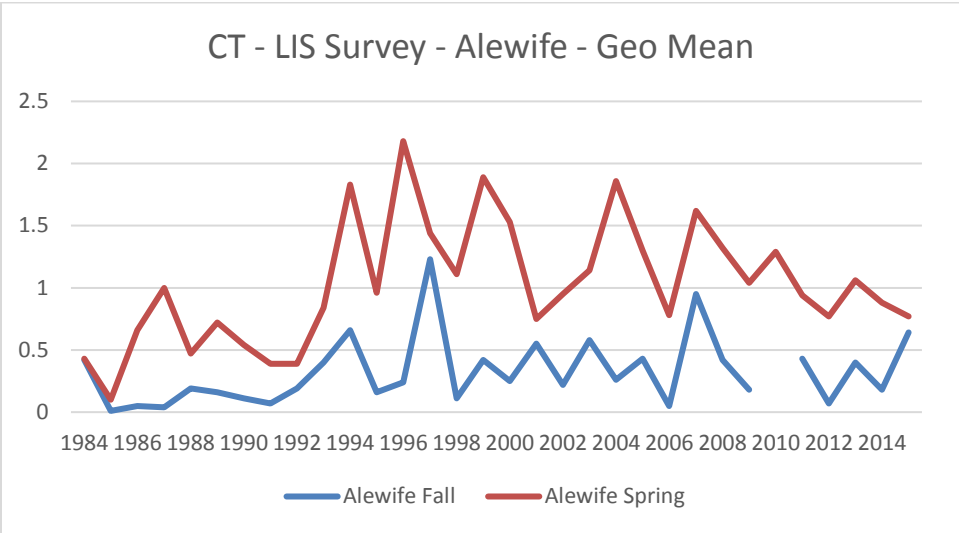


Figure 22. Connecticut Long Island Survey Indices Geometric Mean Alewife, Blueback, Am. Shad

Run Counts

While collecting state by state river run data is beyond the resources of Council staff (that is an assessment update type activity), the ASMFC does provide selected run counts in its FMP reviews, provided below for 2012-2014. 2015 will be provided to the Council in October if it becomes available. An issue that has come up repeatedly in TEWG discussions is that members of the public with diverse perspectives believe that a one-stop database of RH/S run strength trends would be very helpful to contextualize news reporting of runs in particular areas. Council staff has been engaging with NMFS and ASMFC staff to determine if such a project is feasible, and how it could be accomplished. The State of Maine took preliminary steps to accomplish a portal for this kind of information, www.riverherring.com, and discussions are continuing on a way to create a resource that would allow quick access to regional run count information.

Table 1. American shad and river herring passage counts at select rivers along the Atlantic Coast in 2012.

State/River	Shad	River Herring
Maine		
Androscoggin	11	170,191
Saco	6404	27,858
Kennebec	5	179,357
Sebasticook	163	1,703,520
St. Croix		36,168
New Hampshire		
Cochecho		27,608
Oyster		2,573
Lamprey		86,862
Exeter		378
Taylor		92
Winnicut		5
Massachusetts		
Merrimack	21,396	
Rhode Island		
Gilbert Stuart		107,901
Nonquit		60,132
Buckeye Brook		90,625
Pennsylvania/Maryland/Delaware		
Susquehanna (Conowingo)	23,629	52
Susquehanna (Holtwood)	4,238	
South Carolina		
St. Stephen Dam	150,082	
Total 2012	205,928	
Total 2011	307,793	

Table 2. American shad and river herring passage counts at select rivers along the Atlantic Coast in 2013.

State/River	Shad	River Herring
Maine		
Androscoggin	14	69,297
Saco	6171	43,414
Kennebec	0	94,456
Sebasticook	114	2,272,492
St. Croix		16,677
New Hampshire		
Cocheco		18,337
Oyster		7,149
Lamprey		79,408
Exeter		378
Taylor		128
Winnicut		0
Massachusetts		
Merrimack	37,149	17,359
Connecticut		
Holyoke Dam	392,967	976
Rhode Island		
Gilbert Stuart		91,240
Nonquit		52,563
Buckeye Brook		45,244
Pennsylvania/Maryland/Delaware		
Susquehanna (Conowingo)	12,733	7
Susquehanna (Holtwood)	2,503	
Susquehanna (Safe Harbor)	1,927	
Susquehanna (York Haven)	202	
South Carolina		
St. Stephen Dam	324,984	
Total 2013	774,132	2,808,149
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.

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.

5.1.2 Review of recent genetic studies and how they relate to bycatch

Partly as a result of previously ongoing research, and partly as a result of TEWG-driven activities, a number of studies have been published recently that pertain to river herring and bycatch. Most immediately relevant to genetics and bycatch are Palkovacs et al. 2014 (Evol. App.) and Hasselman et al. 2016 (CJFAS), summaries of which are generally excerpted below. Palkovacs et al. 2014 used population genetic data to define groups of RH/S populations linked by migration and then used demographic information from monitored populations to draw inferences about the status of unmonitored populations within those groups. Results show that

most populations comprise genetically distinguishable units, which are nested geographically within genetically distinct clusters or stocks. They identified three distinct stocks in alewife (Northern NE, Southern NE, Mid-Atlantic) and four stocks in blueback herring (Northern NE, Southern NE, Mid-Atlantic, South Atlantic) and their results gave them confidence that they had identified the major genetic stocks within the US portions of these species ranges. Analysis of available time series data for spawning adult abundance and body size indicated declines across the US ranges of both species, with the most severe declines having occurred for populations belonging to the Southern New England and the Mid-Atlantic Stocks. They recommended those belonging to these genetic stocks as warranting the highest conservation prioritization.

Hasselman et al. 2016 used data from 15 microsatellites genotyped for baseline populations and bycatch to conduct genetic stock identification to understand how bycatch was partitioned among previously identified regional genetic stocks. They then combined this information with fishery observer data to estimate genetic stock-specific bycatch mortality for the southern New England Atlantic herring fishery (2012–2013).

River herring bycatch specimens ($n = 2928$) were sampled opportunistically by fisheries observers monitoring the Atlantic herring, shrimp (pandalid species), longfin squid (*Doryteuthis pealeii*), and Atlantic cod (*Gadus morhua*) fisheries. The majority of samples came from the Atlantic herring fishery, which uses single and paired midwater trawl and bottom otter trawl fishing gear. Other sampled fisheries use only bottom otter trawls. Bycatch collections were obtained in fall (October–December) and winter (January–March) during 2011–2013 from statistical areas (SA) comprising five nearshore regions (i.e., Gulf of Maine (GoM), SA 513, 514; Cape Cod (CC), SA 521; southern New England (SNE), SA 537, 539, 611; New Jersey – Long Island (NJLI), SA 612, 613, 615; Delaware (DEL), SA 622). Bycatch overall, but especially in the Atlantic herring fishery, was disproportionately assigned to the most severely depleted genetic stocks (alewife southern New England stock—70% of assignments; blueback herring mid-Atlantic stock—78% of assignments). The authors suggested that mitigating bycatch on the southern New England fishing grounds may therefore benefit recovery efforts for alewife and blueback herring genetic stocks that have experienced the greatest declines in spawning adult abundances.

In addition, ongoing efforts by some of the researchers involved in the above two studies include a new analysis of population genetic structure for alewife and blueback herring across both the US and Canadian ranges of both species using a new set of single nucleotide polymorphism (SNP) markers. These markers have several advantages over the microsatellites used in the past, and this new analysis includes many more rivers, many more samples, and extends north to Newfoundland.

Over the next year, researchers will be building on this new SNP analysis to link spawning runs to marine caught samples from bycatch and fisheries-independent scientific trawl surveys. This analysis will allow refinement of genetic stock identification of bycatch, extend it to more recent years, and provide better understanding of patterns of genetic structure at sea in areas where bycatch is not (yet) a problem. The latter is important if we want to know the potential impacts of management actions that could shift fisheries in time and space to new areas. Also, as part of an ASMFC award, researchers are working with the UMass and MassDMF groups on a model to understand how bycatch interacts with freshwater productivity to influence alewife populations, focusing on southern New England watersheds.

Finally, there is an ongoing analysis of population structure and relative abundance of RH/S based on larval tows and adult samples for Mid-Atlantic rivers (Chesapeake Bay and North Carolina). This analysis will use the microsatellites to identify larval samples to species to get a better idea of the relative abundances of alewife and bluebacks in places where it is very hard to sample adults. It will also look at population structure in this region to determine the degree to which tributaries within major watersheds are genetically differentiated (and therefore might need to be managed separately) (pers com E. Palvovick)

5.1.3 Review of recent assessments

River Herring

In the most recent Atlantic States Marine Fisheries Commission river herring stock assessment (ASMFC 2012²), of the 24 river herring stocks for which sufficient data are available to make a conclusion, 23 were depleted relative to historic levels and one was increasing. The status of 28 additional stocks could not be determined because the time-series of available data was too short.

Estimates of coastwide abundance and fishing mortality could not be developed because of the lack of adequate data. The “depleted” determination was used instead of “overfished” because of the many factors that have contributed to the declining abundance of river herring, which include not just directed and incidental fishing, but likely also habitat issues (including dam passage, water quality, and water quantity), predation, and climate change. There are no coastwide reference points.

As part of a recent river herring status review under the Endangered Species Act, NMFS completed an extinction risk analysis (http://www.greateratlantic.fisheries.noaa.gov/protected/pcp/soc/river_herring.html). This analysis investigated trends in river herring relative abundance for each species range-wide as well as for each identified stock complex. This analysis found that "the abundance of alewife range-wide significantly increased over time (mid 1970s-2012), but the increase in blueback herring abundance was not significant (page 7 and Figures 8 and 9 of the referenced document). These range-wide analyses incorporated data from fishery independent surveys with the widest geographic extent, specifically the Northeast Fisheries Science Center spring and fall bottom trawl surveys and Canada's Department of Fisheries and Oceans (DFO) Scotian Shelf survey.

Stock-specific analyses incorporated run count data and stock-specific fishery-independent surveys. Stock-specific analyses indicated that the abundance of the Canadian alewife stock complex was significantly increasing, the abundance of the mid-Atlantic blueback herring stock complex was significantly decreasing, and all other analyzed stock complexes were not significantly increasing or decreasing in abundance.

The status review concluded that the species did not currently warrant listing under the ESA. NMFS and the ASMFC are engaged in a proactive conservation strategy for river herring and the Council is also involved in the endeavor. This strategy is described at

² Staff from the NEFSC also participated and conducted analyses in support of this assessment.

<http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/tewg/index.html> and also below - it brings together a variety of management partners and stakeholders together to address river herring threats and plan conservation and data gathering activities.

Shad

The most recent American shad stock assessment report (ASMFC 2007) identified that American shad stocks are highly depressed from historical levels. Of the 24 stocks of American shad for which sufficient information was available, 11 were depleted relative to historic levels, 2 were increasing, and 11 were stable (but still below historic levels). The status of 8 additional stocks could not be determined because the time-series of data was too short or analyses indicated conflicting trends.

Taken in total, American shad stocks do not appear to be recovering. The assessment concluded that current restoration actions need to be reviewed and new ones need to be identified and applied. These include fishing rates, dam passage, stocking, and habitat restoration. There are no coastwide reference points for American shad. There is no stock assessment available for hickory shad.

5.1.4 Consider upcoming assessment updates/benchmarks

RH and Shad are scheduled to undergo assessment updates in 2018/2017 respectively. Benchmarks are scheduled for five years after the updates, though if new data or modeling improvements suggest a benchmark would be appropriate sooner, then sooner is also a possibility for benchmarks. Waiting until after 2020 for benchmarks should allow some of the improvements in data collection being worked on through the TEWG to be useful for an assessment. Also, if state moratoria and/or RH/S catch caps have had positive impacts there would be more time to observe those impacts.

5.2 DESCRIPTION OF RH/S ROLE IN THE ECOSYSTEM

Given their at-sea and in-river life phases, RH/S likely are or could be (RH/S roles in the ecosystem currently are likely diminished related to their low populations) important prey for a wide variety of animals. Alewife and blueback herring are an important forage fish for marine and anadromous predators, such as striped bass, spiny dogfish, bluefish, Atlantic cod, and pollock (ASMFC 2012). Marine mammals likely feed on RH/S at times, and other predators such as fish-eating birds (e.g. ospreys, cormorants, and herons), and other mammals (e.g. river otters, raccoons, and fishers) have been observed feeding on RH/S (<http://www.maine.gov/dmr/science-research/searun/alewife.html>). RH/S also likely facilitate general nutrient transport from marine to fresh water, depending on the size of a run (Hanson et al 2010, Norris 2012).

5.3 DESCRIPTION OF RH/S DIRECTED & INCIDENTAL FISHERIES (CURRENT AND HISTORICAL)

5.3.1 Historical use and value of RH/S directed fisheries

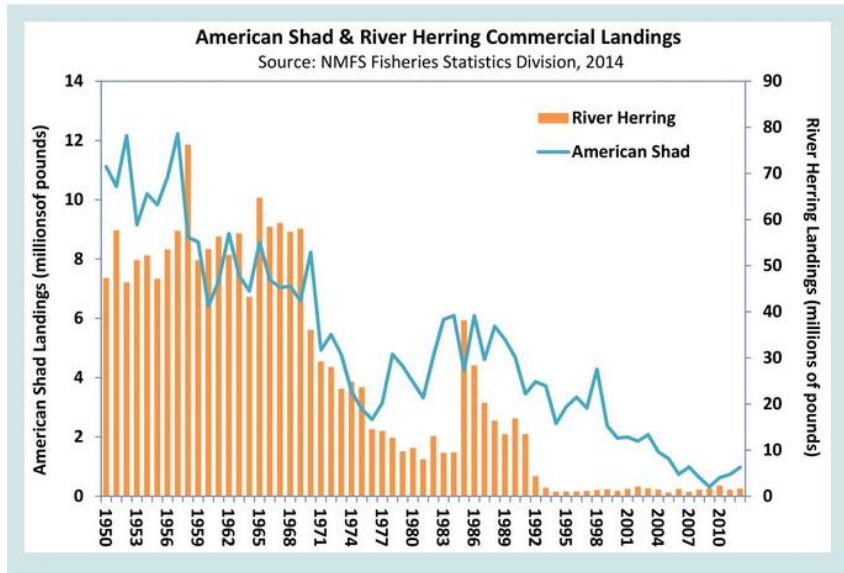


Figure 23. RH/S Commercial Landings 1950-2012

The figure above describes RH/S landings 1950-2012. 2013 river herring landings were 1.6 million pounds and 2013 American shad landings were 0.6 million pounds. 2014 river herring landings were 1.8 million pounds and 2014 American shad landings were 0.8 million pounds (ASMFC FMP Reports). The majority of recent landings have been accounted for by directed shad landings in North and South Carolina and directed river herring landings in Maine. The FMP report for 2015 data is not yet available, but regulations have likely kept landings in the same general low level as recent years. The 2012 ASMFC stock assessment also notes that tens of millions of pounds of river herring were landed by foreign fisheries in the late 1960s and early 1970s, with a peak of 80 million pounds of river herring taken in 1969 by foreign fisheries (primarily USSR).

The ASMFC annual fishery management plan reviews are available at <http://www.asmfc.org/species/shad-river-herring>. Landings figures for 2012-2014 from those reports (all “Table 2”) are provided below:

Table 4. RH/S in-river commercial and ocean bycatch landings (pounds) provided by states, jurisdictions, and NOAA Fisheries for 2012

	American Shad	River Herring	Hickory Shad
Maine ⁴		1,606,535	
New Hampshire		2,681	
Massachusetts			
Rhode Island			
Connecticut	61,623		
New York ¹	1,485	16,965	
New Jersey ²	28,120	84	924
Pennsylvania			
Delaware			
Maryland		290	
D.C.			
PRFC	4,742		446
Virginia	4,601		999
North Carolina	235,861	678	65,645
South Carolina ³	299,528	163,076	
Georgia ⁴			
Florida			
Total	635,960	1,790,309	68,014

¹New York American shad landings are from ocean bycatch

²Includes in-river and coastal harvest

³American shad landings include hickory shad

⁴Georgia & Maine (shad) landings are confidential

Table 5. RH/S in-river commercial and ocean bycatch landings (pounds) provided by states, jurisdictions, and NOAA Fisheries for 2013

	American Shad	River Herring	Hickory Shad
Maine ³		1,423,878	
New Hampshire		4,420	
Massachusetts			
Rhode Island			
Connecticut	65,679		
New York ¹	932	10,349	
New Jersey ²			3,483
Pennsylvania	2,854		
Delaware			
Maryland		305	
D.C.			
PRFC	3,799		
Virginia	4,825		755
North Carolina	257,869	743	71,326
South Carolina	205,368	192,454	652
Georgia	62,017		2,162
Florida			
Total	608,428	1,632,149	78,378

¹New York American shad landings are from ocean bycatch

²Includes in-river and coastal harvest

³Maine (shad) landings are confidential

Table 6. RH/S in-river commercial and ocean bycatch landings (pounds) provided by states, jurisdictions, and NOAA Fisheries for 2014

	American Shad	River Herring	Hickory Shad
Maine ³		1,720,285	
New Hampshire			
Massachusetts		192	
Rhode Island			
Connecticut	61,544		
New York ^{1,3}		8,450	
New Jersey ²	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 Carolina ⁴	333,602	114,905	1,311
Georgia ³			
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

RH/S have been used as a fishery resource since before colonial times. Earlier historical records are imprecise and incomplete, but were used to document landings amounts in the last river herring assessment back to 1887. The last shad assessment also has state by state landings records going back to the late 1800s, and the importance of the shad fishery was being documented as early as the late 1700s (Gerstell 1988). Even late 19th century harvests may have been conducted on already depleted populations. Historical records 1887-1938 show that in the late 1920s and early 1930s river herrings generated from \$2-\$5 million dollars a year in revenues (2010 dollars) based on landings of 12-42 million pounds, i.e. they were a substantial fishery (ASMFC 2012). There is also ample evidence for Native American use of RH/S fishery resources (e.g. Visel 2006, Basset 2015).

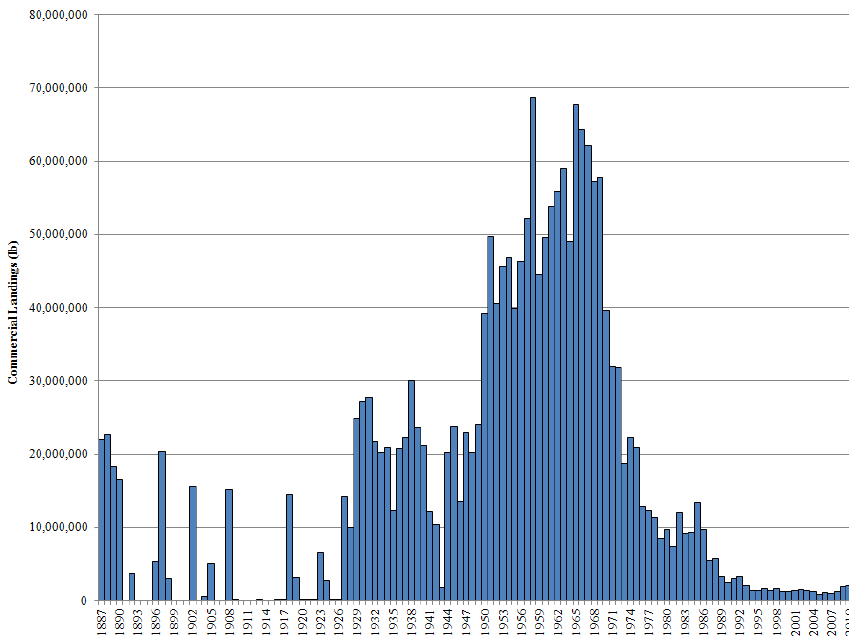


Figure 24. Historical Domestic River Herring Landings 1887-2010.

5.3.2 Review of the current information on incidental catch

Incidental catch for the various fleets through 2013 are provided in Table 13. Since 2013, the Atlantic Herring and Atlantic mackerel fisheries have been subject to incidental catch caps, and the cap monitoring results are provided below (the herring cap began in late 2014).

Table 7. RH/S Catch Atl. Herring Fishery 2014

River herring / shad catch by Atlantic herring vessels

Report Run on: 1/8/2015
For data reported through: 1/7/2015
Monitoring period: 12/4/2014 to 12/31/2014

Management Area	Current Week's Catch (mt) ¹	Reporting Week's Catch (mt) ²	Cumulative Catch (mt)	Catch Cap (mt)	Percent of Catch Cap
Gulf of Maine Mid-water Trawl	0.0	0.0	0.0	86	0.05%
Cape Cod Mid-water Trawl	0.0	0.0	0.0	13	0.00%
Southern New England Bottom Trawl	0.3	0.0	11.3	89	12.69%
Southern New England Mid-water Trawl	0.6	0.0	15.8	124	12.70%
Total	0.9	0.0	27.1	312	8.68%

¹River herring/shad catch reported for week ending 1/3/2015

²River herring/shad catch reported for week ending 1/10/2015

Table 8. RH/S Catch Atl. Herring Fishery 2015

River herring / shad catch by Atlantic herring vessels

Report Run on: 1/14/2016
For data reported through: 1/13/2016
Monitoring period: 1/1/2015 to 12/31/2015

Management Area	Current Week's Catch (mt) ¹	Reporting Week's Catch (mt) ²	Cumulative Catch (mt)	Catch Cap (mt)	Percent of Catch Cap
Gulf of Maine Mid-water Trawl	0.0	0.0	11.1	86	12.95%
Cape Cod Mid-water Trawl	0.0	0.0	0.7	13	5.38%
Southern New England Bottom Trawl	7.4	0.0	100.7	89	113.19%
Southern New England Mid-water Trawl	2.0	0.0	64.0	124	51.59%
Total	9.4	0.0	176.5	312	56.58%

¹River herring/shad catch reported for week ending 1/2/2016

²River herring/shad catch reported for week ending 1/9/2016

Table 9. RH/S Catch Atl. Herring Fishery 2016

River herring / shad catch by Atlantic herring vessels

Report Run on: 7/28/2016
 For data reported through: 7/27/2016
 Monitoring period: 1/1/2016 to 12/31/2016

Management Area	Cumulative Catch (mt)	Catch Cap (mt)	Percent of Catch Cap
Gulf of Maine Mid-water Trawl	0.2	86	0.2%
Cape Cod Mid-water Trawl	0.7	13	5.4%
Southern New England Bottom Trawl	20.5	89	23.1%
Southern New England Mid-water Trawl	40.3	124	32.5%
Total	61.7	312	19.8%

Table 10. RH/S Catch Atl. Mackerel Fishery 2014

River herring / shad catch by Atlantic mackerel vessels

Report run on : January 8, 2015
 Data reported through: January 7, 2015
 Quota period: 1/1/14 to 12/31/14

Month	Monthly estimated river herring/shad catch (mt)	Cumulative estimated river herring/shad catch (mt)	Cumulative percent of quota (236 mt)
JANUARY	0.92	0.92	0.39%
FEBRUARY	2.92	3.85	1.63%
MARCH	0.95	4.79	2.03%
APRIL	0.13	4.92	2.09%
MAY	0.00	4.92	2.09%
JUNE	0.00	4.92	2.09%
JULY	0.00	4.92	2.09%
AUGUST	0.00	4.92	2.09%
SEPTEMBER	0.00	4.92	2.09%
OCTOBER	0.00	4.92	2.09%
NOVEMBER	1.34	6.27	2.66%
DECEMBER	0.15	6.42	2.72%

Table 11. RH/S Catch Atl. Mackerel Fishery 2015

**River herring / shad catch
by Atlantic mackerel vessels**

Report run on : January 19, 2016
 Data reported through: January 18, 2016
Quota period: 1/1/15 to 12/31/15

Month	Monthly estimated river herring/shad catch (mt)	Cumulative estimated river herring/shad catch (mt)	Cumulative percent of quota (89 mt)
JANUARY	3.09	3.09	3.47%
FEBRUARY	0.70	3.79	4.26%
MARCH	3.95	7.74	8.70%
APRIL	1.10	8.84	9.93%
MAY	0.79	9.63	10.82%
JUNE	0.00	9.63	10.82%
JULY	0.00	9.63	10.82%
AUGUST	0.00	9.63	10.82%
SEPTEMBER	0.00	9.63	10.82%
OCTOBER	0.00	9.63	10.82%
NOVEMBER	2.48	12.11	13.61%
DECEMBER	0.76	12.87	14.46%

Table 12. RH/S Catch Atl. Mackerel Fishery 2016

**River herring / shad catch
by Atlantic mackerel vessels**

Report run on : July 29, 2016
 Data reported through: July 28, 2016
Quota period: 1/1/16 to 12/31/16

Month	Monthly estimated river herring/shad catch (mt)	Cumulative estimated river herring/shad catch (mt)	Cumulative percent of quota (82 mt)
JANUARY	0.08	0.08	0.10%
FEBRUARY	0.00	0.08	0.10%
MARCH	0.33	0.41	0.50%
APRIL	0.00	0.41	0.50%
MAY	1.07	1.48	1.81%
JUNE	0.00	1.48	1.81%
JULY	0.00	1.48	1.81%

Table 13. Total incidental catch (mt; retained plus discarded catch) estimates and corresponding CVs for river herring and shad combined (RHS include alewife, blueback herring, American shad and hickory shad) for the primary fishing fleets from 1989-2013. MWT fleets are only included beginning in 2005.

Year	BT						Gillnet						Single MWT		Paired MWT		Purse Seine		Other	
	Sm		Med		Lg		Sm		Lg		Xlg		Catch	CV	Catch	CV	Catch	CV	Catch	CV
1989	180	0.53	2	0.89	126	1.63	0		0		0						0		3	0.62
1990	184	0.54	7	1.22	121	0.52	0		0		0						0		5	0.40
1991	465	0.31	14	0.89	109	0.34	0		0		0						0		62	0.17
1992	1,308	0.39	0		97	0.42	0		0		0						0		21	0.28
1993	488	0.36	1	1.21	840	1.19	0		0		0						0		8	0.24
1994	246	0.75	0	5.70	72	0.51	1	0.10	31	0.63	0						0		6	0.28
1995	127	0.71	0	0.40	26	1.56	1	0.37	278	0.47	0	0.84					0		52	0.44
1996	3,414	1.94	0	1.40	234	1.02	5	0.40	59	0.41	0						0		80	0.34
1997	1,588	0.70	9	0.37	12	0.69	5	0.60	31	0.23	0	0.67					0		84	0.36
1998	328	1.01	1	1.00	431	0.78	11	0.57	90	0.26	2	0.64					0		0	0.98
1999	366	0.58	0	0.91	175	1.09	7	0.89	52	0.50	1	1.15					0		54	0.60
2000	123	0.39	30	1.31	68	1.30	0	0.95	198	0.77	0	0.95					0		71	1.92
2001	431	0.56	14	0.40	376	0.31	71	0.43	6	0.47	0	0.78					0		0	0.88
2002	278	0.32	0	1.36	3	0.43	3	0.59	36	0.39	0	1.07					0		0	
2003	916	0.68	0	0.42	12	0.27	2	1.48	34	0.63	1	0.86					0		29	0.31
2004	389	0.39	4	0.71	25	0.31	0	0.39	373	1.21	0	0.49					0		59	1.42
2005	246	0.38	3	1.29	6	0.34	0	0.72	4	0.27	0	0.37	44	0.86	468	0.40	0	1.59	7	0.41
2006	81	0.83	0	0.63	15	0.77	0	0.35	68	11.17	0	1.05	178	0.74	27	0.81	0		2	0.40
2007	384	0.42	4	0.63	3	0.28	0	1.06	62	0.64	0	1.41	190	3.12	179	1.21	0		4	0.58
2008	72	0.58	0	0.48	4	0.21	0		46	0.34	0	1.10	66	0.88	579	0.52	3	0.85	5	0.94
2009	138	0.38	1	0.48	14	0.59	2	1.87	48	4.32	0	0.79	43	0.58	205	0.37	2	0.46	11	0.78
2010	92	0.29	3	0.34	12	0.18	0	0.70	17	0.19	0	0.43	6	0.52	170	0.22	3	0.59	26	0.41
2011	151	0.24	1	0.39	10	0.13	0		29	0.11	1	0.25	5	0.34	31	0.18	0	1.11	1	0.02
2012	79	0.30	0	0.63	12	0.13	0		31	0.09	0	0.45	46	0.53	301	0.33	1	0.65	27	0.34
2013	262	0.33	3	0.20	16	0.14	0		24	0.12	0	0.39	6	1.09	23	0.72	4	0.48	6	0.49

The Omnibus Industry Funded Monitoring Amendment has analyzed observer data to obtain RH/S incidental catch estimates for purposes of determining which fleets have accounted for RH/S catch. The table below is excerpted from draft Omnibus Industry Funded Monitoring Amendment text:

Table 14. Fleets Responsible for RH/S Catch 2005-2013.

FLEETS RESPONSIBLE FOR RH/S CATCH (TOTAL CATCH FROM 2005-2013)

Fishing Fleet	Percent of RH/S Catch
Midwater Trawl (Single and Paired)	57%
Small Mesh Bottom Trawl	33%
Large Mesh Gillnet	7%
Purse Seine	0.3%

While the 2014 RH/S caps in the Atlantic herring fishery approximately matched this pattern, catch was higher for small mesh bottom trawl in the 2015 herring caps, and that would have only accounted for a portion of total small mesh bottom trawl RH/S catch. See http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Mackerel_RHS/Mackerel_RHS.htm for historical performance of the Atl. herring and mackerel RH/S caps.

5.3.3 Consideration of recent/current/future observer coverage levels.

The Standardized Bycatch Reporting Methodology (SBRM) is used to place observers so that reasonable precision is obtained for discards of Federally-managed species. Since RH/S are not federally managed, RH/S are not considered when SBRM allocates observer coverage by fleet (areas and gear types). Analysis by NMFS (NMFS GARFO 2014) has previously demonstrated that coverage of RH/S in the mid-water trawl and purse-seine fisheries would not benefit substantially from being included in SBRM, largely because there are relatively few RH/S discarded in the relevant fisheries (there were only small shifts of coverage among fleets).

2015 coverage rates for relevant fisheries were 4.7% for mid-water trawl (MWT), 2.5% for purse seine, and 9.1% for small mesh bottom trawl (NMFS 2016). The coefficients of variation (C.V.) for the mackerel fishery’s RH/S cap were 49% in 2014 and 23% in 2015 – C.V.s less than 30% are generally targeted as an acceptable level of imprecision. Analysis of the midwater trawl fleet done for the IFM amendment suggests that 25%-50% coverage is needed to obtain a C.V. about or less than 30% for RH/S catch estimates in the MWT fleet, and that 5% - 22% coverage should result in a C.V. about or less than 30% for RH/S catch estimates in the small mesh bottom fleet. While these are not directly comparable to the RH/S cap on the mackerel fishery, if these fisheries that target mackerel achieve these levels of coverage, overall RH/S cap estimates for the mackerel fishery’s RH/S cap would likely be in a reasonably level of precision.

The revised SBRM prioritization procedures determine year to year observer coverage generally based on where discards of federally-managed species most occur, and available funding. In recent years this process has led to fewer midwater trips being observed (but more small mesh bottom trawl trips). The Omnibus Industry-Funded Monitoring Amendment is seeking to supplement SBRM coverage through a variety of options. The following tables were developed for the Industry-Funded Monitoring Amendment and describe planned and realized coverage levels for the relevant fleets as pertaining to RH/S caps.

Table 15. 2012-2013 NEFOP Sea Days

Fleet	Region	Sea Days allocated for April 2014 to March 2015	Observed sea days, July 2012 to June 2013	VTR sea days, July 2012 to June 2013	Observed trips, July 2012 to June 2013	VTR trips, July 2012 to June 2013
Small Mesh Bottom Trawl	MA	1,289	631	7,003	263	3,569
Small Mesh Bottom Trawl	NE	1,604	463	7,315	171	3,315
Purse seine	MA	12	0	447	0	441
Purse seine	NE	20	71	699	31	319
Midwater Trawl (Pair and Single)	MA	0	7	72	1	10
Midwater Trawl (Pair and Single)	NE	45	638	1,389	146	394

Source: NEFOP/GARFO Proposed Seaday Allocation for 2014 (Appendix C); Wigley et al., 2014 (Appendix D).

Table 16. 2014-2015 NEFOP Sea Days

Fleet	Region	Proposed sea days for April 2016 to March 2017	Observed sea days, July 2014 to June 2015	VTR sea days, July 2014 to June 2015	Observed trips, July 2014 to June 2015	VTR trips, July 2014 to June 2015
Small Mesh Bottom Trawl	MA	1,171	997	6,761	360	3,088
Small Mesh Bottom Trawl	NE	798	933	8,847	319	3,381
Purse seine	MA	6	0	174	0	172
Purse seine	NE	19	29	661	13	315
Midwater Trawl (Pair and Single)	MA	30	8	134	1	26
Midwater Trawl (Pair and Single)	NE	440	160	1,189	43	363

Source: 2016 Discard Estimation, Precision, and Sample Size Analyses for 14 Federally Managed Species Groups in the Waters off the Northeastern United States; Wigley et al., 2016 (included in Appendix 4).

5.3.4 Predictability of time and area overlap between RHS and the sea herring and mackerel fisheries (env. Modeling work)

NMFS Greater Atlantic Region funded a Northeast Fisheries Science Center (NEFSC) project to use environmental data collected as part of the NEFSC bottom trawl survey to model marine habitat preferences for alewife, blueback herring, Atlantic herring, and Atlantic mackerel. Habitat preferences were associated with bottom temperature, bottom salinity, depth, solar position, and region of the Northwest Atlantic Ocean:

<http://icesjms.oxfordjournals.org/content/early/2015/09/15/icesjms.fsv166.abstract>

Turner et al 2015 used generalized additive models (GAMs) to describe habitat associations of Alewife, Blueback Herring, Atlantic Herring, and Atlantic Mackerel. Bottom temperature, bottom depth, bottom salinity, solar azimuth and elevation, and region of the Northeast U.S. continental shelf were all significant in the habitat models; GAMs explained 25.2, 16.9, 18.9, and 20.6% of the deviance observed for the presence/absence of Alewife, Blueback Herring, Atlantic Herring, and Atlantic Mackerel. A subset of the data was omitted from the model and the probability of presence was compared with observations; 66–77% of observations were correctly predicted. The individual probabilities of presence were used to quantify and evaluate the accuracy of modelled overlap of Alewife and Blueback Herring with Atlantic Herring (68–72% correct predictions) and Alewife and Blueback Herring with Atlantic Mackerel (57–69% correct predictions). The findings indicate that environmental gradients influence the distributions and overlap of Alewife, Blueback Herring, Atlantic Herring, and Atlantic Mackerel, and with further testing and refinement these models could be developed into a tool to aid industry in reducing incidental catches of river herring.

The models will be coupled with oceanographic forecast models, and model accuracy will be evaluated through directed sampling with the cooperative research fleet. The ultimate project goal is to develop a river herring/ Atlantic herring/Atlantic mackerel overlap forecast tool for use by the Atlantic herring and Atlantic mackerel fisheries to minimize incidental river herring catches.

5.3.5 Impacts of incidental fisheries on Mid-Atlantic stocks

It is not currently possible to currently know what the impact of incidental catches of RH/S are on Mid-Atlantic RH/S stocks. Given the RH/S cap performance, it appears that catches of RH/S related to mackerel fishing have been minimal, at least compared to the historical landings of RH/S. Part of this undoubtedly has to do with the low catches of mackerel in recent years, and there is certainly some uncertainty given the low observer coverage, but even if catches were double what was estimated in the highest year of the catch (38,400 pounds X 2 = 76,800 pounds), such catch would appear to be trivial compared to historical landings (e.g. 40-60 million pounds of just domestic landings of river herring alone each year in the 1950s and 1960s)

5.4. DESCRIPTION OF RECENT/CURRENT RH/S MANAGEMENT

5.4.1 States/ASMFC

Shad and river herring are managed under Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (American Shad Management) and Amendment 2 to the Interstate Fishery Management Plan for Shad and River Herring (River Herring Management), respectively. Amendment 2 prohibits state waters commercial and recreational fisheries 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 (see below for links to the approved plans). 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 state waters commercial and recreational fisheries beginning January 1, 2013, unless a state or jurisdiction has a sustainable management reviewed by the Technical Committee and approved by the Management Board.

Amendment 3 also requires states and jurisdictions to submit a habitat plan regardless of whether their commercial fishery would remain open. The habitat plans outline current and historical spawning and nursery habitat, threats to those habitats, and habitat restoration programs in each of the river systems. The purpose of the habitat plans is to provide a record of the major threats facing American shad to aid in future management efforts. The habitat plans provide a comprehensive picture of threats to American shad in each state and include collaboration with other state and federal agencies (e.g., state inland fish and wildlife agencies, water quality agencies, U.S Army Corps of Engineers).

The two largest threats identified in the habitat plans were barriers to migration and a lack of information on the consequences of climate change. A key benefit of the habitat plans is that each river system relevant to shad now has its threats characterized. The habitat plans will be filed with the Federal Energy Regulatory Commission to ensure that shad habitat is considered when hydropower dams are licensed. They will also be shared with inland fisheries divisions to aid in habitat monitoring and restoration efforts. In February 2014, the Board approved habitat plans for the majority of states and jurisdictions. It is anticipated that habitat plans will be updated every five years.

The following states/areas have approved sustainability plans, which are available at:
<http://www.asmfc.org/species/shad-river-herring>.

Shad Sustainable Fishery Management Plans – Connecticut, Delaware River Basin, Potomac River Fisheries Commission, North Carolina, South Carolina, Georgia, Florida

River Herring Sustainable Fishery Management Plans – Maine, New Hampshire, New York, North Carolina, South Carolina

5.4.2 ESA/NMFS

In 2013 NMFS completed a review of the status of river herring (alewife and blueback herring) in response to a petition submitted by the Natural Resources Defense Council (NRDC) requesting that alewife and blueback herring be listed as threatened under the Endangered Species Act (ESA) throughout all or a significant portion of their range or as specific distinct population segments (DPS) identified in the petition. The ASMFC stock assessment contained much of the information necessary to make an ESA listing determination for both species; however, any deficiencies were addressed through focused workshops and working group meetings and review of additional sources of information. NMFS determined that listing alewife or blueback herring as threatened or endangered under the ESA was not warranted at that time.

NMFS concluded that while neither species was currently endangered or threatened, both species are at low abundance compared to historical levels, and monitoring both species is warranted. Given the uncertainties and data deficiencies for both species, NMFS committed to revisiting both species in 3 to 5 years, which would be 2016-2018. NMFS determined that this is an appropriate timeframe as a 3- to 5-year timeframe equates to approximately one generation time for each species, and it was unlikely that a detrimental impact to either species could occur within this period. Additionally, it allows for time to complete ongoing scientific studies (e.g., genetic analyses, ocean migration patterns, climate change impacts) and for the results to be fully considered. NMFS also declared its intent to coordinate with ASMFC on a strategy to develop a long-term and dynamic conservation plan (e.g., priority activities and areas) for river herring considering the full range of both species and with the goal of addressing many of the high priority data gaps for river herring, which it has implemented via the TEWG (see below). The full listing determination is available at <http://www.greateratlantic.fisheries.noaa.gov/regs/2013/August/13riverherringlistingesanoticefr.pdf>.

5.4.3 Technical Expert Working Group (TEWG)

Since initiating the TEWG in 2013, the National Marine Fisheries Service (NMFS) and the ASMFC have worked collaboratively with other partners to make progress on a variety of goals specified in a conservation plan (<http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/conserv/index.html>) including:

1. Identify key research needs for assessment and conservation;
2. Increase coordination of river herring research and conservation;
3. Identify funding sources for river herring research and conservation;
4. Identify conservation actions to address threats;
5. Cultivate research groups to address key topics;
6. Improve information to be used in the next assessment;
7. Improve information used in conservation efforts;
8. Further conservation efforts to address threats; and,
9. Increase outreach about river herring

The TEWG recently released an update on progress, which identified the following key areas of progress:

- Coordination was increased with partners through establishment of the TEWG, including six subgroups (Climate change, Fisheries, Genetics, Habitat, Species Interactions, and Stock Status) and one integration committee. Subgroups: <http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/tewg/subgroups.html>
- Two projects were funded through a Plan Request for Proposal process to further information on river herring populations (~\$243,659). See http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/tewg/rfp/rh_cons_proposal_abstracts_vs4.pdf for details on projects.
- A dynamic and comprehensive plan for advancing research, coordination, conservation and outreach was developed by NMFS and ASMFC. The Plan considers the information compiled by the TEWG and will be further refined based on TEWG and public input.
- Conducted an ASMFC 2015 River Herring Data Collection Standardization Meeting to discuss standardized approaches to data collection with funding from NMFS: http://www.asmfc.org/uploads/file/56fc3c6dRH_DataCollectionStandardizationWorkshopSummary_March2016.pdf.
- NMFS Greater Atlantic Region funded a Northeast Fisheries Science Center project to develop a river herring/ Atlantic herring / Atlantic mackerel overlap forecast tool for use by the Atlantic herring and Atlantic mackerel fisheries to minimize incidental catch of river herring (see Turner et al 2015 above).
- Funding was provided to the Atlantic Salmon Federation and St. Croix International Waterway Commission to continue river herring counts at the Milltown Dam fishway in the St. Croix watershed by NMFS (via ASMFC) and the U.S. Fish and Wildlife Service (USFWS).
- A coastwide social science survey to document fishermen's observations of river herring in commercial, recreational, and subsistence fisheries was conducted through NOAA: http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/conserv/plancomp/traditional/coast-wide-survey-final_report_5-2015.pdf.
- The Penobscot River in Maine and the Choptank River in Maryland were selected as Habitat Focus Areas under NOAA's **Habitat Blueprint**, targeting financial resources and technical assistance to support habitat conservation and restoration efforts in these high-priority watersheds including removing passage barriers and restoring unimpeded river herring passage and spawning and rearing habitats.
- Information provided by the Passamaquoddy Tribe, Pleasant Point, on the cultural importance of river herring to the Tribe was incorporated into the Plan: <http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/conserv/plancomp/traditional/index.html>.
- Development of a life history-based model to inform the setting of quantitative-supported performance standards for survival and passage of American shad and river herring at hydropower projects is being supported by NMFS: http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/tewg/stich_tewg_2016.pdf
- Collaboration between NOAA and ASMFC and partners on climate change assessments related to river herring (see below).

- Continued active partnership within the Atlantic Coastal Fish Habitat Partnership by ASMFC and NOAA.
- NEFMC and MAFMC have or are considering including river herring research needs into their research planning processes (i.e., MAFMC Collaborative Research Priorities, NEFMC 2017-2022 Research Priorities, MAFMC Comprehensive Five Year (2016-2020) Research Plan) upon the encouragement of NMFS.
- Collaboration with NMFS and partners to: 1) study the long-term benefits of restoring riverine habitat along the Atlantic Coast; and 2) conduct ecosystem research on river herring.

5.4.4 Councils (caps, coordination issues, IFM etc.)

Since 2014 the Mid-Atlantic and New England Councils have set caps on the fisheries associated with the most RH/S catch: the Atlantic herring and Atlantic mackerel fisheries. The fisheries have generally stayed within their caps, though the 2015 Southern New England Bottom Trawl herring cap went slightly above its cap (see above). Council staff who work on the relevant plans are in frequent contact, and there are Council members who serve across Councils on the relevant Committees. These interactions serve to keep the Council informed of coordination issues. There remains some concern about the coordination of the caps. Given the degree of alignment created by the current estimation procedures and the potential for the Councils to disagree on year to year cap amounts even if a joint framework was established, it is not clear to staff that there likely would be substantial gains from moving from the status quo cap setting procedures to a fully linked cap. If a cap was based on a biologically-derived amount, then more explicitly aligning the caps may be more important. See previous memo on this topic at http://www.mafmc.org/s/Tab16_ED-Report.pdf for additional background. The Councils continue to work on the Joint Omnibus Industry-Funded Monitoring Amendment, which could lead to a range of increased monitoring in the mackerel fishery, as described in the table below (MWT – Mid-Water Trawl; SMBT = Small mesh bottom trawl, SBRM = base level of coverage through SBRM, NEFOP = Monitoring by observers from Northeast Fisheries Observer Program, ASM = At Sea Monitors, EM = Electronic Monitoring). Action is expected on this Amendment in early 2017.

Table 17. IFM Amendment Options for Mackerel Fishery

Gear Type	MWT All Tiers	SMBT Tier 1	SMBT Tier 2	SMBT Tier 3
Alt 1: No Coverage Target for IFM Programs (No Action)	SBRM	SBRM	SBRM	SBRM
Alt 2: Coverage Targets Specified for IFM Programs	Includes Sub-Options: 1) Waiver Allowed, 2) Wing Vessel Exemption, 3) 2 Yr Sunset, 4) 2 Yr Re-Evaluation, and 5) 25 mt threshold			
Alt 2.1: NEFOP-Level Coverage	100% NEFOP	100% NEFOP	50% NEFOP	25% NEFOP
Alt 2.2: ASM Coverage	25% - 100% ASM	25% - 100% ASM	SBRM (No Action)	SBRM (No Action)
Alt 2.3: Combination Coverage	50, 100% EM/Portside	25% - 100% ASM	SBRM (No Action)	SBRM (No Action)
Alt 2.4: EM and Portside Coverage on Midwater Trawl Fleet	50, 100% EM/Portside	SBRM (No Action)	SBRM (No Action)	SBRM (No Action)
Mackerel alternatives would only apply to trips that land greater than 20,000 lb of mackerel. Sub-Options could apply to any of the alternatives.				

5.4.5 Voluntary – shore-side monitoring/bycatch avoidance program(s) results; study fleet + environmental modeling work

Massachusetts-SMAST - <http://www.umassd.edu/smast/bycatch/>

This collaborative project between mid-water trawl fishermen, Rhode Island bottom trawl fishermen, the Massachusetts Division of Marine Fisheries, and SMAST seeks to reduce river herring and shad bycatch independent of management action; aiding in the effort to rebuild river herring and providing fishermen with a tool to avoid area closures.

The project involves increasing portside sampling, a near real-time information system on the location bycatch events, and testing if oceanographic features can be used to indicate areas with a high probability of bycatch. Portside sampling through the Massachusetts Division of Marine Fisheries, which samples about 50% of all landings in Massachusetts, is the main information source for the project. Several other institutions contribute to the project to increase the number of trips monitored. All observations from the Northeast Fisheries Observer Program are reported in near real-time, while the vessels are at-sea via map grids (see figure below). NOAA Study Fleet and the Maine Department of Marine Resource provide additional samples when the vessels land. The project was started in 2010, with funding from the National Fish and Wildlife foundation. It is now sustained by The Nature Conservancy and the Atlantic herring Research Set Aside (RSA) program.

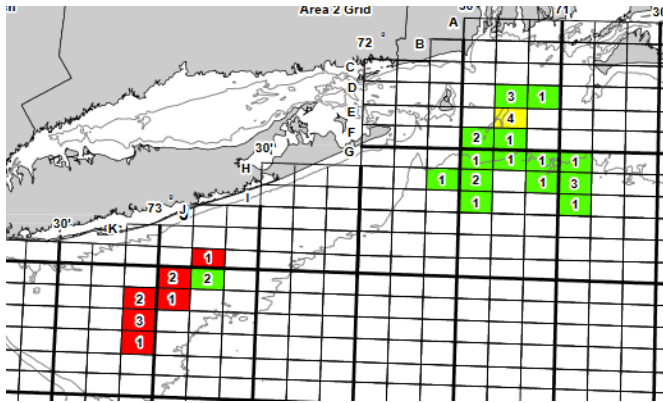


Figure 25. Sample SMAST Avoidance Grid

It is not possible to quantify the effects of the SMAST program in terms of pounds of RH/S avoided because one does not know what catch would have been without the program. However, besides sustained participation from the relevant vessels, there is evidence for intra-annual bycatch reduction in RI bottom trawl fishery in that cells classified as “high” were generally avoided. However, re-entries into a “high” cell still resulted in some of the highest bycatch events. For 2016-2018, the program intends to:

1. Portside sample at least 50% of mid-water trawl trips landed in Massachusetts
2. Continue the river herring avoidance program with mid-water trawlers
3. Advance the avoidance program through habitat forecasts
4. Comprehensive evaluation of program including
 1. Total river herring and shad bycatch
 2. Bycatch rates
 3. Frequency of high bycatch events
 4. Fishing patterns
 5. Context of target species and river herring abundance, distribution, and catchability (in relation to the environment and regulations)

Cornell Cooperative Extension’s Fisheries Program in New York also maintain a voluntary bycatch avoidance program for the longfin squid fishery – see <http://www.squidtrawlnetwork.com/river-herring-avoidance-maps/>. While analyses have not suggested that the longfin squid fishery is a key catcher of river herrings, it does catch shad and some river herrings, and fishermen are aware that if analysis indicates they are interacting with RH/S they could be subject to a RH/S cap in the future (the Council has made such a cap frameworkable).

5.4.6 Dam removals & passage improvements

The NMFS ESA listing determination found that river passage is the single largest issue facing river herring. For example, studies from Maine show that dams have reduced accessible habitat to a fraction of historical levels, 5 percent for alewives and 20 percent for blueback herring (Hall et al., 2011). It is likely the same is generally true for shad.

The organization American Rivers maintains a database of dam removals (<https://www.americanrivers.org/threats-solutions/restoring-damaged-rivers/dam-removal-map/>). Their database, which is considered to be a conservative estimate and the best database for this information, includes the total number of dams removed in Mid-Atlantic states from 1973-2015 as 428 (there are also 11 undated dams in the Mid-Atlantic database). As shown in the figure below, the pace of dam removal appears to be increasing over time.

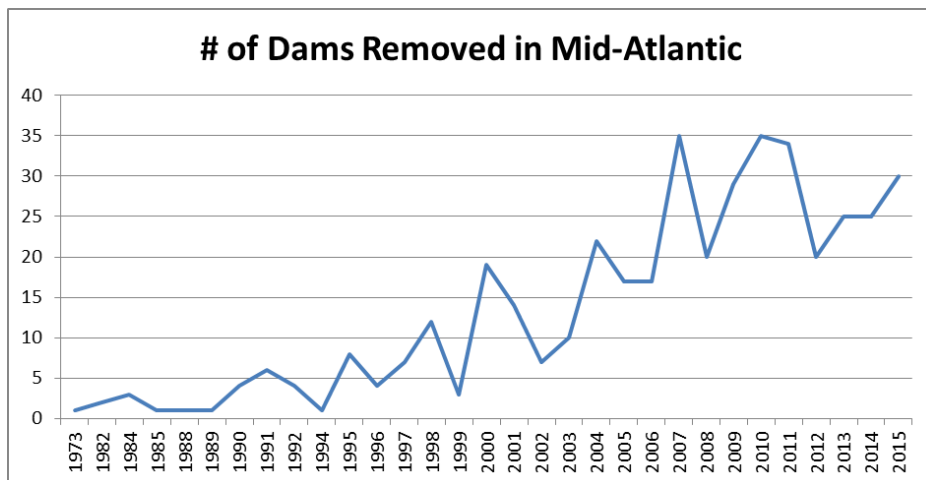


Figure 26. Number of Dams Removed in Mid-Atlantic

When it comes to river miles opened up, American Rivers has data for 150 dams. Since 1973, they estimate dam removals in the Mid-Atlantic have opened up a minimum of 2,340 river miles from those 150 removals. There is some variability in how this data is reported, but this estimate is likely low considering that 278 dams in the Mid-Atlantic do not have river mile data.

Some gains from dam removal over this timeframe may be offset by development and agricultural expansion that has resulted in substantial wetland loss and use of culverts that may cause substantial passage issues when viewed on a watershed scale (pers com Jessie Thomas-Blate, American Rivers, NMFS RH listing determination).

States, various entities, and private citizens have also spent substantial resources on fish passage around dams, whether by construction/improvement of fishways or transporting fish (manually, by truck, or fish lift). A state by state evaluation is beyond the scope of this paper, but for example, the Pennsylvania Fish and Boat Commission estimated that \$145 to \$160 million has been spent just on shad management and restoration construction costs (no operating costs were included) within the Susquehanna and Delaware basins to date, and that an additional \$168 to \$352 million may be spent on fish passage improvements over the next 40 to 50 years (pers com Joshua D. Tryninewski).

Susquehanna River Basin:

- Construction of three fish lifts (two at Conowingo, and one at each Holtwood and Safe Harbor dams) and one vertical slot fishway (at York Haven Dam) on the main-stem Susquehanna River totaled some \$75 to \$85 million (all completed and operational before or by 2000).
- Fish passage upgrades at Holtwood Dam (completed in 2015) are estimated at \$50 million plus.

- Pennsylvania Fish and Boat Commission anadromous fish restoration program (includes annual hatchery operation, bio-monitoring, etc.) estimated at \$10 million over the past 40 years.
- Fish passage projects on major tributaries to the Susquehanna River with relevance to shad
 - West Branch Susquehanna River, denil fishway at approximately \$1 million.
 - Five fishways on several Lower Susquehanna River tributaries, cost of more than \$1 million.
 - Some 23 dam removals on several Lower Susquehanna River tributaries cost more than \$1.5 million.
- Proposed Nature-Like Fishway at the confluence of the West Branch and Susquehanna rivers is estimated to cost some \$6.5 million (construction is yet to be determined).
- Conowingo Dam estimates that their new Federal Energy Regulatory Commission operating license will cost between \$155 and \$339 million in fish passage improvements over the 45 to 50 year license term (new FERC license yet to be issued).
- York Haven Dam will build a Nature-Like Fishway by 2021 at an estimated cost of \$6.3 million.

Delaware River Basin:

- Seven fishways (two denil and five vertical slot) between the Schuylkill and Lehigh rivers cost an estimated \$7 to \$12 million dollars.

5.5. CONSIDER ROLE OF CLIMATE CHANGE

By considering species' sensitivity and exposure to climate changes, a fisheries climate vulnerability assessment has found river herrings and American shad to be very highly vulnerable to climate change – Hare et al 2016:

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0146756>. Nye et al. 2012 investigated climate-related mechanisms in the marine habitat of the United States that may impact river herring. Their preliminary results indicate the following: (1) A shift in northern ocean distribution for both blueback herring and alewife depending on the season; (2) decrease in ocean habitat within the preferred temperature for alewife and blueback herring in the spring; and (3) effects of climate change on river herring populations may depend on the current condition (e.g., abundance and health) of the population, assumptions, and temperature tolerances (e.g., blueback herring have a higher temperature tolerance than alewife). Specific findings include the following:

- Alewife: At low population size, coast-wide abundance is projected to decrease with less suitable habitat and patchy areas of high density in the Gulf of Maine and Georges Bank in 2060–2100. At high population size, abundance is projected to increase slightly from 2020–2060 (+4.64 percent) but is projected to decrease (¥39.14 percent) and become more patchy in 2060–2100.
- Blueback herring: Abundance is

projected to increase at both high and low population size throughout the Northeast United States, especially in the mid-Atlantic and Georges Bank. However, at low abundance the increase is minimal and remains at a level below the 40-year mean. The percentage change due to climate change (factoring only temperature) is +29.93 percent for the time period 2020–2060 and +55.81 percent from 2060–2100.

6.0 THE KINDS OF ALTERNATIVES THAT RESULT FROM THE REQUIRED AND DISCRETIONARY MSA FMP CONTENTS

It is difficult to predict the full suite of alternatives that would result from FMP implementation. However, based on other Council FMPs and the requirements of the MSA, certain elements would be likely, as described below.

Management Unit

Options would be considered to define the stocks/populations to be managed and their management unit. The stocks considered would likely be tied to the Council's representative states (NC-NY) or utilize the broader populations segments identified in recent genetic analyses (see above). Given the at-sea movement of RH/S, the management unit could be all East Coast waters for the stocks the Council decided to manage.

Status Determination Criteria (SDCs)

The Council has recently built provisions into its plans to automatically incorporate SDCs from the most recent accepted assessment. Without or until such an assessment, proxies for SDCs can be utilized, and the Council's Scientific and Statistical Committee (SSC) can be consulted in the development of proxies. Examples of possible proxies for data-poor species like RH/S could include survey abundance triggers and proportions of historical catches. The Council's risk policy also has provisions for the SSC when determining acceptable biological catches in cases where there is very high uncertainty related to establishment of an overfishing level or proxy thereof. National Standard 1 guidelines indicate that approval of SDCs will be based on consideration of whether the proposal:

- (A) Has sufficient scientific merit;
- (B) Contains the elements described in paragraph (e)(2)(ii) of this section;
- (C) Provides a basis for objective measurement of the status of the stock or stock complex against the criteria; and
- (D) Is operationally feasible.

Paragraph (e)(2)(ii) states:

In specifying SDC, a Council must provide an analysis of how the SDC were chosen and how they relate to reproductive potential. Each FMP must specify, to the extent possible, objective and measurable SDC as follows:

(A) SDC to determine overfishing status. Each FMP must describe which of the following two methods will be used for each stock or stock complex to determine an overfishing status.

(1) Fishing mortality rate exceeds MFMT. Exceeding the MFMT for a period of 1 year or more constitutes overfishing. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F

value), or as a function of spawning biomass or other measure of reproductive potential.

(2) Catch exceeds the OFL. Should the annual catch exceed the annual OFL for 1 year or more, the stock or stock complex is considered subject to overfishing.

(B)

SDC to determine overfished status. The MSST or reasonable proxy must be expressed in terms of spawning biomass or other measure of reproductive potential. To the extent possible, the MSST should equal whichever of the following is greater: One-half the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years, if the stock or stock complex were exploited at the MFMT specified under paragraph (e)(2)(ii)(A)(1) of this section. Should the estimated size of the stock or stock complex in a given year fall below this threshold, the stock or stock complex is considered overfished.

Permitting and Reporting

The Council typically requires permitting and trip reporting for commercial and for-hire vessels. Federally-permitted vessels are required to sell to Federally-permitted dealers, who most also report catches.

Framework Actions

To increase flexibility, previously-considered actions that do not involve a major departure from existing measures are allowed to be implemented through a streamlines process.

Specifications and Acceptable Biological Catch (ABC) Process

The Council would develop a process for its SSC to set ABCs via annual or multi-year specifications for whatever stocks were to be added. It is likely that the current control rule and risk policy would be utilized. The risk policy guides the SSC in terms of the Council's risk tolerance for overfishing, and the control rule guides how uncertainty is handled. Additional measures that are generally used by the Council during annual specifications include specifying overfishing levels (OFLs), Acceptable Biological Catches (ABC), Annual Catch Limits (ACLs), Annual Catch Targets (ACTs), discard set-asides, total allowable landings (TALs), commercial and recreational quotas, trip limits, bag limits, seasons, size limits, retention requirements, and/or any measure needed to ensure that the specifications are not exceeded. Time/area restrictions are typically considered through amendments or framework actions. The initial implementing Amendment would likely consider a range of options for these kinds of measures which are geared toward avoiding ABC/ACL overages.

Allocations

The Council may consider if allocations are appropriate, for example between the recreational and commercial sectors.

Essential Fish Habitat (EFH)

The Council would consider options for the designation of EFH and of the impacts on EFH from fishing and non-fishing activities.

Designating essential fish habitat (EFH) for river herrings and shads would increase NMFS's authority but not necessarily NMFS's ability to conserve habitats used by these anadromous species, especially freshwater habitats used for spawning and as juvenile nursery areas that are most affected by a wide range of human activities.

Currently, acting under the authority of the Magnuson-Stevens Act, there is a mandatory requirement that NMFS must designate essential fish habitat for managed species and issue essential fish habitat conservation recommendations to federal agencies for activities proposed, funded, permitted, or undertaken by those agencies. Designation of essential fish habitat for river herrings and shads would expand the geographic boundaries where mandatory consultations would be required including most coastal rivers and their watersheds on the Atlantic coast.

EFH Consultations (summary from <http://www.nero.noaa.gov/hcd/appguide1.html>)

Federal agencies which fund, permit, or undertake activities that may adversely affect EFH are required to consult with NMFS regarding the potential effects of their actions on EFH, and respond in writing to NMFS's recommendations. Wherever possible, NMFS is utilizing existing interagency coordination processes to fulfill EFH consultations with federal agencies. These existing coordination procedures include the National Environmental Policy Act (NEPA), Endangered Species Act, Clean Water Act, and Fish and Wildlife Coordination Act. Use of these existing processes allows for efficient project review by NMFS and the other federal agencies.

Although the federal action agency is ultimately responsible for complying with the EFH Consultation requirements of the Magnuson-Stevens Act, the agency may designate a non-federal representative to conduct an abbreviated consultation or prepare an EFH Assessment. Generally this means that a permit applicant or consultant prepares the required EFH Assessment.

There are basically two types of consultations, abbreviated and expanded. The type of consultation necessary depends upon the magnitude of the adverse effect on EFH. Abbreviated consultations are used when a proposed project will have a less than substantial adverse impact on EFH. Expanded consultations are used when the adverse impact on EFH may be substantial. Regardless of consultation type, there are four required components to consultations:

1. Notification - The federal agency must notify NMFS regarding a proposed action that may adversely affect EFH. The notification will typically be in the form of a Public Notice, Draft Environmental Assessment (EA), or Draft Environmental Impact Statement (EIS).

2. EFH Assessment - This is a written assessment of the effects of the action on EFH. The EFH Assessment will typically be incorporated within the notification document (Public Notice or Environmental Assessment) or submitted as a separate document in cases where an expanded consultation is required.

An EFH Assessment must contain the following four sections:

- A description of the proposed action.
- An analysis of the potential adverse effects of the action on EFH, and managed species.
- The federal agency's conclusions regarding the effects of the action on EFH, and the managed species. The agency's views will usually determine the type of consultation. Examples of agency determinations are as follows: A) no adverse effect to EFH (no consultation required); B) minimal adverse effect or less than substantial adverse effect to EFH (abbreviated consultation can be conducted); or C) substantial adverse effect to EFH (expanded consultation required).
- Proposed mitigation, if applicable.

Other information may also be appropriate to include in the assessment such as: the results of an on-site inspection to evaluate habitat and site-specific effects of the project; the views of recognized experts on the habitat or species that may be affected; a review of pertinent literature and relevant information; an analysis of alternatives to the proposed action including those alternatives that avoid or minimize the adverse effects on EFH. The level of detail contained within the EFH Assessment should be commensurate with the degree of adverse impact to EFH.

3. EFH Conservation Recommendations - After receipt of the completed EFH Assessment, NMFS will provide EFH Conservation Recommendations to the federal agency detailing measures that can be taken by that agency to conserve EFH.

4. Agency Response - Within 30 days of receiving NMFS' recommendations, the federal agency must provide a detailed written response to NMFS. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case where a response is inconsistent with NMFS' recommendations, the federal agency must explain (and only explain) its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the proposed action and the measures needed to minimize, mitigate or offset such effects.

The Magnuson-Stevens Act also states that Councils "shall comment on and make recommendations to the Secretary and any Federal or State agency concerning any such activity that, in the view of the Council, is likely to substantially affect the habitat, including essential fish habitat, of an anadromous fishery resource under its authority." While the Council's resources would likely preclude comment on every activity, this could be a component of Council coordination. However, other entities have no obligations regarding the Council's recommendations unless they prompt NMFS recommendations in the above-described consultation process.

To summarize, EFH designations provide NMFS the authority to recommend mitigation measures for proposed actions and permitting. NMFS does make such recommendations with

other species' EFH and often does secure some level of mitigation. However, the agency may lack the resources to effectively implement the necessary actions related to river herrings and/or shads

Accountability Measures (AMs)

The Council would consider options for appropriate AMs, which ensure that ACLs are not exceeded, or that if they are exceeded corrective measures are taken to avoid future overages. Examples can include in-season closures and paybacks for overages.

Observer Coverage

RH/S would enter into SBRM allocation algorithms, but analysis by NMFS has previously indicated little change in observer placements would occur (see above).

6.1 How would all these work together with the ASMFC?

Coordination with the ASMFC would have to be developed as part of the development of an action that added RH/S as Council-managed stocks. However, the Council and the ASMFC engage on joint/complementary management of several species that are caught in state and Federal waters. While Commission/Council coordination for river herring and shad issues has been extensive in the last 5 years (primarily via the TEWG), the ramifications of ACLs would likely lead to additional collaboration. The Council would likely engage in complementary management with the Commission and ACLs or other catch quotas for federal management would be based on ABCs provided by its Scientific and Statistical Committee and would have to account for any state fishing mortality beyond the control of the Council. The Council and Commission would likely negotiate (via a joint meeting) how to utilize the ABC provided by the Scientific and Statistical Committee. While the Council and Commission may come to an agreement, the Council would be bound to enact measures that keep catch at or below the ABC regardless. This could mean closing other federal directed fisheries quite earlier than would otherwise occur if state-waters catch approached (or was expected to approach) the ABC. The exact accountability measures would be developed during implementation if that is the chosen path, but since the states are not bound by the Scientific and Statistical Committee's decision, and since substantial catch may occur in state waters, and an ABC could be quite low, impacts on federal fisheries like Atlantic herring and mackerel that catch river herrings and/or shads could be substantial. Mortality caps for federal fisheries could be part of the accountability measures that are used, but they would have to be set low enough such that state waters catch plus any mortality caps were expected to restrain catch at or below the ABC. While the Council could be unable to totally control all mortality because of state fisheries and discards in state waters, mortality in federal waters would be limited.

The Council and ASMFC has different processes for amending fishery management plans, and some concern has been expressed that ASMFC-based management is subject to less oversight than Council management and could be “undone” more easily. While this may be true procedurally, the ASMFC currently appears very committed to sustainable RH/S management through the use of its sustainability plans.

7.0 ENVIRONMENTAL ANALYSIS (DIRECT, INDIRECT, AND CUMULATIVE) OF IMMEDIATELY ADDING VS NOT ADDING RIVER HERRING AND SHAD TO A FISHERY AND MANAGING IT BY USE OF PROXIES.

7.1 DESCRIBE NO-ACTION IMPACTS, INCLUDING:

Introduction

Under the no action alternative, it is presumed that state fisheries would continue to be limited subject to approved state sustainability plans, and catch in federal fisheries would continue to be limited subject to the current RH/S caps set by Amendment 14 for the Atlantic mackerel and Atlantic herring fisheries. Also, the various collaborative efforts of the TEWG would be expected to continue, as would the efforts of various other entities that engage in RH/S conservation, such as watershed associations. The impacts of Council management of RH/S versus no action are described below. While an actual action by the Council would typically examine direct, indirect, and cumulative impacts on the managed species, other non-targets, habitat, protected resources, and human communities, this white paper focuses on the impacts for RH/S, their habitat, and related human communities. If the Council decides to proceed with an FMP/FMP Amendment then those other impact areas would be examined, but the impacts to other non-targets and protected resources are simply the impacts of effort, and if effort is reduced then impacts to other non-targets and protected resources are also reduced. Including these resources would only involve repeating this concept below. Based on the assumption that at least in the short term the only RH/S fisheries in Federal waters would be incidental, recent MSB and Atlantic herring specifications can be consulted for relevant protected resource and other non-target impacts. Since observer coverage is not expected to be different regardless of whether or not RH/S are Council-managed stocks (see above) this issue is not discussed in the impacts section.

The previous white paper documented the various positive benefits that could accrue from RH/S restoration, including several types of value such as commercial, recreational, ecological, existence, and cultural. These are not necessarily the only types of value, and this is not an exhaustive treatment of the subject, but the descriptions of these benefits below re-establishes that these fisheries likely have, or at least could have if revived, substantial importance to the nation. To the degree that RH/S stocks are improved, gains would be expected under all of these types of benefits.

First, while the historical peak commercial river herring and shad catches were likely unsustainable, these species have supported substantial commercial fisheries in the past that were, and could be important to their regional economies. Benefits of potential higher future harvests would accrue to producers in the form of profits (revenues minus costs) and to consumers in the form of higher consumer surplus (the difference between consumers willingness to pay and what they actually had to pay). Because of the lack of information about what level of harvest would actually be sustainable (as well as unknown economic factors such as production costs), it is not possible to quantify the *economic value* of these potential landings.

However, given the available price data in recent river herring and shad Commission plan amendments (ASMFC 2009, ASMFC 2010), if sustainable landings of 4,000 mt (about 8.6 million pounds) of river herrings and 2,000 mt (about 4.3 million pounds) shads were possible, and if an average ex-vessel price of \$0.27/Lb. and \$1.09/Lb. is used for river herring and shad, respectively (these values were reported by Commission staff, K. Taylor, for 2012 fisheries), this example would result in about \$7 million dollars per year in ex-vessel revenues (1 mt equals about 2204.6 pounds). Based on historic landings these levels seem not unreasonable, but it is important to note that higher landings may result in lower prices per pound so the ex-vessel value of a higher quantity of fish may be lower.

Second, there is economic value in recreational fishing and subsistence fishing, which can be important to local and regional economies. Presumably each fishing trip provides some value to each angler, whether in the form of recreation or food. If fish runs increase, there can be benefits related to higher angler satisfaction from higher catch each trip and/or related to taking more trips. For river herring, recreational benefits primarily accrue related to their use as bait for other, larger fish but there is still definite value in that respect (some fishermen pay \$1-\$3 per fish for similar live baits depending on local conditions, based on personal communication with Kate Taylor (ASMFC) and staff observations at local tackle stores). For shad, they are often the primary target but may also be used as bait. Recreational catch data on these species is poor since recreational catch primarily takes place out of the geographical scope of the NMFS recreational surveys, but harvest is currently relatively low due to the moratoria and other recreational restrictions.

The general literature on the value of recreational fishing is well developed, though little information is available specific to river herring and/or shad fishing. One study did estimate an annual aggregate "willingness to pay" (value) of \$3.2 million dollars for Delaware River shad fishing in 1986 (based on 63,000 angler days and a per angler day value of \$50 - Lupine and Miller 1987), which is equivalent to \$6.5 million in 2012 dollars. Additional reference documents on the general economic value of saltwater recreational fishing in the Mid-Atlantic may be accessed at http://www.st.nmfs.noaa.gov/st5/RecFishEcon_pubs.html. An econometric analysis is beyond the scope of this document, but based on the large existing body of recreational-demand literature, there are often substantial socio-economic benefits related to improved recreational fisheries and there is no reason to conclude that this would not be the case with river herrings and shads.

Third, there could be indirect ecological value related to recreational activities. This comes from river herrings' and shads' role as forage species for higher trophic level predators such as striped bass or whales. Higher forage populations could indirectly help predator populations, which support better recreation such as fishing or whale-watching. From this perspective the ecological benefits of healthy populations create recreational benefits, as described above. There are ways to measure these benefits but not within the scope of this paper.

Fourth, there are non-market existence values (i.e., value gained by individuals related to the knowledge that these species are being conserved successfully) that can result from successful management, especially given these species role as forage. Public interest in this issue demonstrates that a segment of the general public holds a certain value for the knowledge that these fisheries are being sustainably managed, and even if each individual's value is small the

total value may be quite large when many people are involved. While there are not existing studies related to non-use benefits from river herring and shad, there are many non-use studies on other environmental issues documenting the occurrence of such values.

Finally there is cultural value, which may be thought of as a separate type of existence value. River herring and shad runs are or have been important culturally for many communities (just Google “Shad Festival” or “Herring Festival”) and there can also be cultural value beyond food value related to subsistence fishing (e.g. Mashpee Wampanoag Indian Tribe on Cape Cod, Massachusetts (ASMFC 2011)). While difficult to quantify, this is another potential benefit related to river herring and shad conservation that contributes toward its importance to the Nation. The recent Commission Shad and River Herring Plans also describe that river herring and shad festivals can be important sources of regional economic activity. If the related economic activity is lost, replacement activities will mitigate the net loss, but there is still some loss of net value and certainly local or regional distributional consequences in terms of jobs.

In summary, healthier river herring and shad runs and fisheries would likely constitute substantial value to the Nation, but it is beyond the scope of this paper to estimate exactly what that value might be.

7.1.1 Full consideration of the impacts of the earlier decision by the full Council to not add River Herring and Shad into an FMP in Amendment 14

Most portions of Amendment 14 became effective in early 2014. Given the additional steps that would have been required to integrate RH/S into an FMP, it is unlikely that implementation could have occurred before January 1, 2015 at the earliest. Thus at most the requirements of an FMP would have been in effect for approximately 18 months. It is likely that the only substantial difference in RH/S over those months would have been that the Council’s SSC would have set an ABC for RH/S stocks in the management unit(s) selected by the Council and the Council would have set specifications accordingly (other possibly longer-term impacts are described below related to future decisions). Depending on the ABC set by the Council, this could have led to either higher or lower catches than have occurred. Qualitatively, higher or lower catches could have negatively or positively impacted RH/S, respectively. However, it is not clear that the scale of catches that have been occurring in recent years are substantially contributing to the current low RH/S population levels, and recent catches represent a very small fraction compared to historical catches. It is also not clear that Council action would have impacted state actions and state catches. The most likely impacts would have been for the Atlantic herring and mackerel fisheries, which are already subject to relatively low incidental catch caps. To the degree that the caps have encouraged fishermen to avoid RH/S, if Amendment 14 had been delayed (delaying the caps) then there could have been negative impacts for RH/S. However assuming implementation, with low enough ABCs the Atlantic herring and mackerel fisheries could have been more limited, which qualitatively could have had a positive impact on RH/S but the extent is unclear as described above.

Taking also into consideration the relatively high NEFSC and NEAMAP indices in the most recent years, and the mixed state indices in the most recent years, it appears likely that overall the earlier decision by the full Council to not add RH/S into an FMP in Amendment 14 has had minimal if any impacts on RH/S populations to date related to the short timeframe and other

measures already in place. Likewise, there would also have been minimal impacts in terms of the various potential commercial, recreational, ecological, existence, and cultural benefits described above that should accrue from higher RH/S populations.

7.1.2 Review success criteria and progress updates to determine course of RH/S situation over last 3 years

7.1.2.A Are RHS stocks improving?

It is uncertain whether RH/S stocks have changed from October 2013 to now. There are some indications that the overall numbers of RH/S may have increased since 2013 based on the NMFS and NEAMAP survey data described above, but state surveys appear more mixed.

7.1.2.B Any evidence that incidental catch in federal fisheries has been limited and/or reduced?

A review of cap performance

(http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Mackerel_RHS/Mackerel_RHS.htm) indicates that a relatively small percentage of the RH/S cap was caught in 2014, 2015, or 2016 to date. There have been no closures related to the RH/S cap so far. Low mackerel landings have contributed to the low RH/S estimates. Due to the overlap in the Atl. Herring and mackerel fisheries, their RH/S cap catches cannot be added together to produce a total catch across caps - RH/S on a trip with both Atl. herring and mackerel can count against both the Atl. herring and mackerel RH/S caps. Because the cap amounts were set considering this circumstance, double counting is not a problem for monitoring. The Monitoring Committee has not found any operational issues with the cap, other than noting that the recent low observer coverage and high RH/S catch variability means precision may be low. The Industry-Funded Monitoring Amendment has analyzed precision in the 2014/2015 mackerel RH/S caps:

Table 18. RH/S Cap CV Performance 2014-2015

Catch Cap	Fishing Year ¹ : CV (Observer Coverage)	
	2014	2015 ³
RHS-Mackerel	48.9% (37.8%)	22.7% (7.3%) ²

Source: GARFO Quota Monitoring Database as of 5/22/2016

¹Catch cap fishing year: river herring/shad = calendar year; haddock = May-April

²Fishing Year 2015 data are PRELIMINARY

Somewhat counterintuitively, the Coefficient of Variation (CV – a measure of relative precision) for 2015 was better than 2014 despite substantially lower observer coverage in 2015. CV is dependent on both coverage and the underlying data - the RH/S catches in 2015 were more similar to each other on the few 2015 observed mackerel trips compared to 2014, resulting in better CVs despite the lower coverage.

It is not clear if the cap has led to lower RH/S catches. On one hand RH/S catches have appeared low in the mackerel fishery, and perhaps the cap has provided an incentive to avoid RH/S. On the other hand, the mackerel fishery has not been very active, and that could be the main driver of cap performance.

As described above there is some evidence that the voluntary bycatch avoidance networks (SMAST) have led fishermen to avoid high RH/S areas to some degree.

7.1.2.C Has scientific information about RH/S improved (life history, abundance, etc.)?

There have been several advancements in RH/S science in recent years due in part to the attention brought to RH/S through the Council's considerations regarding RH/S. The advancements primarily concern RH related to the resources attracted by TEWG activities. The first is the data standardization workshop the Commission organized with funding support from NOAA Fisheries. If states can better align their data collection and reporting methodologies, future assessments (RH and Shad) will benefit. Another major advancement is the genetics work done on river herring, which both has better defined the natal spatial characteristics of RH as well as providing information on how bycatch may be impacting different natal areas. Recent research on assessing demographic effects of dams on diadromous fish (Nieland et al 2015) also holds promise on assessing impacts to RH/S populations under various scenarios of harvest. The work described above on environmental modeling may also offer options for avoiding RH/S in the mackerel and Atl. herring fisheries. Finally, all of the TEWG subgroups have established data gap documents, which should continue to stimulate research on RH/S, though most TEWG efforts are focused on RH.

7.1.2.D Has coordination between the entities that are involved in RHS management improved?

The primary work from staff over the last year that could affect RH/S involves the TEWG and the Joint Omnibus Industry-Funded Monitoring (IFM) Amendment. Both of these efforts involve substantial collaboration and coordination. The IFM Amendment, which could result in additional monitoring of the mackerel fishery, has led to extensive work between NMFS, MAFMC, and NEFMC staff to develop monitoring options for the Atl. herring and mackerel fisheries. The TEWG incorporates those entities plus the ASMFC and a wide variety of other management partners, interested parties, and researchers. Through the TEWG, it is relatively easy to identify the key issues and data needs for river herring, and appropriate contacts. Shad lags somewhat in this area, but most of the TEWG participants are familiar with Shad as well.

7.1.3 Full consideration of the future impacts of failing now to include River Herring and Shad in the fishery

These are the impacts of maintaining the status quo into the future. Again, under the no action alternative, it is presumed that state fisheries would continue to be limited subject to approved state sustainability plans, and catch in federal fisheries would continue to be limited subject to the current RH/S caps set for the Atlantic mackerel and Atlantic herring fisheries. Also, the

various collaborative efforts of the TEWG would be expected to continue, as would the efforts of various other entities that engage in RH/S conservation, such as watershed associations.

Two critical things will not get done under the status quo that could impact RH/S. First, Council-developed status determination criteria (SDCs or reference points) will not be set (nor resulting ABCs/ACLs/AMs), and EFH will not be designated. Each is considered separately.

Status Determination Criteria (SDCs or Reference Points) and ABCs/ACLs/AMs

SDCs lead to ABCs/ACLs/AMs which lead to other catch controls, so they may be considered together – it is really the SDCs and ABCs that matter – the other measures just operationalize the ABCs. The available evidence suggests that not setting SDCs will not have a substantial negative impact on RH/S. This is due to several factors. First, it is not clear that recent/current catches are having substantial impacts on RH/S populations as they are already a very small fraction of historical catches. Second, RH/S are already being actively managed by the ASMFC and state catches are already strictly limited within the context of approved state sustainability plans.

The states, through the Commission and its Interstate FMP for Shad and River Herring, appear to have effectively controlled directed harvest of river herrings and shads in state waters. The Commission also has a stock assessment process in place that effectively integrates data from the states, though there are a variety of data gaps. The Commission peer-reviewed stock assessment process integrates data from both the states' and federal waters and the stock assessment committee has both NMFS and U.S. Fish and Wildlife Service representatives.

The Magnuson Stevens Act precludes federal regulation of a fishery in state waters unless the fishery occurs predominantly in federal waters. 16 U.S.C. § 1856(3)(b). All river herring and American shad state fisheries that have not been designated by the Commission as sustainable were closed by January 1, 2013. The Commission has communicated to the Council (Dec 5, 2012 letter, attached) that it will take 3-5 years to determine the effect of these measures. In the same letter, the Commission encouraged exploration of the concept of Council management but also indicated a preference that the Commission would retain authority to manage in-river state-water fisheries. The Council would not have the authority to manage in-river state-water fisheries, and the potential consequences of this on annual catch limits and accountability measures are described above.

It is not clear that states/the Commission have effectively controlled discards in state waters, but they could and would be in a better position to do this given the Council's limited authorities in state waters. State regulations also appear likely to avoid redevelopment of directed ocean fisheries for river herrings and shads since outside of approved state-specific sustainable FMPs, possession is either banned or only allowed as limited incidental catch related to directed landings of other species.

When combined with the caps that are in place at the Councils to achieve a relatively low level of incidental catch and the voluntary avoidance practices of the fishery, the current management systems already in place appear likely to have a reasonable likelihood of having positive impacts moving forward even if previous management has led to a depleted condition. The existing measures also do not appear to be ephemeral. The positive impacts would extend to the various

potential commercial, recreational, ecological, existence, and cultural benefits described above that should accrue from higher RH/S populations.

The previous white paper suggested that there might be more stock assessment progress if RH/S became a Council-managed species, through additional involvement of NMFS assessment personnel. This indirectly ties to the SDCs because additional science resources could theoretically lead to more useful SDCs that would effectively guide management, regardless of the lead entity. However, given the activities of the TEWG, and the engagement by NMFS assessment staff in the TEWG and in the last river herring assessment, continued progress on RH/S science also appears likely under the no action alternative (TEWG activities are further described above). The positive impacts would extend to the various potential commercial, recreational, ecological, existence, and cultural benefits described above that should accrue from higher RH/S populations. The ASMFC also requires states to implement fisheries-dependent and independent monitoring programs to provide data for use in future stock assessments.

Essential Fish Habitat (EFH)/Habitat

No EFH would be designated. However, as discussed in the previous white paper: A) states are already independently acting to improve riverine habitats B) NMFS has ongoing consultations with upstream dam removal/riverine habitat improvement projects (as well as funding them), and C) NMFS has already been successful in mitigating impacts to some habitats (tidal riverine waters) used by river herrings and shads because they are forage species for other federally-managed fish species (e.g., bluefish), and are, therefore, considered a component of essential fish habitat for those predatory species. River herrings, shads, and Atlantic salmon utilize the same areas for in-river dependent life stages however (where impacts are more likely due to water passage and water quality issues), and the in-river geographic range in which river herring may benefit from the designation of Atlantic salmon EFH extends from Connecticut to the Maine/Canada border. In addition to the state sustainability plan mandate, the ASMFC makes recommendations to states for the conservation, restoration, and protection of habitat. States are involved in many habitat improvement projects. These efforts at improving RH/S habitat would continue under the no action alternative and should have positive impacts for RH/S. The positive impacts would extend to the various potential commercial, recreational, ecological, existence, and cultural benefits described above that should accrue from higher RH/S populations.

7.2. FULLY DESCRIBE THE LIKELY IMPACTS OF IMMEDIATELY ADDING RH/S AS TYPICALLY-MANAGED COUNCIL STOCKS THROUGH THE USE OF PROXY REFERENCE POINTS

7.2.1 Describe likely and/or potential impacts from FMP provisions

RH/S

As described above, it is really the Status Determination Criteria (SDCs) and Acceptable Biological Catches (ABCs) that matter for impacts to RH/S – the other measures just operationalize the ABCs. Managing RH/S through the use of Council-specified SDCs (proxies or other) is expected to have a minimal impact on RH/S and likewise for the various potential commercial, recreational, ecological, existence, and cultural benefits described above that should accrue from higher RH/S populations. First, it is not clear that recent/current catches are having substantial impacts on RH/S populations as they are already a very small fraction of historical catches. Second, RH/S are already being actively managed by the ASMFC and state catches are already strictly limited within the context of approved state sustainability plans. In addition, compared to the status quo, given the uncertainty that could be involved with any proxy that the Council would enact, it is possible that such a proxy would not inform the Council appropriately about whether rebuilding was necessary or about what catch should occur. When combined with the caps that are in place at the Councils to achieve a relatively low level of incidental catch and the voluntary avoidance practices of the fishery, the result of implementing Council FMP management appears unlikely to result in a substantially different outcome for RH/S compared to the status quo.

Given the ongoing efforts stimulated by the TEWG, it is also unlikely that adding RH/S as directly managed species would bring in substantially more scientific resources for assessing the stocks than will occur under the status quo. Continued progress on RH/S assessment science is likely to be similar under the status quo or if they are added as Council-managed species.

Essential Fish Habitat (EFH)

EFH designations provide NMFS the authority to recommend mitigation measures for proposed actions and permitting. NMFS does make such recommendations with other species' EFH and often does secure some level of mitigation. However, the agency may lack the resources to effectively implement the necessary actions related to river herrings and/or shads. Limited resources (staff and funding) already restrict the agency's ability to effectively manage essential fish habitat for Atlantic salmon and there is no reason to believe that this situation will be different for river herrings and shads if they became federally-managed species.

It is unclear if substantial and tangible habitat benefits would accrue beyond those already being pursued for river herring (and other species that utilize similar habitat) by the states, NMFS, and other federal agencies, especially given current funding limitations. Thus compared to the status quo, there do not appear to be substantial benefits that would accrue to RH/S from the identification of EFH and likewise for the various potential commercial, recreational, ecological,

existence, and cultural benefits described above that should accrue from higher RH/S populations.

Given the minimal impacts compared to the status quo alternative, significant cumulative impacts would not be expected, but the possibility would be fully analyzed if the Council decides to move forward with an action in October.

8.0 OTHER RELEVANT LAWS

Table 19 summarizes how many MSA requirements are or can be addressed by existing authorities. Additional details on several authorities developed for the previous white paper are provided below.

Federal Power Act (16 U.S.C. 791-828) and Amendments

The Federal Power Act, as amended, provides for protecting, mitigating damages to, and enhancing fish and wildlife resources (including anadromous fish) impacted by hydroelectric facilities regulated by the Federal Energy and Regulatory Commission (FERC). Applicants must consult with state and Federal resource agencies who review proposed hydroelectric projects and make recommendations to FERC concerning fish and wildlife and their habitat, e.g., including spawning habitat, wetlands, instream flows (timing, quality, quantity), reservoir establishment and regulation, project construction and operation, fish entrainment and mortality, and recreational access. Section 10(j) of the Federal Power Act provides that licenses issued by FERC contain conditions to protect, mitigate damages to, and enhance fish and wildlife based on recommendations received from state and Federal agencies during the licensing process. With regard to fish passage, Section 18 requires a FERC licensee to construct, maintain, and operate fishways prescribed by the Secretary of the Interior or the Secretary of Commerce. Under the Federal Power Act, others may review proposed projects and make timely recommendations to FERC to represent additional interests. Interested parties may intervene in the FERC proceeding for any project to receive pertinent documentation and to appeal an adverse decision by FERC.

While the construction of hydroelectric dams contributed to historical losses of spawning habitat, only a few new dams have been constructed in the range of these species in the last 50 years. In some areas, successful fish passage has been created; thus, restoring access to many habitats once blocked. Thus, river herring and shad may often benefit from Federal Power Act fishway requirements when prescriptions are made to address anadromous fish passage and during the relicensing of existing hydroelectric dams when anadromous species are considered.

Anadromous Fish Conservation Act (16 U.S.C. 757a-757f) as Amended

This law authorizes the Secretaries of Interior and Commerce to enter into cost sharing with states and other non-Federal interests for the conservation, development, and enhancement of the nation's anadromous fish. Investigations, engineering, biological surveys, and research, as well as the construction, maintenance, and operations of hatcheries, are authorized. This Act was last authorized in 2002, which provided 5 million dollars for the fiscal years 2005 and 2006 (Pub. L. 107-372). There was an attempt to reauthorize the Act in 2012; however, this action has not yet been authorized.

Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661-666)

The Fish and Wildlife Coordination Act is the primary law providing for consideration of fish and wildlife habitat values in conjunction with Federal water development activities. Under this law, the Secretaries of Interior and Commerce may investigate and advise on the effects of Federal water development projects on fish and wildlife habitat. Such reports and recommendations, which require concurrence of the state fish and wildlife agency(ies) involved, must accompany the construction agency's request for congressional authorization, although the construction agency is not bound by the recommendations.

The Fish and Wildlife Coordination Act applies to water-related activities proposed by non-Federal entities for which a Federal permit or license is required. The most significant permits or licenses required are Section 404 and discharge permits under the Clean Water Act and Section 10 permits under the Rivers and Harbors Act. The U.S. Fish and Wildlife Service and NMFS may review the proposed permit action and make recommendations to the permitting agencies to avoid or mitigate any potential adverse effects on fish and wildlife habitat. These recommendations must be given full consideration by the permitting agency, but are not binding. Federal Water Pollution Control Act, and amendments (FWPCA) (33 U.S.C. 1251-1376)

Also called the "Clean Water Act," the FWPCA mandates Federal protection of water quality. The law also provides for assessment of injury, destruction, or loss of natural resources caused by discharge of pollutants.

Of major significance is Section 404 of the FWPCA, which prohibits the discharge of dredged or fill material into navigable waters without a permit. Navigable waters are defined under the FWPCA to include all waters of the United States, including the territorial seas and wetlands adjacent to such waters. The permit program is administered by the Army Corps of Engineers (Corps). The Environmental Protection Agency (EPA) may approve delegation of Section 404 permit authority for certain waters (not including traditional navigable waters) to a state agency; however, the EPA retains the authority to prohibit or deny a proposed discharge under Section 404 of the FWPCA.

The FWPCA (Section 401) also authorizes programs to remove or limit the entry of various types of pollutants into the nation's waters. A point source permit system was established by the EPA and is now being administered at the state level in most states. This system, referred to as the National Pollutant Discharge Elimination System (NPDES), sets specific limits on discharge of various types of pollutants from point source outfalls. A non-point source control program focuses primarily on the reduction of agricultural siltation and chemical pollution resulting from

rain runoff into the nation's streams. This effort currently relies on the use of land management practices to reduce surface runoff through programs administered primarily by the Department of Agriculture.

Like the Fish and Wildlife Coordination and River and Harbors Acts, Sections 401 and 404 of the FWPCA have played a role in reducing discharges of pollutants, restricting the timing and location of dredge and fill operations, and affecting other changes that have improved river herring and shad habitat in many rivers and estuaries over the last several decades. Examples include reductions in sewage discharges into the Hudson River (A. Kahnle, New York State, Pers. comm. 1998) and nutrient reduction strategies implemented in the Chesapeake Bay.

Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act requires a permit from the Corps to place structures in navigable waters of the United States or modify a navigable stream by excavation or filling activities. The permitting then requires EFH Consultation.

National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321-4347)

The National Environmental Policy Act requires an environmental review process of all Federal actions. This includes preparation of an environmental impact statement for major Federal actions that may affect the quality of the human environment. Less rigorous environmental assessments are reviewed for most other actions, while some actions are categorically excluded from formal review. These reviews provide an opportunity for the agency and the public to comment on projects that may impact fish and wildlife habitat.

Coastal Zone Management Act (16 U.S.C. 1451-1464) and Estuarine Areas Act

Congress passed policy on values of estuaries and coastal areas through these Acts. Comprehensive planning programs, to be carried out at the state level, were established to enhance, protect, and utilize coastal resources. Federal activities must comply with the individual state programs. Habitat may be protected by planning and regulating development that could cause damage to sensitive coastal habitats.

Federal Land Management and Other Protective Designations

Protection and good stewardship of lands and waters managed by Federal agencies, such as the Departments of Defense, Energy and Interior (National Parks and National Wildlife Refuges, as well as state-protected park, wildlife and other natural areas), contributes to the health of nearby aquatic systems that support important river herring and shad spawning and nursery habitats. Relevant examples include the Great Bay, Rachel Carson's and Corps Basin National Estuarine Research Reserves, Department of Defense properties in the Chesapeake Bay, and many National Wildlife Refuges.

Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA), Titles I and III and the Shore Protection Act of 1988 (SPA)

The Marine Protection, Research and Sanctuaries Act protects fish habitat through establishment and maintenance of marine sanctuaries. The Marine Protection, Research and Sanctuaries Act and the Shore Protection Act regulate ocean transportation and dumping of dredge materials, sewage sludge, and other materials. Criteria that the Corps uses for issuing permits include considering the effects dumping has on the marine environment, ecological systems and fisheries resources. NMFS must be consulted per its EFH responsibilities.

Endangered Species Act Determination - River Herring

http://www.nero.noaa.gov/prot_res/candidatespeciesprogram/RiverHerringSOC.htm

Subsequent to NMFS's findings that river herring are not endangered, NMFS also announced a variety of measures that it will be undertaking to assist river herring conservation. The agency has provided funding to the Atlantic States Marine Fisheries Commission and will be working with the Commission and other partners to implement a coordinated coastwide effort to continue to address data gaps and proactively conserve river herring and their habitat.

NMFS intends to establish a technical working group and to continue to work closely with the Commission and others to develop a long-term and dynamic conservation plan for river herring throughout both species' range from Canada to Florida. This group will attempt to quantify the impact of ongoing restoration and conservation efforts and new fisheries management measures that are being developed (e.g., mortality caps in two federal fisheries), which should benefit the species, review any new information produced from ongoing scientific studies (e.g., genetic analyses, ocean migration patterns, climate change impacts) that are completed in the next 3-5 years, and assess available data to determine whether recent reports of higher river counts in many areas along the coast in the last two years represent sustained trends. During this time, NMFS is also committed to working with partners and tribal governments to continue implementing important conservation efforts and fund needed research for river herring. NMFS intends to revisit the status of river herring within the next five years. Council staff will likely be involved in these efforts.

Endangered Species Act Listing - Sturgeon

<http://www.nero.noaa.gov/stories/2013/riverherringlistingfrnotice.pdf>

In 2012, five distinct population segments of Atlantic sturgeon were listed under the Endangered Species Act. The Chesapeake Bay, New York Bight, Carolina, and South Atlantic Distinct Population Segments of Atlantic sturgeon are listed as endangered, while the Gulf of Maine Distinct Population Segment is listed as threatened. Measures to improve habitats and reduce impacts to Atlantic sturgeon may directly or indirectly benefit river herring. Atlantic sturgeon critical habitat will be specified in the next year. Like river herrings and shad, Atlantic sturgeon are anadromous; adults spawn in freshwater in the spring and early summer and migrate into estuarine and marine waters where they spend most of their lives. As with Atlantic salmon, many of the habitats that Atlantic sturgeon occupy are also habitats that river herring use for spawning, migration and juvenile rearing. The geographic range in which river herring may benefit from Atlantic sturgeon Endangered Species Act protections extends from the

Maine/Canada border to Florida. Therefore, any protection measures within this range such as improved fish passage or a reduction of water withdrawals may also provide a benefit to river herring. River herrings and/or shads travel further upriver than sturgeon to spawn so the overlap would not be complete. Rivers in which sturgeon are found and which are likely to receive critical habitat designation may be found at:

<http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm>.

Endangered Species Act Listing - Atlantic salmon & Critical Habitat Designation

In 2009, the Gulf of Maine Distinct Population Segment of Atlantic salmon was listed as endangered under the Endangered Species Act (74 FR 29344). The Gulf of Maine Distinct Population Segment includes all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River. Concurrently in 2009, critical habitat was designated for the Atlantic salmon Gulf of Maine Distinct Population Segment pursuant to section 4(b)(2) of the Endangered Species Act (74 FR 29300; August 10, 2009). The critical habitat designation includes 45 specific areas occupied by Atlantic salmon at the time of listing, and includes approximately 12,160 miles (19,600 km) of perennial river, stream, and estuary habitat and 308 square miles (495 sq km) of lake habitat within the range of the Gulf of Maine Distinct Population Segment in the State of Maine.

Measures to improve habitats and reduce impacts to Atlantic salmon as a result of the Endangered Species Act listing may directly or indirectly benefit river herrings and shads. Atlantic salmon are anadromous and spend a portion of their life in freshwater and the remaining portion in the marine environment. River herring occupy a lot of the same habitats as listed Atlantic salmon for spawning, breeding, feeding, growth and maturity. Therefore, protection measures such as improved fish passage or reduced discharge permits may benefit river herrings and shads.

The critical habitat designation provides additional protections beyond classifying a species as endangered by preserving the physical and biological features essential for the conservation of the species in designated waters in Maine. One of the biological features identified in the critical habitat designation for Atlantic salmon was freshwater and estuary migration sites with abundant, diverse native fish communities to serve as a protective buffer against predation. Co-evolved diadromous fish species are included in this native fish community.

The U.S. Fish and Wildlife Service and NOAA are also engaged in general riverine habitat issues with a focus on dam removal and fish passage improvement. They work in cooperation with other agencies and non-governmental agencies.

The efforts described above in this section (that will be ongoing regardless of the Council's decision regarding an FMP for river herring and/or shad) mean that many of the management activities that would normally be stimulated by management within an FMP are, or could be addressed by existing management programs and authorities. While there are some gaps that might be filled (see Section 3.2 above), this is not a case where there is a complete void of existing management.

Table 19. Magnuson-Stevens Act Required Plan Provisions and How They May be Addressed by Existing Authorities.

Provision	Current measures using existing authority
Measures for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery	<ul style="list-style-type: none"> • Commission Amendments 2 and 3 to the Commission Plan for Shad and River Herring, which requires states to close their waters to recreational and commercial river herring harvest unless they have an approved sustainable plan in place that will “not diminish the potential future stock reproduction and recruitment.” Currently ME, NH, RI, NY, NC and SC have approved plans for river herring; DE River Basin, Potomac River Fisheries Commission, NC, SC, GA and FL have plans for shad (Atlantic Coastal Fisheries Cooperative Management Act - ACFCMA). • Proposed catch caps in the Atlantic mackerel and Atlantic herring fisheries will address incidental catch (Magnuson-Stevens Act, through existing FMPs).
Description of the fishery	<ul style="list-style-type: none"> • Amendments 2 and 3 to the Commission Plan for Shad and River herring describe commercial/recreational fisheries in state waters (ACFCMA). • Atlantic herring and MSB actions that relate to river herring and shad, most recently Amendments 5 and 14, describe river herring and shad catch in federal waters (Magnuson-Stevens Act, through existing FMPs).
Assessment and specification of present and probable future condition of, and the maximum sustainable yield and optimum yield from the fishery.	<ul style="list-style-type: none"> • Present condition of the fishery is described in recent Commission stock assessment. • Trend analysis for river herring included in recent Endangered Species Act decision.
Assessment and specification of domestic harvesting and processing capacities	<ul style="list-style-type: none"> • U.S. fishing vessels are capable of, and expected to, harvest the optimum yield from the river herring and shad fisheries. U.S. processors are also expected to process the harvest of U.S. fishing vessels. None of the optimum yield from this fishery can be made available to foreign fishing.
Specification of the pertinent fishery data that shall be submitted to NMFS	<ul style="list-style-type: none"> • Amendments 2 and 3 to the River Herring and Shad Commission Plan specify fishery dependent and fishery independent monitoring requirements (ACFCMA). • At-sea monitors and port-side samplers collect species composition and biological information related to river herring and shad (Magnuson-Stevens Act, related to existing FMPs).
Provision of temporary adjustments to fishery access because of weather or other ocean conditions affecting the safe conduct of the fishery	<ul style="list-style-type: none"> • Could be provided to states on an as needed basis.

Provision	Current measures using existing authority
Description and identification of essential fish habitat, and minimization to the extent practicable adverse effects on such habitat caused by fishing	<ul style="list-style-type: none"> • Amendments 2 and 3 to the River Herring and Shad Commission Plan require states to identify, categorize and prioritize important existing and historic shad and river herring and shad habitat within its area of jurisdiction, establish periodic monitoring to ensure the long-term health and viability of the habitat, and develop plans to restore access to rivers (ACFCMA). • EFH consultations for currently managed species, including Atlantic salmon, Atlantic herring, and Atlantic mackerel could benefit river herring and shad where their habitats overlap (Magnuson-Stevens Act). • Critical habitat consultations for Atlantic salmon and Atlantic sturgeon could benefit river herring and shad where their habitats overlap (Endangered Species Act). • Consultations related to hydroelectric projects could benefit river herring and shad (Federal Power Act). • Federal protection of water quality is afforded through the Federal Water Pollution Control Act (also called the “Clean Water Act”). This act has played a role in reducing discharges of pollutants, restricting the timing and location of dredge and fill operations, and affecting other changes that have improved river herring and shad habitat in many rivers and estuaries. • Other state and federal habitat restoration activities (as described in this document).
Specification of the nature and extent of scientific data which is needed for effective implementation of the plan	<ul style="list-style-type: none"> • Current research needs were identified in Amendments 2 and 3 to the River Herring and Shad Commission Plan, and the most recent assessments for river herring and shad (ACFCMA).
Description of the likely effects of management measures on fishery participants and fishing communities	<ul style="list-style-type: none"> • National Environmental Policy Act (NEPA) analyses are conducted for all federal actions (not just fishery management measures) to evaluate the impacts of the federal action on fishery participants and fishing communities.
Specification of objective and measurable criteria for identifying when the fishery to which the plan applies is overfished and conservation and management measures to prevent overfishing, end overfishing, and rebuild the fishery as appropriate	<ul style="list-style-type: none"> • KEY POTENTIAL BENEFIT of Magnuson-Stevens Act; this would be required in a Federal FMP. • No definition currently for river herring in Amendment 2 to the Shad and River Herring Commission Plan. • The most recent stock assessment (ASMFC 2007) concluded that the definition of overfishing in Amendment 1 to the Shad and River Herring Commission plan that focused only on directed fishing mortality (F) was no longer valid for American shad stocks because shad are affected by several sources of human-induced mortality, including directed fishing (F), fish passage mortality at dams, mortality from pollution, and bycatch and discard mortality in indirect fisheries activity.
Assessment of the amount and type of bycatch occurring in the fishery and minimize bycatch to the extent practicable	<ul style="list-style-type: none"> • Adjustments to federal monitoring programs can be made to assess river herring and shad bycatch in federal fisheries (Magnuson-Stevens Act, through existing FMPs). • Proposed catch caps to minimize bycatch in Atlantic herring and Atlantic mackerel fisheries (Magnuson-Stevens Act, through existing FMPs).
Assessment of recreational release mortality and minimization of such mortality to the extent practicable	<ul style="list-style-type: none"> • States and jurisdictions must monitor recreational catch and effort within certain specified rivers under Amendments 2 and 3 of the Shad and River Herring Commission Plan. Techniques used to gather this data may include creel surveys, surveys of license/permit holders, Marine Recreational Fisheries Statistical Survey (MRFSS) / Marine Recreational Information Program (MRIP) and reporting requirements for obtaining/maintaining license or permit (ACFCMA).

Provision	Current measures using existing authority
	<ul style="list-style-type: none"> • Amendments 2 and 3 to the Commission Plan for Shad and River Herring, which requires states to close their waters to recreational and commercial river herring harvest unless they have an approved sustainable plan in place that will “not diminish the potential future stock reproduction and recruitment.” Currently ME, NH, RI, NY, NC and SC have approved plans for river herring; DE River Basin, Potomac River Fisheries Commission, NC, SC, GA and FL have plans for shad (ACFCMA).
Allocation of harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors	<ul style="list-style-type: none"> • Could be coordinated through Councils and Commission.
Establishment annual catch limits, and measures to ensure accountability.	<ul style="list-style-type: none"> • KEY POTENTIAL BENEFIT OF Magnuson-Stevens Act; this would be required in a Federal FMP. • Catch is limited through Amendments 2 and 3 to the Commission Plan for Shad and River Herring, and under the state plans that have already been approved • Federal bycatch limits proposed in Atlantic herring and Atlantic mackerel fisheries; proposed consequence (similar to an accountability measure) is closure of directed fisheries for these species once cap is attained (Magnuson-Stevens Act, existing FMPs).

9.0 CONCLUSION

The information in this document is designed to facilitate Council consideration of whether conservation and management, in the form of an FMP or FMP amendment, are needed for RH/S. Because the proposed revisions to the General National Standard Guidelines subsume and clarify the question at hand they are briefly revisited here:

Not every fishery requires Federal management. Any stocks that are predominately caught in Federal waters and are overfished or subject to overfishing, or likely to become overfished or subject to overfishing, are considered to require conservation and management. In addition, the following non-exhaustive list of factors should be used by a Council when deciding whether stocks require conservation and management:

While RH/S may be overfished and/or subject to overfishing, they are not predominantly caught in Federal waters. River herring are predominantly caught in directed fisheries in Maine and shad in North and South Carolina.

(i) The stock is an important component of the marine environment.

RH/S are important components of the marine environment.

(ii) The stock is caught by the fishery.

RH/S are caught incidentally to Atlantic herring, Atlantic mackerel, and other small-mesh fisheries.

(iii) Whether an FMP can improve or maintain the condition of the stocks.

It does not appear that an FMP would substantially improve or maintain the condition of RH/S stocks because existing management authorities are already managing catch at levels that are a small fraction of historical catch.

(iv) The stock is a target of a fishery.

RH/S are not targeted fisheries in Federal waters or other Council-managed fisheries.

(v) The stock is important to commercial, recreational, or subsistence users.

As described in this document, RH/S are or have been important to some commercial, recreational, or subsistence users.

(vi) The fishery is important to the Nation and to the regional economy.

While the RH/S fishery currently operate at small fractions of former levels, the ecological, historical, and cultural importance of RH/S fisheries, as well as their potential to support

future commercial and recreational fisheries, make them important to the Nation and regional economies.

(vii) The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution.

There is conflict between the Atlantic mackerel/herring fisheries and non-governmental organizations seeking additional monitoring and restrictions for those fisheries. The conflict involves both catch of non-target species like river herrings and shads as well as the optimal amount of directed harvest, but the most immediate issue is whether the at-sea catch of river herrings and shads is having a substantial detrimental impact on river herring and shad populations.

Since recreational fisheries have largely lost access to river herring harvest through state moratoria and shad catches are often very restricted as well if not totally banned, a fairness issue has been raised that all parties that catch river herrings and shads should be limited in similar fashions.

Establishing Council management of river herrings and shads via an FMP does not seem likely to immediately resolve these conflicts, especially because of the lack of absolute abundance estimates.

(viii) The economic condition of a fishery and whether an FMP can produce more efficient utilization.

The RH/S fisheries operate at only a fraction of earlier levels, but those levels may have been unsustainable. There is no information to suggest that an FMP would produce a more efficient utilization of the RH/S resource. However, an FMP could further examine the relative value of river herrings and shads across fishing interests (commercial versus recreational versus ecosystem; directed versus incidental catch) and consider efficiency in that respect.

(ix) The needs of a developing fishery, and whether an FMP can foster orderly growth.

These are not developing fisheries.

(x) The extent to which the fishery could be or is already adequately managed by states, by state/Federal programs, by Federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the policies and standards of the Magnuson-Stevens Act.

This issue is addressed extensively in this document. State RH/S fisheries must abide by state sustainability plans approved by the ASMFC, and the Councils have already taken actions to limit incidental catch in Council-managed fisheries to levels that are a very small proportion of historical landings. Industry bycatch avoidance programs appear to be allowing the Atlantic herring and Atlantic mackerel fisheries to operate within those limits. This document notes that a variety of entities are already working to improve habitats that are important to RH/S, and the TEWG has identified key data gaps and begun efforts to fill some

of those data gaps. It is not clear that FMP management would lead to any substantial improvements in management of RH/S beyond what is already occurring.

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