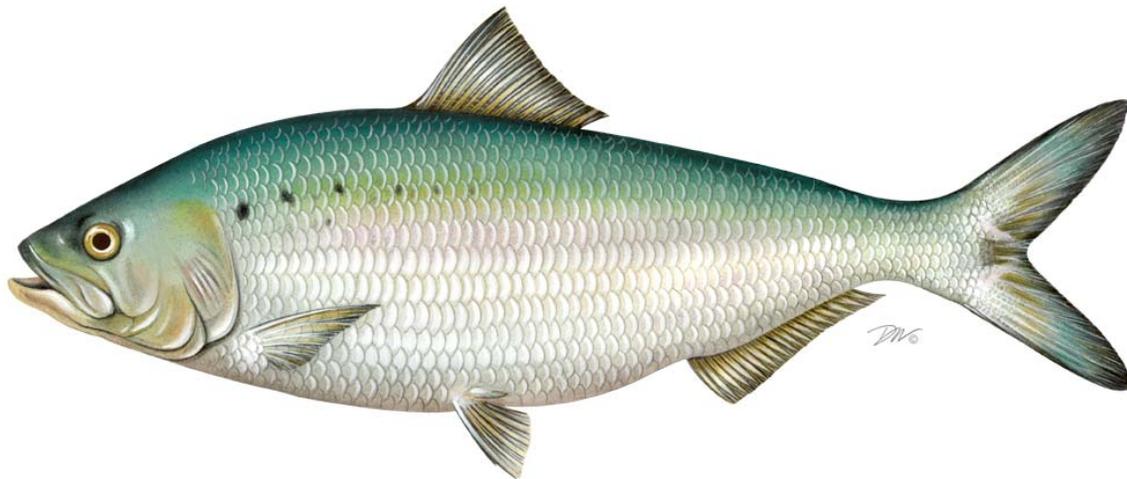


**REVIEW OF THE
INTERSTATE FISHERY MANAGEMENT PLAN FOR
SHAD AND RIVER HERRING (*Alosa spp.*)
2008 FISHING YEAR**



October 2009

Shad & River Herring Plan Review Team

Kate Taylor, Atlantic States Marine Fisheries Commission (Chair)
Mike Hendricks, Pennsylvania Fish and Boat Commission
Cheri Patterson, New Hampshire Fish and Game Department
Sara Winslow, North Carolina Division of Marine Fisheries

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

I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	October 1985
<u>Amendments:</u>	Amendment 1 (April 1999) Amendment 2 (August 2009)
<u>Addenda:</u>	Technical Addendum #1 (February 9, 2000) Addendum I (August 28, 2002)
<u>Management Unit:</u>	Migratory stocks of American shad, hickory shad, alewife, and blueback herring from Maine through Florida
<u>States With Declared Interest:</u>	Maine through Florida, including the Potomac River Fisheries Commission and the District of Columbia
<u>Active Boards/Committees:</u>	Shad & River Herring Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Plan Review Team, Plan Development Team

In 1994, the Plan Review Team and the Management Board determined that the original 1985 Fishery Management Plan (FMP) was no longer adequate for protecting or restoring the remaining shad and river herring stocks. As a result, Amendment 1 was adopted in October 1998 (completed April 1999).¹ Amendment 1 focuses on American shad regulations and monitoring programs, but also requires States to initiate fishery-dependent monitoring programs for river herring and hickory shad in addition to current fishery-independent programs. Such monitoring programs will seek to improve data collection and stock assessment capabilities. Furthermore, Amendment 1 contains specific measures to control exploitation of American shad populations while maintaining the status quo in other alosine fisheries. The amended goal of the FMP is to protect, enhance, and restore East Coast migratory spawning stocks of American shad, hickory shad, and river herring (collectively alewife and blueback herring) in order to achieve stock restoration and maintain sustainable levels of spawning stock biomass. The Plan further specifies four (4) management objectives as follows:

- 1) Prevent overfishing of American shad stocks by constraining fishing mortality below F_{30}
- 2) Develop definitions of stock restoration, determine appropriate target mortality rates and specify rebuilding schedules for American shad populations within the management unit
- 3) Maintain existing or more conservative regulations for hickory shad and river herring fisheries until new stock assessments suggest changes are necessary
- 4) Promote improvements in degraded or historic alosine habitat throughout the species' range

¹ ASMFC, 1999. Amendment 1 to the Interstate Fishery Management Plan for Shad & River Herring. April, 1999. Washington, D.C. 76 pp.

In the fall of 1999, the Technical Committee reviewed both state annual reports and fishing recovery plans. After doing so, the Technical Committee compiled a report that identified a number of technical errors requiring correction and/or clarification in Tables 2 and 3 of Amendment 1. Upon review by the Shad and River Herring Management Board, the Board concurred with the Technical Committee's report and suggested that a technical addendum be developed to address modifications to the states' fishery-dependent and independent monitoring program for American shad. The Board approved Technical Addendum #1 to Amendment 1 of the Interstate Fishery Management Plan for Shad and River Herring.

In February 2002, the Plan Review Team and the Technical Committee recommended several changes to both Amendment 1 and Technical Addendum #1. The Management Board approved the changes and directed the Commission staff to develop an addendum to both Amendment 1 and Technical Addendum #1. Addendum I does the following: changes the conditions for marking hatchery-reared alosines; clarifies the definition and intent of *de minimis* status for the American shad fishery; and modifies and clarifies the fishery-independent and dependent monitoring requirements of Tables 2 and 3 of Technical Addendum #1. These measures went into effect on January 1, 2003.

In August 2009, the Shad and River Herring Management Board approved Amendment 2, which deals only with river herring management. The Amendment prohibits state waters commercial and recreational fisheries beginning January 1, 2012, unless a state or jurisdiction develops and submits for approval a sustainable management plan by January 1, 2010. The Amendment defines a sustainable fishery as "a commercial and/or recreational fishery that will not diminish the potential future stock reproduction and recruitment." Submitted plans must clearly demonstrate that the state's or jurisdiction's river herring fisheries meet this new definition of sustainability through the development of sustainability targets which must be achieved and maintained. Amendment 2 requires states to implement fisheries-dependent and independent monitoring programs similar to current requirements for American shad, and contains recommendations to member states and jurisdictions to conserve, restore, and protect critical river herring habitat.

II. Status of the Stocks

While the FMP addresses four species including American shad, hickory shad, alewife, and blueback herring, lack of comprehensive and accurate commercial and recreational fishery data for the latter three species make it difficult to ascertain the status of these stocks. A stock assessment for American shad was completed in 1997 and submitted for peer review in early 1998 based on new information and Management Board recommended terms of reference. The 1998 assessment estimated fishing mortality rates for nine shad stocks and general trends in abundance for 13 shad stocks.

A coastwide American shad stock assessment was completed and accepted in August 2007. The 2007 assessment found that American shad stocks are currently at all-time lows and do not appear to be recovering. Recent declines of American shad were reported for Maine, New Hampshire, Rhode Island, and Georgia stocks, and for the Hudson (NY), Susquehanna (PA), James (VA), and Edisto (SC) rivers. Low and stable stock abundance was indicated for Massachusetts, Connecticut, Delaware, the Chesapeake Bay, the Rappahannock River (VA), and some South Carolina and Florida stocks. Stocks in the Potomac and York Rivers (VA) have shown some signs of recovery in recent years. Data limitations and conflicting data precluded

the report from indicating much about the current status or trend of many of the stocks from North or South Carolina.

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

The last stock assessment was completed in 1990 and looked at 15 river herring stocks. It concluded that five of the stocks were overfished and recruitment failure was apparent, and another four stocks were not overfished but had declined in recent years. In 2008, a river herring stock assessment was initiated by the Management Board in response to concern over population decline and the impact of ocean bycatch. Preliminary results from the current stock assessment indicate that commercial landings are at historic lows and that recent trends in stock size were inconsistent. However, stocks in some river systems appear to have suffered declines. On a coastwide basis, decreases in the mean length and age of river herring were observed. The stock assessment is scheduled to be completed in 2011.

III. Status of the Fisheries

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

AMERICAN SHAD:

Total combined river and ocean commercial landings decreased from a high of 2,364,263 pounds in 1985 to a low of 1,390,512 pounds in 1999, but increased in 2000 to 1,816,979 pounds. The closure of the ocean-intercept fishery has lowered the coastwide total landings of American shad. Based upon landings data provided in Compliance Reports from individual states and jurisdictions, 2008 landings totaled 544,907, decreasing 34% from 824,730 pounds in 2007 (Table 1). Combined landings from North Carolina and South Carolina accounted for 80% of the commercial harvest in 2008. Connecticut, New York, New Jersey, Delaware, PRFC, Virginia and Georgia accounted for 20% of the commercial harvest in 2008. Maine, New Hampshire, Massachusetts, Rhode Island, Pennsylvania, Maryland, the District of Columbia and Florida reported no directed shad harvest in their state Compliance Reports. The National Marine Fisheries Service reported landings totaling 485,449 in 2008.

Amendment 1 requires that each state annually document that the American shad ocean bycatch did not exceed 5% of the total landings (in pounds) per trip. Shad bycatch landings from ocean waters in 2008 decreased from 2007 levels, comprising 20,511 pounds, or about 3.6% of the coastwide total. Four states—Maine, Massachusetts, New York and New Jersey—reported

landings of ocean bycatch. 93% of the ocean bycatch came from New York, where approximately 38% of trips reported shad catches over the 5% trip limit.

Substantial shad sport fisheries occur on the Connecticut (CT and MA), the Hudson (NY), the Delaware (NY, PA and NJ), the Susquehanna (MD), the Santee and Cooper (SC), the Savannah (GA), and the St. Johns (FL) Rivers. Shad sport fisheries are also pursued on several other rivers in Massachusetts, Virginia, North Carolina, South Carolina, and Georgia. In 2008, recreational creel limits ranged from zero to 10 fish per day. The exception to this is the Santee River (SC), which is permitted to have a 20 fish per day creel limit due to the approval of a conservation equivalency plan in 2000. Tens of thousands of shad are caught by hook and line from large East Coast Rivers each year, but detailed creel surveys are generally not available. Actual harvest (catch and removal) may amount to only about 20-40% of total catch, but hooking mortality could boost this “harvest” value substantially. Several comprehensive angler use and harvest surveys are planned or have been recently completed. In October 2006, the Management Board suspended the requirement to monitor the recreational fishery.

As of 2009, MRFSS data are no longer provided for American shad. This is a result of the unreliable design of MRFSS that focuses on active fishing sites along coastal and estuarine areas. In previous years the proportional standard error (PSE) has ranged from 0-100.1

Table 1. Commercial landings (in pounds) of American shad in 2008

State	State Compliance Report Landings			NMFS Landings
	Ocean Bycatch	In-river	Total	
Maine	216	-	216	38
New Hampshire	-	-	-	-
Massachusetts	31	-	31	-
Rhode Island	-	-	-	783
Connecticut	-	28,419	28,419	-
New York	19,152	18,672	37,842	20,102
New Jersey	1,112	30,146	31,258	6,761
Pennsylvania	-	-	-	-
Delaware	-	8,317	8,317	18,340
Maryland	-	-	-	5,340
PRFC	-	6,975	6,975	-
DC	-	-	-	-
Virginia	-	573	573	2,034
North Carolina	-	118,971	118,971	118,978
South Carolina	-	334,626	334,626	282,687
Georgia	-	31,032	30,032	31,207
Florida	-	-	-	-
Total	20,511	544,907	565,418	485,449
Percent	3.6%	96.4%		
2007 Total	4,562	820,168	824,730	776,316
2007 Percent	0.55%	99.45%		

HICKORY SHAD:

Coastwide hickory shad landings have averaged 131,692 pounds from 2000-2008. During that time period North Carolina has accounted for, on average, 76% of total coastwide landings. In 2008, Virginia, North Carolina, South Carolina, and Georgia reported hickory shad commercial landings. The coastwide commercial landings were 71,028 in 2008, an increase of 75% from 2007 (40,360 pounds landed). North Carolina reported 89% of the total landings (66,767 pounds).

As of 2009, MRFSS data are no longer provided for hickory shad. This is a result of the unreliable design of MRFSS that focuses on active fishing sites along coastal and estuarine areas. In previous years the proportional standard error (PSE) has ranged from 0-100.1

RIVER HERRING (BLUEBACK HERRING/ALEWIFE COMBINED):

Commercial landings of river herring declined 90% from over 13 million pounds in 1985 to about 1.33 million pounds in 1998. In 2008, river herring landings were reported from Maine, New Hampshire, New York, New Jersey, Delaware, Maryland, the Potomac River Fisheries Commission, North Carolina, and South Carolina, totaling 1,283,115, an 65% increase from 2007 (landings from 2008 compliance reports totaled 777,064 pounds), but just under reported landings from 2006 (landings from 2007 compliance reports totaled of 1,390,892). The majority of the landings (95%) were reported by the state of Maine. Not all states reported their river herring landings.

Table 2 Shad and River Herring Fish Passage Counts at Select Dams – 2006

<u>State</u>	<u>Shad</u>	<u>River Herring</u>
Maine		
Androscoggin	1	92,359
Saco	1,419	22,563
St. Croix	0	12,261
Massachusetts		
Essex/Lawrence	25,116	1,169
Holyoke	153,149	84
Westfield River	3,212	0
Rhode Island		
Gilbert Stuart		58,640
Nonquit		224,506
Potter Hill	70	
Pennsylvania/Maryland		
Conowingo	22,541	
Holtwood	28,063	
Safe Harbor	20,828	
Lehigh Dams	408	
South Carolina		
St. Stephen Dam	29,002	
Total 2008	283,809	411,582
Total 2007	558,261	79,756

As of 2009, MRFSS data are no longer provided for river herring (alewife or blueback herring). This is a result of the unreliable design of MRFSS that focuses on active fishing sites along coastal and estuarine areas. In previous years the proportional standard error (PSE) has ranged from 0-100.1

IV. Status of Research and Monitoring

Under Amendment 1 (April 1999), fishery-independent and fishery-dependent monitoring programs are now mandatory for American shad. Juvenile abundance index (JAI) surveys, annual spawning stock surveys, and hatchery evaluations are required for states and jurisdictions specified in the fishery management plan. In addition, Amendment 1 recommends that JAIs for other alosine species be reported when possible. In February 2000, the Shad Management Board indefinitely deferred the ocean-tagging requirement stipulated by Amendment 1 due to the pending ocean fishery closures, which was to begin in the year 2000 to analyze the mixed stock contribution to ocean landings coastwide.

All States are required to calculate mortality and/or survival estimates, and monitor and report data relative to landings, catch, effort, and bycatch. States must submit annual reports including all monitoring and management program requirements, on or before July 1 of each year. In addition, States were required to submit State recovery/fishing plans by July 1, 1999. All States plans to implement Amendment 1 were approved by January 1, 2000.

In addition to the mandatory monitoring requirements stipulated under Amendment 1, some states and jurisdictions continue important research initiatives for these species. For example, Maine, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, and USFWS are actively involved in shad restoration using hatchery-cultured fry and fingerlings. All hatchery fish are marked with oxytetracycline marks on otoliths to allow future distinction from wild fish. During 2008, several jurisdictions from Maine to North Carolina (including USFWS) reared American shad, hickory shad, and alewife, stocking a total of 19,082,025 American shad, 7,180,215 hickory shad, and 90,000 alewife (Table 3).

V. Status of Management Measures

All state programs must implement commercial and recreational management measures or an alternative program approved by the Management Board. The current status of each state's compliance with these measures is provided in the PRT Report.

As noted in Section I, the Management Board determined that the original Plan and its lack of mandatory measures were insufficient for protecting and restoring alosine stocks along the East Coast. Accordingly, the 1985 fishery management plan was amended in 1999. The Plan Development Team developed Amendment 1 to expedite recovery of American shad populations and maintain current regulations in the hickory shad and river herring fisheries.

After careful consideration of the 1998 stock assessment results, peer reviewers' comments, and public opinion, the Management Board voted to address in-river or estuarine American shad fisheries differently than oceanic intercept fisheries. Specifically, the Board decided to require states to submit in-river shad restoration plans for stocks under their jurisdiction. For those seven river systems evaluated in the 1998 stock assessment (Connecticut R., Hudson R., Delaware R., Upper Chesapeake Bay MD, Edisto R., Santee R., and Altamaha R.), states could continue current regulations since overfishing was not detected for those respective stocks.

States/jurisdictions must maintain a fishing mortality level at or below F_{30} . Also, reporting of catch and effort data for all alosine fisheries is now mandatory under Amendment 1.

Table 3. Stocking of Cultured Alosines in State Waters, 2008.

State	American Shad	Hickory Shad	Alewife
Maine			
Graham Lake			90,000
Kennebec River	3,561,643 (fry)		
Androscoggin River	712,286 (fry)		
Massachusetts			
Charles River	610,442 (fry)		
Pennsylvania			
Susquehanna River	2,490,081 (fry)		
Lehigh	696,785 (fry)		
Octoraro Creek		3,545,292 (fry)	
Ridley Creek		1,129,126 (fry)	
Pennypack Creek		2,505,797 (fry)	
Delaware			
Nanticoke Tributaries	574,000 (larvae)		
Maryland			
Choptank River	442,000 (larvae)		
	64,596 (juvenile)		
Patuxent River	526,000 (larvae)		
	60,377 (juvenile)		
District of Columbia			
Anacostia River	1,124,200 (fry)		
North Carolina			
Roanoke River	8,219,615		
Total 2008	19,082,025	7,180,215	90,000
Total 2007	22,368,849	7,815,640	90,120

In addition, the Management Board voted to phase out all ocean intercept fisheries for American shad within five years of Amendment 1 implementation. States were to comply with a 40% reduction in effort within the ocean intercept fishery by December 31, 2002. States with non-directed harvest of American shad in ocean fisheries can permit the landing of shad bycatch, provided that American shad do not constitute more than 5% of the total landings (in pounds) per trip. As required, each state submitted a proposal for a 40% reduction in effort by December 31, 2002. All states have closed their ocean-intercept fisheries as of January 1, 2005.

For recreational fisheries, the states voted to implement a 10 fish combined daily creel limit for American and hickory shad. In October of 2000, the Board approved a 10 fish per day creel limit (combined American and hickory shad) for all waters of South Carolina except the Santee River, which will have a 20 fish, combined daily limit.

In addition, the states are required to submit annual reports on harvest and certain required fishery-independent and dependent monitoring programs. Implementation of these programs and

reporting schedules is intended to improve future assessments of alosine populations and permit adaptive management of fisheries as stock recovery is documented.

In response to concerns over the decline of many river herring stocks coastwide the Management Board initiated the development of Amendment, which deals with river herring management. The Amendment was approved by the Board in August 2009 and prohibits state waters commercial and recreational fisheries beginning January 1, 2012, unless a state or jurisdiction develops and submits for approval a sustainable management plan by January 1, 2010. Amendment 2 requires states to implement fisheries-dependent and independent monitoring programs similar to current requirements for American shad, and contains recommendations to member states and jurisdictions to conserve, restore, and protect critical river herring habitat. The monitoring requirements go into effect January 1, 2010.

V. Prioritized Research Needs

High Priority

- Continue to assess current aging techniques for American shad and river herring, using known age fish, scales, otoliths, and spawning marks. Conduct biannual aging workshops to maintain consistency and accuracy of aging fish sampled in state programs.
- Determine and update biological benchmarks used in assessment modeling (fecundity at age, mean weight at age for both sexes, partial recruitment vector/maturity schedules) for American shad and river herring stocks in a variety of coastal river systems, including both semelparous and iteroparous stocks.
- Validate the different values of M for shad stocks through verification of shad aging techniques and repeat spawning information and develop methods for calculating M.
- Investigate the relation between juvenile production and subsequent year class strength in American shad with emphasis on the validity of juvenile abundance indices, rates and sources of immature mortality, migratory behavior of juveniles, natural history and ecology of juveniles, and essential nursery habitat in the first few years of life.
- Evaluate additional sources of mortality for shad, including bait and reduction fisheries.
- Conduct population assessments on river herrings—particularly needed in the south.
- Determine which stocks are impacted by mixed stock fisheries (including bycatch fisheries). Methods to be considered could include otolith microchemistry, oxy-tetracycline otolith marking, and/or tagging.
- Evaluate predation by striped bass as a factor of mortality for alosines.
- Evaluate fish passage efficiency at all fishways.
- Conduct studies to improve fish passage design criteria.
- Quantify fishing mortality (in-river, ocean bycatch, bait fisheries) for major river stocks after ocean closure of directed fisheries.

Medium Priority

- Identify ways to improve fish passage efficiency using hydroacoustics to repel alosines or pheromones or other chemical substances to attract them. Test commercially available acoustic equipment at existing fish passage facility to determine effectiveness. Develop methods to isolate/manufacture pheromones or other alosine attractants.
- Develop effective culture and marking techniques for river herring.

- Develop and implement techniques to determine shad and herring population targets for tributaries undergoing restoration (dam removals, fishways, supplemental stocking, etc.).
- Evaluate and ultimately validate large-scale hydroacoustic methods to quantify American shad escapement (spawning run numbers) in major river systems. Identify how shad respond (attract/repelled) by various hydroacoustic signals.
- Refine techniques for hormone induced tank spawning of American shad. Secure adequate eggs for culture programs using native broodstock.
- Develop comprehensive angler use and harvest survey techniques for use by Atlantic states to assess recreational fisheries for American shad.
- Determine the effects of passage impediments on all life history stages of shad and river herring, conduct turbine mortality studies and downstream passage studies.
- Conduct studies on energetics of feeding and spawning migrations of shad on the Atlantic coast.
- Encourage university research on hickory shad.
- Conduct studies of egg and larval survival and development.
- Suggest hard limits and range levels for water quality deemed appropriate and defensible for all alosines.

Low Priority

- Review studies dealing with the effects of acid deposition on anadromous alosines.
- Characterize tributary habitat quality and quantity for Alosine reintroductions and fish passage development.
- Identify and quantify potential American shad spawning and rearing habitat not presently utilized and conduct an analysis of the cost of recovery.
- Conduct and evaluate historical characterization of socio-economic development (potential pollutant sources and habitat modification) of selected shad rivers along the east coast.
- Development of appropriate Habitat Suitability Index Models for alosine species in the fishery management plan. Possibly consider expansion of species of importance or go with the most protective criteria for the most susceptible species.

VII. Current State-by-State Implementation of Compliance Requirements

Upon review of the state annual reports, the PRT has determined that all states have fully implemented the required provisions of Amendment 1 to the Shad and River Herring Fishery Management Plan. The PRT notes, however, that some states did not document that landings were less than 5% in pounds per trip and some states did not include the Harvest and Loss table as required in Table 10.1 D in Amendment 1.

Maine, New Hampshire and Massachusetts have requested *de minimis* status for 2009. These states continue to meet the standards for commercial *de minimis* as defined in Amendment 1 and clarified in Addendum I. Qualification for *de minimis* status was calculated by using the highest reported landings for 2008 based upon data from the 2009 State Compliance Reports and the National Marine Fisheries Service. The following states had landings that were reported to be less than 1% of the coast-wide commercial landings for American shad: Maine, New Hampshire, Massachusetts, Rhode Island, Pennsylvania, Maryland, Delaware, PRFC, D.C., Virginia, and Florida.

VIII. Recommendations of Plan Review Team

1. Several of the states did not report all of the monitoring requirements listed under Amendment 1, Technical Addendum #1, and Addendum I. The states should take note of the required monitoring programs that were not reported and make concerted effort to report all monitoring programs in forthcoming annual reports. The most common omissions were: variance, length frequency, age frequency and degree of repeat spawning. The PRT requests that the Technical Committee provide a spreadsheet on how to accurately determine that variance.
2. Amendment 1 requires each state report to include a Harvest and Losses Table. Many of the states followed the PRT's request from the 2006 PRT Report and included this table in their compliance report. The PRT requests that all states include this table in their 2010 compliance report even if there is no information. The PRT reminds states that information should be provided in both pounds and numbers.

According to Amendment 1, Table 10 "Format Required for Annual State Report," the Harvest and Losses Table should have the following information:

D. Table 1. Harvest and Loss – including all above estimates in numbers and weight (pounds) of fish and mean weight per fish for each gear type.

An example of the format for the table would be:

Harvest and Losses	Number	Weight (pounds)	Mean weight per fish (pounds)
Commercial			
Gear			
Set Gill Nets			
Drift Gill Nets			
Recreational			
Gear			
Hook and Line			
Fish Passage Mortality			
Discarded Males			
Brood Stock Capture			
Research Losses			

3. The PRT requests that all states check with law enforcement agencies and their freshwater counterparts when reporting poaching, bycatch or other losses.
4. The PRT requests that staff inform states of previous compliance issues when sending out the general compliance report reminder.
5. The PRT requests that for those states and jurisdictions that share monitoring should report who was responsible for the required monitoring in lieu of not including the information.

6. Amendment 1 requires that each state annually document that the American shad ocean bycatch did not exceed 5% of the total landings (in pounds) per trip. The PRT reminds states to include this information in their compliance reports.
7. The PRT recommends increased communication between state shad and river herring technical committee members and Atlantic sturgeon technical committee members to better facilitate accurate reporting of Atlantic sturgeon bycatch. Amendment 1 requires that all states report any estimates of Atlantic sturgeon bycatch in their shad and river herring fisheries.
8. The PRT recommends that states report absence of fisheries in state waters rather than omitting these fisheries from the compliance report, in order to prevent mistaken compliance issues (e.g. reporting of hickory shad).