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### DRAFT - 1989 Chesapeake Bay Alosa Management Plan and Amendment #1 - DRAFT Review May, 2013

#### Summary

The Alosa Plan Review Team (PRT) reviewed the 1989 Chesapeake Bay Alosid Management Plan (CBAMP) and the 1998 Amendment #1 during 2013. While ASMFC's Amendments 2 (2009) and 3 (2010) to the coastal shad and river herring FMP have made significant changes to Alosa management; the CBAMP's goals, objectives, and actions remain appropriate and adequate. The CBAMP emphasizes quantifiable targets and thresholds plus adequate water quality, quantity, and access. Since all four Alosa species are currently under a harvest moratorium, the PRT determined that it was premature to discuss resource allocation among stakeholders. The PRT recommends status quo for the 1989 Chesapeake Bay Alosid Management Plan and Amendment #1.

During the PRT evaluation the following comments were noted:

- Current management goals and objectives are appropriate and consistent with ASMFC requirements for Chesapeake Bay Alosa species.
- American and hickory shad moratoria will continue as required by ASMFC.
- Bay wide river herring (alewife and blueback) moratoria have been in effect since January 1, 2012 and will continue as required by ASMFC.
- The Maryland target for successful restocking of American shad or hickory shad within a tributary is three consecutive years where 80% of recaptures are of wild stock. A target for successful restocking of river herring has not been determined.
- Preliminary stock recruit indices for river herring were developed and presented to the ASMFC's Herring Stock Assessment Sub-committee (SAS). The effects of bycatch, environmental factors, and stock changes require further study. No trends were detected for American shad and there were insufficient data for hickory shad. The ASMFC SAS decided not to pursue further development of the indices.
- Ocean bycatch mortality from the Atlantic herring and the Atlantic mackerel/squid/butterfish fisheries are significant contributors to the decline of American shad and river herring populations. The New England Fisheries Management Council (NEFMC) has proposed Amendment 5 to the Atlantic Herring Fishery Management Plan (FMP). Pertinent to Alosa species are provisions to increase the fleet coverage of onboard observers and fishery modifications to reduce shad and river herring bycatch. Amendment 5 implementation is pending National Marine Fisheries Service (NMFS) approval. The Mid-Atlantic Fisheries Management Council (MAFMC) is developing Amendment 14 to the Atlantic Mackerel/Squid/Butterfish FMP to accomplish comparable outcomes. The MAFMC amendment is also under review by NMFS. Bycatch mortality will continue to inhibit successful restoration of Alosa species.
- Fish passage projects will focus on providing river herring access to suitable spawning habitat. Removing blockages rather than building fishways is the preferred method to provide access and to improve the quality of spawning habitat. Significant progress has been made towards removing blockages on the mainstem Patapsco River. The remaining blockages for river herring across the state are primarily low-head dams on smaller tributaries. The remaining partial blockages limiting American shad access to spawning habitat are on the Susquehanna River: Conowingo, Holtwood, Safe Harbor, and York Haven dams.
- As of 2001, all Chesapeake Bay jurisdictions use American shad broodstock collected from the Potomac River.

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- Larval and juvenile stocking of hickory shad in the Patuxent River has been successful. American shad restoration has had mixed results. River herring restoration will not be implemented until a restoration plan has been developed. Experimental river herring and shad stocking is underway (2013) on the Patapsco River. Funding is available for three years of stocking (2013-2015) plus two additional years of monitoring (through 2017). River herring production has been expanded at the Manning hatchery following the drilling of an additional well.
- Implementation of ecosystem-based fisheries management practices will largely focus on factors that impact habitat quality and access.
- Resource allocation decisions should be deferred until American shad, hickory shad, alewife herring, and blueback herring populations have recovered sufficiently to accommodate harvest.
  - Current management goals are for restoration of Chesapeake Bay stocks which have remained at historic lows for several decades.
  - Conservation and resource management factors are currently being addressed by the harvest moratoria on each of the four species.
  - A catch-and-release shad fishery exists below Conowingo Dam. Presence of this recreational fishery has led to recent renewal of social and cultural importance, and has increased in economic value.
  - A market remains for roe from American shad and river herring, however, the availability of roe is very limited due to the moratoria. Commercial harvest of American shad continues through a limited bycatch fishery from the Potomac River.
  - River herring supported recreational and commercial fisheries both for roe and for bait. The economic value of river herring fisheries has received little attention.
  - Environmental impacts to Alosa populations and the generation of fishery related economies include fish passage blockages and access to suitable spawning grounds.

### FMP Development for Alosa in Chesapeake Bay

The first coordinated effort to manage *Alosa* sp. along the Atlantic Coast began in 1985 with implementation of the ASMFC Interstate Fishery Management Plan for Shad & River Herring. The majority of *Alosa* in Chesapeake Bay traverse two or more jurisdictions to access spawning and nursery habitats; consequently Maryland, Virginia, Pennsylvania, Potomac River Fisheries Commission, and the District of Columbia implemented a coordinated Chesapeake Bay Alosid Management Plan (CBAMP) in 1989. In 1998, the ASMFC completed the American Shad & Atlantic Sturgeon Stock Assessment Peer Review: Terms of Reference and Advisory Report, which identified problems with the mark-recapture methodology used in the Conowingo Dam tailrace. At the same time Pennsylvania established two measures for successful American shad restoration; the presence of 3.0 million adults at Conowingo Dam and 2.0 million adults upstream of York Haven Dam. Amendment #1 to the CBAMP was developed in 1998 to address the upper Bay mark-recapture data, to reevaluate criteria for reopening a Chesapeake Bay fishery, and to incorporate measurable restoration targets for American shad as soon as they are available. Although there have been several attempts to develop targets, none have been adopted.

Since implementation of CBAMP Amendment #1, ASMFC completed a new *Alosa* stock assessment in 2007 and three ASMFC amendments, including two addenda to the Interstate Fishery Management Plan for Shad & River Herring. The ASMFC Amendment I (1999) restricted fishing mortality to F30 and emphasized the need for stock restoration definitions, appropriate target mortality rates, schedules for rebuilding the stocks, and improvements to habitat access and quality. Technical Addendum 1 and Addendum 1 clarified several provisions in ASMFC Amendment 1. Concerns about river herring, alewife and blueback, stock status and management were addressed in ASMFC Amendment 2 (2009). It requires juvenile and adult abundance monitoring and mortality estimates. Both commercial and recreational river herring fisheries were closed on January 1, 2012 unless an approved sustainable fishery plan was submitted to ASMFC. Amendment 3 (2010) was implemented following coastwide declines in American shad indices. The restoration target was changed from a fishing rate (F30) to a total mortality rate (Z30) to account for all sources of mortality. The benchmark for juvenile recruitment failure was

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changed from three consecutive years below 90% of the time series to 75% of the time series. All other requirements are currently being implemented.

### Alosa Chesapeake Bay FMP Review

The 1989 Chesapeake Bay Alosa FMP including Amendment 1 was reviewed by a Plan Review Team (PRT) consisting of staff from Fisheries Service's Marine/Estuarine Fisheries Program, Hatcheries Division, and FMP Program (Karen Capossela, Chuck Stence, Nancy Butowski, and Marek Topolski). The CBAMP and Amendment 1 Implementation Table, a synopsis of management strategies and actions, and a FMP update from 2012 were used to guide the review. Additionally, ecosystem-based fisheries management and resource allocation principles were included in the discussion to determine if any pertinent issues were not being addressed by the CBAMP and Amendment 1.

A Fisheries Allocation Review policy was adopted in 2012 by MD Department of Natural Resources. During the review process, the following allocation factors were considered : fairness and equity; conservation and management, environmental impact, social and cultural importance, and present and future economic value and viability of associated fisheries..

Historically (late 1800s to mid-1900s), Alosa commercial fisheries were among the most valuable in Chesapeake Bay. In Maryland, American shad commercial landings declined sharply in the 1970s to a historic low where landings have remained. River herring commercial landings steadily declined since the 1930s then rapidly fell to historic lows in the early 1970s where they remain. Similarly, hickory shad commercial landings declined to historic lows in the mid-1970s and have not increased since.

### Alosa Stock Status in Chesapeake Bay:

Abundance of all Alosa species in Chesapeake Bay remains at historic lows. The Chesapeake Bay Program's 2010 Shad Abundance Indicator (an updated indicator is in progress) for the Chesapeake Bay indicated the Potomac River abundance was 96% of 1950s commercial gillnet landings. However, abundance in York River has declined from the 2004 high of 41% to 20% of 1950s commercial landings over the past decade. Fish passage at the Conowingo (Susquehanna River) and Boshers (James River) dams have remained low since monitoring began in 2000. The number of American shad tagged below Conowingo Dam and passed over the dam declined during the early 2000s but stabilized around 2007. Total mortality for American shad is estimated to be 72% in the Nanticoke River, 87% in the Conowingo Dam tailrace, and 74% Bay wide. Ocean bycatch from the Atlantic herring and Atlantic mackerel/squid/butterfish fisheries has been identified as a significant source of adult mortality. Juvenile catch per unit effort (CPUE) in the upper Chesapeake Bay has varied between a geometric mean of 0 to 8 per seine haul since 1995. No correlation between juvenile American shad production and either spawning adult abundance or habitat quality has been detected.

Hickory shad data is collected by recreational anglers in Deer Creek (Susquehanna River) and MD DNR's Hatcheries Division. The Patuxent River hickory shad population is considered self-sustaining and restored. The proportion of wild adult hickory shad has been at least 80% for more than three consecutive years. Hickory shad in the Choptank River are showing similar population trends, an indication they are also recovering. The Marshyhope Creek population has not changed despite stocking efforts. Sampling for juveniles from this area has not been very productive. Juveniles caught by the MDNR seine surveys are uncommon due to gear inefficiency for this species.

**Comment:** Stocking was discontinued in Marshyhope after 2009

Before the moratorium for river herring in 2012, commercial landings were at historic lows (<150,000 lbs) beginning in the mid-1970s. By 2006, landings were below 20,000 lbs. The CPUE also declined and remained low for both blueback and alewife herring. Chesapeake Bay states did not submit sustainable harvest management plans to ASMFC making them subject to the coastwide moratorium. Blueback and alewife herring annual CPUEs from summer seine surveys are variable with little trend. A weak correlation was detected between juvenile river herring production and both spawning adult abundance and habitat quality. Development of these stock recruit indices has been discontinued.

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Amendment #1 to the CBAMP addressed two specific restoration issues: the annual adult American shad abundance estimates for the upper Bay and tributary-specific restoration targets. The mark-recapture data collected from the upper Bay represents relative population trends rather than absolute abundance. Since American shad abundance could not be calculated, revised criteria are needed to replace those established in Strategy 1.1.1 in the 1989 CBAMP. Tributary-specific and measurable restoration targets are needed to determine restoration success for American shad.

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1989 Chesapeake Bay Alosid Management Plan Goal and Objectives (updated 1/2010)

Alosa Management Plan Goal and Objectives

Goal: Protect, restore and enhance baywide shad and river herring stocks to generate the greatest long term ecological, economic and social benefits from the resource. The management plan for Alosa will be adaptive and involve continuous responses to new information about the current state of the resource.	Goa
Objectives: 1. Maintain a spawning stock at the size which eliminates low reproductive potential as a cause of poor spawning success. 2. Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues. 3. Reduce fishing effort until they exhibit increased abundance. 4. Improve knowledge of Alosa stock dynamics to develop more accurate data bases and minimize interjurisdictional conflicts. 5. Redefine the tributary survey program to improve water quality and habitat accessibility specifically for Alosa. 6. Continue programs to restock Alosa into areas which historically supported natural spawning migrations and to expand existing stock restoration programs to include areas which do not presently support Alosa.	Obj Obj Mai mor exhi

1998 Amendment 1 to the 1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/20)

Strategy	Action	Date	
1.1 The Bay jurisdictions will reevaluate the criteria for reopening a fishery in the Chesapeake Bay during the Alosid FMP revision process. Until new criteria are determined, the moratorium will remain in place for American and hickory shad in the Chesapeake Bay.	1.1 The Bay jurisdictions will continue the moratorium on American shad in Chesapeake Bay.	1989 On-going	The Bay jurisdic reopening a fisher Alosine FMP revi December 2004. r place for Americ
		2009 - 2011	MD Sea Grant co Chesapeake Bay l Management Plar
		On-going	Chesapeake Bay j ASMFC requiren <a href="http://www.asmfc">http://www.asmfc</a>
1.2 A special target-setting task force was charged to "establish measurable restoration targets" for American shad in the Bay. Eight spawning/nursery areas that historically supported substantial recreational and commercial fisheries were used to develop tributary-specific, quantitative recovery targets. The task force recommended that the stock recovery targets proposed for American shad be incorporated into the Alosid management plan.	1.2 The bay jurisdictions will incorporate the shad restoration targets into the revised Alosine FMP	1999	River specific tar should be reevalu
		2007	STAC held a 200 The white paper c
		2008 On-going	The CBP shad ab the Susquehanna and Potomac Riv passage on the Su commercial bycat and gill net CPU

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1998 Amendment 1 to the 1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/20)

Strategy	Action	Date	
		2010	information: <a href="http://www.chesa">http://www.chesa</a> No relationship e: shad abundance li Any relationship i mortality.
		2012	The CBP Fisherie abundance indica workgroup was a: American shad in option to recomm status-quo by the

1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
1.1.1 Removing the moratorium on Maryland American shad will not occur until the stocks of American shad in the upper Bay are fully recovered. Reestablishing a fishery will occur when annual population estimates in the upper Bay increase for three consecutive years and stock size reaches at least 50% of historical levels (approximately 500,000 fish) during one of those three years. Regulations will be established to ensure that initial annual exploitation in the upper Bay does not exceed 10% when the fishery is opened. Stock levels will be determined from an annual stock estimation study and exploitation rates will be established based on recreational and commercial surveys.	1.1.1 American shad abundance in the upper Bay has improved but has not sufficiently recovered to warrant an open fishery. American shad abundance is also low in other Maryland river systems. Maryland will continue the moratorium on American shad in the Chesapeake Bay.	1980	Shad stocks have began in 1980. Sp estimated annual tailrace. Populati Bay are no longer commercial poun Criteria to reopen
		On-going	Limited hickory ε harvest is allowec net and gill net fi
		1982	PRFC has had a r harvest in Potoma
		On-going	DCFM implemen harvest within Di Potomac River.
		1998	CBAMP Amendr restoration criteri

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1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
		2013	No stock allocatio developed due to allocation will be deemed recovere
1.1.2 Virginia will follow ASMFC recommendations for a 25% exploitation rate for alosids [sic].	1.1.2 Virginia will utilize the Virginia Marine Resources Commission's Stock Assessment Program and the fishery surveys of the Virginia Institute of Marine Science to assess current Alosid [sic] exploitation is above the 25% rate, Virginia will take the appropriate steps to limit fishing effort.	1994  Continue  2010 On-going  2012 On-going	VA implemented American and hic  ASMFC allows a commercial bycat and Rappahannoc staked gill net fish for Native Ameri  PRFC adopted a r river herring for t  VA instituted a ri 2012 as specified
1.2 Maryland will recommend management of river herring on a system by system basis. Criterion for closing a system to river herring harvest will be based on juvenile indices from 1985 through 1989 and commercial harvests over the last 10 years. Maryland, Pennsylvania and Virginia will recommend that harvest from all systems slated for restoration be regulated or closed. Technical criterion will be submitted to ASMFC for reevaluation of the 0% exploitation rate for river herring in Maryland. In addition, Maryland will control the harvest of river herring by one or a combination of the following harvest limits; harvest season; areal closures; or gear restrictions. Virginia will use similar measures to control harvests of river herring, American shad and hickory shad.	1.2 River herring harvest will be controlled. Types of management actions which will be considered in the regulation of river herring are as follows: <u>Harvest</u> – Quotas would be a reasonable regulation if the size of the spawning stock in a given year was predictable <u>Seasons</u> – Setting a season during a segment of the “average” spawning period to regulate exploitation <u>Areal closures</u> – Restrict exploitation in those areas where the potential for harvest is greatest such as restricted portions of migratory routes or at migration barriers <u>Gear restrictions</u> – Restrict large-volume harvesting by pound nets and/or haul seines	On-going - 2012  2012 On-going  2012	No harvest restric herring until 2012  Commercial harv low market dema  MD and VA do n sustainable fisher recreational river were closed as of and river herring VA must include invoice.  PA prohibits the l Susquehanna Riv
1.3 Maryland will continue the moratorium on the fishery for hickory shad and consider opening a recreational fishery when the American shad stocks have recovered.	1.3 Management actions and strategies for American shad and hickory shad will not be separated due to the paucity of information available for hickory shad and by nature their similar life history.	On-going  1996 Continue	MD (1981) and E continue moratori monitoring result rebuilding in the l  Larval and juveni in the Chester, Pa Nanticoke rivers.

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1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
			considered restor discontinued. Onl in 2010, 2011 & 2012.
1.4 Pennsylvania will continue to prohibit the harvest of American shad in the Susquehanna River and its tributaries, and American and hickory shad in the Conowingo Reservoir while restoration efforts are in progress.	1.4 As restoration of alosids [sic] progresses over dams in the Susquehanna River, additional regulations in Pennsylvania will be promulgated to protect these species until a degree of restoration is achieved	On-going  Continue	PA prohibits the harvest of American shad in the Susquehanna River and its tributaries. The recreational catch limit at Conowingo Dam is 100 fish per day.
2.1 Maryland, Pennsylvania and Virginia will continue to participate in the ongoing ASMFC-coordinated coastal fishery stock identification and ocean landing studies of alosids [sic].	2.1 Maryland, Pennsylvania and Virginia will participate in the ongoing ASMFC alosid [sic] management program, both in Board and Scientific and Statistical Committee activities, with the goal of providing adequate protection to the component of the coastal stock which returns to the Chesapeake Bay to spawn.	On-going  1997  1999  2007    2012  2012	MD, VA, and PR shad management plans have been developed. ASMFC conducted stock identification studies in 1997. In 1999, ASMFC amended its plan adopted a strategy to reduce F <sub>30</sub> to 0.25. ASMFC amended its plan in 2007 to reduce shad total mortality to 0.25. The ASMFC has developed a stock assessment for American shad and Atlantic croaker. American shad and Atlantic croaker have been increased in ocean fisheries and bycatch mortality is estimated. The ASMFC Marine Fisheries Management Plan for 2012 river herring and Atlantic croaker has been released for public comment. The ASMFC has recommended expansion of the Atlantic croaker and mackerel trawl fishery.
2.2 Virginia will follow ASMFC recommendations to reduce shad harvest to a 25% exploitation rate.	2.2 A) Implement a coastal shad tagging program to determine which stocks are being exploited in the intercept fishery 2.2 B) Control the coastal intercept fishery through	1991-1992  1993	Results from the 1991-1992 coastal fishery stock assessment are year to year. ASMFC amended its plan in 1993 to reduce shad harvest to a 25% exploitation rate.



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1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
	a combination of gear restrictions, seasonal and area closures, and harvest limits	2005 On-going	coastal intercept f
	2.2 C) Continue to monitor and document its territorial sea intercept fishery for American shad	1993 2004 On-going	VA is required to harvest.
2.3.1 Virginia will follow ASMFC recommendations to reduce river herring harvest to a 25% exploitation rate.	2.3.1 Virginia will control river herring harvest during spawning migrations through gear restrictions and spawning area closures.	1992 On-going  2012 On-going	The harvest of riv number of reason habitat due to dar catch from the At squid/butterfish/!  Action 2.3.1 was 2012 moratorium
2.3.2 Maryland and Virginia will ensure that river herring by-catch in the foreign and domestic mackerel fisheries is minimized.	2.3.2 Maryland and Virginia will monitor river herring by-catch through the mid-Atlantic Fishery Management Council and support the following recommendations: a) The foreign fishery will stay 20 miles offshore.	In effect On-going	River herring byc Amendments 14 ; Mackerel/Squid/I review by NMFS  Northwest Atlant monitors internati States is no longe
	2.3.2 b) Maximum by-catch of 1% for river herring in the foreign and domestic mackerel fisheries with a cap on total allowable by-catch.	In effect On-going	River herring byc MAFMC, NEFM
	2.3.2 c) Intercept fisheries will be discouraged.	2011	The Mid-Atlantic (MAFMC) devel Atlantic mackerel river herring and reduction. This ar NMFS. Amendm identify river herr has developed Ar FMP with similar Monitoring and b trawl fisheries in
3.1 The jurisdictions will collect specific data on alosine species to improve stock assessment databases.	3.1 A) Maryland will continue the alosid [ <i>sic</i> ] juvenile survey and develop an index of stock abundance. Virginia will continue to collect shad and herring juvenile abundance data with the objective of developing a baywide index of abundance for these species. (Currently being implemented) The juvenile index will be used in	Continue	VIMS, MD DNR surveys and calcu
		2009	- The last several juvenile Alosines
		Continue	ASMFC Amendn surveys. VA & M

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1989 Chesapeake Bay Anadromous Fish Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
	conjunction with adult stock estimates to trigger regulatory changes and harvest rates.	2010 Discontinued	coastal stock asse  Preliminary stock were developed a Herring Stock Assessment. The effect of bycatch on stock change on the study. No trends were and there was insufficient data. The SAS decided indices.
		Pending	MD will implement monitoring program.
	3.1 B) Maryland will continue research projects for American shad in the upper Bay and Nanticoke River which provide annual estimates of adult shad. (Currently being implemented)	Continue Discontinued	Adult shad tagging was ended due to
		2009 Continue	ASMFC Amend spawning/population River commercial for the river herring assessment. The 1 survey will continue
		2011	
		2013	A fishery independent monitor river herring
	3.1 C) Virginia will improve assessment of current fishing rates on shad stocks in territorial waters and seek to improve catch and effort data through mandatory reporting. (1990)	1995 Continue	Commercial land coastwide basis w Shad are still caught
	3.1 D) The VMRC Stock Assessment Program will provide additional fishery dependent data collection for Virginia's shad fisheries (on-going)	On-going	Required by the /
	3.1 E) Virginia will initiate an ocean intercept tagging program to determine stock composition in the coastal shad fishery (1990)	1991-1992 Completed	Tagging work completed - Results indicate highly variable. - Other tagging work
	3.1 F) Maryland will examine the exploitation rates of alewife and blueback herring in selected tributaries of the Chesapeake Bay and improve the accuracy and utility of herring landings. (1990)	1990 On-going	Mortality rates at the Nanticoke River been a priority.
	3.1 G) Virginia will cooperate with research	1990	A map of historic

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1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
	institutes to implement a survey of selected shad and herring spawning grounds, compiling information on basic spawning stock characteristics including relative adult abundance, juvenile abundance, size, age and sex ratios. (Currently being implemented)	Completed	has been complet  Tributary-specific FMPC and ad hoc discuss how to ad No targets were a
		2009	CBSAC sponsore methodologies an approach.
		2009 on-going	ASMFC Amendn spawning/populat
	3.1 H) American shad abundance will be investigated in the Potomac River, a system of historic importance, through a joint effort by Maryland, Virginia, and District of Columbia. (1991)		MD striped bass j collect American
		1991 On-going	DCFM has been s shad and river hei
		2011	The juvenile surv are increasing in ; Juvenile shad ind to 13/3 (2004). TI abundance of juv and involves dens regulate year clas
		2011	The PRFC Ameri indicates that CPI of the ASMFC re
4.1 The Chesapeake Bay Program's Fish Passage Workgroup has analyzed the problem of impediments to Alosid [ <i>sic</i> ] migration and presented its recommendations for acceptance in December 1988. Maryland will develop a multi-faceted program based on the program's recommendations to restore spawning habitat to migratory fishes by removing blockages. Virginia, through its Anadromous Fish Restoration Committee, will develop a comprehensive inventory of dams and other impediments restricting the migration of the shad and river	4.1 The District of Columbia, Maryland, Pennsylvania and Virginia will implement the plan adopted by the Fish Passage Workgroup to remove barriers. Projects include:  A) Permanent fish passage facilities are being designed and will be constructed at Conowingo Dam at a cost of \$12.5 million. (1989)	Variable	Actions 4.1A - 4.1L are completed. / 4.1L are underwa
		Completed	Conowingo Dam
		2011	The last significai American shad pe

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1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
herring to their historical spawning grounds and establish fish passage facilities. The Pennsylvania Fish Commission (PFC) will continue to refine its inventory of low head dams through SRAFRFC and continue to promote fish passage at structures on the Susquehanna River tributaries having the potential for Alosid [ <i>sic</i> ] spawning and nursery habitat. Maryland, Virginia, District of Columbia, U.S. Fish and Wildlife Service and Corps of Engineers will continue its work for fish passage at Little Falls and Rock Creek.	4.1 B) Design planning and implementation of fishways at Holtwood, Safe Harbor and York Haven dams on the Susquehanna River. (In progress)	1986 Completed	Fishways have be improvements are boost fish passagi
		2010 Continue	Holtwood Dam fi improve upstream
		2012 Continue	York Haven Pow application to FE fishway.
		2012	Shad telemetry st behavior in tailra Connowingo, Ho
	4.1 C) A comprehensive inventory of dams and other impediments restricting the migration of shad and river herring to their historical spawning grounds has been completed. (1989)	1990	Action completed
		2011/2012 Completed	The Nature Cons NOAA, USFWS, completed a GIS Prioritization tool on ecologically re
	4.1 D) Removal of stream blockages, re-stocking efforts, and construction of fish ladders at sites of barriers on priority streams and rivers will begin. (1990)	Completed	1,838 miles of Cf reopened in PA, 1 from 1988 throug
		2009 Continue	The revised fish f steam opened by  Between 1986 an American shad fr and released in St

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1989 Chesapeake Bay Anadromous Fish Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
		<p align="center">2010 Continue</p> <p align="center">2011/2013</p> <p align="center">2013 Continue</p> <p align="center">2012 Continue</p>	<p>Mattaponi, Rappahannock rivers. Stocking began in 2003.</p> <p>Patuxent River herring stocking discontinued. Hickory the Choptank River stocking has been only stocked in the</p> <p>Additional wells installed at hatchery and existing with liners. Upgrade increased river herring</p> <p>Experimental stocking of shad, and river herring in 2013. The project in additional years could</p> <p>Possible removal of Appomattox River dam owner.</p> <p>Virginia dam removal <a href="http://www.dgif.virginia.gov">http://www.dgif.virginia.gov</a></p>
	<p>4.1 E) A demonstration fish ladder project has been developed with the Chesapeake Bay Foundation and the town of Elkton as an example with public access. (1989)</p>	<p align="center">Completed</p>	<p>Elkton dam fishway of herring and restoration to access 12 miles spawning, forage, documented over herring using the</p> <p>Town of Elkton closed the dam which increased erosion upstream. increased at the creek that has to be dredged number of herring significantly decreased corresponds with</p>

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1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
	4.1 F) A program to reduce turbine mortalities by implementing guidance and avoidance techniques, i.e., use of fish attraction or avoidance devices to guide shad away from turbines to "sluice gate". (1991)	2009-2013 Completed	decline of both shad and Exelon Generation Francis and Kaplan of the FERC relicensing No study of avoidance
	4.1 G) Fish passage facilities on the James and Rappahannock Rivers will be established. (Currently being implemented )	1999 Completed  2005 Completed	Vertical slot fishway on the James River, 10 miles Richmond. This project mainstem James River and tributaries.  Embrey Dam was closed River reopening 10 miles and Rapidan river
	4.1 H) The recently constructed passage facility on the Chickahominy River at Walker's Dam will be evaluated for its effectiveness. (1990)	1989 Completed	A double Denil fishway rebuilt in 1989 by allow passage of herring, alewife and documented using
	4.1 I) Fish passage facilities at Little Falls Dam on the Potomac River will restore about 10 miles of spawning habitat and at Rock Creek park will open an additional 5 miles of spawning habitat.	1992 - 2000 Completed	A hydraulic model of Dam fish passage effectiveness has
	4.1 In addition to the strategies detailed in the Fish Passage Plan, several aspects must be coordinated with the Fishery Management Plan:  J) Sources of adult fish used for restocking areas will be coordinated with other states and agencies. (1990)	Continue  Continue	Hatchery-rearing in VA, and PA strip hormone free. Juveniles  All American shad PA, and USFWS stocks larval, early to improve stock calculations for survival and abundance
	4.1 K) The reintroduction of alosid [sic] stocks will require specific regulatory measures to protect the newly-introduced fish until populations have been established.	Continue  2010	Moratorium in place shad. Hickory shad tributaries to determine  Juvenile downstream dams having Frerick Haven. Little Atlantic downstream passage

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1989 Chesapeake Bay Anadromous Fish Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
		2011	Moratorium is in
		2013	Allocation of sha stakeholders has l stocks are declare
	4.1 L) Monitoring is essential in gauging the impact of fish passage projects on restoration efforts.	1999 Continue	ASMFC Amendn fishway passage c herring.
		Continue	Boshers Dam ver passage each spri species are knowi
		Continue	Fishways are mor ladders are constr monitoring goal c considered. Fishv measure. Passage explored.
4.2 Restoration of shad and river herring to suitable unoccupied habitats will be accomplished by introducing hatchery-raised juveniles or transplanting gravid adults. Present policy fully supports the transplantation of adult shad using fish passage facilities at Conowingo Dam under the assumption of reasonable outmigration. However, if outmigration is not obtained, then the effects of transporting adults from the population below the dam needs to be reevaluated.	4.2.1) Maryland and Pennsylvania will continue to work within SRAFRFC's ongoing programs as described in the annual workplan to evaluate methods for ensuring successful downstream passage for juveniles and adults. This will include spill, diversion devices, and bypass systems.	Continue 2002 2010	SRAFRFC adoptec Restoration Plan in 2002. Restorati <a href="http://www.dec.nfcfinal.pdf">http://www.dec.nfcfinal.pdf</a> .
		2012	York Haven Pow application to FE fishway at York I
	4.2.2 A) Maryland, Pennsylvania, and Virginia working within SRAFRFC, will promote using Susquehanna River brood stock for hatchery production.	Discontinued 2002 Continue	Brood stock are n Susquehanna Riv American shad br Potomac River. 1 Potomac River br Potomac as mitig Susquehanna Riv hatcheries have h Funding is not av Population level i the wild stock [in





**DRAFT - DRAFT**

1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
	achieve a 40% reduction of nutrients entering the Chesapeake Bay by the year 2000. 1) Construct public and private sewage facilities. 2) Reduce the discharge of untreated or inadequately treated sewage. 3) Establish and enforce nutrient and conventional pollutant limitations in regulated discharges. 4) Reduce levels of nutrients and other conventional pollutants in runoff from agricultural and forested lands. 5) Reduce levels of nutrients and other conventional pollutants in urban runoff.	2009  2007  2009	<a href="http://www.chesapeakebay.net">http://www.chesapeakebay.net</a>  New commitment: Chesapeake 2000 priority population specific targets de  STAC sponsored develop restoratic  Executive Order required federal and leadership, co government, and  EPA is mandating for Chesapeake B - EPA developed TMDL. - States must have fines and other sa
	4.5 B) Develop and adopt a basinwide plan for the reduction and control of toxic materials entering the Chesapeake Bay system from point and nonpoint sources and from bottom sediments. 1) Reduce discharge of metals and organic compounds from sewage treatment plants receiving industrial wastewater. 2) Reduce the discharge of metals and organic compounds from industrial sources. 3) Reduce levels of metals and organic compounds in urban and agriculture runoff. 4) Reduce chlorine discharges to critical finfish areas.	On-going	Chesapeake Bay monitors goals and more information <a href="http://www.chesapeakebay.net/contaminants">http://www.chesapeakebay.net/contaminants</a>
	4.5 C) Develop and adopt a basinwide plan for the management of conventional pollutants entering the Chesapeake Bay from point and nonpoint sources. 1) Manage sewage sludge, dredge spoil and hazardous wastes. 2) Improve dissolved oxygen concentrations in the Chesapeake Bay through the reduction of nutrients	2011	Some Alosa spaw and gravel deficic MD DNR and US gravel transport a (Patapsco River) effects of accumu blockages.

**DRAFT - DRAFT**

1989 Chesapeake Bay Alosid Management Plan Implementation Table (updated 4/2013)

Strategy	Action	Date	
	from both point and nonpoint sources. 3) Continue study of the impacts of acidic conditions on water quality. 4) Manage groundwater to protect the water quality of the Chesapeake Bay. 5) Continue research to refine strategies to reduce point and nonpoint sources of nutrient, toxic and conventional pollutants in the Chesapeake Bay.	2008	MD DNR Fisheries spawning and habitat and water.
	4.5 D) Develop and adopt a plan for continued research and monitoring of the impacts and causes of acidic atmosphere deposition into the Chesapeake Bay. This plan is complimented by Maryland's research and monitoring program on the sources, effects, and control of acid deposition as defined by Natural Resources Article Title 3, Subtitle 3A, (Acid Deposition: Sections 3-3A-01 through 3-3A-04). 1) Determine the relative contributions to acidic deposition from various sources of acid deposition precursor emissions and identify any regional variability. 2) Assess the consequences of the environmental impacts of acid deposition on water quality. 3) Identify and evaluate the effectiveness and economic costs of technologies and non-control mitigative techniques that are feasible to control acid deposition into the Bay.	On-going	Chesapeake Bay monitors goals and more information <a href="http://www.chesapeakebay.net">http://www.chesapeakebay.net</a>

**Acronyms:**

ACCSP – Atlantic Coastal Cooperative Statistics Program  
 ASMFC – Atlantic States Marine Fisheries Commission  
 C2K – Chesapeake 2000 Agreement  
 CBP - Chesapeake Bay Program  
 CBSAC – Chesapeake Bay Stock Assessment Committee  
 DCFM – District of Columbia Fisheries Management  
 EBFMP – Ecosystem Based Fisheries Management  
 FERC – Federal Energy Regulatory Commission  
 FMP - Fishery Management Plan  
 FMPC – Fisheries Management Planning and Coordination  
 GIS – Geographic Information System  
 GM – Geometric Mean

JAI – Juvenile Abundance Index  
 MAFMC – Mid-Atlantic Fisheries Management Commission  
 MD DNR – Maryland Department of Natural Resources  
 PRFC – Potomac River Fisheries Commission  
 SRAFRC – Susquehanna River Anadromous Fishery Research Consortium  
 STAC - Chesapeake Bay Program, Scientific and Technical Advisory Committee  
 USACE – United States Army Corps of Engineers  
 VIMS – Virginia Institute of Marine Science  
 VMRC – Virginia Marine Resource Commission

**Background: Management Plan Development and Review Process**

Fishery management plans (FMPs) provide a framework for how a fishery resource will be managed based on a species life history, habitat, and fishery utilization over time. Maryland law (Nat. Res. Art. Sec. 4-215) contains a statutory mandate for the development of FMPs for a given list of species. Legislation enacted in 2010 expanded DNR's authority to prepare FMPs for additional fish species. DNR no longer needs to go to the legislature to justify adding new species to the list. FMPs can be prepared for species based on specific concerns about the status of a species and after consultation with the Tidal Fisheries Advisory Commission (TFAC) and the Sport Fisheries Advisory Commission (SFAC).

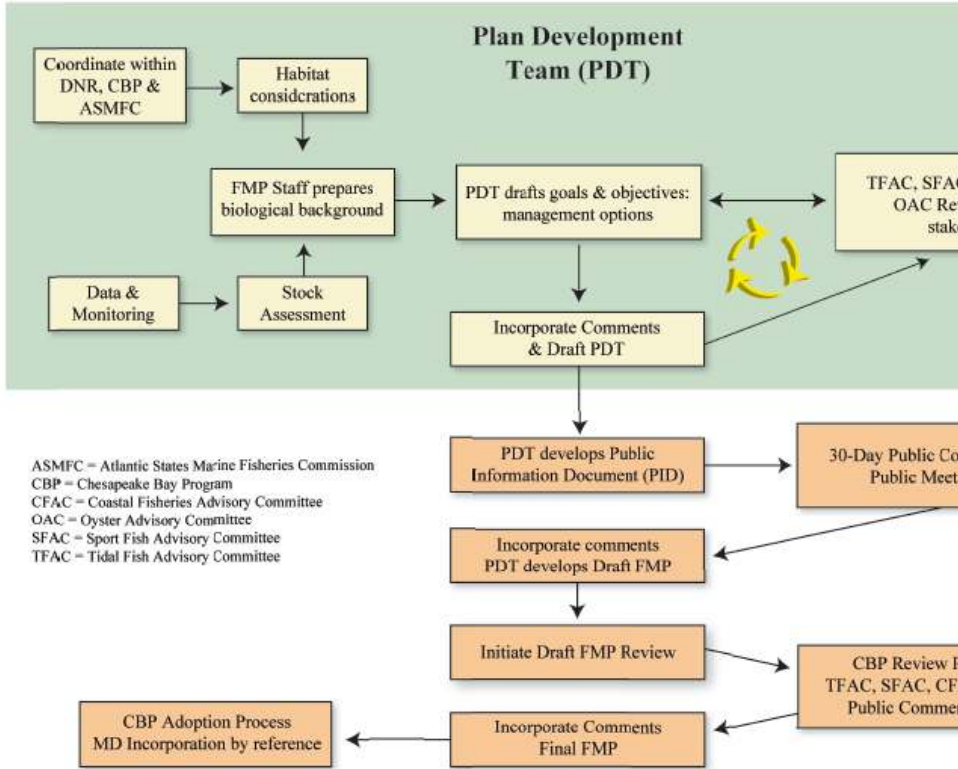
A Maryland Task Force on Fishery Management (Task Force) was convened in 2008 to review the current fishery management planning process and recommend improvements to the process that would increase stakeholder input and transparency during all stages of the fishery management plan (FMP) development and review process (see Addenda #1 and #2 for flowcharts of the FMP Development Process and the FMP Review Process).

FMP review begins with the designation of a Plan Review Team (PRT) by the Fisheries Service Director. The PRT evaluates the FMP goal, objectives, management strategies, and actions for their implementation status and applicability to current management needs. Depending on the particular species, the FMP review could also include the Chesapeake Bay Program and/or coordination with the ASMFC. After reviewing the components of the FMP and providing comments on the status of the management actions, the PRT recommends one of three pathways: 1) continue implementing the plan; 2) develop an amendment to significantly change or add to the FMP; or 3) develop a new FMP to change the overall management framework. The PRT drafts a FMP review report for review by the Fisheries Service (FS) Senior Management Team. The draft is also sent to the TFAC and SFAC for their review and input. The final, revised FMP review report is submitted to the Fisheries Service Director who makes the final decision regarding which of the three options to pursue: status quo, amendment, or revision.

In 2008, the Maryland Task Force on Fishery Management (Task Force) emphasized the need for ecosystem-based management for all state managed fish species, including ASMFC managed species such as striped bass. The Task Force recommended MDNR continue research on the influence of

habitat on fish populations, factors that impair the environmental review process, updating the management framework, and outreach to other Chesapeake Bay jurisdictions continue to evaluate based management tools that will supplement currently in use. Ecosystem-based tools will include assessment, and socioeconomic issues.

# Fishery Management Plan (FMP) Development Process



# Fishery Management Plan (FMP) Review Process

