

Atlantic States Marine Fisheries Commission

**ADDENDUM IV TO AMENDMENT 6
TO THE ATLANTIC STRIPED BASS
INTERSTATE FISHERY MANAGEMENT PLAN**



Approved October 2014

*ASMFC Vision:
Sustainably Managing Atlantic Coastal Fisheries*

1.0 Introduction

Atlantic striped bass are managed through the Atlantic States Marine Fisheries Commission (ASMFC) in state waters (0-3 miles) and through NOAA Fisheries in federal waters (3-200 miles). The management unit includes the coastal migratory stock between Maine and North Carolina. With approval of this Addendum in October 2014, Atlantic striped bass are currently managed under Amendment 6 (2003) to the Fishery Management Plan (FMP) and Addenda I–IV.

At its October 2013 meeting, the Atlantic Striped Bass Management Board (Board) approved the following two motions:

Move to develop an addendum to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points (fishing mortality) for the Chesapeake Bay and Albemarle/Roanoke stocks.

Move to initiate an addendum to develop a range of management measures that reduces fishing mortality to at least the fishing mortality target with implementation in January 2015.

At its February 2014 meeting, the Board combined the two addenda into one document. As a result, Draft Addendum IV proposed changes to the biological reference points and contained management options to reduce fishing mortality to a level that is at or below the target within one year (implementation in January 2015).

At its May 2014 meeting, the Board continued the development of Draft Addendum IV by adding consideration of a three year timeframe to reduce fishing mortality (F) to a level at or below the target as well as management options associated with the three year timeframe. The intent of adding the three year timeframe was to reduce potential social and economic impacts by spreading out the harvest reductions over time while maintaining a January 2015 implementation date.

The Board approved Addendum IV in October 2014. The Addendum establishes new F reference points, as recommended by the 2013 benchmark stock assessment. In order to reduce F to a level at or below the new target, coastal states will implement a 25% harvest reduction from 2013 levels. Chesapeake Bay states/jurisdictions will implement a 20.5% harvest reduction from 2012 levels since their fisheries were reduced by 14% in 2013 based on their management program. All states/jurisdictions will promulgate regulations prior to the start of their 2015 fisheries.

2.0 Overview

2.1 Statement of the Problem

The 2013 benchmark stock assessment, which was approved by the Board for management use, recommended changes to the F reference points to be consistent with the spawning stock biomass (SSB) reference points. An addendum to the FMP is required to implement new reference points for management use. Results of the benchmark stock assessment also showed F in the terminal year (2012) was above the new F target, and SSB has been steadily declining below the target since 2006 (Figures 2 and 3). This indicates that even though the stock is not overfished and overfishing is not occurring, SSB is approaching its overfished threshold and stock projections show SSB will likely fall below the threshold in the coming years. In addition,

a similar downtrend has been observed in total harvest with approximately a 19% decrease since 2008. In response to these concerns, Addendum IV contains management measures which are aimed at reducing F to a level at or below the target beginning in 2015. Addendum IV measures address several objectives including conservation of the strong 2011 year class and conservation of spawning fish to enhance the long-term sustainability of the striped bass resource and the fisheries that it supports.

2.2 Background

2.2.1 Biological Reference Points for Striped Bass

Biological reference points are used in fisheries management as a measure of stock status and as a reference to evaluate management plan effectiveness. There are two biological reference points used in striped bass management. The first is based on F, with a threshold value set at maximum sustainable yield (MSY). Managing a population at MSY allows the largest average catch to be taken from a stock without negatively impacting the ability of the stock to replace itself. The second reference point is based on SSB, with a threshold value equal to the SSB value in 1995; the year the striped bass stock was declared rebuilt. These threshold levels are used to determine when the stock is experiencing overfishing or is overfished, respectively. Target levels for F and SSB provide additional performance metrics. The current F target provides a buffer to account for the uncertainty in the estimate of F_{MSY} threshold, while the SSB target corresponds to 125% of the SSB threshold.

The 1995 SSB level has proven to be a useful reference point for striped bass; however, even though SSB_{1995} is a proxy for SSB_{MSY} , they are not the same. In other words, fishing at F_{MSY} does not maintain SSB at the 1995 level. Furthermore, F has always been maintained below current F target, yet SSB continues to decline towards its threshold (Figure 2). To address this issue, the 2013 benchmark stock assessment recommended new F reference points that would maintain SSB at or above its 1995 level. The new method resulted in a F threshold of 0.22, corresponding to the SSB threshold of 127 million pounds (57,626 mt), as well as a F target of 0.18, corresponding to the SSB target of 159 million pounds (72,032 mt). These SSB target and threshold levels are still based on the SSB value in 1995, as estimated by the 2013 benchmark stock assessment.

2.2.2 Chesapeake Bay and Albemarle Sound/Roanoke River Management Areas

Separate F reference points for the Chesapeake Bay and Albemarle Sound/Roanoke River were established through conservation equivalency in Amendment 5 to compensate for the smaller minimum size limit granted to both of these management areas. Establishing a lower F target was intended to enable these management areas to harvest smaller fish without increasing the effects of harvest on the spawning stock.

To ensure the F in the Chesapeake Bay does not exceed the target, the Bay uses a harvest control model to set an annual Bay-wide quota. This quota is for both recreational and commercial fisheries for the Bay portions of Maryland, Virginia and the Potomac River Fisheries Commission. Use of the harvest control model enables flexibility that allows for the annual Bay-wide quota to increase or decrease as the exploitable stock biomass increases or decreases. Although the Chesapeake Bay stock has a different management program, it is still a major contributor to the coastal migratory stock and is therefore included in the coastwide assessment and not assessed as an independent stock.

The Albemarle Sound/ Roanoke River stock differs in that it contributes minimally to the coastal migratory stock. Additionally, the Albemarle Sound/Roanoke River stock is smaller in total abundance relative to the other producer areas and does not participate in the coastal migration until older ages. The female maturation schedule for the Albemarle Sound/Roanoke River stock is also different than the Chesapeake Bay stock (ASMFC 2013; NCDMF 2014). As a result, the Albemarle Sound/Roanoke River stock is not included in the coastwide assessment and is instead assessed independently by the State of North Carolina. This enables the development of Albemarle Sound/Roanoke River stock-specific reference points for both F and SSB.

Since new reference points for the coastal migratory stock were recommended in the 2013 benchmark stock assessment, the Board also considered adjusting the Chesapeake Bay and Albemarle Sound/Roanoke River management as well.

2.2.3 Ecosystem Considerations

When fishery management changes are being contemplated, food web relationships should be considered. The implementation of Amendment 6 in 2004 has maintained an F below the F_{TARGET} of 0.3. The success of Amendment 6 allowed the striped bass stock to expand beyond the SSB target during this time period. However, the 2013 benchmark stock assessment indicates that SSB levels have decreased significantly in recent years. The impacts of biomass levels of predator species on prey species should be considered as the Commission moves toward ecosystem management. Striped bass are predators of other Commission-managed species, including weakfish, shad and river herring. As the striped bass population grows the demand on prey species also increases. The increased demand on prey species may have impacts on those species undergoing rebuilding plans (Hartman 2003). Addendum IV's goal of reducing F to target levels may impact predation on other Commission-managed species.

2.3 Description of the Fishery

Striped bass have formed the basis of one of the most important fisheries on the Atlantic coast for centuries. However, overfishing and poor environmental conditions led to the collapse of the fishery in the 1980s and a moratorium on harvest from 1985 to 1989. Through the hardship and dedication of both commercial and recreational fisherman, the stock was rebuilt and continues to support fishing opportunities along the Atlantic coast.

2.3.1. Commercial Fishery Status

Total and state-specific commercial harvests of striped bass have varied little from year-to-year because of a quota management system that was continued through Amendment 6 in 2004 (refer to Appendix 1 for jurisdiction specific regulations). The total coastal commercial harvest from 2003 to 2013 ranged between 2.53 and 3.15 million pounds (Table 1) and averaged 2.87 million pounds. Massachusetts and New York land on average 65% of the total coastal quota. The average commercial harvest since 2003 (2.87 million pounds) is approximately a 19% underage from the allocated coastal quota in Amendment 6 after accounting for conservation equivalency programs. The coastal quota underage is mainly attributed to game fish status in several states. Additionally, in recent years migratory striped bass have not been available to the ocean fishery in North Carolina, resulting in minimal harvest.

Commercial harvest in the Chesapeake Bay from 2003 to 2013 ranged between 3.29 and 4.40 million pounds and averaged 4.06 million pounds (Table 2). Chesapeake Bay commercial

harvest has continued to decline since 2009 because the Bay's quota management program is adjusted based on changes in exploitable stock biomass. The Chesapeake Bay quota has historically been split among the three Bay jurisdictions based on their percent contribution to the 1994 catch as follows, Maryland = 52.359%, Potomac River Fisheries Commission = 15.226%, and Virginia = 32.414%.

Within the Albemarle Sound/Roanoke River management area, commercial harvest (Albemarle Sound only) from 2003 to 2013 ranged from 68,214 to 273,636 pounds and averaged 165,504 pounds (Table 2).

In total, the commercial fishery harvested an estimated 5.82 million pounds in 2013, which is lower than 2012 harvest (6.51 million pounds) and also lower than the 2003-2012 average harvest of 7.05 million pounds (Figure 1).

2.3.2 Recreational Fishery Status

The recreational fishery is currently managed with bag and size limits (refer to Appendix 1 for jurisdiction specific regulations). From 2003 to 2013, total coastal recreational harvest has ranged from a high of 31 million pounds in 2006 to a low of 19.2 million pounds in 2012, with an average of 26.4 million pounds (Figure 1; Table 4). Landings from New York (25%), Massachusetts (19%), New Jersey (19%), and Maryland (11%) have comprised approximately 74% of annual recreational landings since 2003. The number of fish released alive increased annually after the passage of Amendment 6 to a high of 23.3 million fish in 2006. Since then, the number of fish released alive has decreased by 77% to a low of 5.2 million fish in 2012. Reasons for the decline may be attributed to a reduction in stock size from the peak in 2003, a decreased availability of fish staying in nearshore areas, and changes in angler behavior in response to socioeconomic factors.

Between 2003 and 2013, recreational harvest in the Chesapeake Bay has ranged from a high of 5.5 million pounds in 2005 to a low of 2.4 million pounds in 2012 with an average of 3.9 million pounds. The Albemarle Sound/Roanoke River recreational quota is set at 275,000 pounds and is divided between the two management areas equally. The average combined harvest in the Albemarle Sound/Roanoke River from 2003 through 2013 was 111,598 pounds, less than half the allowable quota (Table 3).

2.3.3 Management History

Since Amendment 4 in 1990, the foundation of the striped bass management program has been to maintain harvest below a target F. Amendment 6 modified the F target and threshold, and also introduced a new set of biological reference points based on female SSB in 1995 (as described earlier). On a regular basis, SSB and F are estimated and compared to target and threshold levels. These reference points, as well as new management triggers, have enabled the Board to be more responsive to changes in the stock.

Amendment 6 also phased in new regulations for both the commercial and recreational fisheries. In 2004, the coastal commercial quotas for striped bass were restored to the states' historical average landings during the 1972 to 1979 base period, a 43% increase from the 2002 coastal commercial quotas. For the recreational fisheries, all states were required to implement a two fish bag limit with a minimum size limit of 28 inches, except for the Chesapeake Bay and Albemarle Sound/Roanoke River management areas and states with approved conservation

equivalency proposals. Addendum III (August 2012) outlined measures to address illegal harvest of striped bass. States and jurisdictions are required to implement a tagging program for all commercially harvested striped bass within state or jurisdictional waters to better track harvest and minimize poaching.

Federal waters, also known as the exclusive economic zone (EEZ) has been closed to the harvest, possession and targeting of striped bass since 1990, with the exception of a defined route to and from Block Island in Rhode Island. A recommendation was made in Amendment 6 to re-open federal waters to commercial and recreational fisheries. However, NOAA Fisheries concluded opening the EEZ to striped bass fishing was not warranted at that time.

2.4 Status of the Stock

In 2012, the Atlantic striped bass stock was not overfished or experiencing overfishing relative to the newly adopted reference points. Female SSB was estimated at 128 million pounds (58,238 mt) just above the SSB threshold of 127 million pounds (57,626 mt), and below the SSB target of 159 million pounds (72,032 mt; Figure 2). Total F was estimated at 0.20, below the F threshold of 0.22 but above the F target of 0.18 (Figure 3).

Recruitment

Striped bass experienced several years of strong recruitment of age-1 fish entering the population from 1993 to 2004, followed by a period of lower recruitment from 2005-2010 (although not as low as the early 1980s, when the stock was overfished). Since the stock was declared recovered in 1995 the recruitment failure trigger (any state's juvenile abundance index value below 75% of all other values in their dataset for three years in a row) has not been met. The 2011 year-class (age-1 fish in 2012) was strong (i.e., abundant; Figure 2); however, overall the 2012 year-class (age-1 fish in 2013) was below average (i.e., low abundance). The 2013 juvenile abundance index was above average for Maine and Virginia, below average for New Jersey and Maryland, and below the 75% quartile for New York and North Carolina.

2.5 Fishing Mortality Reference Points

This section replaces Section 2.5.1 in Amendment 6.

Fishing mortality based reference points are designed to manage the rate at which individual striped bass die because of fishing. If the current F exceeds the F threshold, then overfishing is occurring. This means the rate at which striped bass are dying because of fishing (i.e., harvest and dead discards) exceeds the stock's ability to maintain itself at SSB threshold. The value of the F target is set at a cautionary level intended to safeguard the fishery from reaching the overfishing threshold. The F target and threshold may change through updated stock assessments because these reference point values are estimated based on the best available data.

This section identifies F reference points for the (1) coastwide population, which includes the Chesapeake Bay, Hudson River and Delaware River/Bay as a metapopulation, and (2) Albemarle Sound/Roanoke River Stock, while additional work is being conducted for standalone Chesapeake Bay reference points for future Board consideration. Separate F targets for the Chesapeake Bay and Albemarle Sound/Roanoke River were previously established in Amendment 5 to compensate for the smaller minimum size limit granted to both of these management areas.

2.5.1 Coastwide Population F Reference Points

The table below identifies the current fishing mortality reference points as adopted through this addendum.

Reference Point	Definition	Value (as estimated in 2013 benchmark stock assessment)*
$F_{\text{THRESHOLD}}$	F associated with achieving the SSB threshold	0.22
F_{TARGET}	F associated with achieving the SSB target	0.18

* The F target and threshold values may change through updated stock assessments because they are estimated based on the best available data.

The above reference points are consistent with those accepted in the Striped Bass 2013 Benchmark Assessment and Peer Review (SARC 57). The F target and threshold values will be revised as necessary when stock assessment updates are completed because they are estimated on the best available data.

2.5.2 Chesapeake Bay Stock F Reference Points

Due to data and model limitations which hindered the Technical Committee from developing Chesapeake Bay stock-specific reference points, the Chesapeake Bay stock will be managed under the coastwide F reference points. While the coastwide reference points include the effects of the Chesapeake Bay's harvest of smaller fish on the coastwide SSB they do not incorporate data on the sex ratio that exists in the Bay (i.e., data suggest harvest is comprised of a greater proportion of males than females). The Technical Committee will continue to work on developing Chesapeake Bay reference points to be considered by the Board for future management use as directed by the Board.

2.5.3 Albemarle Sound/Roanoke River Stock F Reference Points

The State of North Carolina will manage the Albemarle Sound/Roanoke River stock using reference points from the latest North Carolina Albemarle Sound/Roanoke River stock assessment accepted by the Technical Committee and approved for management use by the Board. The recreational and commercial fisheries in the Albemarle Sound and Roanoke River will operate under North Carolina's Fishery Management Plan while the recreational and commercial fisheries in the Atlantic Ocean will continue to operate under the Commission's management measures as the rest of the coastal fisheries.

2.6 Timeline to Reduce F to the Target

The Board did not change the management triggers established in Amendment 6; however, because of the unique characteristics of the Chesapeake Bay fishery it elected to establish a suite of measures that are projected to achieve the F target (section 2.5.1) in 2016. Prior to the start of the 2015 fishing season, all jurisdictions are required to implement regulations to achieve the current F target by implementing a 25% harvest reduction in the coastal fisheries and a 20.5% harvest reduction in the Chesapeake Bay fisheries.

It is important to note that the reductions established through this addendum will mitigate, but not immediately reverse the current decline in SSB. The measures will provide additional

protection to the strong 2011 year class which will become part of the spawning stock in 2016-2017, and result in an increase in SSB.

3.0 Management Program

The coastal area can be defined as the entire management unit (i.e., all coastal and estuarine areas of all states and jurisdictions from Maine through North Carolina) excluding the Chesapeake Bay and Albemarle Sound/Roanoke River management areas. Amendment 6 (Section 4.6) allows for states to submit alternative regulations that are conservationally-equivalent to regulations approved in this document for Board review and approval. Additionally, states may voluntarily implement management programs that are more conservative than those required herein.

3.1 Recreational Fishery Management Measures

Recreational fisheries will be constrained by minimum size limits and bag limits. Jurisdictions may use additional regulations to ensure the target fishing mortality rate is not exceeded (i.e., fishing seasons or harvest caps). If a jurisdiction uses harvest caps in its recreational fishery, any amount over the cap shall be subtracted from the following year's recreational quota.

This section replaces Section 4.2.1 in Amendment 6.

Coastal Recreational Fishery

All coastal jurisdictions (excluding Chesapeake Bay and the Albemarle Sound/Roanoke River) will be constrained by a one fish bag limit and 28-inch minimum size limit. Any coastal jurisdiction submitting a proposal for conservation equivalency must demonstrate through quantitative analysis that its proposal achieves at least a 25% reduction in harvest (including estimated dead discards) from its coastal recreational fishery. All conservation equivalency proposals are subject to Technical Committee review and Board approval.

Note: the Chesapeake Bay spring trophy fishery is part of the coastal fishery for management purposes.

Chesapeake Bay Management Area Recreational Fishery (Maryland, Potomac River Fisheries Commission and Virginia)

The Chesapeake Bay jurisdictions will submit a management program that achieves at least a 20.5% reduction from 2012 harvest (including estimated dead discards) in the Chesapeake Bay recreational fishery for Technical Committee review and Board approval.

The Chesapeake Bay fisheries reductions were based on 2012 harvest because the Bay-wide quota had already been reduced by 14% in 2013, in keeping with the Bay commitment to raise or lower quotas, with definitive changes in the exploitable stock biomass as approved by the FMP. The commercial Chesapeake Bay fisheries' quota reduction meant harvesters were provided 14% less tags or pounds of harvestable quota in 2013, as compared to 2012 and the 2013 recreational summer and fall quotas were reduced by 14% compared to 2012.

Albemarle Sound/Roanoke River Management Area Recreational Fishery

The State of North Carolina will manage the recreational striped bass fisheries in the Albemarle Sound and Roanoke River based on target F and SSB reference points from the latest North

Carolina stock assessment accepted by the Technical Committee and approved for management use by the Board.

3.2 Commercial Fishery Management Measures

This section replaces Section 4.3 in Amendment 6.

Addendum IV continues the use of a state-by-state quotas and minimum size limits to regulate the Atlantic striped bass commercial fisheries. In the event that a state/jurisdiction exceeds its quota, the amount in excess of its annual quota will be deducted from the state’s allowable quota in the following year.

Coastal Commercial Fishery

This section replaces Section 4.3.2 in Amendment 6.

The table below indicates each states commercial quota in pounds. These quotas reflect a 25% reduction from the previous Amendment 6 quotas.

State	Quota (Pounds of fish)
Maine*	188
New Hampshire*	4,313
Massachusetts	869,813
Rhode Island	182,719
Connecticut**	17,813
New York	795,795
New Jersey**	241,313
Delaware	145,085
Maryland	98,670
Virginia	138,640
North Carolina	360,360
Coastal Total	2,854,706

* Commercial harvest/sale prohibited, with No re-allocation of quota to the recreational fishery.

** Commercial harvest/sale prohibited, with re-allocation of quota to the recreational fishery.

Chesapeake Bay Management Area Commercial Fishery (Maryland, Potomac River Fisheries Commission and Virginia)

The Chesapeake Bay jurisdictions will submit a management program that achieves at least a 20.5% reduction from 2012 harvest in the Chesapeake Bay commercial fishery for Technical Committee review and Board approval. A 20.5% reduction from 2012 harvest results in a Chesapeake Bay commercial quota of 3,120,247 pounds.

Albemarle Sound/Roanoke River Management Area Commercial Fishery

The State of North Carolina will manage the commercial striped bass fishery in the Albemarle Sound based on target F and SSB reference points from the latest North Carolina stock assessment accepted by the Technical Committee and approved for management use by the Board.

3.3 Commercial Quota Transfers

Consistent with Amendment 6 commercial quota transfers are not permitted.

3.4 Commercial Size Limits

This section replaces Section 4.3.1 in Amendment 6.

All areas will maintain their 2013 minimum size limits for the commercial fishery, including the Chesapeake Bay (18 inch minimum), Albemarle Sound (18 inch minimum) and the Delaware Bay shad gillnet fishery for Delaware (20 inch minimum).

4.0 Compliance Schedule

Addendum IV is effective January 1, 2015. States must implement Addendum IV according to the following schedule to be in compliance with the Atlantic Striped Bass Amendment 6:

December 1, 2014: States submit proposals to meet requirements of Addendum IV.

February 5, 2015: Management Board reviews and takes action on state proposals.

States are required to implement regulations prior to their 2015 fishing seasons.

5.0 Literature Cited

ASMFC. 2003. Amendment 6 to the Interstate Fishery Management Plan for Atlantic Striped Bass. Washington (DC): ASMFC. Fisheries Management Report No. 41. 63 p.

ASMFC. 2013. Update of the Striped Bass Stock Assessment using Final 2012 Data. A report prepared by the Atlantic Striped Bass Technical Committee. 74 p.

Hartman, K.J. 2003. Population-level consumption by Atlantic coastal striped bass and the influence of population recovery upon prey communities. *Fisheries Management and Ecology* 10:281-290.

North Carolina Division of Marine Fisheries. 2014. Stock Status of Albemarle Sound-Roanoke River Striped Bass. N.C. Department of Environment and Natural Resources, Division of Marine Fisheries, Moorhead City, N.C. 210p.

6.0 Tables

Table 1. Coastal commercial harvest of Atlantic striped bass by state in pounds (2003-2013).

Year	MA	RI	CT*	NY	NJ*	DE	MD+	VA+	NC**	Total Harvest
2003	1,055,439	246,312		753,261	121,410	188,419	98,149	159,786	434,369	3,057,145
2004	1,206,305	245,204		741,668	81,870	181,974	115,453	160,301	421,645	3,154,420
2005	1,104,737	242,303		689,821	29,866	173,815	46,871	184,734	454,521	2,926,668
2006	1,312,168	238,797		688,446	23,656	185,987	91,093	194,934	352,036	3,087,117
2007	1,040,328	240,627		729,743	13,615	188,668	96,301	165,587	424,723	2,899,592
2008	1,160,122	245,988		653,100	7,345	188,719	118,005	164,400	299,162	2,836,841
2009	1,138,291	234,368		789,891	10,330	192,311	127,327	140,420	189,995	2,822,933
2010	1,224,356	249,520		782,402	12,833	185,410	44,802	116,338	272,632	2,888,293
2011	1,163,865	228,163		854,731	16,332	188,620	21,401	158,811	242,600	2,874,523
2012†	1,219,665	239,913	1,062	681,399	6,285	194,324	77,551	170,788	6,226	2,597,213
2013	1,002,519	231,280	1,479	823,801	6,096	191,424	93,532	182,427	-	2,532,558

* NJ and CT values reflect striped bass harvested recreationally via the Bonus Fish Program

** NC values represent harvest during the December 1-November 30 fishing year

+MD, VA and NC harvest from ocean only. Does not include Chesapeake Bay or Albemarle Sound/Roanoke River.

†The impacts of hurricane Sandy may have caused lower harvest in 2012 in some states.

Table 2. Total (commercial and recreational) Chesapeake Bay harvest in pounds (2003-2013).

Year	Commercial	Recreational	Total Harvest	Quota
2003	4,169,585	5,335,278	9,504,863	10,500,000
2004	4,156,977	4,277,549	8,434,526	8,417,000
2005	4,102,804	5,484,312	9,587,116	9,285,588
2006	4,008,349	4,859,593	8,867,942	9,590,238
2007	4,206,503	4,228,977	8,435,480	9,590,238
2008	4,369,971	3,539,541	7,909,512	10,132,844
2009	4,403,215	4,065,721	8,468,936	10,132,844
2010	4,092,654	3,173,290	7,265,944	9,489,794
2011	3,925,048	2,914,653	6,839,701	8,825,510
2012	3,924,839	2,400,987	6,325,826	8,825,510
2013	3,293,337	2,667,886	5,961,223	7,589,937

Table 3. Albemarle Sound / Roanoke River annual quota* and harvest in pounds (2003 – 2013).

Year	Commercial		Recreational	
	Quota	Harvest	Quota	Harvest
2003	275,000	266,555	275,000	90,964
2004	275,000	273,636	275,000	187,288
2005	275,000	232,693	275,000	171,007
2006	275,000	186,399	275,000	120,518
2007	275,000	171,683	275,000	89,125
2008	275,000	74,921	275,000	64,353
2009	275,000	96,134	275,000	106,894
2010	275,000	199,829	275,000	83,507
2011	275,000	134,538	275,000	114,097
2012	275,000	115,940	275,000	159,727
2013	275,000	68,214	275,000	40,094

* Quota is allocated 25% for the Roanoke River recreational fishery, 25% for the Albemarle Sound recreational fishery, and 50% for the Albemarle Sound commercial fishery

Table 4. Total coastwide recreational harvest of Atlantic striped bass by state in pounds (2003-2013).

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
2003	253,910	281,549	5,120,554	1,502,455	1,537,899	4,687,685	4,545,515	303,909	2,975,437	2,789,745	772,981	24,771,639
2004	226,200	98,995	6,112,746	1,386,138	1,617,561	3,727,105	5,548,167	330,623	2,347,752	2,956,310	4,833,112	29,184,709
2005	381,058	281,114	5,097,821	1,732,581	2,173,638	5,537,432	5,958,454	286,777	4,612,417	1,996,840	2,164,859	30,222,991
2006	323,355	179,181	4,832,355	999,300	2,030,878	6,028,409	7,067,533	260,134	3,868,944	3,694,529	1,759,796	31,044,414
2007	232,328	68,142	5,136,580	1,584,354	1,468,499	7,913,817	3,718,451	99,800	3,504,041	2,392,258	876,707	26,994,977
2008	271,768	73,807	5,763,763	751,507	1,868,335	10,925,408	4,696,090	333,149	2,728,048	2,657,976	525,891	30,595,742
2009	329,064	113,705	4,786,895	1,123,434	835,970	5,004,604	4,238,319	275,410	4,278,145	1,791,058	160,922	22,937,526
2010	104,117	67,409	4,270,401	1,096,369	1,259,008	6,997,089	5,382,743	251,853	2,630,802	481,147	453,844	22,994,782
2011	91,705	370,798	3,504,522	1,257,302	758,216	8,969,762	6,197,026	241,149	2,640,309	1,160,914	2,042,981	27,234,684
2012†	57,509	163,804	5,489,928	851,460	814,310	6,540,024	2,376,866	360,106	1,260,490	1,353,351	-	19,267,848
2013	103,106	227,447	4,828,109	3,076,814	2,129,160	6,749,587	4,643,220	248,183	2,377,734	478,750	70,798	24,932,908

Notes: The 2003 to 2006 values for Virginia do not include Technical Committee estimates of wave 1 harvest. The 2013 values do not include Technical Committee estimates of wave 1 harvest and are preliminary. †The impacts of hurricane Sandy may have caused lower harvest in 2012 in some states.

7.0 Figures

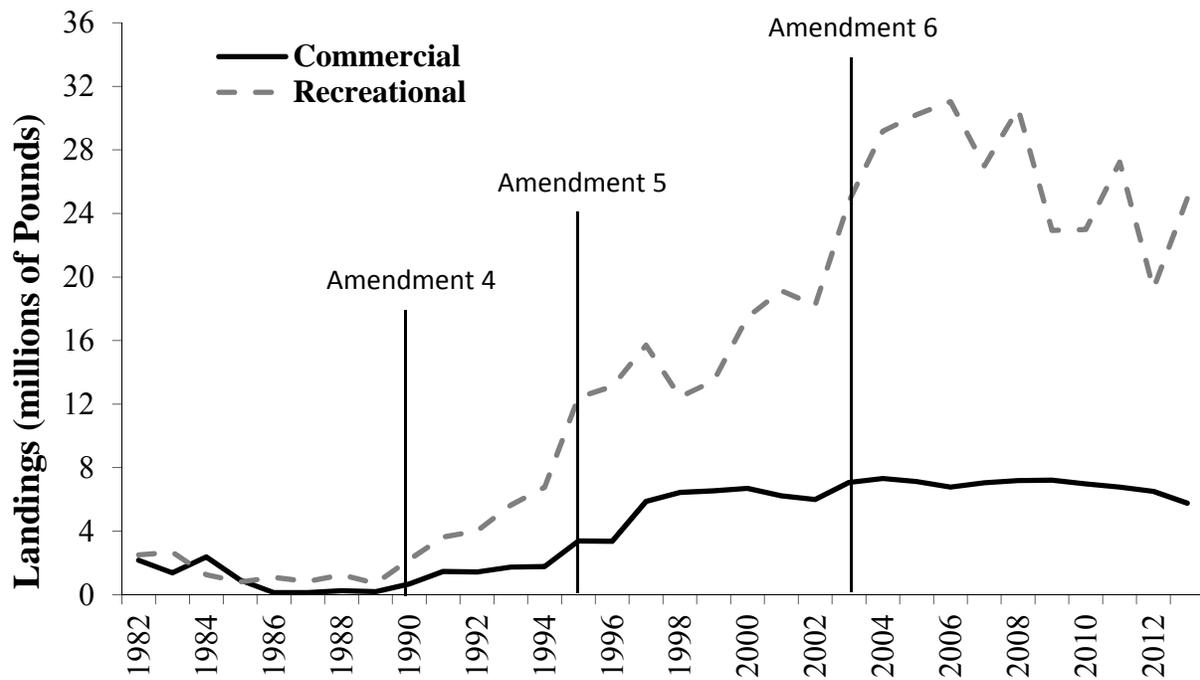


Figure 1. Annual migratory striped bass landings (in pounds) from coastal and Chesapeake Bay fisheries, 1982 – 2013.

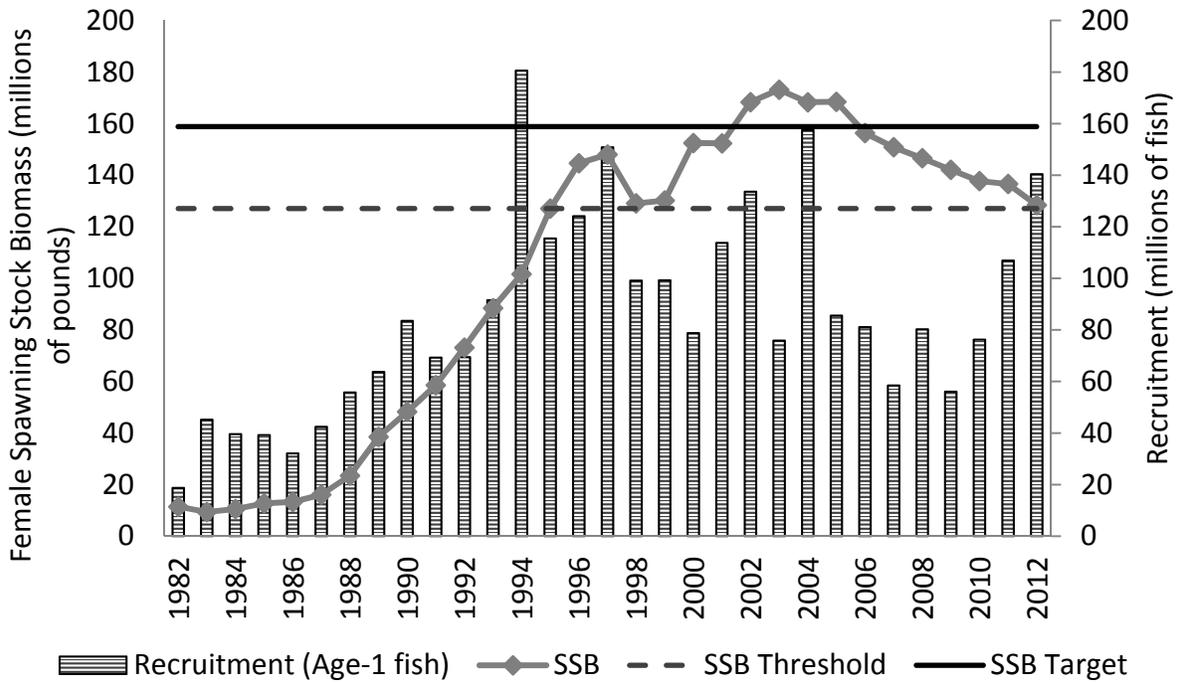
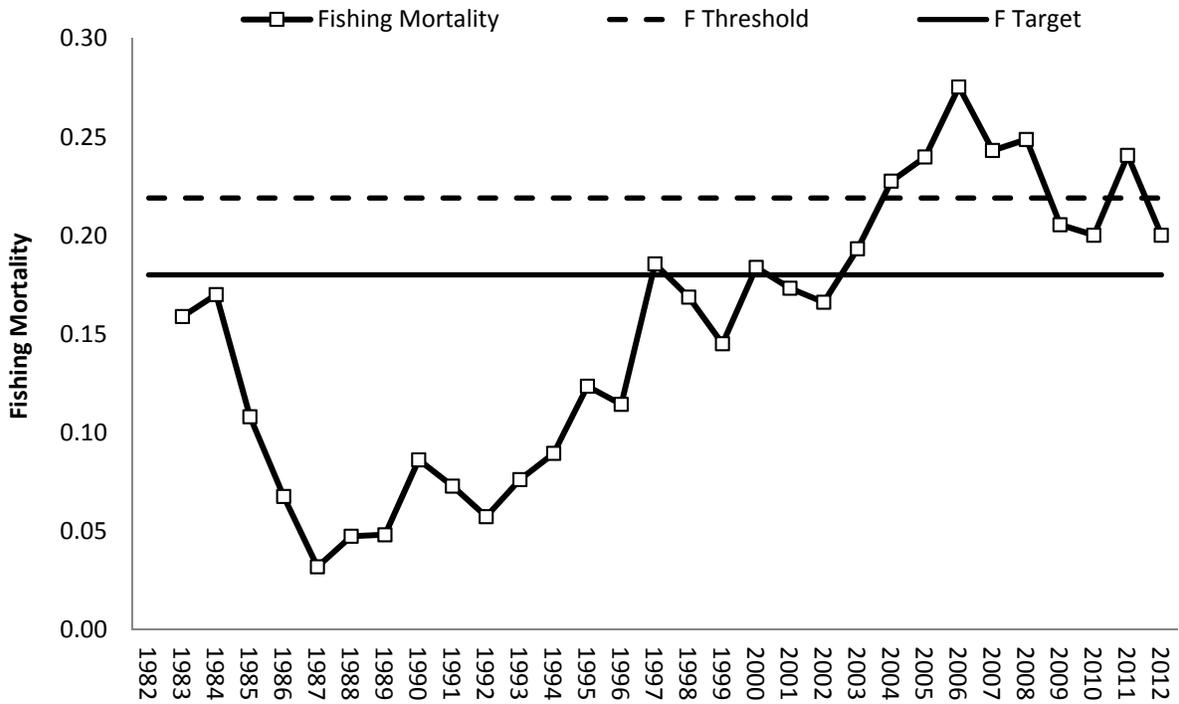


Figure 2. Atlantic striped bass female spawning stock biomass and recruitment (age-1) from 1982 to 2012.



* The F estimate for 1982 was considered unrealistic and unreasonable high, and is not shown on this graph.

Figure 3. Atlantic striped bass fishing mortality rates relative to the $F_{\text{threshold}}$ and F_{target} from 1982 to 2012.

Appendix 1

Summary of Atlantic Striped Bass Commercial Regulations in 2013

STATE	SIZE LIMITS	SEASONAL QUOTA	OPEN SEASON
ME	Commercial fishing prohibited		
NH	Commercial fishing prohibited		
MA	34" min.	1,159,750 lb. (minus any overage from previous year) Hook & line only	7.12 until quota reached; 5 fish/day on Sun; 30 fish/day Tues-Thurs
RI	Floating fish trap: 26" min. General category (mostly rod & reel): 34" min.	Total: 239,963 lb. (minus any overage from previous year) Split 39:61 between trap and general category. Gill netting prohibited.	Trap: 1.1 until quota reached; if 80% quota harvested before 8.26, a 500 lb/trap/day limit is imposed; from 8.27–12.31, 10,000 lb. quota set-aside available. General Category: 6.1-8.31 or 75% quota; 9.13-12.31 or 100% quota; 5 fish/day Sun-Thu.
CT	Commercial fishing prohibited		
NY	24–36" Ocean only (Hudson River closed to commercial harvest)	828,293 lb. (minus any overage from previous year). Pound nets, gill nets (6-8" stretched mesh), hook & line.	7.1 – 12.15 Gill nets <6 or >8", 7 fish/trip; trawls 21 fish/trip. Gill nets prohibited in Great South, South Oyster, and Hempstead Bays.
NJ	Commercial fishing prohibited		
PA	Commercial fishing prohibited		
DE	28" minimum except 20" spring gillnet in DE Bay/River & Nanticoke River (5.5" max mesh & 0.28mm max twine)	193,447 lb. (minus any overage from previous year)	Gillnet: 2.15-5.31 (3.1-31 for Nanticoke) & 11.15-12.31; drift nets only 2.15-28 & 5.1-31; no fixed nets in DE River Hook and Line: 4.1–12.31 Except 4.1-5.31 closed spawning areas
MD	Bay and Rivers: 18–36" Ocean: 24"	Bay and River: 1,963,873 lbs (part of Baywide quota) Gear specific quotas and landing limits Ocean: 126,396 lb. (minus any overage from previous year)	Bay Pound Net: 6.1-11.30, Mon-Sat Bay Haul Seine: 6.7-11.30, Mon-Fri Bay Hook & Line: 6.7-11.30, Mon-Thu Bay Drift Gill Net: 1.1-2.28, 12.1-12.31, Mon-Fri Ocean Drift Gill Net & Trawl: 1.1-4.30, 11.1-12.31, Mon-Fri

(Continued – Summary of commercial regulations in 2013)

STATE	SIZE LIMITS	SEASONAL QUOTA	OPEN SEASON
PRFC	18" min all year 36" max 2.15–3.25	635,623 lbs (part of Baywide quota)	Hook & line: 2.15-3.25, 6.1-12.31 Pound Net & Other: 2.15-3.25, 6.1-12.15 Gill Net: 1.1-3.25, and 11.11-12.31
DC	Commercial fishing prohibited		
VA	Bay and Rivers: 18" min, 28" max & complimentary gill net mesh size limit 3.26–6.15 Ocean: 28" minimum	Bay and Rivers: 1,430,361 lbs in 2012 (part of Baywide quota) Ocean: 184,853 lb. (minus any overage from previous year)	Bay and Rivers: 2.1-12.31 Ocean: 2.1-12.31
NC	Albemarle Sound: 18" Ocean: 28"	Albemarle Sound: 275,000 lb Ocean: 480,480 lb. (minus any overage from previous year) split 160,160 lbs each to beach seine, gill net & trawl	Albemarle Sound: 1.1-4.30, 10.1-12.31; daily trip limit ranging from 5 to 15 fish; striped bass cannot exceed 50% by weight of total finfish harvest; season and daily trip limits set by proclamation. Ocean: gear requirements; open days and trip limits for beach seine, gill net, and trawl set via proclamation

Summary of Atlantic Striped Bass Recreational Regulations in 2013

STATE	SIZE LIMITS	BAG LIMIT	OTHER	OPEN SEASON
ME	20 – 26” OR ≥40”	1 fish	Hook & line only	All year, except spawning areas are closed 12.1 – 4.30 and catch and release only 5.1 – 6.30
NH	1 fish 28–40” & 1 fish >28”	2 fish	No netting; no gaffing; must be landed with head and tail intact; no culling	All year
MA	28” min	2 fish	Hook & line only	All year
RI	28” min	2 fish		All year
CT	28” min, except Connecticut River Bonus Program: 22-28”	2 fish, except CR Bonus: 1 fish	CR Bonus Quota: 4,025 fish	All year, except CR Bonus 5.4-6.30 (limited to I-95 bridge to MA border)
NY	Ocean Private: 1 fish 28-40” & 1 fish > 40” Ocean Charter: 28” min Hudson River: 18” min DE River: 28” min	Ocean: 2 fish Hudson R.: 1 fish DE River: 2 fish	Angling or spearing only	Ocean: 4.15 – 12.15 Hudson River: 3.16 – 11.30 Delaware River: All year
NJ	28” min	2 fish, plus 1 additional through Bonus Program	Bonus program quota: 321,750 lb. No netting. Non-offset circle hooks required 4.1-5.31 in DE River if using natural bait.	All year except 1.1-2.28 in intra-coastal waters plus 4.1-5.31 in lower DE River
PA	Non-tidal DE River: 28” min; Delaware Estuary: 28” min. except 20-26” from 4.1-5.31	2 fish		Year round
DE	28” min. except 20-26” from 7.1-8.31 in Del. River, Bay & tributaries	2 fish	Hook & line, spear (for divers) only. Circle hooks required in spawning season.	All year except 4.1-5.31 in spawning grounds (catch & release allowed)

(Continued – Summary of recreational regulations in 2013)

STATE	SIZE LIMITS	BAG LIMIT	OTHER	OPEN SEASON
MD	Susquehanna Flats (SF): 18-26" Chesapeake Bay Trophy: 28" min Chesapeake Bay Regular: 18" min with 1 fish > 28" Ocean: 28" min	SF: 1 fish Chesapeake Bay Trophy: 1 fish Chesapeake Bay Regular: 2 fish Ocean: 2 fish	SF: non-off set circle hook if baited hooks & gap>0.5" Chesapeake Bay Quota: 2,657,102 lbs (part of Baywide quota; includes Susquehanna Flats harvest, excludes trophy harvest)	SF: 3.1-5.31; catch & release only 3.1-5.3 Chesapeake Bay Trophy: 4.18-5.15 (most tribs closed) Chesapeake Bay Regular: 5.16-12.15 (most tribs closed until 6.1) Ocean: All year
PRFC	Trophy: 28" Regular: 18" min with 1 fish > 28"	Trophy: 1 fish Regular: 2 fish	Quota: 520,055 lbs. (part of Baywide quota; excludes trophy harvest)	Trophy: 4.20 -5.15 Regular: 5.16-12.31
DC	18" min with 1 fish > 28"	2 fish	Hook & line only	5.16-12.31
VA	Bay/Coastal Trophy: 32" min (28" Potomac tribs) CB Spring: 18-28"; 1 fish >32" CB Fall: 18-28"; 1 fish >34" Potomac Tribs: 18-28"; 1 fish >28" Ocean: 28"	Bay/Coastal Trophy: 1 fish CB Spring: 2 fish CB Fall: 2 fish Potomac Tribs: 2 fish Ocean: 2 fish	Hook & line, rod & reel, hand line only Chesapeake Bay Quota: 1,430,361lbs in 2012 (part of Baywide quota; excludes trophy harvest)	Bay Trophy: 5.1-6.15 (open 4.18 Potomac tribs) Coastal Trophy: 5.1-5.15 CB Spring: 5.16-6.15 (no fish >32" in spawning areas) CB Fall: 10.4-12.31 Potomac Tribs: 5.16-12.31 Ocean: 1.1-3.31, 5.16-12.31
NC	Roanoke River: 2 fish 18- 22" OR 1 fish 18-22" and 1 fish >27" Albemarle Sound: 18" min. Ocean: 28" min	Roanoke River: 2 fish Albemarle Sound: 3 fish Ocean: 2 fish	Roanoke River quota: 137,500 lb. Albemarle Sound quota: 137,500 lb.	Roanoke River: 3.1 – 4.30 (single barbless hook required 3.1-6.30 from Roanoke Rapids dam downstream to US 258 bridge) Albemarle Sound: Spring 1.1 – 4.30; Fall 10.1-12.31 Ocean: All year



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MEMORANDUM

May 6, 2014

To: Atlantic Striped Bass Management Board
From: Atlantic Striped Bass Technical Committee
RE: Reference Points for the Chesapeake Bay (Appendix 2)

The Striped Bass Management Board tasked the Technical Committee (TC) with developing reference points for the Chesapeake Bay stock. The TC evaluated five different scenarios of reference points. However, after detailed discussions, the TC concluded:

1. The TC cannot develop Chesapeake Bay stock specific reference point that explicitly accounts for migratory movements at this time.
2. The TC considered a set of reference points based on SSB/R conservation equivalency, but this methodology does not adequately take into account coastal harvest or the skewed sex-ratio of the Chesapeake Bay harvest. In addition, there is no way to measure the current F of the Chesapeake Bay fishery that is consistent with the assumptions of this type of model.
3. The TC considered a set of reference points based on SCA coastwide model. We discussed that if those were adopted, they would be very conservative because they ignore the fact that resident striped bass population in Chesapeake Bay is dominated by male fish.
4. The TC considered a method of adjustment to the SCA based reference points but the TC was uncomfortable in accepting the proposed scale of adjustment without more detailed analysis.
5. The TC agreed that stock-specific reference points are the ultimate goal for management of this species, and work on developing a sex-specific model that incorporates stock structure should be continued.
6. In the meantime the TC recommends that the new coastwide reference points should be used for the Chesapeake Bay.
7. The new coastwide reference points already include the effects of the CB fleet's unique selectivity pattern on the coastwide SSB, and represent the best available scientific advice to manage total fishing mortality on the coastwide striped bass population at this time.

The coastwide target total F is designed to maintain the spawning stock biomass at its target level over the long term. The effects of the Bay's harvest of smaller fish on the total coastwide stock are already incorporated into the coastwide population reference points due to different selectivity patterns for the Bay and Coastal fleets. As a result, the reference points approved for management use in the 2013 benchmark stock assessment represent the best available scientific advice at this time to manage fishing mortality on the entire striped bass population.

Biologically, the coastal migratory population of striped bass is comprised primarily of three stocks: the Chesapeake Bay stock, the Delaware River stock, and the Hudson River stock. Based on tagging data the Albemarle-Roanoke stock contributes insignificantly to the coastal migratory stock, and thus harvest and indices of abundance from the Albemarle Sound and Roanoke River Management Areas are not included in the coastal assessment. Sexually mature adults from the coastal migratory population return to their natal rivers to spawn on an annual basis. Currently, we lack critical data on the sex- and age-specific rates of migration between the natal Bay and rivers and the coastal population. Thus, the stock assessment model treats the coastal population as a single stock. As a result, the TC cannot develop meaningful reference points specifically for the Chesapeake Bay stock at this time.

As an alternative, the TC worked to develop F reference points that would assess the impact of the Chesapeake Bay fleet on the total coastwide stock, since that can be measured through the SCA model using F estimates for the Chesapeake Bay fleet. Such estimates were developed, but it was noted that they would be very conservative due to the dominance of smaller males in the Chesapeake Bay resident population. It is recognized that the Chesapeake Bay fleet harvests primarily small males, but that is not explicitly modeled in the current SCA because it is not a sex-specific model. Therefore, given limited amount of time and constraints in the available data, the TC could not come to a consensus on whether or how to calculate a Chesapeake Bay fleet reference point at this time.

In the meantime, the effects of Chesapeake Bay's different selectivity pattern (i.e., harvest on smaller fish) are incorporated into the target and threshold total F values developed for the entire coastwide population of striped bass. By maintaining total F at the target level, the impact of the Chesapeake Bay fleet on the total coastwide population should remain sustainable.